

Year 1 Biological Baseline Report

VOLUME I

Ore Transportation Project

May 2022

Project No.: 0594588

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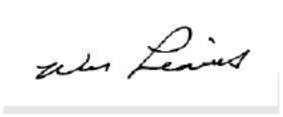
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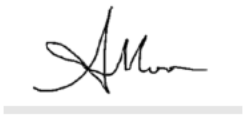
May 2022

Year 1 Biological Baseline Report

Ore Transportation Project



Wes Leavitt
Partner



Amberly Moon
Principal Consultant – Project Management

ERM-West, Inc.
136 East South Temple
Suite 2150
Salt Lake City, Utah 84111

T: +1 801 204 4300
F: +1 801 595 8484

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Acronyms and Abbreviations

°F	degrees Fahrenheit
amsl	above mean sea level
AIM	Assessment, Inventory, and Monitoring
ARMPA	Approved Resource Management Plan Amendment
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BSU	Biologically Significant Unit
CFR	Code of Federal Regulations
CWMA	cooperative weed management areas
ECBC	Elko County Board of Commissioners
ESA	Endangered Species Act
ESD	Ecological Site Description
ERM	ERM-West, Inc.
GAP	Gap Analysis Project
GIS	Geographic Information System
GPS	geographic positioning system
ID	identification
IIRH	Interpreting Indicators of Rangeland Health, Version 5
IM	Instruction Memorandum
IPaC	Information for Planning and Consultation
LCT	Lahontan cutthroat trout
MBTA	Migratory Bird Treaty Act
MLRA	Major Land Resource Area
mph	miles per hour
NA	not applicable
N/A	data not available
NAC	Nevada Administrative Code
NDA	Nevada Department of Agriculture

NDNH	Nevada Division of Natural Heritage
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NF	Nonfunctional
NGM	Nevada Gold Mines, LLC
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Services
NRMAC	Natural Resource Management Advisory Commission
NRS	Nevada Revised Statute
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
PEM	palustrine emergent
PFC	Proper Functioning Condition
PFO	palustrine forested
PMU	Population Management Unit
PSS	palustrine scrub-shrub
Project	Ore Transportation Project
RMP	Resource Management Plan
SSURGO	Soil Survey Geographical Database
SWReGAP	Southwest Regional Gap Analysis Project
UPRR	Union Pacific Railroad
USC	United States Code
USDA	U.S. Department of Agriculture
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
WAFWA	Western Association of Fish and Wildlife Agencies
WAP	Wildlife Action Plan

°F	degrees Fahrenheit
amsl	above mean sea level
AIM	Assessment, Inventory, and Monitoring
ARMPA	Approved Resource Management Plan Amendment
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BSU	Biologically Significant Unit
CFR	Code of Federal Regulations
CWMA	cooperative weed management areas
ECBC	Elko County Board of Commissioners
ESA	Endangered Species Act
ESD	Ecological Site Description
ERM	ERM-West, Inc.
GAP	Gap Analysis Project
GIS	Geographic Information System
GPS	geographic positioning system
ID	identification
IIRH	Interpreting Indicators of Rangeland Health, Version 5
IM	Instruction Memorandum
IPaC	Information for Planning and Consultation
LCT	Lahontan cutthroat trout
MBTA	Migratory Bird Treaty Act
MLRA	Major Land Resource Area
mph	miles per hour
NA	not applicable
N/A	data not available
NAC	Nevada Administrative Code
NDA	Nevada Department of Agriculture
NDNH	Nevada Division of Natural Heritage

NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NF	Nonfunctional
NGM	Nevada Gold Mines, LLC
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Services
NRMAC	Natural Resource Management Advisory Commission
NRS	Nevada Revised Statute
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
PEM	palustrine emergent
PFC	Proper Functioning Condition
PFO	palustrine forested
PMU	Population Management Unit
PSS	palustrine scrub-shrub
Project	Ore Transportation Project
RMP	Resource Management Plan
SSURGO	Soil Survey Geographical Database
SWReGAP	Southwest Regional Gap Analysis Project
UPRR	Union Pacific Railroad
USC	United States Code
USDA	U.S. Department of Agriculture
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

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1. INTRODUCTION

Nevada Gold Mines, LLC (NGM) contracted ERM-West, Inc. (ERM) to conduct biological and noise baseline studies for the proposed Ore Transportation Project (Project). The purpose of this baseline report is to characterize wildlife resources in the study area and support future National Environmental Policy Act (NEPA) analysis. Surveys, inventories, and monitoring were completed using protocols approved by Bureau of Land Management (BLM) and Nevada Department of Wildlife (NDOW). The objective of the biological and noise baseline studies was to inventory and characterize vegetation, soil types, water resources, and wildlife for the Project. The information found in this baseline report will be used to support future permitting needs, including compliance with NEPA. The biological and noise baseline studies presented in this report were completed May through September 2021.

1.1. PROJECT LOCATION

The Project is within Elko, Eureka, and Lander counties, Nevada, and includes approximately 2,660 acres (1,077 hectares) of public lands administered by the Elko and Battle Mountain BLM Nevada District Offices, and approximately 3,962 acres (1,603 hectares) of privately owned lands (Table 1.1-1 and Figure 1.1-1). The Project is located within the U.S. Environmental Protection Agency (USEPA) Central Basin and Range Level III Ecoregion. This ecoregion is characterized by mid- to high-elevation ranges, interspersed with rolling hills, alluvial fans, and valleys. Valleys and lower elevation slopes are dominated by Great Basin sagebrush or saltbush-greasewood vegetation communities, while pinyon-juniper woodland and mountain-mahogany occur at higher elevations. The Central Basin and Range Ecoregion hydrology is internally drained, and most streams are intermittent and ephemeral (Wiken et al. 2011).

Table 1.1-1: Land Jurisdiction within the Project Area

Ownership	BLM Field Office	Acres
BLM Elko District Office	Tuscarora Field Office	2,076.9
BLM Battle Mountain District Office	Mount Lewis Field Office	583.8
Private	-	3,961.5
Total	**-**	**6,622.2**

Source: BLM 2020a

1.1.1. Landscape Setting and Land Use

Land uses in northeastern Nevada include mining, mine exploration, livestock grazing, agricultural use, and off-highway vehicle recreation and occur throughout the Project (Wiken et al. 2011). Elevations within the Project Area range from approximately 9,135 feet above mean sea level (amsl) at the summit of Mount Tenabo in the northern Cortez Mountains, to approximately 4,600 feet (1,450 meters) amsl northwest of the Dunphy rail siding.

1.1.2. Climate

The climate in northeastern Nevada is characterized by a dry, mid-latitude desert climate, with hot summers, cold winters, and wet springs. Precipitation in this area regularly falls in winter as snow, and most rainfall occurs during spring and summer thunderstorms, which is typical of the Central Basin and Range Ecoregion (USGS 2012; Wiken et al. 2011). Annual precipitation in Elko, Eureka, and Lander counties ranges from just under 10 inches to 16 inches (Table 1.1-2). Temperatures during January range from a low of 16 degrees Fahrenheit (°F) to a high of 37.9°F. During the summer, temperatures range from a low of 49°F to a high of 90°F. Table 1.1-2 presents the monthly average precipitation, as well as mean high and low temperatures for Elko, Eureka, and Lander counties.

Table 1.1-2: Monthly Precipitation and Temperatures for Elko, Eureka, and Lander Counties

Calendar Year Rainfall and Mean Temperatures per Month													
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	
Elko County, Nevada [a]													
Precipitation (inches)													Total
Mean	1.16	0.88	0.96	1.05	1.22	0.56	0.36	0.34	0.57	0.72	0.88	1.19	9.94
Temperature (°F)													Average
High	37.9	42.8	53.1	59.6	70.0	81.5	91.8	90.0	80.1	65.5	49.9	38.0	63.4
Low	16.0	20.5	26.8	31.5	38.5	44.9	52.0	49.2	40.5	29.4	21.9	15.4	32.2
Mean	27.0	31.6	39.9	45.6	54.2	63.2	71.9	69.6	60.3	47.4	35.9	36.7	47.8
Eureka County, Nevada [a]													
Precipitation (inches)													Total
Mean	0.85	1.28	1.34	1.36	1.18	0.49	0.46	0.64	0.78	0.83	0.79	0.86	10.86
Temperature (°F)													Average
High	37.6	40.2	48.4	54.9	64.7	76.7	85.6	84.1	74.7	61.7	47.7	37.3	59.5
Low	18.0	19.3	24.3	28.6	36.4	44.4	53.2	52.3	44.1	33.3	24.3	17.3	33.0
Mean	27.8	29.7	36.4	41.7	50.6	60.6	69.4	68.2	59.4	47.5	36.0	27.3	46.2
Lander County, Nevada [b]													
Precipitation (inches)													Total
Mean	1.2	1.5	2.2	1.8	2.3	0.9	1	0.8	0.9	1	1	1.6	16.2
Temperature (°F)													Average
High	36	38	45	53	62	75	83	81	73	58	47	35	57.17
Low	21	23	29	35	42	51	60	59	51	39	28	19	38.08
Mean	28.5	30.5	37	44	52	63	71.5	70	62	48.5	37.5	27	47.63

[a] NOAA 2021a
[b] WeatherWX.com 2021

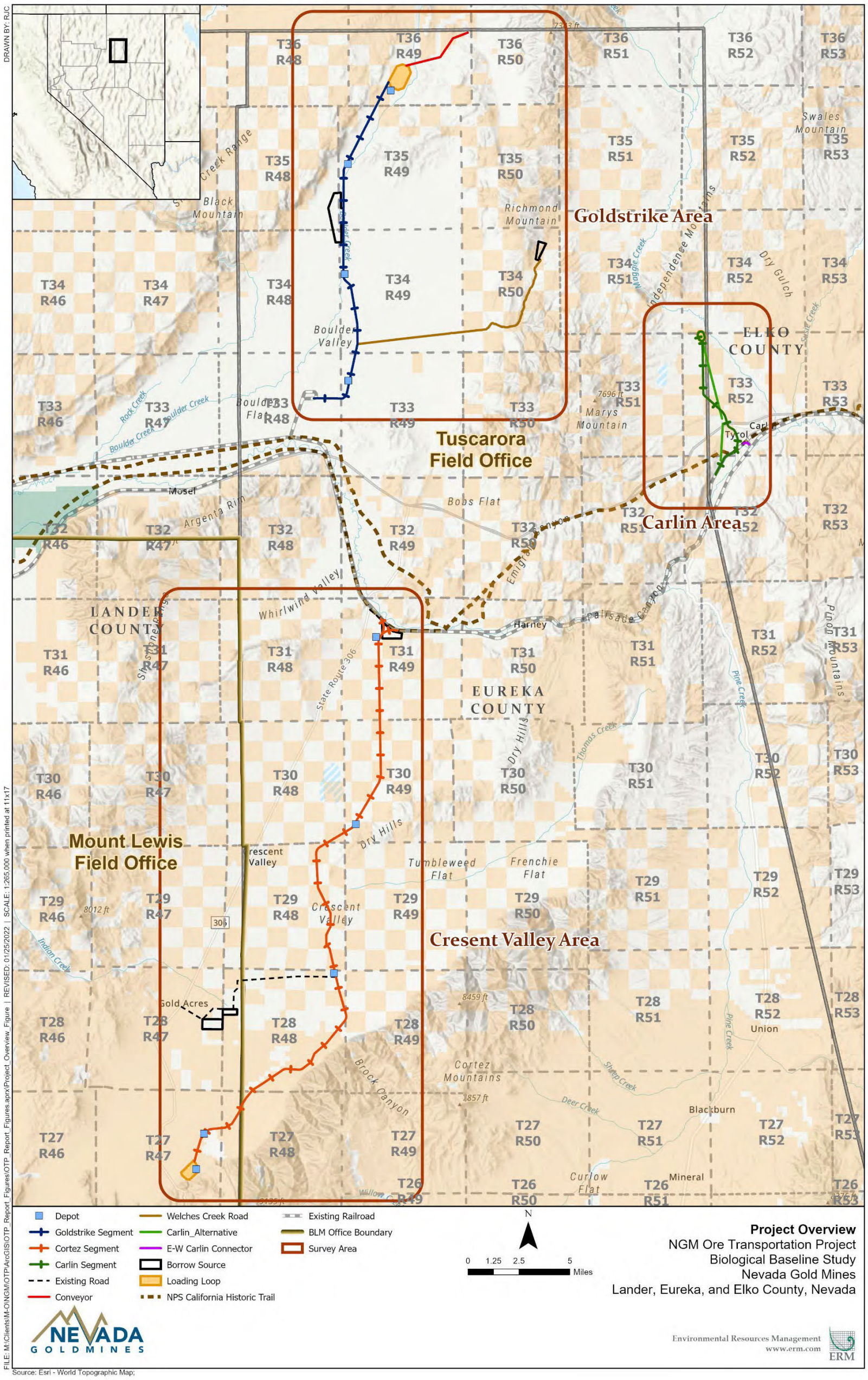


Figure 1.1-1: Project Overview

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1.2. PROJECT DESCRIPTION

The Project would consist of a newly constructed railway and conveyor system to haul ore from the Cortez Mine District north to the Gold Quarry and Goldstrike mines for processing. The purpose of the Project is to allow for optimized processing, which would improve safety by reducing over-the-road haulage on public highways and would reduce potential air and greenhouse gas emissions. Project specifics include the following:

- New private rail line to be constructed from Cortez to Beowawe where it would connect to the existing Union Pacific Railroad to travel east or west;
- New siding and private rail line would be constructed near Carlin to travel north to Gold Quarry;
- New private railway would be built from the T.S. Power Plant to the east and extend north through Boulder Valley to Goldstrike; and
- Loading/unloading facilities such as stockpiles, rail loops, and conveyors.

This rail system includes temporary borrow source areas and temporary depots (construction laydown yards). The depots and borrow sources will be reclaimed after construction is complete. As shown on Figure 1.1-1, the Project is separated into three distinct surveyed areas: Goldstrike, Carlin, and Crescent Valley. This report will discuss the results based on the three defined areas.

1.3. LAWS, REGULATIONS, AND PLANS

The federal, state, and county regulations and permits pertaining to biological resources and land use management that guided the information collected during the 2021 baseline studies are described below. Land and resource management plans applicable to this biological baseline report and noise study include BLM Resource Management Plans (RMPs), a comprehensive plan prepared by the National Park Service, and county management and master plans.

1.3.1. Federal

The Council on Environmental Quality regulations discuss “human environment” in the Code of Federal Regulations, Title 40, Section 1508.14 (40 CFR 1508.14). This term broadly relates to the biological, physical, social, and economic elements of the environment. It includes the wildlife resources category. Relevant data is to be used in describing the affected environment as the basis for determining the effects (direct and indirect) of a proposed action. The *BLM National Environmental Policy Act Handbook H-1790-1* (BLM 2008a) describes potential NEPA-related federal requirements.

Other federal requirements, such as the Endangered Species Act (ESA) consultations, and critical habitat procedural requirements must be followed. The following sections provide a list of relevant federal regulations.

1.3.1.1. Endangered Species Act

Section 7 of the ESA (19 United States Code [USC] § 1536(c)), as amended, states that any action authorized, funded, or carried out by a federal agency does not jeopardize the continued existence of a federally listed threatened and endangered species, or result in the destruction or adverse modification of federally listed designated critical habitat. Currently there is one federally listed species and one candidate species with potential to occur in the region: Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*), currently threatened; and the monarch butterfly (*Danaus plexippus*), currently a candidate species for listing under the ESA.

1.3.1.2. The Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA; 16 USC § 668) prohibits the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export, or import of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. As defined in the act, a "take" includes "disturbing a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle, decrease in its productivity or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

1.3.1.3. The Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA; 16 USC §§ 703-712) implements various treaties and conventions for the protection of migratory birds. Under this act, taking, killing, or possessing migratory birds (including any part, nest, or egg) is unlawful.

1.3.1.4. Bureau of Land Management

The applicable BLM RMPs are the 1987 Elko RMP, the 1987 Shoshone-Eureka RMP, and amendments to those plans. These two RMPs guide BLM management decisions and actions based on multiple-use and sustained yield, unless otherwise specified by law.

BLM finalized an Approved Resource Management Plan Amendment (ARMPA) to address greater sage-grouse (*Centrocercus urophasianus*) habitat protection measures in Nevada and California (BLM 2015). The 2015 ARMPA provides guidance on measures to avoid and minimize potential impacts resulting from proposed projects in addition to providing appropriate measures to compensate for impacts that are unavoidable to greater sage-grouse (shortened hereafter to GRSG) habitat resulting from development projects.

BLM Nevada Special-status species are species that occur on BLM administered lands in Nevada consistent with Manual Section 6840 and current WO-230 guidance (NV IM [Instruction Memorandum]-2018-003) (BLM 2017b, 2019a). This IM officially updates the List, which includes federally designated threatened, endangered, and proposed species as well as Nevada BLM sensitive species. In addition to the species listed in the IM, the BLM Elko District Office also maintains a sensitive species list (BLM 2019b) BLM's list of special-status species includes the following three categories: 1) federally listed as Threatened or Endangered, Proposed, and Candidate species; 2) Nevada State Protected species; and 3) Nevada BLM Sensitive Species. BLM Sensitive Species are species for which population viability is a

concern; they are managed by the BLM to “ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed”; these species are afforded the same level of protection as federal Candidate species.

1.3.1.5. National Park Service

In 1992, Congress established the California National Historic Trail (National Trails System Act, Section 5(a)(18)). As required by the National Trails System Act, a Comprehensive Management and Use Plan was completed for the California National Historic Trail and three other national historic trails (i.e., Oregon, Mormon Pioneer, and Pony Express National Historic Trails) in 1999 (NPS 1999). This plan provides broad-based policies, guidelines, and standards for administering the four trails to ensure the protection of trail resources, their interpretation, and their continued use. The purposes of the California National Historic Trail are to 1) enable all people to envision and experience—in a coherent and convenient way—the heritage and impacts of the western overland migration; and 2) encourage preservation of its history and physical remains.

1.3.2. State

Under Nevada law and regulation, any wildlife receiving the distinction of fully protected species may not be captured, removed, or destroyed at any time except with special permit as provided under Nevada Revised Statutes (NRSs) 503.584-503.589 and Nevada Administrative Code (NAC) 503.093. NAC Chapters 501 and 503 provide information on the protection of threatened, endangered, protected, and sensitive plant and animal species. NAC Chapter 501 establishes broad policies for the protection, propagation, restoration, transplanting, introduction, and management of wildlife in Nevada, while Chapter 503 defines the criteria for classification of species as protected and identifies those species that require protection.

The NDOW manages fish and wildlife populations through objectives specified in various management plans. NDOW has direct responsibility for wildlife protection. NDOW’s Wildlife Action Plan (WAP) (Wildlife Action Plan Team 2012) was completed and approved by the U.S. Fish and Wildlife Service (USFWS) in 2012.

Nevada’s WAP has served as a plan of action for state wildlife conservation and funding by targeting the species of greatest conservation need and the key habitats on which they depend. The WAP serves as a comprehensive, landscape level plan, identifying the species of greatest conservation need and the key habitats on which they depend, with the intent to prevent wildlife species from becoming threatened or endangered. The WAP contains conservation actions to provide guidance to successfully conserve Nevada’s key habitats and priority species.

Many of the conservation actions within the WAP are strategies identified in other existing conservation plans. The WAP’s recommended conservation actions do not represent a mandate or expectation for a given party to carry out or implement these actions. During WAP implementation, conservation actions developed at the state or local level would be used to provide guidance to address site-specific conditions as appropriate. Some of these actions may

be applicable at the land use plan level, and some more appropriately applied at an activity plan or site-specific plan level.

1.3.3. County Management Plans

1.3.3.1. Elko County

Per the planning directives in the *Elko County Public Land Use & Natural Resource Management Plan* (Elko County 2010), all proposed actions on public lands are to be brought to the attention of the Elko County Natural Resource Management Advisory Commission (NRMAC) or the Elko County Board of Commissioners (ECBC) for purposes of review to determine if the federal program is in conformance with Elko County policies pursuant to NEPA requirements and allows the county to cooperate and coordinate with the federal land management agencies. Elko County will coordinate and cooperate with federal agencies on actions that affect public lands within the county.

The Elko County NRMAC will serve in an advisory capacity as liaison to the ECBC. The Elko County NRMAC and ECBC requires consistency between its RMP (Elko County 2010) and all federal land use management, resource management, travel management, and any other federal management plans and actions that apply to Elko County.

1.3.3.2. Eureka County

In 1993, the Eureka County Commissioners created the Eureka County Natural Resources Advisory Commission and appointed a nine-member board to serve on that commission. The Natural Resources Advisory Commission makes recommendations to the Eureka County Commission on issues regarding the goals and policies established in the *Eureka County Master Plan 2010* related to public lands issues, including air space, wild horses, wildlife, grazing allotments, mining and recreation (Eureka County 2010).

1.3.3.3. Lander County

The Conservation and Natural Resource Element of the *Lander County Master Plan 2010* (Lander County 2010) outlines policies and action programs for protecting Lander County's land, water, and air resources as growth and development occurs. The Conservation and Natural Resource Element provides guidelines for conserving the county's important natural resources while satisfying the requirement for a conservation plan as outlined by the NRSs. As defined in the Conservation and Natural Resource Element, land resources include soils, topography, agricultural lands, minerals, public lands, and geothermal resources (Lander County 2010).

Specific goals of the Conservation and Natural Resources Element include protecting important agricultural lands that provide economically productive acreage, important flood management areas, prime or unique farmland, or farmlands of statewide importance; limiting conflicts and encroachment from developing lands on agricultural lands; promoting the development of renewable energy projects; and protecting important environmental resources and open space (Lander County 2010).

2. BIOLOGICAL BASELINE REPORT APPROACH

ERM developed this biological baseline report consistent with the 2021 Work Plan (ERM 2021a) approved by the BLM. This report is organized into four sections: 1) Ecological Site Description (ESD), 2) water resources, 3) vegetation, and 4) wildlife. The appendices for each of these four sections include detailed information, figures, and datasheets from the field surveys conducted during the 2021 pre-field assessments and field surveys. Surveys for biological resources were conducted in each of the Goldstrike, Carlin, and Crescent Valley areas within the Project footprint plus the listed buffer from the centerline of the proposed railway, borrow source areas, access roads, and the proposed construction depots (herein referred to as “Project Area”). ESD, vegetation, and wildlife resources were surveyed within a 200-foot buffer of the centerline (400-foot survey area), and water resources were surveyed within a 400-foot buffer of the centerline (800-foot survey area), as shown on Figure 2-1 through Figure 2-9. These survey areas included the borrow source areas, access roads that include a 50-foot buffer of the centerline (100-foot survey area), and the proposed construction depots.

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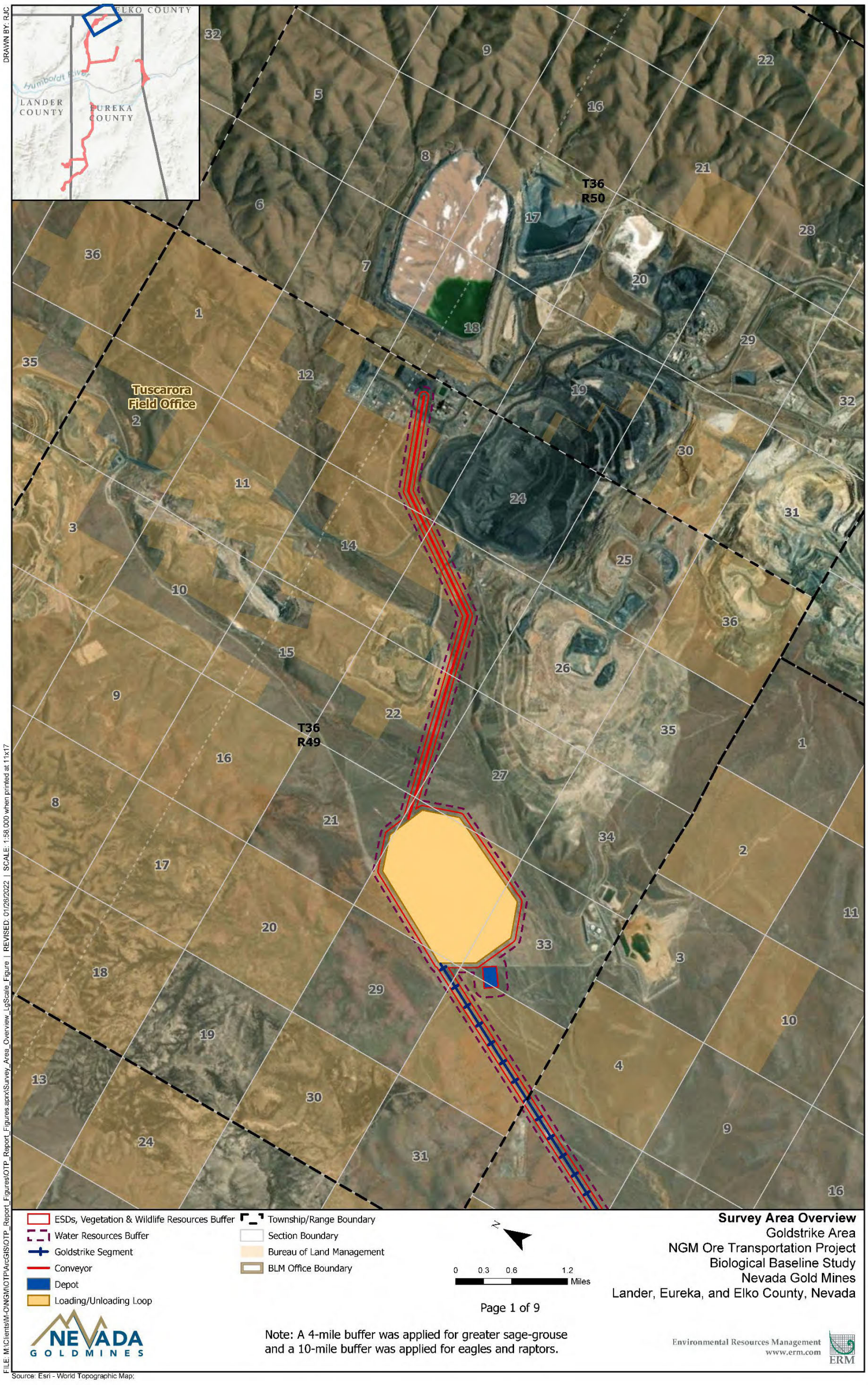


Figure 2-1: Goldstrike Survey Area Overview

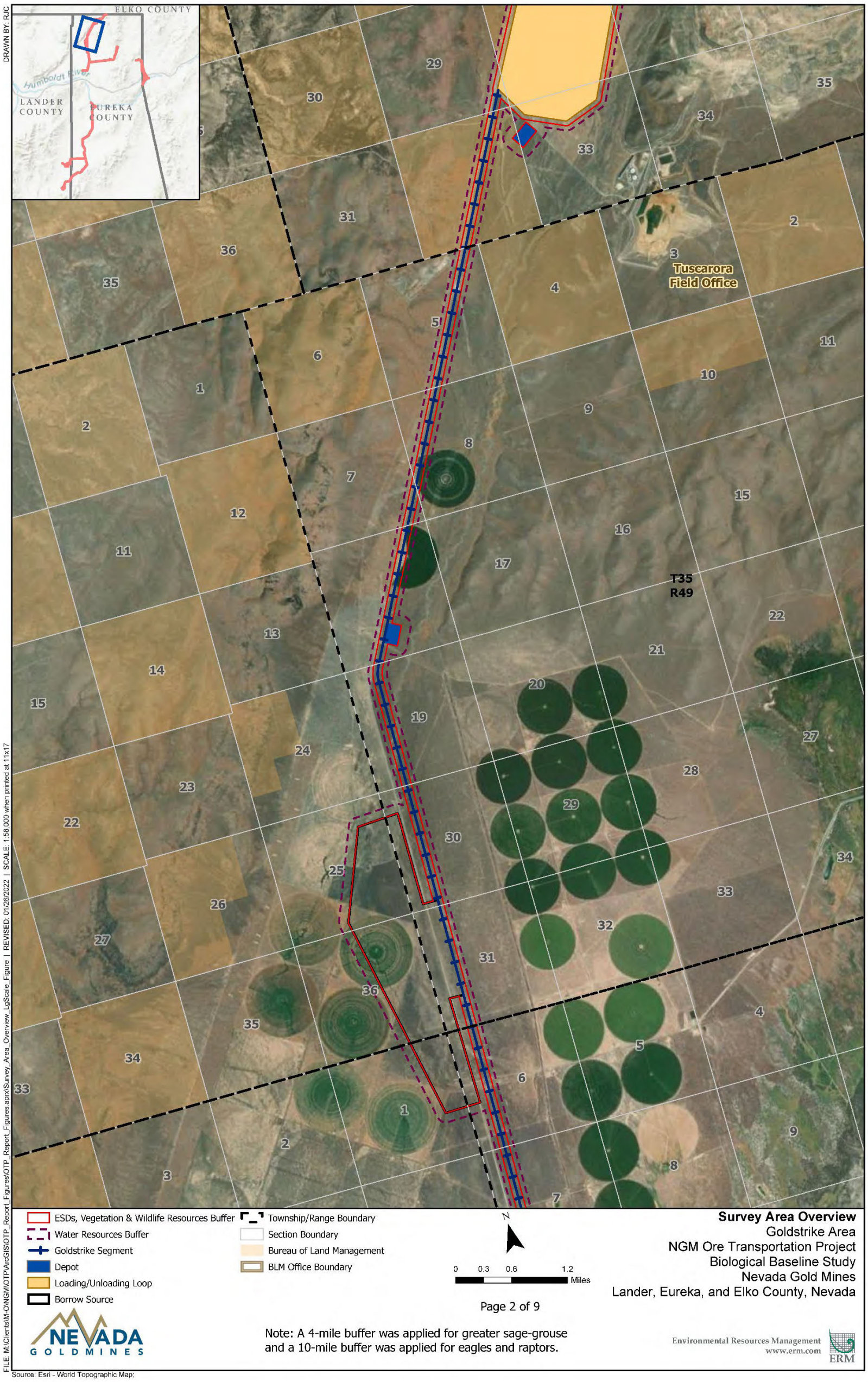


Figure 2-2: Goldstrike Survey Area Overview

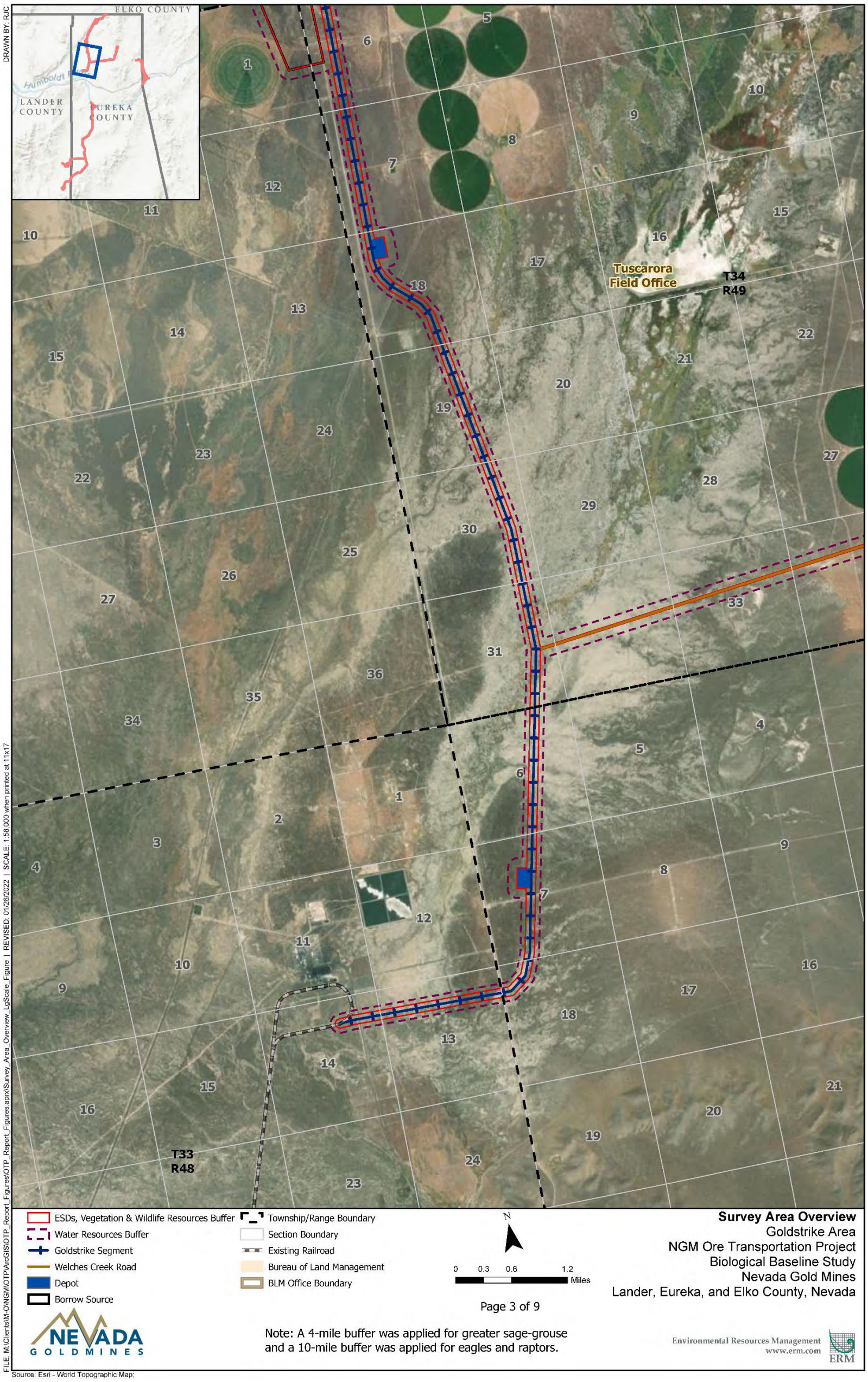


Figure 2-3: Goldstrike Survey Area Overview

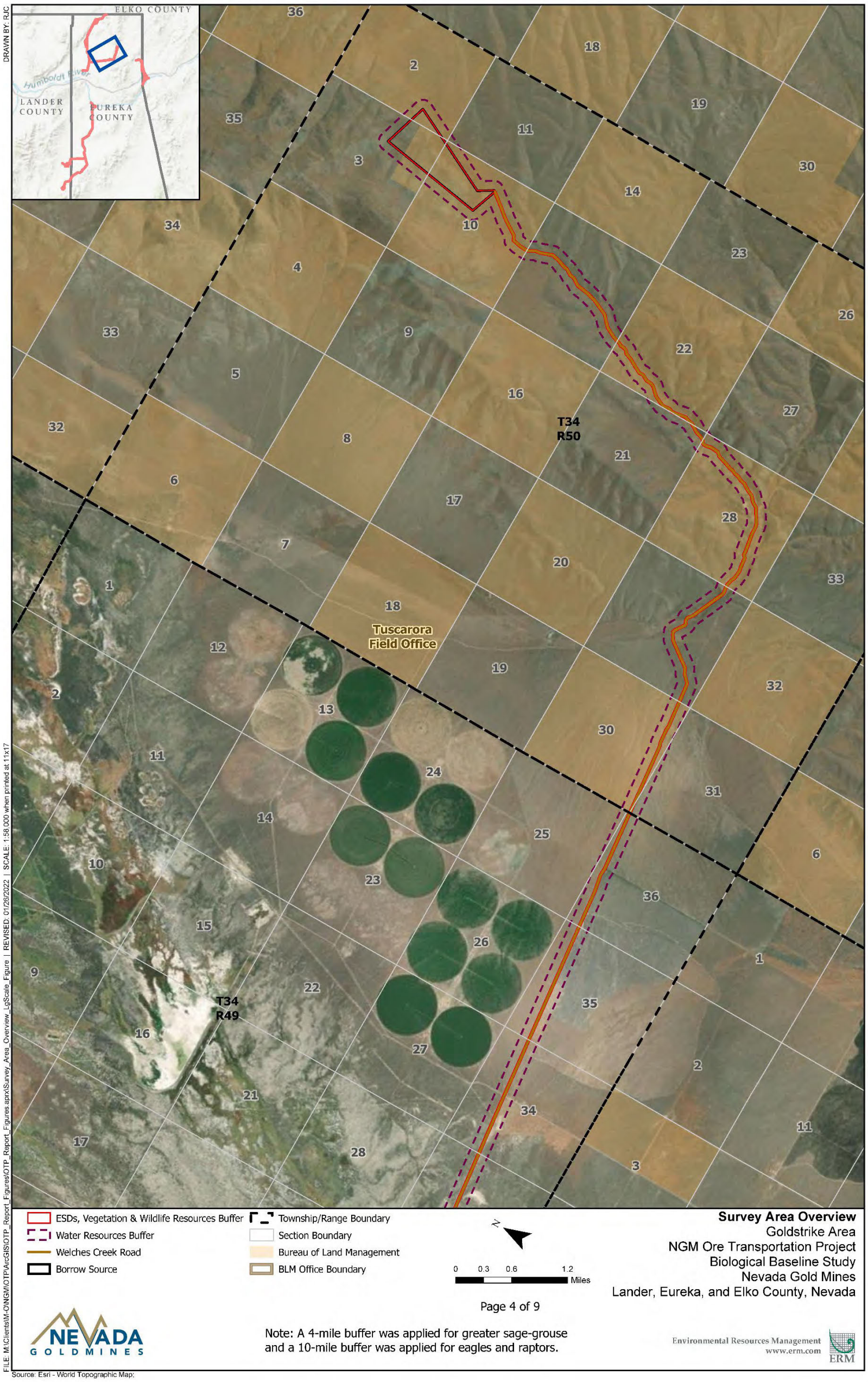


Figure 2-4: Goldstrike Survey Area Overview

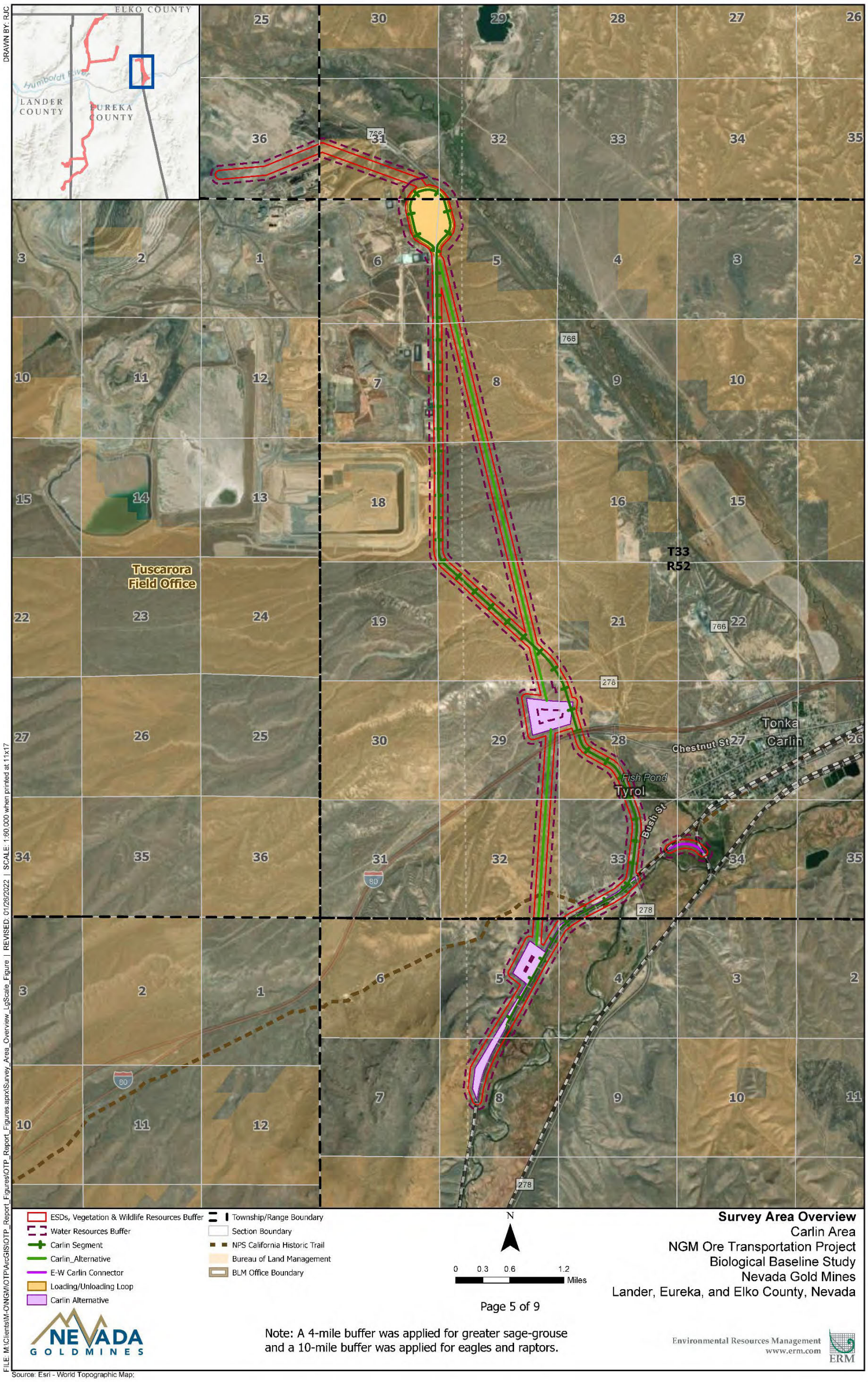


Figure 2-5: Carlin Survey Area Overview

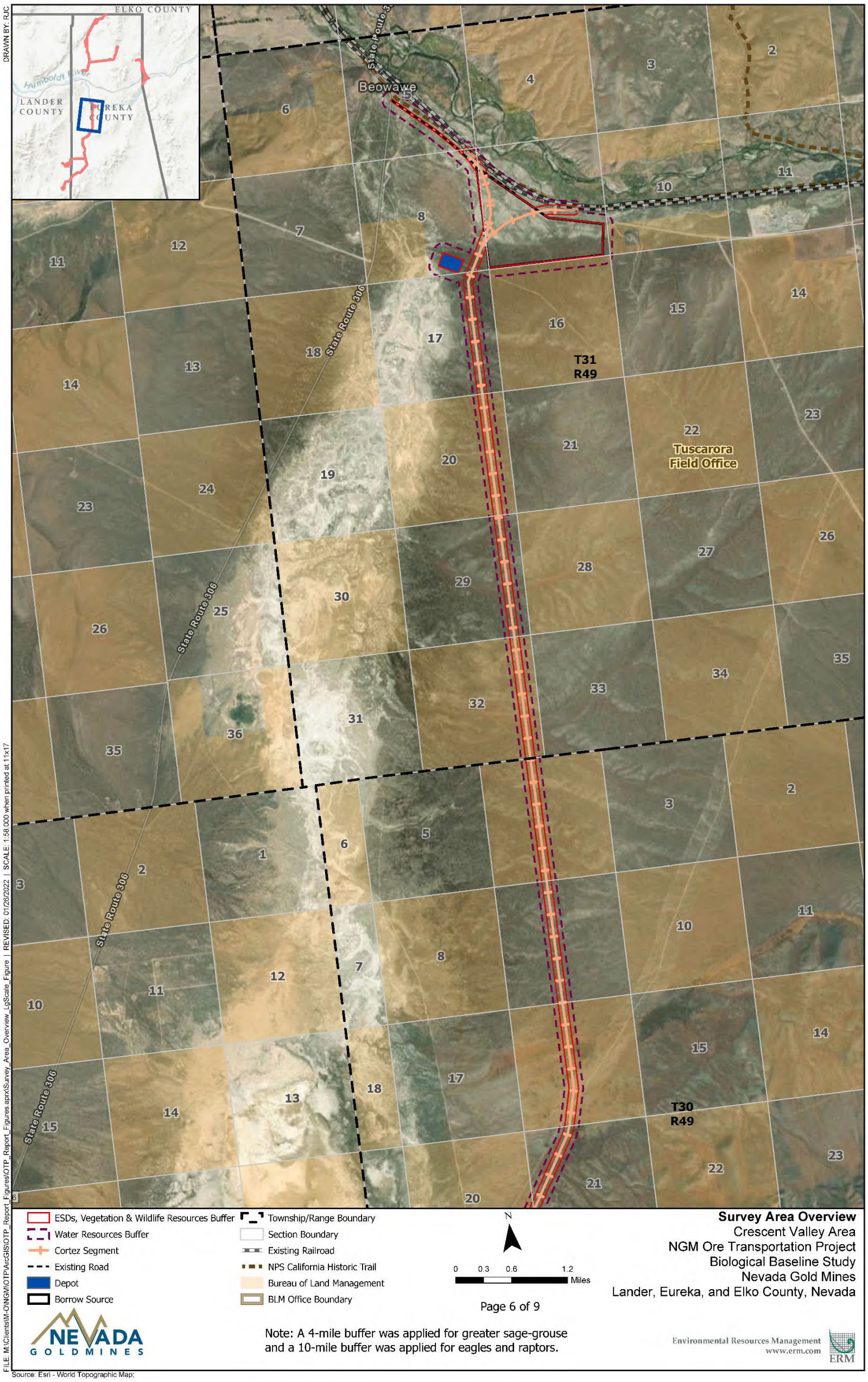


Figure 2-6: Crescent Valley Survey Area Overview



Figure 2-7: Crescent Valley Survey Area Overview

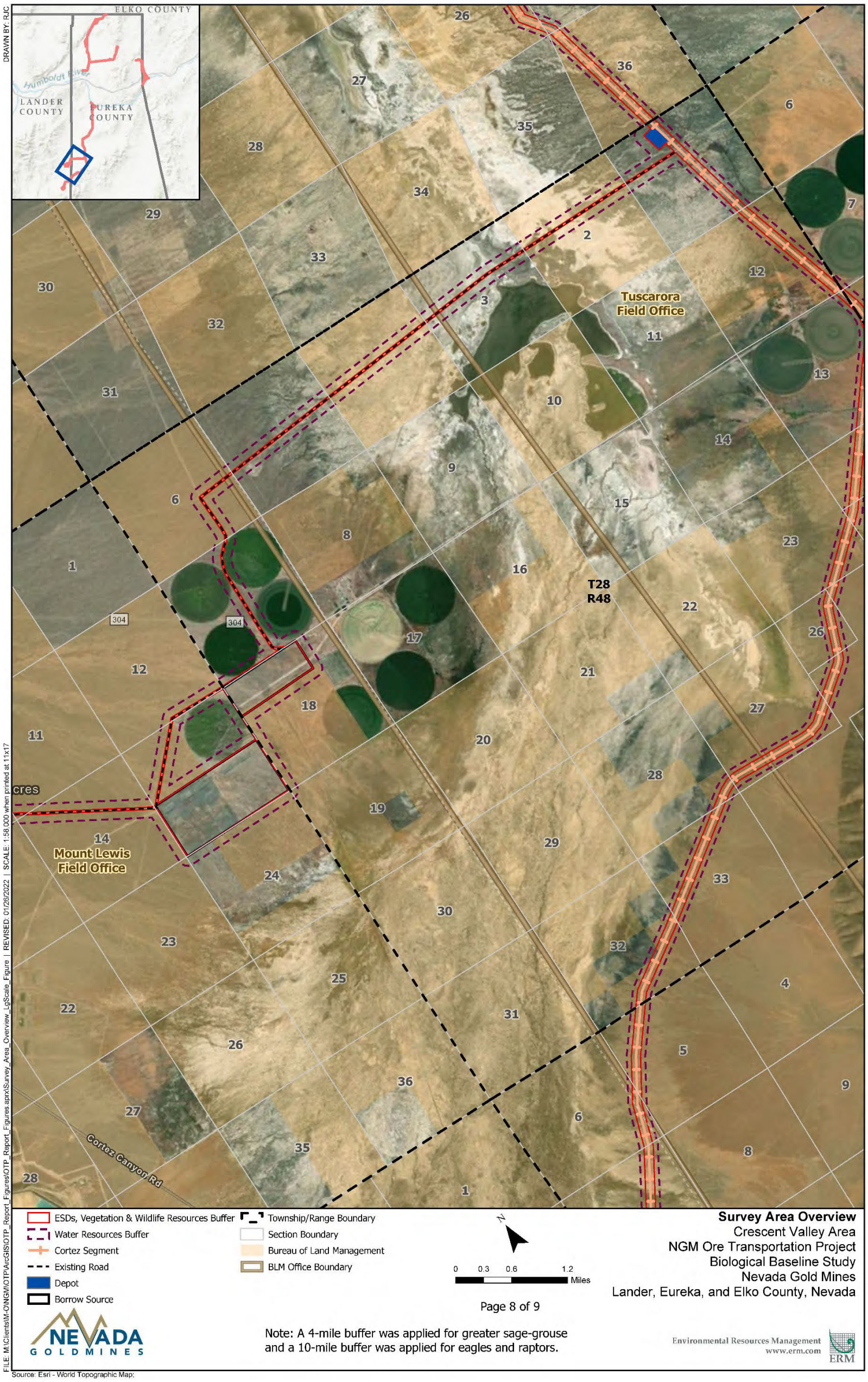


Figure 2-8: Crescent Valley Survey Area Overview

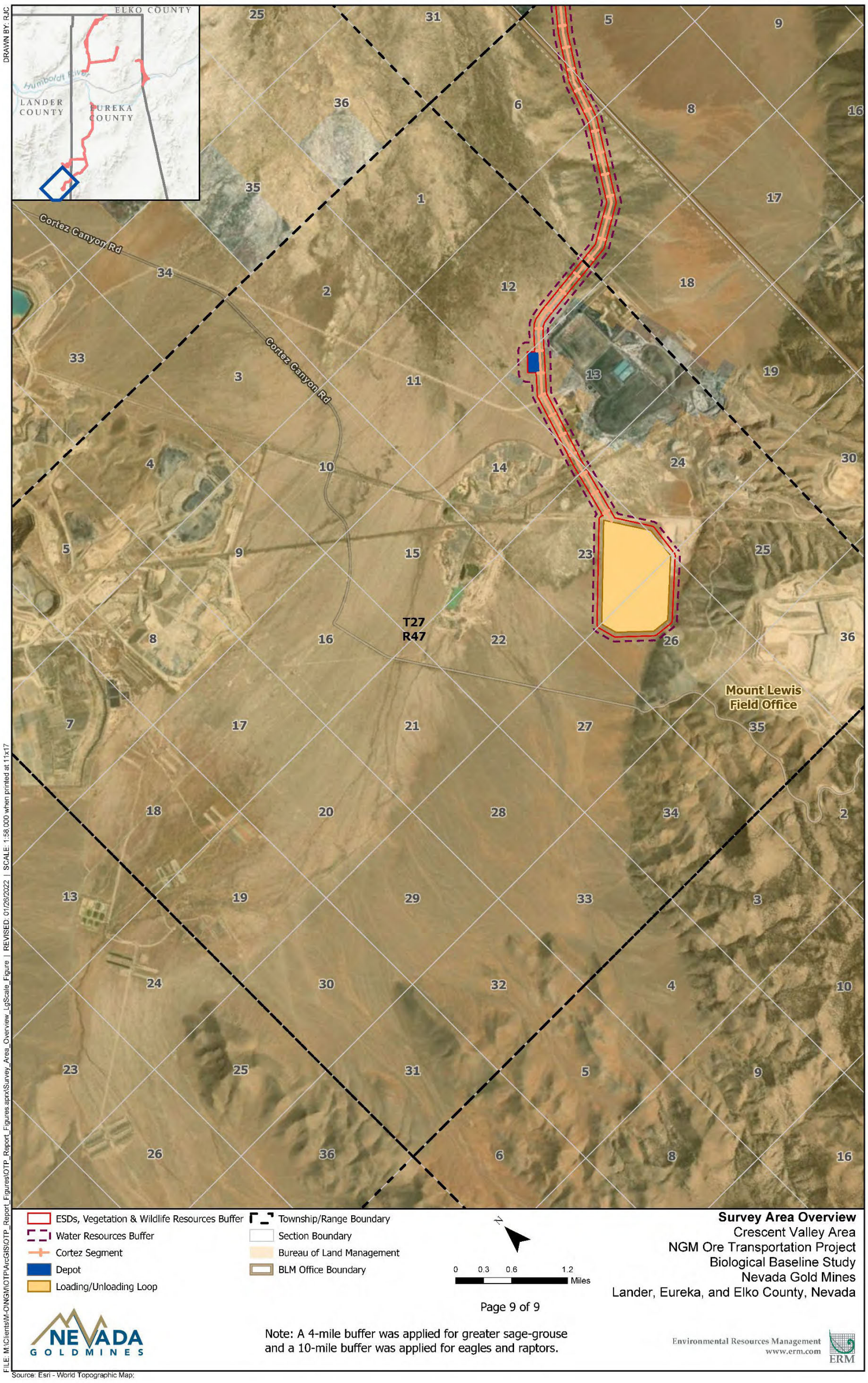


Figure 2-9: Crescent Valley Survey Area Overview

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2.1. ECOLOGICAL SITE DESCRIPTION APPROACH

ESD includes rangeland health, soil, and vegetation community verification and mapping within the 400-foot survey area, borrow sources, access roads, and depot locations. Prior to field surveys, existing background information and data were collected. Initially, existing literature and background data for soils, vegetation, and ecological sites were reviewed. Because ecological sites are directly associated with soil types, soil map units and ecological sites incorporate information from U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey tool.

Ecological sites were field-verified by digging at least one soil pit in each of the ecological classes to a minimum depth of 20 inches or the depth of the restrictive layer. Soil texture, landform, and topographic features were recorded for each soil pit. The current condition of the ecological site, including a plant species list, was also recorded at each soil pit.

2.2. WATER RESOURCES APPROACH

Water resources includes information on the water resources, seeps and springs, and proper functioning condition surveys within an 800-foot survey area, borrow sources, access roads, and depot locations. ERM biologists used data from the U.S. Geological Survey (USGS) 7.5-minute Topographic Quadrangles, NRCS Soil Survey Geographic database, USFWS National Wetlands Inventory (NWI), USGS National Hydrography Dataset (NHD) (streamlines and seeps-springs points), Federal Emergency Management Agency National Flood Hazard Layer. In addition, wetland and waters location data were used to identify potential wetland and waters features on maps for use during field surveys.

The entire study area was assessed either on foot or by vehicle, where possible. Wetland and waterbody delineations, feature data points, non-water points, and seeps and springs data were collected utilizing sub-meter accurate Global Positioning Satellite (GPS) units as required for U.S. Army Corps of Engineers (USACE) jurisdictional determinations.

2.3. VEGETATION APPROACH

As described in the ESD section, the survey area for vegetation is the 400-foot survey area, borrow sources, access roads, and depot locations. ERM staff used Southwest Regional Gap Analysis Project (SWReGAP), Soil Survey Geographical Database (SSURGO), and ESD available from NRCS. Field verification and vegetation community condition assessments were conducted that were correlated with the ESD survey state-and-transition model descriptions (Stringham et al. 2015a, 2015b). General vegetation community data was collected concurrently with the ESD field surveys. A vegetation inventory was conducted to meet ESD requirements, as well as collecting data on the presence of noxious weeds, invasive plants, and special status plants.

2.4. WILDLIFE APPROACH

Wildlife includes information on the habitat surveys and surveys conducted for bats, amphibians, and butterflies within a 400-foot survey area, borrow sources, access roads, and depot locations. The general wildlife desktop assessment used existing literature, Geographic Information System (GIS) data, SWReGAP, and survey information from BLM, USFWS, NDOW, Nevada Division of Natural Heritage (NDNH), and Western Association of Fish and Wildlife Agencies (WAFWA). Spatial data available from BLM such as the Western Wildlife Crucial Habitat Assessment Tool or similar databases were used to identify wildlife migration corridors. The desktop assessment and habitat assessment provided information on general wildlife species that may be present in the Project Area.

Field surveys for wildlife included identifying species based on direct observation, scat, tracks, or other methods such as roadside mortality. Wildlife habitat verification and incidental observations were conducted during general vegetation surveys, ESD surveys, and focused species surveys.

3. BIOLOGICAL BASELINE

3.1. ECOLOGICAL SITE DESCRIPTION

3.1.1. Background

Classification of landscapes into ecological sites is based on similar environmental factors used to guide decisions (NRCS 2021b; Brischke et al. 2018; Butler et al. 2003). ESDs are reports that provide detailed information about a particular kind of land—a distinctive ecological site (NRCS 2021b). The NRCS uses four categories of information to describe ecological sites and provide information on resource conditions and trends. These four categories are site characteristics, plant communities, site interpretations, and supporting information (NRCS 2021b). This report provides ecological site information describing site characteristics and plant communities and supporting field data collected during the 2021 field season.

An ecological site is defined as “a distinctive kind of land based on recurring soil, landform, geological, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond similarly to management actions and natural disturbances” (Caudle et al. 2013; NRCS 2021). Ecological sites are conceptual divisions with physical (climate, geomorphology, geology, soils) and biotic environmental factors (such as vegetation) and natural disturbance regimes (Caudle et al. 2013). An ESD such as R024XY002NV Loamy 8-10 P.Z. is a description of the soils, uses, and potential of land with specific physical characteristics that produce distinctive kinds and amounts of vegetation. The ESD describes the central set of site characteristics (e.g., precipitation); there may be overlap between ESDs (Pellant et al. 2020). The ESD survey objective is to collect background information on the ecological sites, rangeland health, and vegetation communities. In addition, field surveys described existing conditions to support assessing potential effects on vegetation and wildlife habitat.

The Project is within the USEPA Central Basin and Range Level III Ecoregion, and the USDA Northeastern Great Basin physiographic section of the Intermountain Semi-desert and Desert Province (Bailey et al. 1994). This northeast and north-central Nevada area includes the Humboldt and Owyhee High Plateau Major Land Resource Areas (MLRAs) (Stringham et al. 2015, 2017). SWreGAP data refines the ecoregions and MLRAs into land cover types that describe vegetation communities (USGS 2005). Over the last century, vegetation communities have been altered in this area of Nevada. The changes to vegetation communities are associated with climate change, livestock and/or wild horse grazing. Wildfires have also changed the structure and diversity of vegetative communities (Pyke et al. 2016; Knapp 1996).

Normal accumulated precipitation in northeastern Nevada is 9.7 inches, with a recorded range of 4.4 inches (1919) to 18 inches (1983). The 2021 accumulated precipitation through July 15, 2021 was 4.95 inches; normal year to-date accumulated precipitation for the area is approximately 6 inches, as recorded at the Elko National Weather Service Weather Station. Temperatures between May 18 and July 24, 2021, ranged from 33 to 103 °F (NOAA 2021b).

Section 3.1.3, Results and Discussion, provides additional information on annual precipitation and temperatures.

3.1.2. Study Methodology

Ecological sites and soil types were identified for the survey areas using SSURGO (NRCS 2021a). Each unique ecological site and soil type identified during the desktop assessment was verified during the May to July 2021 field surveys.

The following protocols and handbooks were used for the ecological site, soil, and rangeland health surveys:

- *Vegetation and Soils – Baseline Data Collection* (BLM 2014a)
- *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems,* Second Edition, Volume I: Core Methods (Herrick et al. 2017)
- *Interpreting Indicators of Rangeland Health,* Version 5 (Pellant et al. 2020) (shortened hereafter to IIRH)
- *Guide to Using AIM and LMF Data in Land Health Evaluations and Authorizations of Permitted Uses,* Tech Note 453 (Kachergis et al. 2020)
- *Final Report for USDA Ecological Site Description State-and-Transition Models by Disturbance Groups, Major Land Resource Area 24 Nevada* (Stringham et al. 2017)
- *Final Report for USDA Ecological Site Description State-and-Transition Models by Disturbance Groups, Major Land Resource Areas 25 Nevada* (Stringham et al. 2015a)
- *International Vegetation Classification Alliances and Associations Occurring in Nevada with Proposed Additions* (Peterson 2008)
- *Incorporating Thresholds and Responses into Grazing Permit/Leases*, NV IM-2018-023 (BLM 2017a)

The BLM Assessment, Inventory, and Monitoring (AIM) Terrestrial Core and Contingent Indicator strategy standard measurements (i.e., indicators) are shown in Table 3.1-1. These indicators were used to quantify land cover types and describe resource conditions and were used in conjunction with other data collected in the Project Area (Taylor et al. 2014; Herrick et al. 2017). Table 3.1-1 lists the terrestrial indicators for the Nevada Northeastern Great Basin Area used during the ESD survey. Section 3.2, Water Resources, includes a discussion of Standard 2, which applies to riparian and wetland sites. Soil data was collected using the IIRH Evaluation Form (see Appendix A.8, Ecological Site Survey Datasheets and Photolog).

Table 3.1-1: Land Health Standards, Indicators, and AIM Indicators

Land Health Standard	Indicator	AIM Terrestrial and Contingent Indicators Associated with Land Health Standard
Standard 1. Upland Sites: Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform.	Indicators are canopy and ground cover including litter, live vegetation, and rock appropriate to the potential of the site.	• Bare ground • Proportion of large gaps between plant canopies • Soil aggregate stability
Standard 3. **Habitat:** Habitats exhibit a healthy, productive, and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover, and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of threatened and endangered species.	• Vegetation composition (relative abundance of species) • Vegetation structure (life forms, cover, height, and age classes) • Vegetation distribution (patchiness, corridors)	• Vegetation composition • Vegetation height

Source: BLM 1997 and Kachergis et al. 2020

AIM = Assessment, Inventory, and Monitoring

Notes: Ecological site information for these indicators are listed in Table 3.1-2, and soils were collected from each of the vegetation and soil units shown on Figure 3.1-1 through Figure 3.1-3. Standard 2 applies to riparian and wetland sites, which are covered in Section 3.2, Water Resources.

SWReGAP land cover types and NRCS soil type data were used to identify potential locations for collecting quantitative vegetation as described in the *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems,* Second Edition, Volume I: Core Methods and the IIRH (Herrick et al. 2017; Pellant et al. 2020; NRCS 2021a). In addition, provisional ESD Reference Sheets describe an ecological site's ecological potential (i.e., climate, soils, and topographic setting) (Pellant et al. 2020). As described in NV IM-2018-023, ERM field teams used IIRH (Pellant et al. 2020) process for survey sites located in draft ESDs (BLM 2017a).

Vegetation data was collected to meet ESD requirements as well as gather data on the presence of noxious weeds, invasive plants, and special status plants. General vegetation community data was collected between May and July 2021, concurrent with the ESD survey.

3.1.3. Results and Discussion

3.1.3.1. Pre-Field Assessment

Ecological Site Descriptions

Before field surveys, ERM collected existing literature and background data on soils, vegetation, and ecological sites. Vegetation communities were identified and mapped within the Project Area and ESD investigation points are shown on Figure 3.1-1 through Figure 3.1-3. Figure 3.1-1 through Figure 3.1-3 illustrates the SWreGAP land cover types and soil map units within 0.25 mile of the Project Area.

During the pre-field assessment, 18 ESDs were identified within the Project Area; 4 of the ESDs are provisional and 14 ESDs are available as a draft (Table 3.1-2). Table 3.1-2 lists the 18 ESDs and the number of soil map units in the Goldstrike, Carlin, and Crescent Valley survey areas. Within the Project Area, there are a total 234 unique combinations of ESDs and soil map units. Approximately 50 percent of the 234 sites are either the R025XY019NV Loamy 8-10 P.Z. or the R024XY002NV Loamy 5-8 P.Z. ESD.

Table 3.1-2: Project Area Ecological Site Descriptions and Number of Survey Sites[a]

Ecological Site Description	Acres	Percent[b]	Project Area Number of Survey Sites			
			Goldstrike	Carlin	Crescent Valley	Total
R024XY035NV Shallow Loam 10-14 P.Z.	0.7	>1%	1	0	0	1
R024XY002NV1 Loamy 5-8 P.Z.	1,481.8	22%	5	4	44	53
R024XY003NV Sodic Terrace 6-8 P.Z.	490.4	7%	2	0	14	16
R024XY005NV[1] Loamy 8-10 P.Z.	1,210.6	12%	21	4	4	29
R024XY006NV1 Dry Floodplain	93.4	3%	4	0	3	7
R024XY007NV Saline Bottom	293.8	6%	7	1	5	13
R024XY011NV Sodic Flat 6-8 P.Z.	448.3	4%	0	0	10	10
R024XY012NV Saline Terrace 6-8 P.Z.	155.2	3%	6	0	0	6
R024XY014NV Coarse Silty 4-8 P.Z.	0.9	>1%	0	0	1	1
R024XY020NV1 Droughty Loam 8-10 P.Z.	7.6	>1%	0	2	0	2
R024XY022NV Sodic Terrace 8-10 P.Z.	115.8	>1%	0	0	3	3
R024XY030NV Shallow Calcareous Loam 8-10 P.Z.	0.1	>1%	0	0	1	1
R025XY003NV Loamy Bottom 8-14 P.Z.	117.3	3%	5	2	0	7
R025XY005NV Wet Meadow	9.7	2%	0	5	0	5
R025XY014NV Loamy 10-12 P.Z.	106.3	5%	12	0	0	12
R025XY015NV South Slope 8-12 P.Z.	334.2	>1%	0	1		1
R025XY019NV Loamy 8-10 P.Z.	1,654.2	28%	24	31	10	65
R025XY022NV Cobbly Claypan 8-12 P.Z.	60.3	>1%	2	0	0	2
Total	6,580.6	102%	89	50	95	234

Source: NRCS 2021b

[a] Provisional ecological sites description meets *National Ecological Site Handbook* (NRCS 2019) standards and have been through a Quality Control and Quality Assurance process to assure consistency and completeness.
[b] Totals are greater than 100 percent due to rounding.

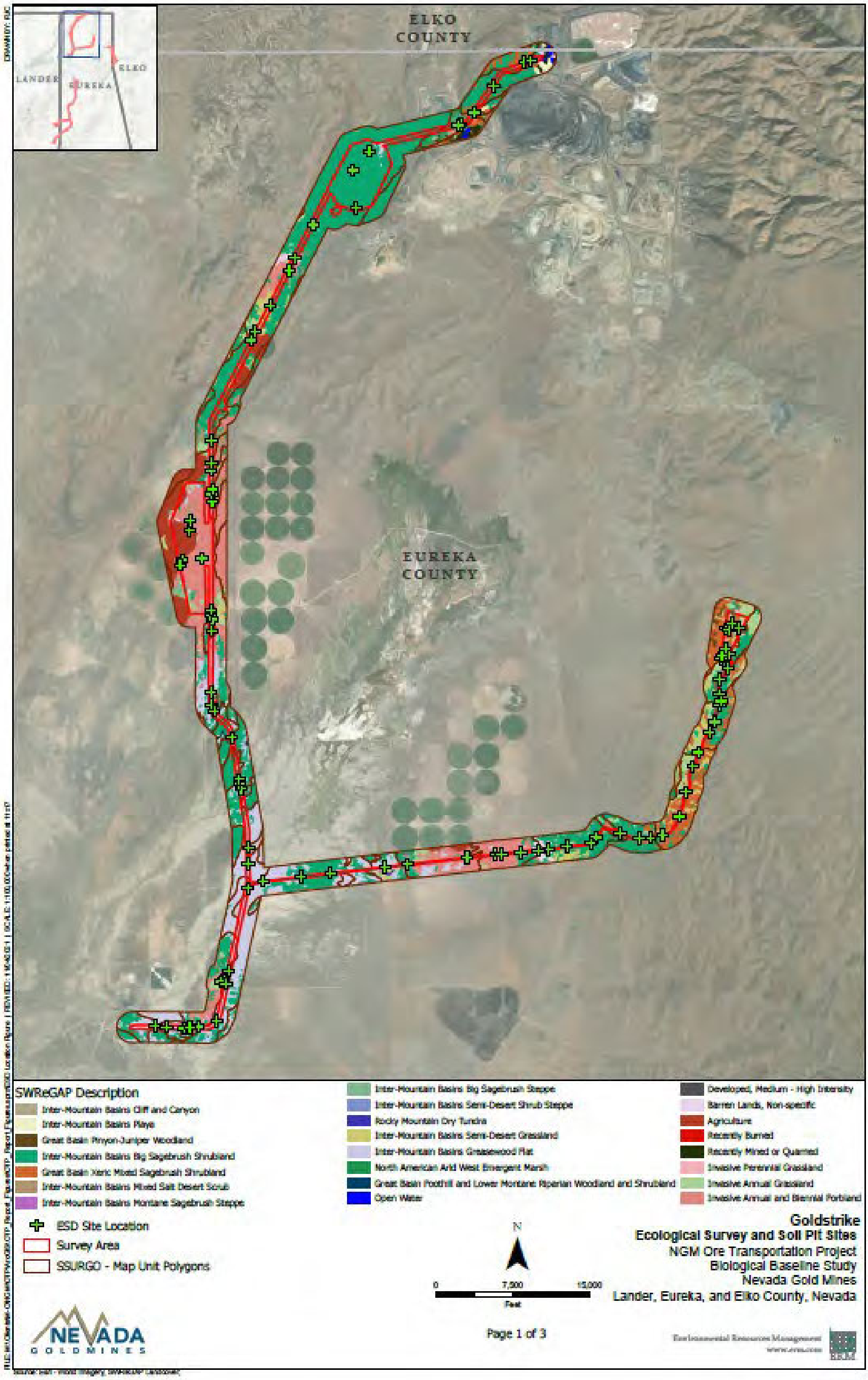


Figure 3.1-1: Goldstrike Ecological Survey and Soil Pit Sites

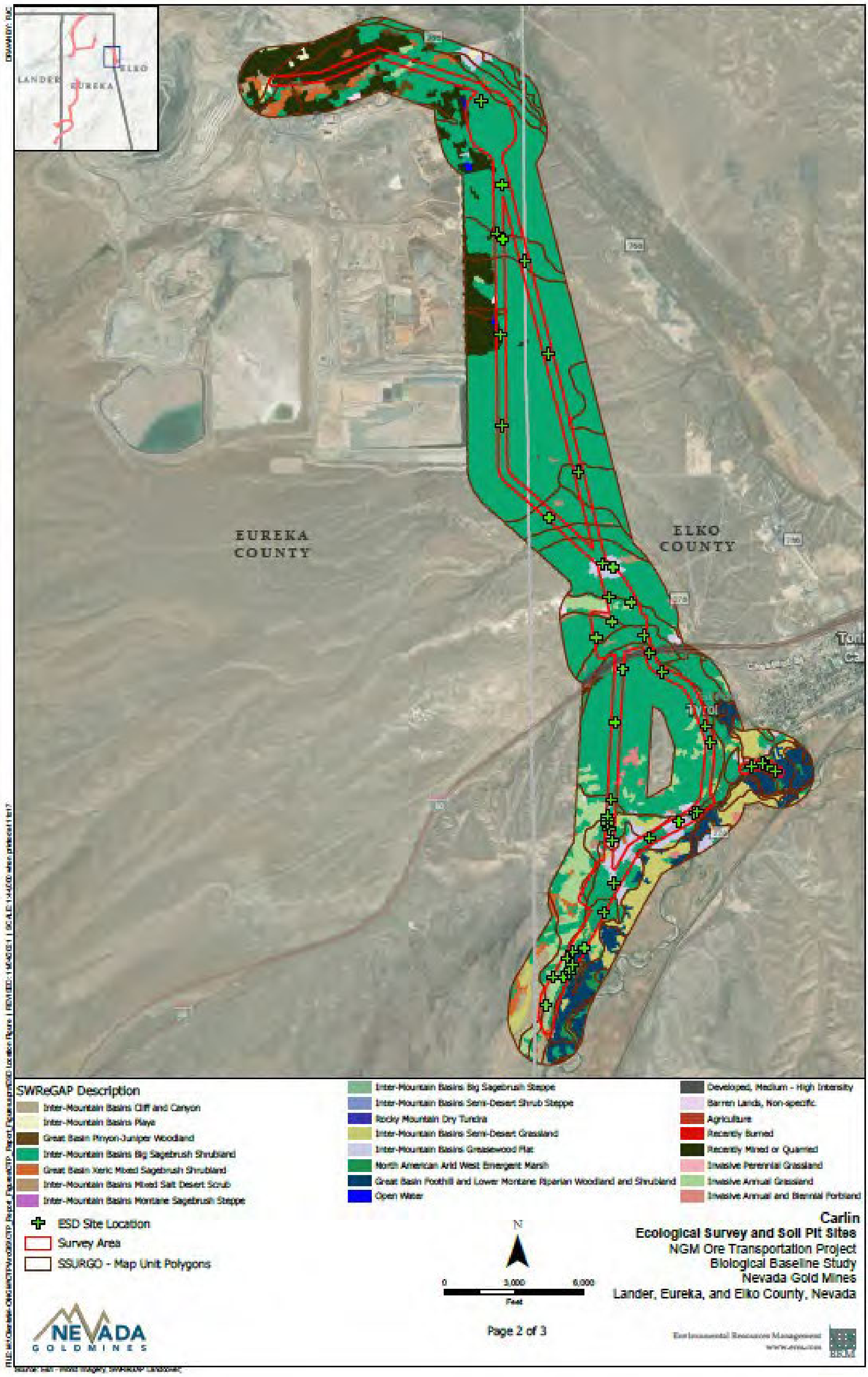


Figure 3.1-2: Carlin Ecological Survey and Soil Pit Sites

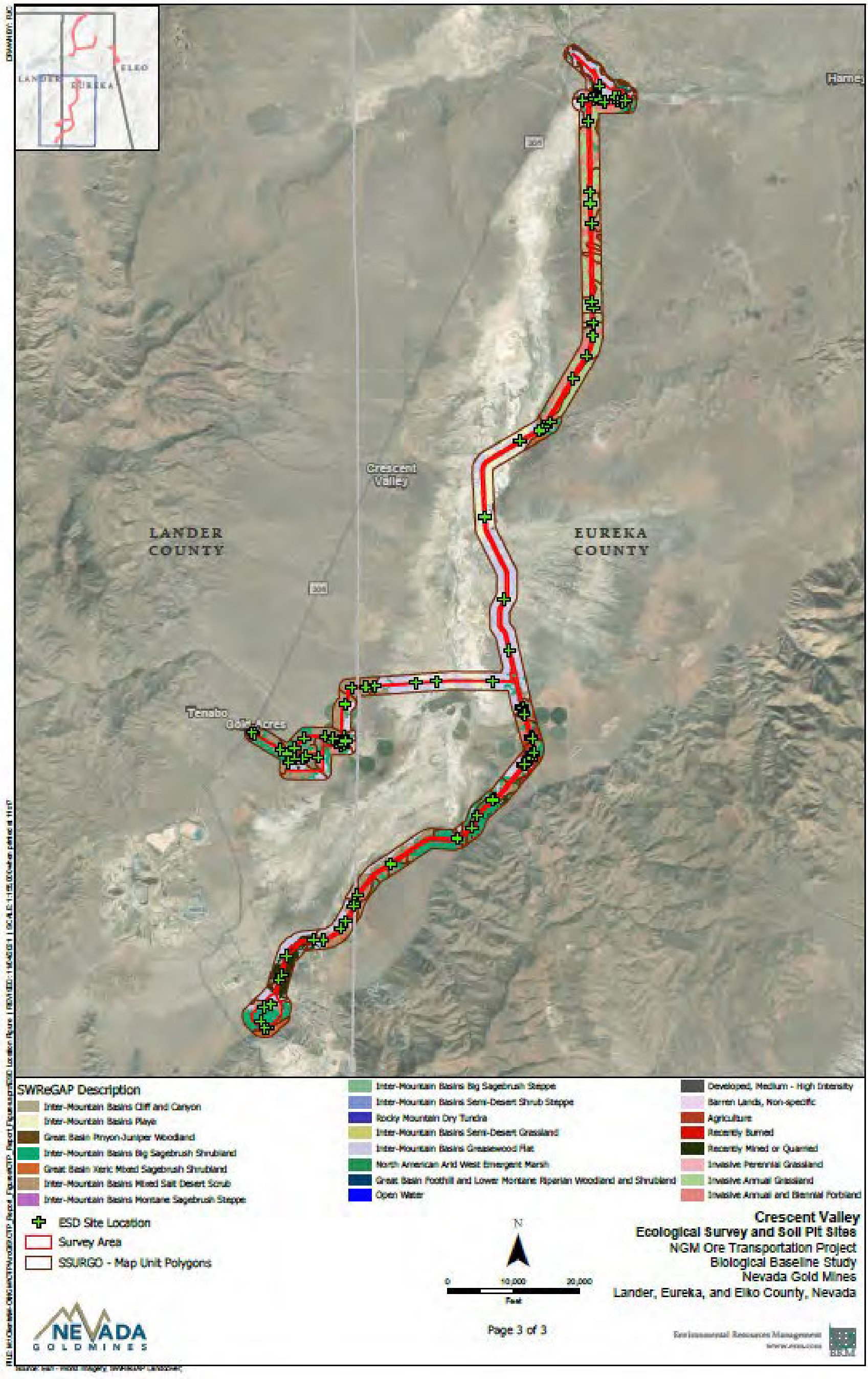


Figure 3.1-3: Crescent Valley Ecological Survey and Soil Pit Sites

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The *National Ecological Site Handbook* Part 631, Subpart B describes the information and process used to develop ESDs and the contents that a provisional ESD is expected to contain (NRCS 2019). ESDs with the status of provisional include a draft state-and-transition model based on vegetation community data (NRCS 2019). State-and-transition models for the provisional and draft ESDs are organized into states that represent stable, long-term ecological conditions based the sites ecological dynamics. A state may include one or more vegetation community phases that represent an assemblage of plants and soil conditions; transitions are a shift between states within an ESD (Pellant et al. 2020).

The provisional and draft ESDs within the survey area include up to five different states based on differences in vegetation structure and the functioning of ecological processes. Each state and transition model contains one or more community phases that are based on differences in plant species composition and production (NRCS 2021b; Stringham et al. 2015a, 2017).

- State 1 Reference State is where the functional capacities represented by soil/site stability, hydrologic function, and biotic integrity are functioning at a sustainable/resilient level under the natural disturbance regime.
- State 2 Current Potential State is similar to the State 1, as the ecological function has not changed; however, the resiliency of the state has been reduced by the presence of invasive weeds.
- State 3 Shrub States have a shrub overstory and bluegrass understory dominate site resources such that soil water, nutrient capture, nutrient cycling, and soil organic matter are temporally and spatially redistributed.
- State 4 Annual State is where the herbaceous understory is dominated by annual non-native species such as cheatgrass (*Bromus tectorum*) and mustards (*Brassica* spp.).
- State 5 Seeded or Eroded State is where soil moisture, soil nutrients, and soil organic matter distribution and cycling are altered due to degraded soil surface conditions and the regeneration of shrubs is not evident.

An ESD may not include all five of these ecological process states. For example, ESD R024XY 006 NV Dry Floodplain includes the first four states, but does not include State 5. Reference states are representative of the natural range of variability under pristine conditions, while Eroded States are where non-native vegetation or introduced species dominate the site (Pellant et al. 2020).

Rangeland Health

The Northeastern Great Basin Area Resource Advisory Council developed the Standards and Guidelines for Nevada's Northeastern Great Basin Area in 1997 (Appendix C in BLM 1997). Standards for Land Health are similar to the objectives established for healthy and functioning watersheds, native plant communities, and rangelands. The IIRH provides guidance for a qualitative evaluation of ecological processes. Described in the IIRH, Rangeland health is defined by the National Research Council as, “The degree to which the integrity of the soil and ecological processes of rangeland ecosystems are maintained” (Pellant et al. 2020).

Rangeland health assessments are quantitative assessments that evaluate 17 rangeland health indicators. The IIRH defines indicators as components of an ecosystem whose characteristics (e.g., presence or absence, quantity, distribution) provide an index to the three attributes of soil/site stability, hydrologic function, and biotic integrity (Pellant et al. 2020). The 17 rangeland health indicators can relate to more than one associated attribute as shown in Table 3.1-3.

- Soil/site stability is the capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water and to recover this capacity when a reduction does occur.
- Hydrologic function is the capacity of an area to capture, store, and safely release water from rainfall, run-on, and snowmelt to resist a reduction in this capacity and to recover this capacity when a reduction does occur.

Biotic integrity is the capacity of the biotic community to support ecological processes within the natural range of variability expected for the site, to resist a loss in the capacity to support these processes, and to recover this capacity when losses do occur. The biotic community includes plants (vascular and nonvascular), animals, insects, and microorganisms occurring both above and below ground (Pellant et al. 2020).

Table 3.1-3: Rangeland Health Indicators and Associated Attributes

Indicator	Associated Attribute
1. Rills	Soil/Site Stability, Hydrologic Function
2. Water Flow Patterns	Soil/Site Stability, Hydrologic Function
3. Pedestals and Terracettes	Soil/Site Stability, Hydrologic Function
4. Bare Ground percent	Soil/Site Stability, Hydrologic Function
5. Gullies	Soil/Site Stability, Hydrologic Function
6. Wind-scours, Blowouts, and Depositional Areas	Soil/Site Stability
7. Litter Movement	Soil/Site Stability
8. Soil Surface Resistance to Erosion	Soil/Site Stability, Hydrologic Function, Biotic Integrity
9. Soil Surface Loss/ Degradation	Soil/Site Stability, Hydrologic Function, Biotic Integrity
10. Plant Community Composition	Hydrologic Function
11. Compaction Layer	Soil/Site Stability, Hydrologic Function, Biotic Integrity
12. Functional/Structural Groups	Biotic Integrity
13. Plant Mortality/ Decadence	Biotic Integrity
14. Litter Amount	Hydrologic Function, Biotic Integrity
15. Annual Production	Biotic Integrity
16. Invasive Plants	Biotic Integrity
17. Perennial Plant Reproduction	Biotic Integrity

Source: Pellant et al. 2020

Natural disturbance, nonnative plants, and human activities within and outside of the Project Area may also influence ecological processes within and outside of surveyed areas. Ecological processes as defined for evaluating rangeland health capture, storage, and redistribution of precipitation, plant growth, and nutrient cycles (Pellant et al. 2020). Natural disturbances from

extreme drought[1] conditions existed in 49 percent of Elko, Eureka, and Lander counties as of September 1, 2021 (NOAA 2021b). The length and severity of a drought influence vegetation communities with potential reductions in canopy cover and litter production, seed production, and increased bare ground. Litter protects the soil surface from raindrop impact, thereby limiting detachment of soil particles and physical crusting of the soil surface. Other natural disturbances within and outside of the Project Area include wildfire and insect outbreaks. Nonnative plants and human activities can disturb ecological processes, resulting in unexpected changes to the natural range of variability (Pellant et al.2020).

Disturbances, both natural and human activities, can alter hydrologic and erosion processes. Reductions in vegetation cover and litter during droughts can increase the amount of bare ground resulting in increased erosion (Pellant et al. 2020). Different ESDs and states within an ESD can have different base erosion predictions (Spaeth et al. 1994; Pellant et al. 2020).

In order to meet Land Health Standard 3 described in Table 3.1-1, wildlife habitats must exhibit a healthy, productive, and diverse population of native and/or desirable plant species appropriate to site characteristics. Habitats meeting this standard provide suitable forage, water, cover, and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of wildlife and plant species. As described below, the dominant SWreGAP land cover types are Inter-Mountain Basins Big Sagebrush Shrubland (39.5 percent), Inter-Mountain Basins Greasewood Flat (18 percent), and Invasive Annual and Biennial Forbland (13.9 percent).

Vegetation Communities

As described in the ESD survey, the vegetation communities are those found in the Owyhee High Plateau and Central Nevada Basin and Range. A desktop assessment using SWReGAP, SSURGO, and ESD data was conducted, and field verification and vegetation community condition assessments were correlated with the ESD survey state-and-transition model descriptions (Stringham et al. 2015a, 2015b). SWreGAP land cover types and acres within the Project Area are listed in Table 3.1-4. Land cover types include areas where vegetation communities have been modified by agriculture, development, and recent mining activity. Inter-Mountain Basins Big Sagebrush Shrubland and Inter-Mountain Basins Greasewood Flat land cover types comprise approximately 57 percent of the Project Area. Invasive Annual Grassland and Invasive Annual and Biennial Forbland comprise approximately 20 percent of the Project Area (Table 3.1-4).

[1] Extreme drought is defined as conditions where major crop and pasture losses are common, fire risk is extreme, and widespread water shortages can be expected requiring restrictions (NOAA n.d.).

Table 3.1-4: Southwest Regional GAP Land Cover Type and Project Area

SWreGAP Land Cover Type	Acres				Percent
	Goldstrike Area	Crescent Valley Area	Carlin Area	Total	
Agriculture	177.8	7.1	0	185.0	2.8%
Barren Lands, Non-specific	15.1	5.4	4.4	24.8	0.4%
Developed, Medium - High Intensity	0	0	5.8	5.8	0.1%
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	0	0.7	13.5	14.2	0.2%
Great Basin Pinyon-Juniper Woodland	0.4	0	0.3	0.7	0.0%
Great Basin Xeric Mixed Sagebrush Shrubland	96.7	7.0	1.0	104.8	1.6%
Inter-Mountain Basins Big Sagebrush Shrubland	1,172.8	614.1	828.6	2,615.6	39.5%
Inter-Mountain Basins Big Sagebrush Steppe	24.8	0	0	24.8	0.4%
Inter-Mountain Basins Cliff and Canyon	12.5	4.2	12.5	29.3	0.4%
Inter-Mountain Basins Greasewood Flat	370.6	772.6	46.6	1,189.8	18.0%
Inter-Mountain Basins Mixed Salt Desert Scrub	61.1	446.2	19.4	526.7	8.0%
Inter-Mountain Basins Playa	0	154.5	0	154.5	2.3%
Inter-Mountain Basins Semi-Desert Grassland	51.3	0	15.0	66.3	1.0%
Invasive Annual and Biennial Forbland	646.1	274.6	1.8	922.4	13.9%
Invasive Annual Grassland	135.2	301.5	45.3	482.0	7.3%
Invasive Perennial Grassland	13.6	0	0	13.6	0.2%
North American Arid West Emergent Marsh	0	0	5.6	5.6	0.1%
Open Water	1.2	0	0.5	1.7	0.0%
Recently Mined or Quarried	4.1	192.9	57.6	254.6	3.8%
Total	2,783.4	2,780.9	1,057.9	6,622.2	100%

Source: USGS 2005

Soils

Soils within the Project Area are composed of soil series described in reports for Eureka, Lander, and Elko counties (NRCS 2021a). Soil survey information for the Project Area in the SSURGO database contains information about each map unit's component soils and their properties (NRCS 2021a). To complete the desktop assessment, a NRCS SSURGO soil report was generated for the Project Area, which identified 61 soil map units with 63 different soil components (Appendix A, Figure A.7-1 through Figure A.7-3). The Cherry Spring-Cortez-Chiara association, McConnell gravelly fine sandy loam, and Batan-Ocala association are the three largest soil series in the Project Area. Soil map units may be unique to a survey area or found in more than one of the distinct surveyed areas. For example, the Cherry Spring map unit, which includes soil components CH, TN, 561, and CG, is found in the Goldstrike, Carlin, and Crescent

Valley survey areas. Table A.6-1 and Table A.6-2 in Appendix A contains a list of the soil map units and their components for each of the three survey areas.

Soil resources in the Project Area formed MLRAs 24 and 25, which correspond to the Humboldt Area and the Owyhee High Plateau, respectively. Most valleys are drained by tributaries to the Humboldt River; however, playas occur in lower elevation valleys with closed drainage systems. Dominant soil orders in MLRAs 24 and 25 are Aridisols, Entisols, Inceptisols, and Mollisols (Soil Survey Staff 2006). Aridisols form in arid or semi-arid climates and are well developed soils that have a very low concentration of organic matter. Entisols are recent soils that lack soil development because erosion or deposition rates occur faster than the rate of soil development. Inceptisols are generally young mineral soils but have had more time to develop profile characteristics than Entisols. Mollisols are fertile soils with high organic matter and a nutrient-enriched, thick surface (Soil Survey Staff 1999).

Soils in the Project Area are classified by the NRCS as aridic and unsuitable for cultivation without irrigation[2] (Soil Survey Staff 2015). The soil series correlate with 37 ecological classifications (Table 3.1-2), which the NRCS categorizes as a rangeland Ecological Site Type (NRCS 2021c). Soils series in the Project Area are moderately deep to very deep and were formed in alluvium derived from mixed rocks, loess, volcanic rocks, and volcanic ash. Soil components in the Cherry Spring series are moderately deep, with a strongly cemented duripan[3] layer between 36 to 54 inches (NRCS 2021c). Each soils series is composed of multiple soil map units composed of components that describe the properties of natural bodies of soils or miscellaneous areas of non-soil (e.g., rock outcrop, dumps) (Soil Survey Staff 1999).

Slopes for these soil series range from zero to 75 percent. Soils on steeper slopes developed on rock core areas of fan piedmont remnant side slopes, hills, plateaus and mountain ridges, crests, summits, shoulders, and side slopes. Soils formed in clayey alluvium derived from loess over alluvium derived from mixed rocks, volcanic tuff, and basalt. These very deep and poorly drained soils are found on alluvial flats, drainage channels, stream terraces, and floodplains and have slopes ranging from zero to 15 percent (NRCS 2021b).

Soil horizons in arid regions are formed by the downward transport of materials by water and the accumulation of various materials at characteristic depths. The depth at which materials accumulate depends mostly on how much precipitation is received and the type of material that is being transported. Table 3.1-5 provides a general description of soil horizons. Not all horizons are present in every soil map unit, and some horizons may be missing due to past land use activities (Soil Survey Staff 2015).

[2] Arid soils are those where during most years the soil is dry for more than 50 percent of all days when the soil temperature is great then 41 °F at a depth of approximately 19.7 inches (Soil Service Staff 2015).

[3] Duripan is a subsurface soil horizon that is cemented by silica, generally opal or microcrystalline forms of silica. Also called hardpan (USDA 2015).

Table 3.1-5: Soil Horizon Descriptions

Horizon Symbol	General Description
A	Surface mineral soil horizon, generally darkened by accumulating humus. May be buried by newer deposits or underlie an organic horizon.
B	Subsoil mineral horizon, generally characterized by accumulation, removal, or redistribution of constituents such as iron, aluminum, silica, clay, humus, calcium carbonate, calcium sulfate, or sesquioxides. May be at the surface in a truncated soil.
C	Relatively unaltered mineral soil layer underlying the pedogenically developed soil profile. Generally unconsolidated, but includes soft bedrock.
E	Subsurface mineral soil horizon characterized by a loss of iron, aluminum, clay, or organic matter. Generally, has lighter color and coarser texture compared to horizon above.
L	Soil horizon composed of organically derived limnic material that was deposited in water by chemical precipitation or aquatic organisms or came from plants (as modified by organisms). Examples include coprogenous earth, diatomaceous earth, and marl.
M	Root-limiting, human-manufactured layer. Examples include a buried layer of continuous asphalt, landfill liner, and geotextile fabric.
O	Soil horizon composed dominantly of organic soil materials (but not limnic materials). Has relatively low bulk density compared to mineral soil. May be at the surface or buried.
R	Consolidated hard, continuous bedrock.
V	Mineral horizon formed at the soil surface or below a layer of rock fragments (e.g., desert pavement), a physical or biological crust, or recently deposited eolian material. Characterized by the predominance of vesicular pores and having platy, prismatic, or columnar structure.
W	Layer of water within or under the soil (not at the surface). Examples include floating bogs and segregated ice layers.

Source: Soil Conservation Staff 2015

The Farmland Protection Policy Act of 1981 is intended to minimize the conversion of farmland to nonagricultural uses, farmland includes prime farmland, unique farmland, and land of statewide or local importance (7 CFR Part 658). The Farmland Protection Policy Act applies to farmland defined as “prime” or “unique” as described in FFPA Section 1540(c)(1), or to farmland of statewide or local importance as defined by the appropriate state or local agency. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Prime farmland and farmland of statewide or local importance includes land includes lands used to produce livestock and timber (7 CFR Part 658).

In Nevada, only irrigated lands have been classified as prime farmlands; within the survey area, none of soils are classified as prime farmland (NRCS 2021d). The Project Area contains 3,627.3 acres of soil map units that are considered farmland of statewide importance for the production of food, feed, fiber, forage, and oilseed crops (Table 3.1-6). Table A.6-1 and Table A.6-2 in Appendix A list the soils map units and soil components that are classified as prime farmland or farmland of statewide importance. Some soil map units such as Orovada, Cherry Spring, and Dunphy are found in one or more of the survey areas. Orovada and Cherry Spring soil map units are found in the Goldstrike and Carlin survey areas, and Rad and Dunphy soil map units are found in the Goldstrike and Crescent Valley survey areas.

Table 3.1-6: Farmland Soil Classification in the Project Area

Farmland Soil Classification	Project Area[a] Acres					
	Goldstrike	Carlin	Goldstrike and Carlin	Crescent Valley	Goldstrike and Crescent Valley	Total Acres
Prime farmland if irrigated	26.6	0	0	0	0	26.6
Prime farmland if irrigated and reclaimed of excess salts and sodium	61.1	11.8	19.1	325.4	92.8	510.2
Farmland of statewide importance	2,117.4	9.3	83.2	1,417.4	0	3,627.3
Not prime farmland	447.0	899.5	110.5	966.8	34.4	2,458.2
Total	2,652.1	920.6	212.8	2,709.4	127.2	6,622.3

Source: NRCS 2021c

[a] A soil map unit may be part of more than one survey area.

Ecological sites are correlated on the basis of soils and the resulting differences in species composition, proportion of species, and total production of the historic climax plant community. Production is determined by measuring the annual aboveground growth of vegetation (Butler et al. 2003). Forage production on rangelands in Nevada can vary from year to year, and production is influenced by precipitation, temperature, litter, and soil characteristics. NRCS soil map unit data include estimates of forage production in yeas with low, average, and above average conditions and are reported in terms of the estimated pounds per acre (NRSC 2021c). Soils in the Project Area have ratings from 350 to 3,500 pounds of forage production in an average year (Table 3.1-7). Table A.6-3 and Table A.6-4 in Appendix A list the estimated forage production from soil map units within each of the surveyed areas.

Table 3.1-7: Soil Type and Forage Production in the Project Area

Project Area[a]	Acres	Range of Soil Map Unit Forage Production[b] in Pounds per Acre		
		Low	Average	High
Goldstrike	2,352.0	200–2000	400–3,500	600–4,500
Carlin and Goldstrike	212.8	400–2,000	600–3,500	800–4,500
Carlin	919.2	300–2,000	450–3,500	750–4,500
Crescent Valley	2704.4	200–1,800	350–2,500	500–3,500
Crescent Valley and Goldstrike	127.2	300	450	600–750

Source: NRCS 2021a

[a] A soil map unit may be part of more than one project area.
[b] Estimated range production in pounds per acre in an average year.

3.1.3.2. Field Survey

The BLM's AIM identifies three attributes essential to describe ecosystem sustainability, soil and site stability, hydrologic function, and biotic integrity (Taylor et al. 2014). Collected data was assessed using the 17 Indicators of Rangeland Health listed in Table 3.1-3 to determine whether these three attributes are achieved and if the Project Area is meeting Standard 1. The 17 Indicators are outlined in IIRH Technical Reference 1734-6 (Pellant et al. 2020).

Ecological Site Surveys

Based on the field data collected using the AIM data, these plots were compared to ESDs and corresponding state-and-transition models (Stringham et al. 2015a, 2017). Within the Project Area, four states and 11 community phases were identified based on the state-and-transition models for the 18 ESDs. A state-and-transition model had not been developed for nine sites (Table 3.1-8 and Figure 3.1-4).

Within the Project Area and off-site, human activities such as agriculture, roads, and utilities influence vegetation communities and ground cover. All three surveyed areas (Goldstrike, Carlin, and Crescent Valley [see Figures 3.1-5 through 3.1-8]) showed evidence of wildfire with annual grasses (e.g., cheatgrass) or annual forb dominating the understory and a loss of dominant and subdominant functional structure groups. The dominance of annual grasses and annual forbs in the understory increases the amount of continuous fine fuels which can modify the fire regime by changing intensity and size of wildfires. Shrubs such as greasewood (*Sarcobatus vermiculatus)* may be killed by severe fires, but re-sprout when fires severity is low to moderate (Stringham et al. 2017). Wildfire in current potential state or shrub state ESDs where the understory is dominated by cheatgrass could transition to an annual state.

Sites classified as State 2 (5 percent as shown in Table 3.1-8 and Figure 3.1-4) showed overall fair to good health with evidence of wildlife and livestock use. Annual forbs and grasses are becoming more common in areas where perennial grasses are heavily grazed or where the site is lacking perennial forbs. Drought conditions may have inhibited the regrowth of shrubs and perennial grasses during the 2021 growing season.

Shrub state and annual states represent conditions in 86 percent of the sites surveyed (Table 3.1-8 and Figure 3.1-4). Cheatgrass and tansymustard (*Descurainia pinnata*) or other mustard species (*Brassica* spp.) dominate the understory. Perennial bunchgrasses and perennial forbs were sparse to missing in the Goldstrike, Carlin, and Crescent Valley areas assessed to be in the shrub or annual state. The shrub community was dominant, but there appeared to be an increasing presence of invasive annuals. The lack of shrub cover after wildfire or other human activities, such as drilling and disking areas during reclamation, could indicate a transition from a shrub state to an annual state has occurred for parts of the Crescent Valley surveyed area.

Seeded or eroded state represent conditions in 5 percent of the sites surveyed (Table 3.1-8 and Figure 3.1-4). Missing expected dominant shrub, perennial grasses, and forbs as well as the increase in annual grasses were characteristic of the 13 sites surveyed assigned to the seeded or eroded state. Cheatgrass comprised up to 95 percent of the residual cover at the 8 sites in the Goldstrike Survey Area and may indicate a transition to an Invasive Annual Grassland as land cover type.

Table 3.1-8: Project Area Survey Sites State and Transition Status

State	State and Transition Phase	Number of Ecological Site Survey Sites				Percent
		Goldstrike Survey Area	Crescent Valley Survey Area	Carlin Survey Area	Total	
Current Potential State	2.1 Community Phase	1	1	0	2	1%
	2.2 Community Phase	0	4	0	4	2%
	2.3 Community Phase	3	2	0	5	2%
	Subtotal	***4***	***7***	***0***	***11***	***5%***
Shrub State	3.1 Community Phase	22	35	1	58	25%
	3.2 Community Phase	13	12	11	36	15%
	3.3 Community Phase	1	4	2	7	3%
	Subtotal	***36***	***51***	***14***	***101***	***43%***
Annual State	4.1 Community Phase	26	16	2	44	19%
	4.2 Community Phase	12	18	26	56	24%
	Subtotal	***38***	***34***	***28***	***100***	***43%***
Eroded State	5.1 Community Phase	6	3	2	11	5%
	5.2 Community Phase	1	0	0	1	0%
	5.3 Community Phase	1	0	0	1	0%
	Subtotal	***8***	***3***	***2***	***13***	***6%***
State-and-Transition models not developed for this draft ecological site description		6	3	0	9	4%
Total		92	98	44	234	100%

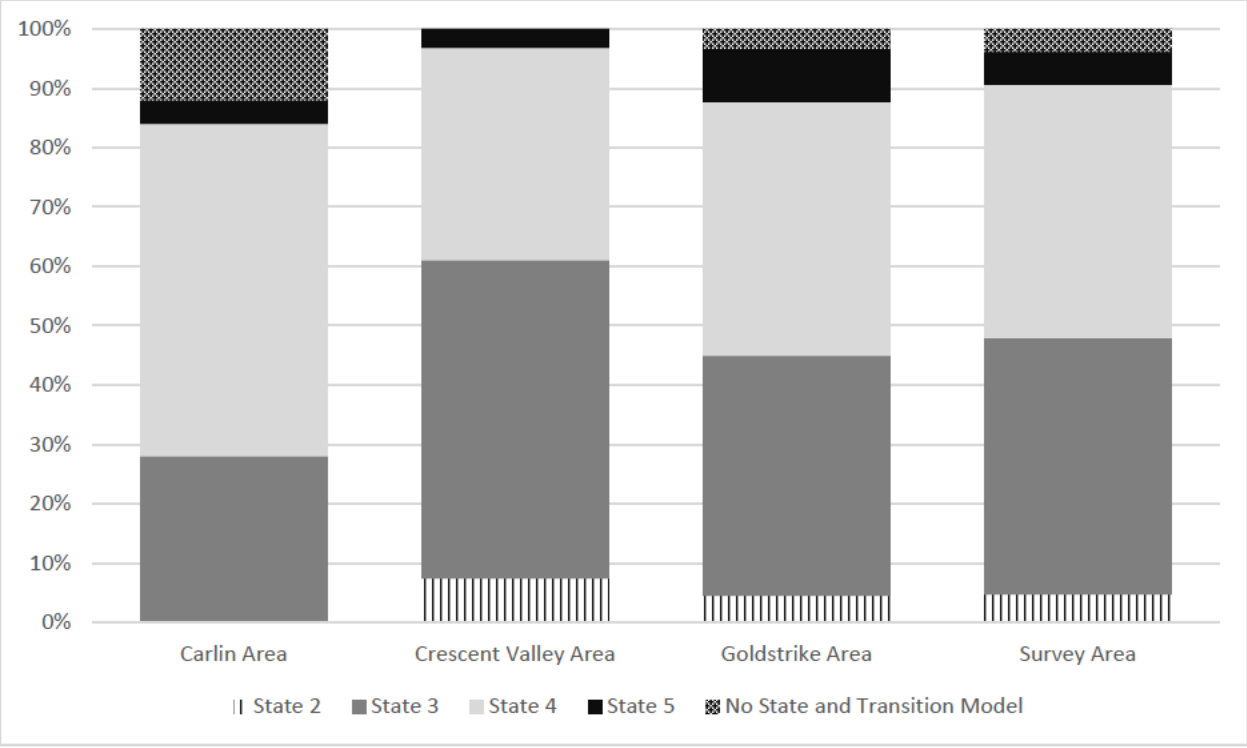


Figure 3.1-4: Survey Areas Percent State-and-Transition

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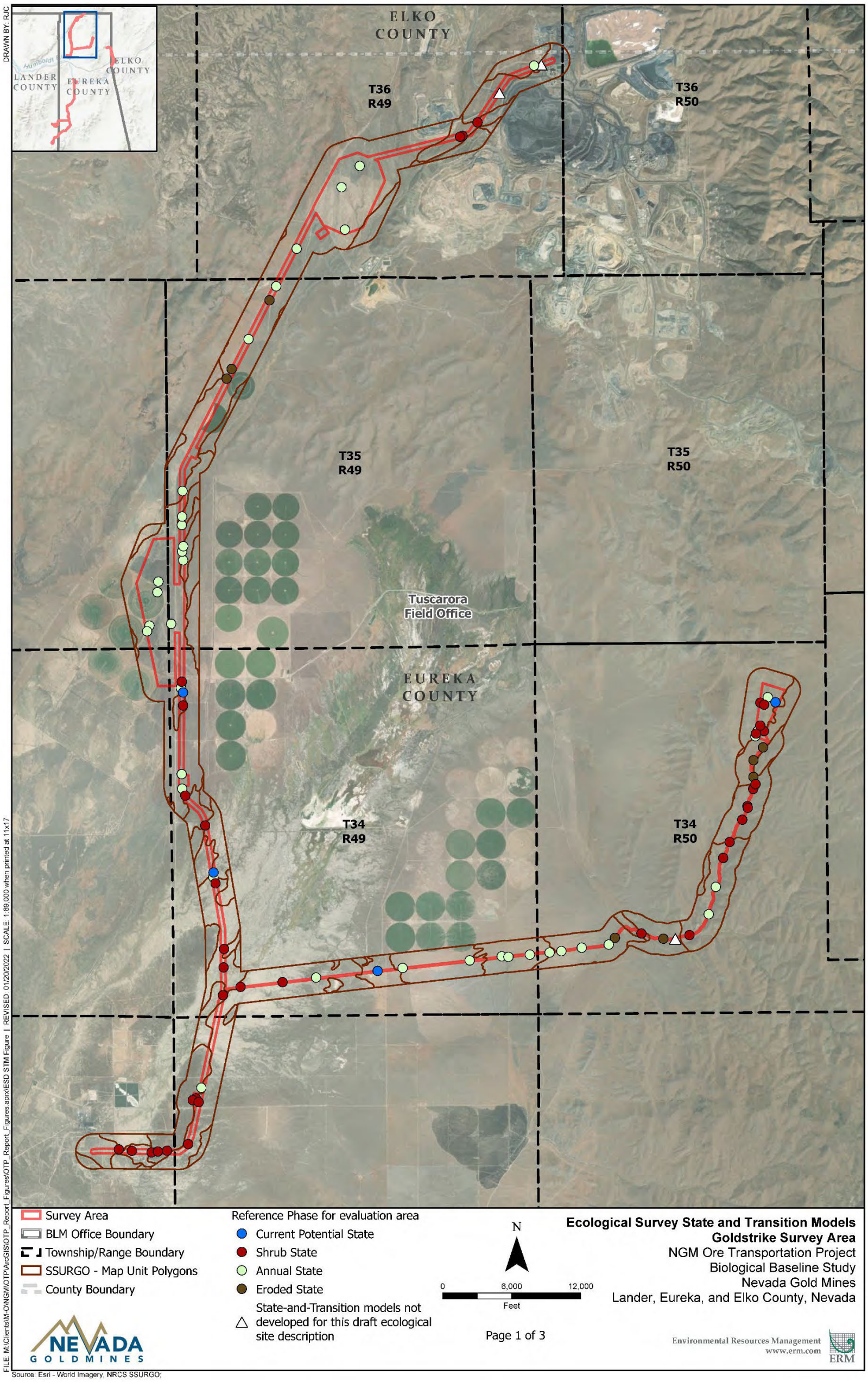


Figure 3.1-5: Ecological Survey State and Transition Models—Goldstrike Survey Area

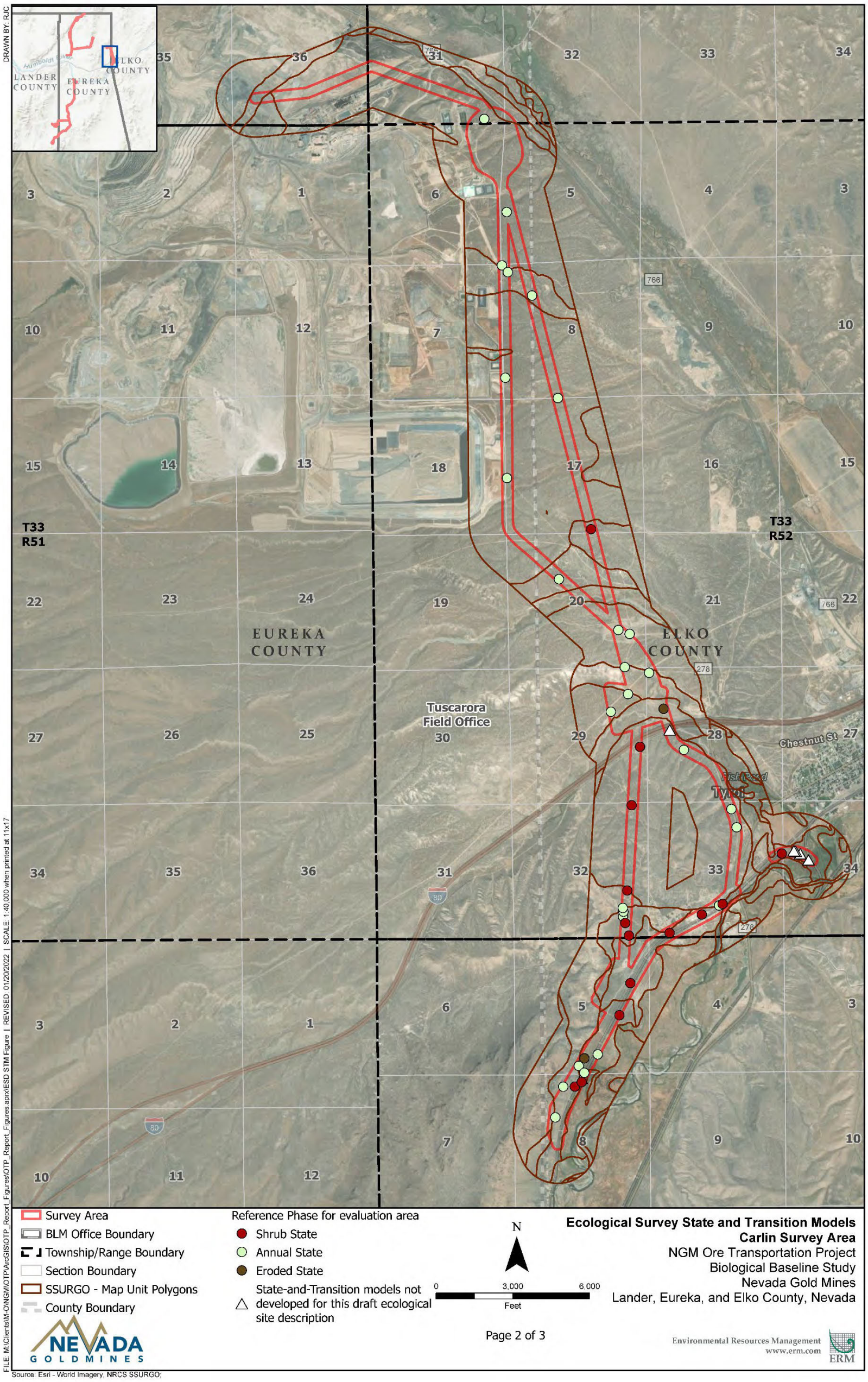


Figure 3.1-6: Ecological Survey State and Transition Models—Carlin Survey Area

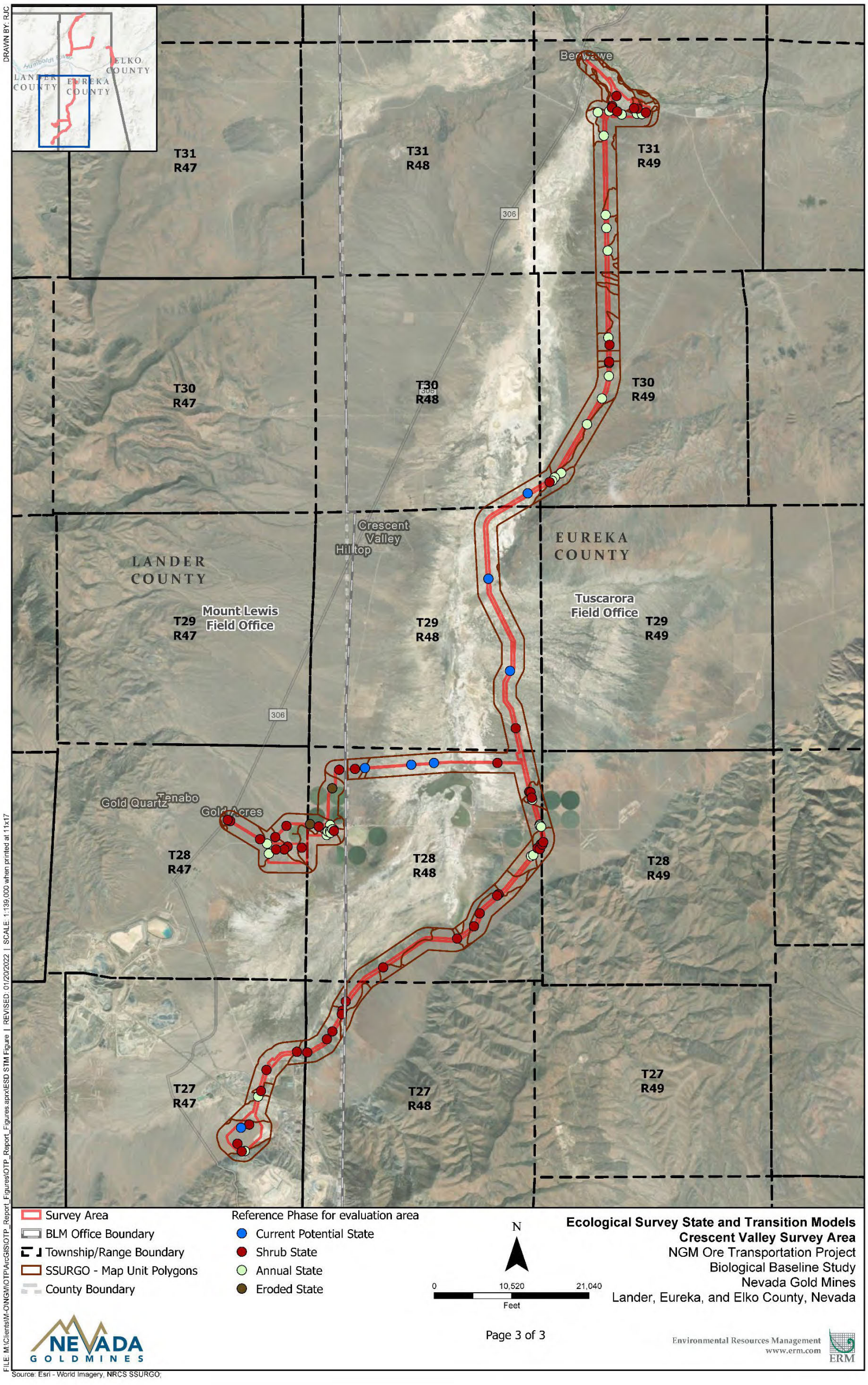


Figure 3.1-7: Ecological Survey State and Transition Models—Crescent Valley Survey Area

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Rangeland Health

A reference state has been developed for four of the ESDs within MLRAs 24 and 25 (NRCS 2021b). Using the five steps described in the IIRH, Table 3.1-9 provides a summary of the 17 indicators of rangeland health for the provisional ESDs and sites where a reference state has not been developed. Appendix A.8 includes copies of data collected at 234 unique ESD sites and photos that are the basis for the findings presented on rangeland health in the areas surveyed. Table 3.1-9 shows the percent departure from reference conditions for the ecological indicators of soil/site stability, hydrologic function, and biotic integrity within the three survey areas.

Overall for the three surveyed areas, the departure from reference states range from slight-to-none to slight-to-moderate for soil/site stability and hydrologic function (Table 3.1-9). The departure for biotic integrity from the reference states were moderate to moderate-to-extreme for sites within each of the survey areas (Figure 3.1-8).

Land uses such as livestock grazing, roads, and agriculture within the survey areas influenced rangeland health. An informal shooting range is on privately held lands within the Carlin Survey Area. During the field review, vegetation in 196 of the 234 sites (approximately 84 percent) surveyed were influenced by access roads for mine facilities, utilities, agricultural fields, and residential areas.

Table 3.1-9: Summary of Survey Area Departure from Reference State

Ecological Processes Indicators	None to Slight	Slight to Moderate	Moderate	Moderate to Extreme	Extreme
R024XY002NV Loamy 5-8 P.Z.					
Soil/Site Stability	84%	10%	6%		
Hydrologic Function	14%	45%	27%	14%	
Biotic Integrity	0%	6%	41%	33%	20%
R024XY005NV Loamy 8-10 P.Z.					
Soil/Site Stability	63%	30%	7%		
Hydrologic Function	26%	30%	19%	26%	
Biotic Integrity	4%	7%	11%	44%	33%
R024XY006NV Dry Floodplain					
Soil/Site Stability	100%				
Hydrologic Function		57%	14%	29%	
Biotic Integrity			14%	57%	29%
R024XY020NV Droughty Loam 8-10 P.Z.					
Soil/Site Stability	100%				
Hydrologic Function		100%			
Biotic Integrity		100%			
Undeveloped Reference State[a]					
Soil/Site Stability	77%	17%	6%		
Hydrologic Function	18%	41%	24%	18%	
Biotic Integrity	1%	8%	29%	38%	24%

[a] For Ecological Site Descriptions where a reference state has not been defined, the departure categories are based on the rangeland health indictors assessed during the field survey.

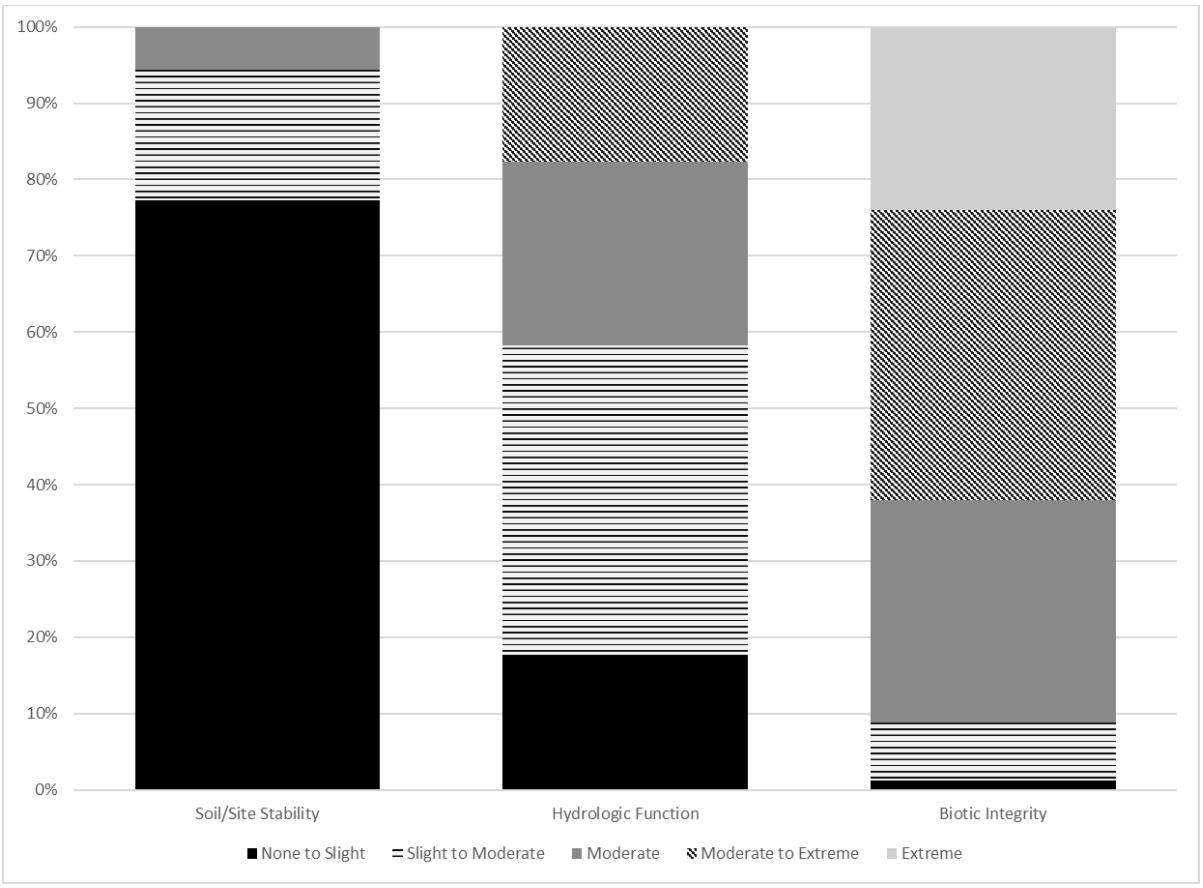


Figure 3.1-8: Ecological Indicators Percent Departure from Reference State

Soil/Site Stability

Within the Project Area, ecological indicators for soil/site stability indicate most sites are within the expected values for the ESD and disturbance is within the natural range of variability. Annual forbs cover and litter from these forbs may contribute to reducing erosion within the Project Area. Sites where soil stability was slight-to-moderate or moderate were due to the lack of dominant and subdominant functional groups or a lack of vegetative cover.

Ground cover acts as a barrier to impede water flow and inadvertently limit water and soil erosion (Pellant et al. 2020). This could contribute to the reduced hydrologic function at surveyed sites as high amounts of bare ground allows for water loss from the site before infiltration occurs. Relative ground cover, including vegetation canopy cover, litter, rock, bare ground, and biotic crusts were evaluated at the 234 sites in the three survey areas (Table 3.1-10). The percent bare ground and percent litter are 2 of the 17 integrated indicators of rangeland health. Vegetative and litter cover can protect surfaces from erosion; however, an increase in litter cover, specifically, may reduce infiltration and negatively affect seed germination and decomposition rates. Areas with higher percentages of bare ground can contribute to soil and water erosion. Large areas of bare ground can indicate a decrease in forage (productivity) and an increase in the risk of invasive plant species becoming established (Pellent et al. 2020).

Table 3.1-10: Ecological Site Description Ground Cover in the Project Area

Average Percent Ground Cover in Survey Area[a]						
Survey Area	**Canopy Cover**	**Bare Ground**	**Litter Cover**	**Biological Crust[b]**	**Rock**	**Residual Cover**
Carlin Area	48	14	14	7	10	7
Crescent Valley Area	55	10	15	9	5	6
Goldstrike Area	40	9	25	4	4	18
Survey Area	48	11	18	7	6	10
Range Percent Ground Cover in Survey Area						
Carlin Area	0–98	0–100	0–46	0–30	0–65	0–28
Crescent Valley Area	18–91	1–45	0–45	0–40	0–47	1–28
Goldstrike Area	3–75	0–43	2–70	0–45	0–33	1–55

[a] Due to rounding, percentages may not equal 100 percent.
[b] Biological crust includes moss, lichen, and cyanobacteria.

Table 3.1-11 presents the range of canopy cover of the perennial and annual grasses, perennial and annual forbs, and shrubs in the three survey areas. Within the 234 sites surveyed, the percent cover of perennial grasses, shrubs, and bare ground indicate a departure from expected reference conditions (NRCS 2021; Stringham et al. 2015a, 2017). This departure could be related to drought, altered fire regimes, disturbance, and livestock grazing. Increases in the percent of bare ground from expected can indicate that the site may have reduced plant productivity. Table A.3-1 through Table A.3-8 in Appendix A provides the percent canopy and ground cover for each survey site in the three survey areas.

Table 3.1-11: Ecological Site Description Canopy Cover in the Project Area

Average Percent Canopy Cover in Survey Area					
Survey Area	**Perennial Grass**	**Annual Grass**	**Perennial Forbs**	**Annual Forbs**	**Shrubs**
Goldstrike Area	7	6	1	10	15
Crescent Valley Area	3	11	1	13	27
Carlin Area	12	4	1	7	24
Range Percent Canopy Cover in Survey Area					
Goldstrike Area	0–64	0–45	0–15	0–40	0–48
Crescent Valley Area	0–48	0–45	0–50	0–50	0–70
Carlin Area	0–75	0–30	0–46	0–43	0–45

Hydrologic Function

For hydrologic function within the areas surveyed, the departure from a reference state is slight-to-moderate to moderate (Table 3.1-9 and Figure 3.1-8). In areas assessed as State 2, current potential state as well as soil and litter movement were short distances with little evidence of rills or gullies. The departure of hydrologic function from the reference state or current potential state is associated with decreased perennial grass cover, the lack of shrub cover, and missing dominant and subdominant functional structure groups. Reduced coverage of deep-rooted bunchgrasses and shrubs may contribute to lower infiltration rates and higher surface runoff. The replacement of perennial bunchgrasses by cheatgrass and bare ground may contribute to reduced infiltration and increased run-off.

Biotic Integrity

Biotic integrity indicates that sites surveyed were mostly in the moderate to moderate-to-extreme departure class except for ESD 024XY020NV Droughty Loam P.Z. Sites surveyed in ESD 024XY020NV Droughty Loam P.Z. were within one departure class (slight-to-moderate; Table 3.1-9). The dominance of non-native invasive plant species, particularly cheatgrass, lack of shrub diversity, and the loss of dominant and subdominant functional structure groups contribute to the departure. Mid- and tall-stature native perennial species were present at levels that maintained adequate nutrient cycling; however, nutrient cycling could be reduced in areas where cheatgrass is present.

The dominant shrub species within the Project Area are big sagebrush (*Artemisia tridentate)* and rabbitbrush (*Chrysothamnus spp*.), which is expected for the majority of the ecological sites. The dominant perennial grass is basin wildrye (*Elymus cinereus*), a deep-rooted bunchgrass present at 27 to 46 percent of the ESD sites in the Project Area (Anderson 2002). Cheatgrass, a shallow-rooted annual species, is present at 34 to 79 percent of the ESD sites in the survey area (Zouhar 2003). Mustards, including tansymustards (*Descurania* spp.) and clasping pepperweed (*Lepidium perfoliatum*) are the most frequently encountered forbs. Table A.4-1 through Table A.4-4 in Appendix A lists the plant species recorded during the ESD survey.

Table 3.1-12 presents the five most frequently encountered grass, forb, and shrub and tree species in each of the three survey areas. Shrubs, non-native annual grasses, and non-native forbs make up a majority of the production for the site, with perennial grasses and native forbs lacking. Weedy species, both annual and perennial, are frequent components of the vegetation community at the sites surveyed.

Over the past several years, drought conditions may also contribute to the frequency of weedy species at sites surveyed. The frequency of plant species can be affected by disturbance type and the intensity of the disturbance. Disturbance from past wildlife in addition to access roads, mining activities, and power lines may influence the percentage of shrub cover in the Goldstrike Survey Area. Reseeding and reclamation activities in these areas could influence the plant species present at these sites.

Table 3.1-12: Project Area Plant Species Frequency

Survey Area	Grass Species		Forb Species		Shrub and Tree Species	
	Species[a]	Percent of Sites	Species[a]	Percent of Sites	Species[a]	Percent of Sites
Goldstrike 92 ESD sites	Basin wildrye	27%	Mustards	31%	Big sagebrush	30%
	Blue bunch wheatgrass	7%	Prickly lettuce	18%	Four-wing saltbush, Green rabbitbrush, and Shadscale	4%
	Cheatgrass	46%	Russian thistle	13%	Greasewood	19%
	Crested wheatgrass	17%	Tansymustards	21%	Rubber rabbitbrush	13%

Survey Area	Grass Species		Forb Species		Shrub and Tree Species	
	Species[a]	Percent of Sites	Species[a]	Percent of Sites	Species[a]	Percent of Sites
	Thurber's needlegrass	11%	Western salsify	18%	Yellow rabbitbrush	10%
Crescent Valley 88 ESD sites	Basin wildrye	46%	Annual forbs	11%	Big sagebrush	24%
	Bottlebrush squirreltail and Squirreltail	17%	Halogeton	8%	Budsage	12%
	Cheatgrass	79%	Mustards	29%	Greasewood	25%
	Crested wheatgras	23%	Pepperweed	22%	Rubber rabbitbrush	9%
	Sandburg's bluegrass	21%	Prickly lettuce	18%	Shadscale	25%
Carlin 44 ESD sites	Basin wildrye	28%	Clasping pepperweed	26%	Big sagebrush	36%
	Cheatgrass	34%	Halogeton	18%	Green rabbitbrush	26%
	Sandburg's bluegrass	26%	Russian thistle	16%	Rubber rabbitbrush	8%
	Squirreltail	22%	Scotch thistle	18%	Shadscale	30%
	Western wheatgrass	12%	Tansymustards	22%	Yellow rabbitbrush	10%

[a] Species are the five most frequent species in the Project Area.

Vegetation Communities

Based on SWreGAP data, Inter-Mountain Basins Big Sagebrush Shrubland, Inter-Mountain Basins Greasewood Flat, and Invasive Annual and Biennial Forblands are the three most abundant land cover types in the three survey areas (Table 3.1-4). Figure 3.1-1 through Figure 3.1-3 show the SWreGAP land cover types within the survey area and a ¼ mile from the centerline of the proposed railway, borrow sources, access roads, and construction depot locations. Vegetation data and the rangeland health evaluations may not represent conditions outside of the Project Area. Appendix A.8 includes the ESD survey site datasheets and site photos.

Non-native annual grasses and forbs were present within the Goldstrike, Crescent Valley, and Carlin survey areas (Table .1-13). Tables A-4.1 through A-4-4 list the plant species found in each of the three survey areas during the field verification. Additional information on noxious weeds and non-native invasive plant species are discussed in Section 3.3, and Appendix C includes a list of noxious weed and invasive plant species found within the three survey areas.

An area's resilience (ability of the ecological site to recover from disturbance) and resistance to invasive species are soil temperature/moisture regimes and the composition and structure of vegetation on the ecological site just prior to the disturbance event. The presence of deep-rooted perennial grasses (e.g., Indian ricegrass [*Achnatherum hymenoides*], and bottlebrush squirreltail [*Elymus elymoides*]) influences ecological site resilience to disturbance, invasive species, and ecological processes (Miller et al. 2013).

Table 3.1-13: Project Area Vegetation Species

Vegetation Type	Species Name
Annual Grass	Annual false wheatgrass (*Eremopyrum triticeum*) Cheatgrass (*Bromus tectorum*)
Perennial Grass	Alkali sacaton (*Sporobolus airoides*) Basin wildrye (*Leymus cinereus*) Bluegrass (*Poa* spp.) Bottlebrush squirreltail (*Elymus elymoides*) Crested wheatgrass (*Agropyron cristatum*) Cultivated wheatgrass (*Agropyron* spp.) Desert saltgrass or Inland saltgrass (*Distichlis spicata*) Indian ricegrass (*Achnatherum hymenoides*) Sandberg bluegrass (*Poa secunda*) Western wheatgrass (*Pascopyrum smithii*)
Annual Forb	Blue mustard (*Chorispora tenella*) Brown-eyed primrose (*Chylismia claviformis*) Bur buttercup (*Ceratocephala testiculata*) Clasping pepperweed (*Lepidium perfoliatum*) Cudweed (*Euchiton involucratus*) Flower baskets (*Mentzelia congesta*) Halogeton (*Halogeton glomeratus*) Lamb's quarter (*Chenopodium album*) Mustard species (*Brassica* spp.) Pepperweed (*Lepidium* spp.) Prickly lettuce (*Lactuca serriola*) Redstem storksbill or storksbill (*Erodium cicutarium*) Russian thistle (*Salsola kali*) Tansy mustard (*Descurainia pinnata*) Thistle species Tumble mustard (*Sisymbrium altissimum*) Wooly star (*Eriastrum densifolium*)
Perennial Forbs	Alfalfa (*Medicago sativa*) Basin yellow catseye (*Cryptantha confertiflora)* Burning bush (*Bassia scoparia*) Desert mallow (*Sphaeralcea ambigua*) Globemallow (*Sphaeralcea* spp.) Poverty weed (*Iva axillaris*) Whitetop (*Cardaria draba*)
Succulents, Shrubs, and Trees	Black sagebrush (*Artemisia nova*) Big sagebrush (*Artemisia tridentate*) Budsage (*Artemisia frigida*) Four-wing saltbush (*Atriplex canescens*) Greasewood (*Sarcobatus vermiculatus*) Green rabbitbrush (*Ericameria teretifolia*) Hopsage (*Grayia spinose*) Littleleaf horsebrush (*Tetradymia glabrata*) Pickleweed (*Allenrolfea occidentalis*) Rabbitbrush (*Ericameria* spp.) Rubber rabbitbrush (*Ericameria nauseosa*) Shadscale (*Atriplex confertifolia*) Spiny horsebrush (*Tetradymia spinosa*)

Soils

The NRCS soil survey identified 61 different soil map units within the three survey areas (NRCS 2021a). During field surveys, 237 soil pits were dug in 234 unique ESD sites to depths up to 32.7 inches. Field crews included more than one soil pit at three ESD locations to characterize the soils. NRCS soil map units in the three survey areas are shown in Figure A.7-1through Figure A.7-3 in Appendix A, and Table A.6-1 and Table A.6-2 summarize the acres of the soil map units in each SWreGAP land cover type.

Actions that affect soil quality include physical characteristics, biotic environmental factors, and natural and human activity disturbance. These activities can result in a variety of impacts that vary in spatial and temporal scale and severity. Vegetation species and ground cover influence water infiltration into soils and erosion rates (Blackburn et al. 1992). Through changes in litter quantity and quality, invasive plant species such as cheatgrass can alter soil characteristics (Norton et al. 2004). As described above, soils may be influenced by off-site human activities such as access roads, railways, agriculture, and utilities.

Soil properties, such as texture and water-holding capacity, are associated with resilience and resistance before and after disturbance (Roundy et al. 2018). Water infiltration and plant growth are related to soil textures, soil depth, and topography. Water infiltration in areas with fine-textured soils such as clays or silts is slower (Singh et al. 1998). Soil texture in the survey areas ranged from clay to silt, with most soils having a sandy loam or sandy clay loam texture (Table 3.1-14).

Table 3.1-14: Project Area Percent Soil Texture[a]

Soil Texture	Goldstrike Project Area	Crescent Valley Project Area	Carlin Project Area	Total
Clay	8%	1%	8%	5%
Sandy Clay	7%	3%	15%	7%
Silty Clay	13%	12%	8%	11%
Sandy Clay Loam	16%	18%	17%	17%
Clay Loam	11%	4%	8%	8%
Silty Clay Loam	16%	17%	9%	15%
Loam	6%	2%	4%	4%
Sandy Loam	15%	30%	24%	23%
Loamy Sand	1%	6%	4%	4%
Sand	0%	1%	2%	1%
Silt Loam	5%	6%	1%	5%
Silt	1%	0%	1%	0%
Total	99%	100%	101%	100%

[a] Due to rounding, percentages may not equal 100 percent.

3.2. WATER RESOURCES SURVEYS

This section describes the survey of water resources including wetlands, waterbodies, seeps, and springs within the Goldstrike, Carlin, and Crescent Valley survey areas. The survey area for water resources encompassed the Project footprint plus a 400-foot buffer from the centerline of the proposed railway (800-foot survey area) (see Figure 2-1 through Figure 2-9).

3.2.1. Background

The objectives of the wetlands and waters study were to:

- Identify and delineate all water resources within the Project Area and survey area.
- Conduct a Proper Functioning Condition (PFC) assessment of all non-ephemeral wetland and water features that have a predominance of wetland vegetation.

The purpose of this document is to inform future assessments of the potential impacts to water resources.

3.2.2. Study Methodology

This survey involved a pre-field desktop review, followed by an on-site field investigation to identify wetlands, waterbodies, seeps, and springs. The delineation of wetland and waterbodies was conducted per U.S. Army Corps of Engineers (USACE) protocol. Additionally, features classified as perennial or intermittent were further assessed using the BLM's PFC assessment. The definitions for wetland, waterbody, and seeps and springs are presented in their respective subsections in Section 3.2.2.2, Field Assessment.

3.2.2.1. Desktop Assessment

Prior to conducting field surveys, a desktop review was conducted to identify potential water resources within the survey areas. The following datasets were reviewed:

- Aerial imagery
- USGS 7.5-minute Topographic Quadrangles
- USGS NHD
- USFWS NWI
- NHD and NGM seeps and springs data
- NRCS Soil Survey
- Federal Emergency Management Agency National Flood Hazard Layer
- Wetland and waters data provided by NGM

Potential wetlands, waters, and seeps/springs features identified during the desktop review were targeted during the field assessment, as described in Section 3.2.2.2.

In addition to the detailed review of water resources information within the Project Area, the desktop review also reviewed the broader regional setting of the survey areas to provide context to the water resources assessment with regards to the regional geography, climate, ecology, vegetation, fire regime, and hydrology.

3.2.2.2. Field Assessment

The Project Area was assessed either on foot or by vehicle to verify potential wetland or waterbody features identified during the desktop assessment, and to document any other

potential features not identified during the desktop review. Surveys occurred during the following timeframes for each survey type:

- Wetlands: May 29, 2021 through July 19, 2021
- Waterbodies: May 27, 2021 through August 9, 2021
- Seeps and springs: May 29, 2021 through July 16, 2021
- PFC: August 17, 2021 through August 19, 2021

Wetland and waterbody delineations, feature data points, non-water points, and seeps and springs data were collected digitally using geographic positioning system (GPS) units with sub-meter accuracy. Data points are identified using the naming convention in Table 3.2-1. After the data was collected, it was reviewed for spatial and descriptive accuracy using ArcGIS and then exported to Microsoft® Excel® spreadsheets for review.

Table 3.2-1: Wetland and Water Resource Naming Protocol for Unique Identifications

Water Resource	Type	Survey Area	Field Crew Letter	Feature Number	Special Designation	Example
Wetland	w = wetland	ca = Carlin	Crew letter (e.g., a, b, c)	001, 002, 003, …	f = PFO [a] e = PEM [a] s = PSS [a]	wcaa001e
Waterbody	s = stream o = open waterbody	cr = Crescent Valley	Crew letter (e.g., a, b, c)	001, 002, 003, …	p = Perennial[b] i = Intermittent [b] e = Ephemeral [b]	scaa001p
Seep or Spring	p = seep or spring	go = Goldstrike	Crew letter (e.g., a, b, c)	001, 002, 003, …	NA	pcaa001
Non-water Point	no = non-water		crew letter (e.g., a, b, c)	001, 002, 003, …	NA	nocaa001

NA = not applicable
[a] Wetland classification/acronym based on *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979):
PEM = palustrine emergent
PFO = palustrine forested
PSS = palustrine scrub-shrub
[b] Flow regime is in accordance with 33 CFR Part 328.

Information was also recorded (such as connections to upstream and downstream waterbodies) that may be used in the future for determining the jurisdictional status of the features and/or for permitting potential impacts to regulated wetlands or waters.

Wetlands

The USACE and the USEPA define wetlands as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3). Three characteristics are required for an area to meet the above definition: a predominance of hydrophytic vegetation; the presence of hydrology; and the presence of hydric soils under normal circumstances.

The field delineation of wetlands and their boundaries was conducted using methodology described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory

1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0)* (USACE 2010). The *National Wetland Plant List,* Version 3.5 (USACE 2020) was referenced for the determination of plant indicator status, and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) was used to classify wetlands based on vegetation type. Areas that were identified as NWI wetlands during the desktop review were field-verified.

Waterbodies

In contrast to wetlands, waters are typically less vegetated or non-vegetated; have a bed, bank, and ordinary high water mark (OHWM); and include streams, rivers, ponds, or lakes (Lichvar and McColley 2008). Areas identified as stream or open water features by the NHD or NWI databases were field-verified. Waterbodies documented during the field survey were categorized as either linear waterbodies or open waterbodies. Streams and open water features may or may not have had flowing water when observed in the field.

For each waterbody feature, numerous descriptive attributes were documented, including hydrologic regime (perennial, intermittent, or ephemeral), type of waterbody (linear or open water), general quality, artificial versus natural, description of sinuosity, substrate type, water depth, presence of riparian zone, dominant bank vegetation, presence of aquatic habitat and organisms, disturbance factors, width of the OHWM, and relevant OHWM indicators. OHWM identification followed the USACE's *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual* (Lichvar and McColley 2008). Three photos were taken of each waterbody feature.

The following hydrologic regime classifications were applied to each waterbody feature:

- **Perennial**: A stream that has continuously flowing water year-round during a typical year. The water table is located above the stream bed for most of the year, and groundwater is the primary source of water for stream flow. Runoff from rainfall or snowmelt is a supplemental source of water for stream flow.
- **Intermittent**: A stream that typically has flowing water during at least 3 months out of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water but may contain pools, and runoff from rainfall is a supplemental source of water for stream flow.
- **Ephemeral**: A stream that has flowing water only during and for a short duration after precipitation events. Ephemeral stream beds are located above the water table year-round; therefore, groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Seeps and Springs

Seeps and springs are areas where the groundwater table discharges at the surface. There is little difference between a seep and a spring. Generally, if the rate of flow is rapid and continuous, it is called a spring. If the flow is slow and intermittent, it is called a seep. Nevada

defines a seep as an area of minor groundwater outflow onto the land surface, whereas a spring is defined as a concentrated discharge of ground water coming out at the surface as flowing water, more or less continuously (NDWR 2021).

Seeps and springs are considered a Nevada Important Habitat because they provide moist oasis areas unique in these types of arid environments to species, including threatened and endangered species. Seeps and springs are treated as wetlands in Nevada, but they may or may not be considered wetlands per USACE protocol, as seeps and springs may not have all three USACE-required parameters present to be considered a wetland. All seeps and springs observed in the field were documented as such, and any associated wetland or water features were recorded separately. Observations about the presence of standing and/or flowing water, substrate, and vegetation was also documented.

Proper Functioning Condition Assessment

PFC assessments qualitatively evaluate the functionality of aquatic systems, including both lotic and lentic systems. Lotic systems are characterized by flowing water (e.g., riparian areas along perennial or intermittent streams) and lentic systems are characterized by still or slow-moving water (e.g., seeps, springs, and other non-riverine wetlands). The PFC assessments were performed following the BLM guidance documents for assessing lentic systems (USDI 2020) and lotic systems (USDI 2015). The PFC assessment was not conducted for features classified as ephemeral, as the PFC method is not intended for use on ephemeral features (USDI 2015).

PFC is both the field assessment method and a defined condition of the feature being assessed. Based on qualitative observation in the field, each feature evaluated was placed into one of three rating categories, described below:

1. **Proper Functioning Condition (PFC)**: Based on the BLM guidance documents (USDI 2015, 2020), an aquatic feature is considered to be in PFC, or functioning properly, when adequate vegetation, soil and/or landform, or woody material are present. The presence of these attributes allows the area to function properly by dissipating energies associated with high water flow events, reducing erosion, filtering and capturing sediment to aid in floodplain development, improving floodwater retention and groundwater recharge, and developing root masses for bank stabilization. An aquatic feature in PFC (either lentic or lotic) will, in turn, provide associated values such as wildlife habitat, recreational opportunities, and good water quality.
2. **Functional–at risk (FAR)**: These aquatic features exhibit limited or impaired functioning condition due to the absence of the attributes described above. The absence of one or more existing hydrologic, vegetative, or soil/geomorphic attributes make them susceptible to impairment.
3. **Nonfunctional (NF)**: These aquatic features clearly are not providing adequate vegetation, soil and landform, or woody material to dissipate energies associated with high water flow events. Examples of attributes that would result in a nonfunctional assessment include absence of a floodplain, actively eroding streambanks, excessive soil compaction, and the presence of upland vegetation in a riparian area.

PFC data was documented on PFC data forms from the BLM guidance documents, photos were taken of each feature, and spatial data was recorded using a handheld GPS unit. In addition, in areas where human-caused alterations have resulted in changes in potential and/or a loss of riparian/wetland characteristics and functions, the procedure for addressing altered potential was followed and an Altered Potential Attachment form was completed.

3.2.3. Results

This section presents the results of the desktop review and the field surveys for water resource features within the region and the Project Area.

3.2.3.1. Regional Setting

Ecology

The ecological setting is described in detail in Section 3.1, Ecological Site Description, and is summarized here. The Project is located in the USEPA Central Basin and Range Level III Ecoregion (Bryce et al. 2003). The Project is located among foothills, alluvial fans, alluvial slopes, fan remnants, playas, salt flats, flats, floodplains, inter-mountains basins, and some montane areas. Agricultural activities, historical mining activities, livestock rotation, and wildfire have altered the landscape by disturbing native soils, vegetation, and local hydrology throughout portions of the region.

Surface and Groundwater Hydrology

The Project is located in the Humboldt River Basin (Region 4), which encompasses an area of nearly 17,000 square miles and contains 34 hydrographic areas (NDWP 1999; Plume and Ponce 1999; USGS 2021b). The USGS and the Nevada Division of Water Resources, Department of Conservation and Natural Resources have divided Nevada into discrete hydrologic units for water planning and management purposes (NDWP 1999; NDCNR 2021). These hydrologic units in Nevada are similar to standard USGS hydrologic units but have slightly different boundaries. The Goldstrike Survey Area lies within the Boulder Flat hydrologic unit, the Carlin Survey Area lies within the Maggie Creek Area and Marys Creek Area hydrologic units, and the Crescent Valley Survey Area lies within the Crescent Valley hydrologic unit (Figure 3.2-1).

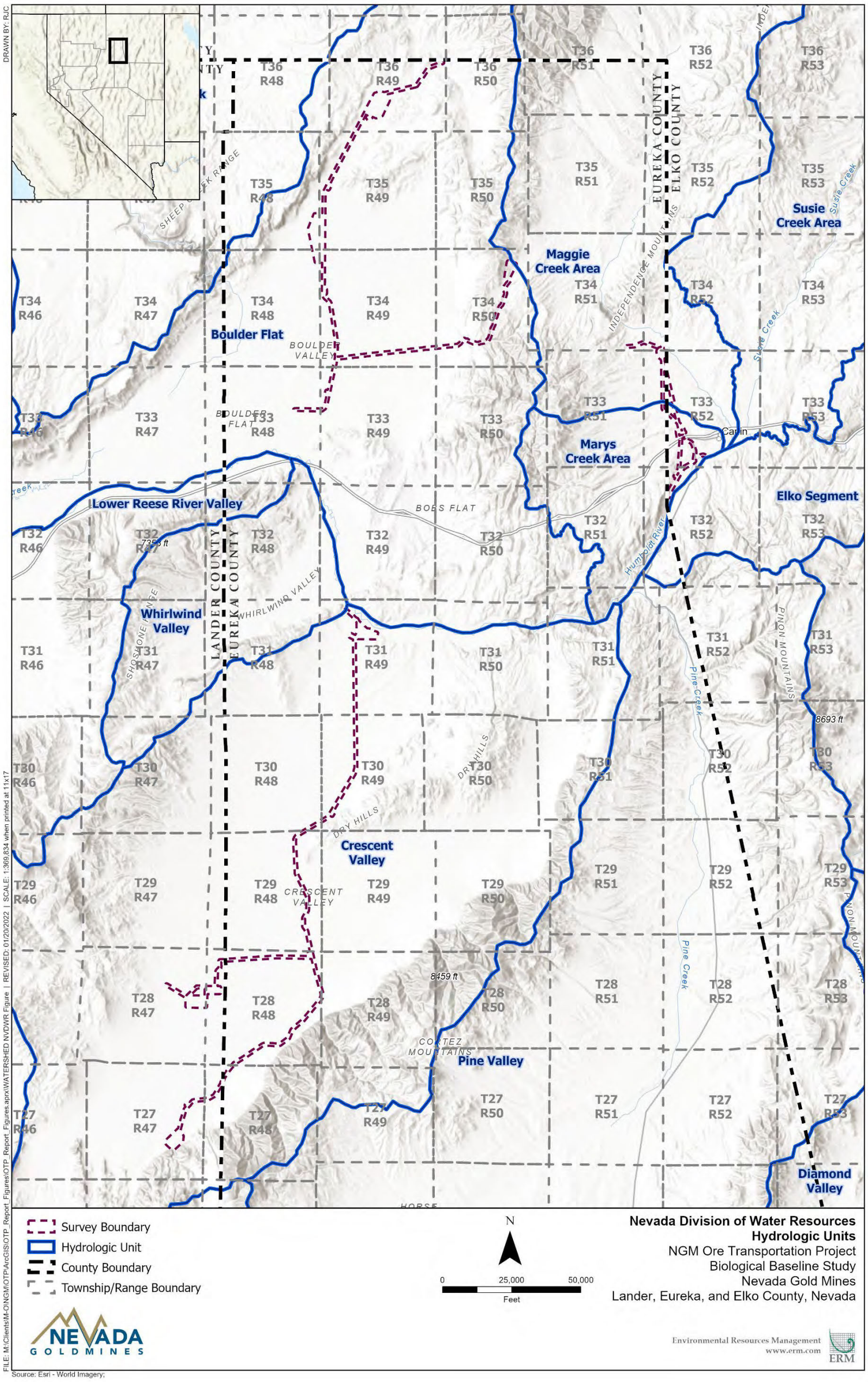


Figure 3.2-1: Nevada Division of Water Resources Hydrologic Units

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Nevada is the driest state in the United States, and most of the surface waters in Nevada are groundwater dependent ecosystems, relying on groundwater as the main water source (BLM 2021). In turn, the main sources of groundwater recharge include rain, snow, and infiltration of surface streamflow (Plume and Ponce 1999). In areas where the valley floors are composed of fine lake sediments, groundwater recharge can be inhibited resulting in the presence of playa lakes (NDWP 1999). Playas are present in several of the valleys in which storm and spring runoff accumulates and stands until it evaporates. In years of very high runoff, some areas—such as the Crescent Valley, which has a very low gradient—will experience through drainage of the playa (Bredehoeft 1963).

Nevada has very few large rivers and streams compared to other states, and the perennial rivers are relatively small. Ephemeral and intermittent streams make up the majority of surface water features, with spring and summer snowmelt supplying most of the streamflow in Nevada (NDWP 1999). Some streams may exhibit dual characteristics with high-elevation perennial streams becoming intermittent or ephemeral near the valley floors (Goodrich et al. 2018; Eureka County 2016). Runoff patterns vary seasonally and geographically and are mainly determined by precipitation patterns (location and timing) and other climate patterns such as temperature (NDWP 1999).

Droughts and floods are common in Nevada. Years of average streamflows are rarely experienced, and periods of high flows followed by low flows are more typical (NDWP 1999). As of October 7, 2021, the Humboldt River Watershed was at 52 percent of the 20-year average annual precipitation amount (NRCS 2021). The Bartlett Decree of 1931 recognized the seasonal and ephemeral nature of many streams within the Humboldt River Basin, referring to them as “flash streams.” These waters were defined as streams “that have a sudden or flash flow or flush flow for a comparatively brief period of time” (NDWP 1999) due to snow melt or flood events.

Surface waters have historically been used for agricultural purposes, mainly for irrigation and livestock. In addition to being a source of recharge to underlying aquifers, streams and wetlands in the region also provide habitat for wildlife (Plume and Ponce 1999). The surface water resources sustain aquatic, riparian, and phraetophytic ecosystems. These ecosystems, in turn, provide habitat for diverse plants and animals, many of which are endemic or sensitive species (BLM 2021). Groundwater in the region is used for municipal, domestic, and mining purposes (Plume and Ponce 1999). Increased demand for groundwater in Nevada has led to increased administration to manage water resources. Hydrographic basins that are identified as being depleted or are in need of additional groundwater management can be designated as groundwater basins by the Nevada State Engineer (NDWP 1999). The Boulder Flat, Maggie Creek Area, and Crescent Valley basins are *Designated* groundwater basins, and the Marys Creek Area basin is a *Designated – Preferred Use* groundwater basin (NDCNR 2021). *Designated* basins do not have any defined administrative controls, whereas *Preferred Use* basins may list certain types of water uses as preferred, and quantity restrictions may be placed on these preferred uses (NDWP 1999).

3.2.3.2. Wetlands

NWI-mapped water features within the survey areas are presented in Figure 3.2-2 through Figure 3.2-4. The wetland features are typically located within the valley bottoms along stream corridors and historic playas. The NWI-mapped features are classified as either palustrine emergent wetland or palustrine scrub-shrub wetland, palustrine unconsolidated bottom wetland/pond, palustrine unconsolidated shore wetland/pond, riverine intermittent, and riverine unknown perennial.

Table 3.2-2 presents the wetland features documented within and near the survey area during the field survey. An overview of the surveyed wetland features in each survey area is presented in Figure 3.2-5, and more detailed figures of the features are provided in Appendix B-1. The field survey mapped a total of 29 wetland features, for a total of 158.33 acres. One feature was in the Goldstrike Survey Area (0.08 acre), 10 features were in the Carlin Survey Area (24.19 acres), and 18 features were in the Crescent Valley Survey Area (134.06 acres). The photo log in Appendix B-2 presents representative photos of the wetlands documented throughout the survey area.

All of the surveyed wetlands were classified as either palustrine scrub-shrub or palustrine emergent, and are typically associated with one of two types of wetland types. The wetlands in the Carlin Survey Area are typically driven by freshwater and are associated with the Humboldt River floodplain. This type of palustrine emergent wetland was observed to be dominated by desert saltgrass (*Distichlis spicata*), Baltic rush (*Juncus balticus*), celery-leaved buttercup (*Ranunculus sceleratus*), and hardstem bulrush (*Schoenoplectus acutus*). The palustrine scrub-shrub wetlands were dominated by coyote willow (*Salix exigua*).

The second type of wetlands were the highly saline playa wetlands in the Crescent Valley Survey Area. These wetlands were typically very sparsely vegetated with some saltgrass, but occasionally greasewood (*Sarcobatus vermiculatus*), a non-wetland species, was also documented. The greasewood was located on pedestal islands of microtopography within the wetland, and in many cases it exhibited signs of stress (presumably due to periodic flooding and high salt content) and was therefore documented as atypical wetland vegetation in these situations.

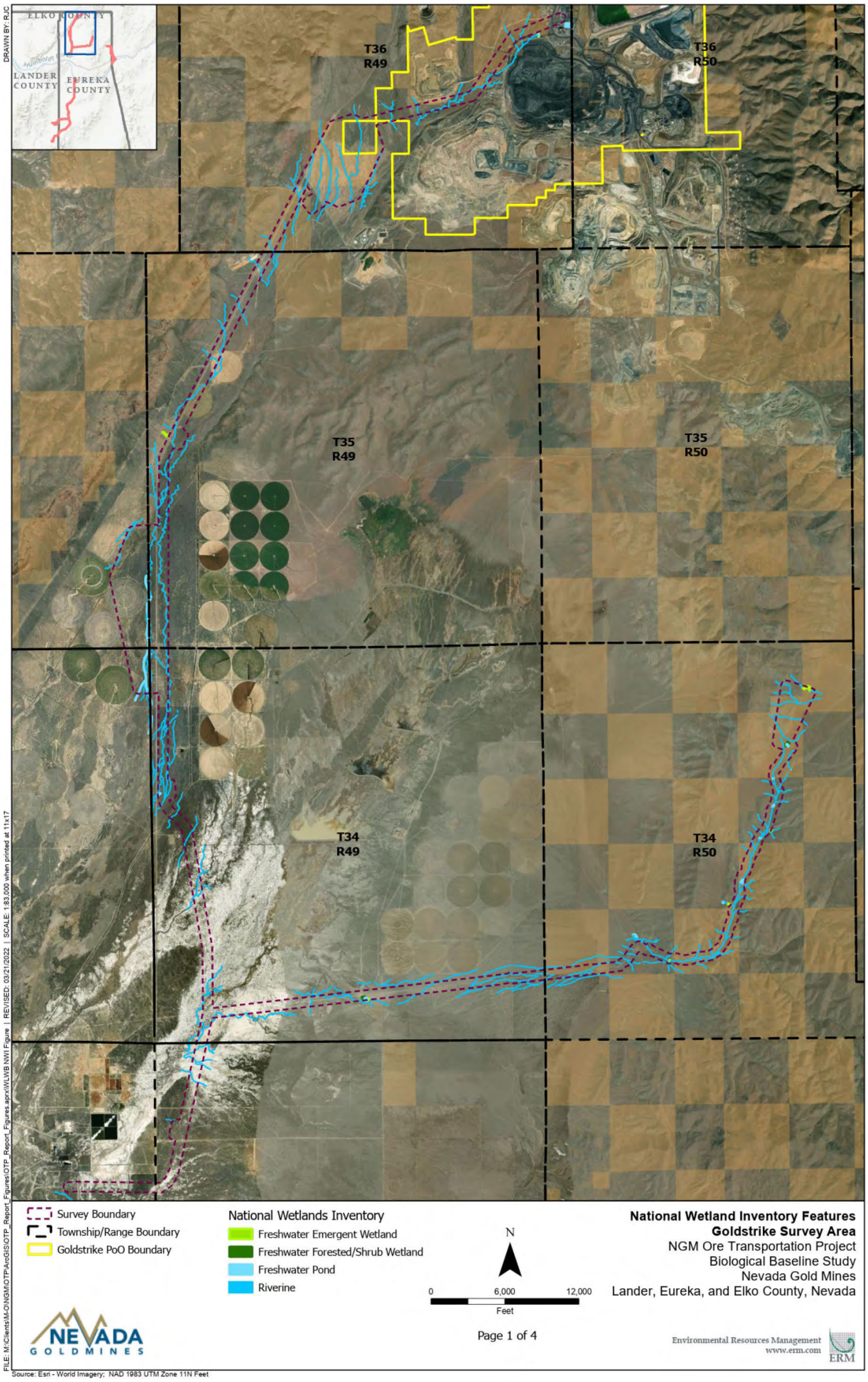


Figure 3.2-2: National Wetland Inventory Features—Goldstrike Survey Area

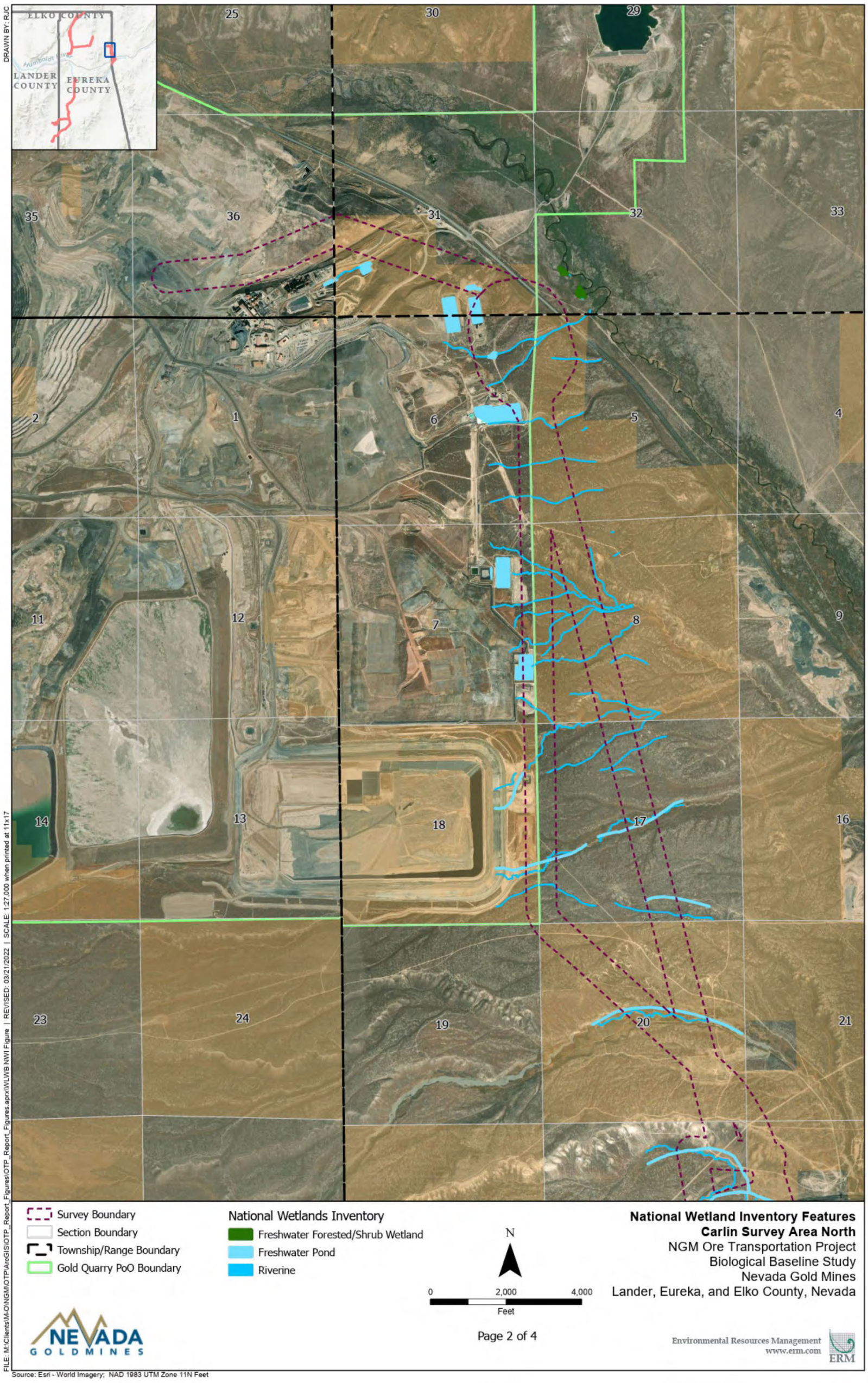


Figure 3.2-3a: National Wetland Inventory Features—Carlin Survey Area North

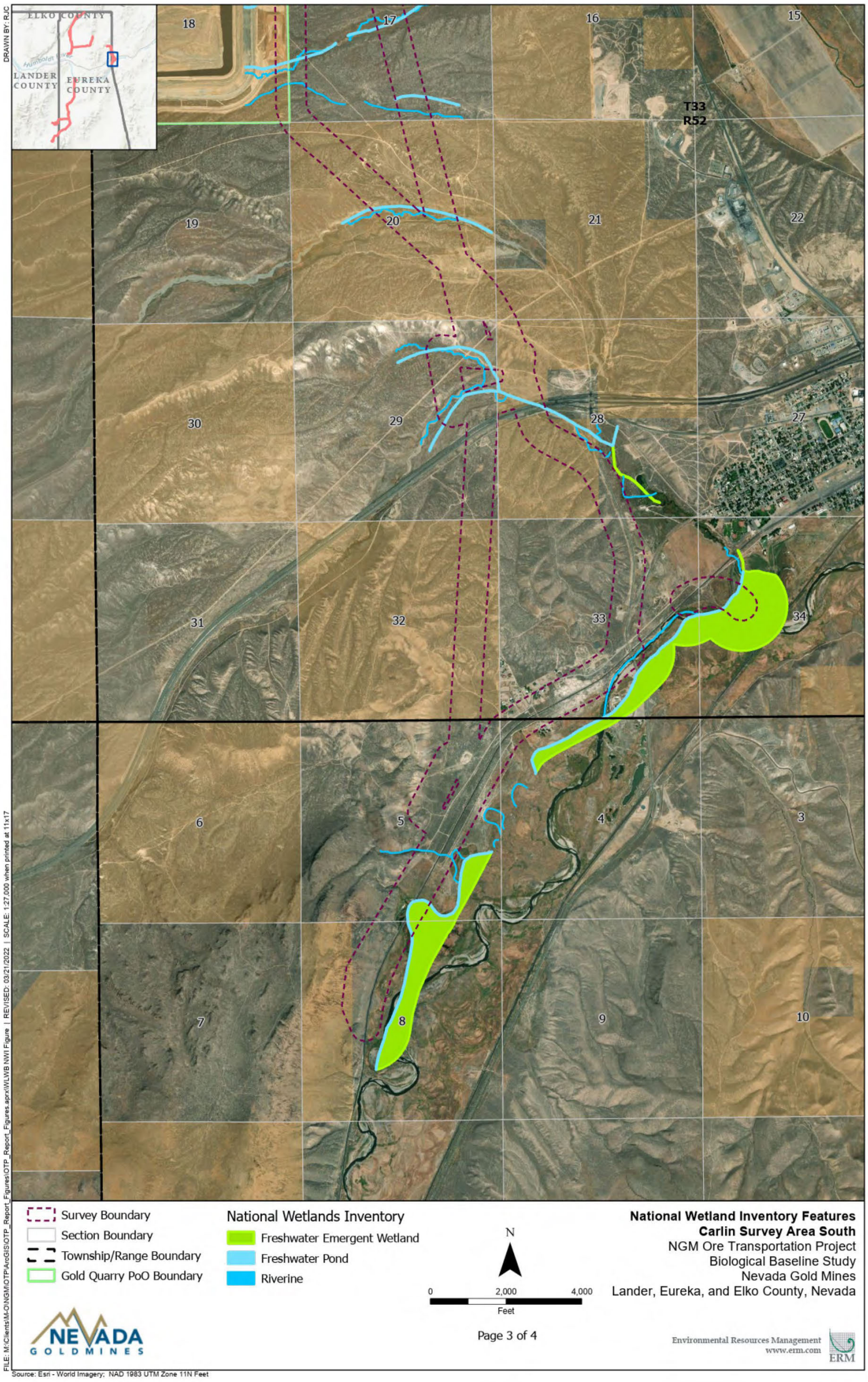


Figure 3.2-3b: National Wetland Inventory Features—Carlin Survey Area South

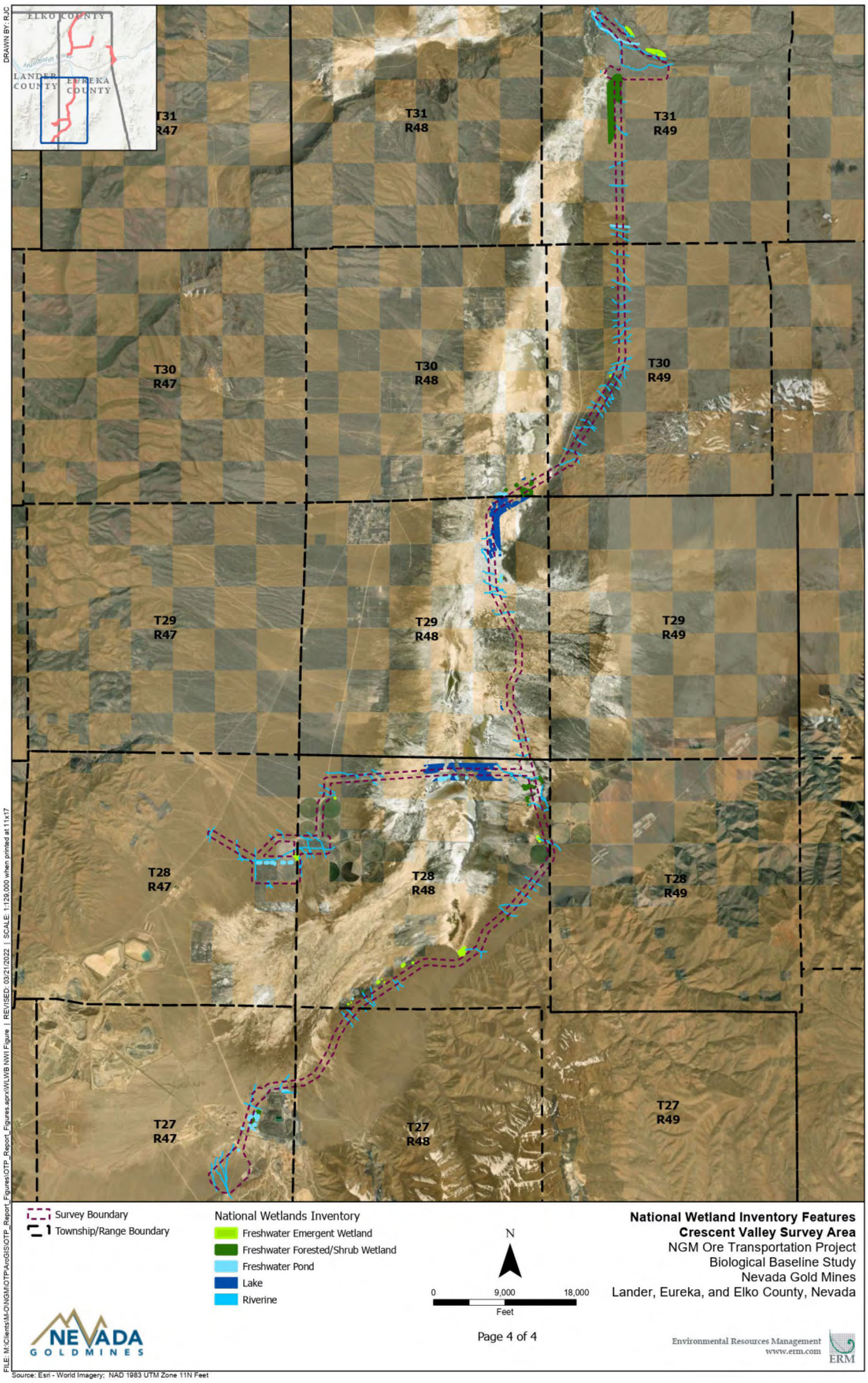


Figure 3.2-4: National Wetland Inventory Features—Crescent Valley Survey Area

Table 3.2-2: Wetland Features Mapped in the Survey Areas

Unique ID	Classification[a]	Comments	Area (acres)
Goldstrike Survey Area			
wgoc001e	PEM	No comments	0.08
Carlin Survey Area			
wcaa001e[b]	PEM	Depressional PEM wetland adjacent railroad; areas of standing water, varying degrees of hydrology, weedy	3.54
wcaa002e	PEM	Humboldt River floodplain; historic channel bed	1.69
wcaa002s	PSS	Sandbar willow thicket with historic channel and current floodplain of the Humboldt River	2.45
wcaa003e[b]	PEM	No comments	4.61
wcaa003s[b]	PSS	No soil profile taken; assumed saturation due to standing water and inaccessibility	1.27
wcac001e	PEM	Vegetation is becoming stressed especially along edges; not normal circumstances due to drought conditions	0.31
wcac002e[b]	PEM	Water culverted and manipulated to run under railroad tracks; flow altered; soil so saturated and dark unable to see redox, assumed due to the saturation	10.12
wcac003e	PEM	The wetland has shifted from a streambed to a wetland as it is fully vegetated; soil is still dominated by gravel	0.05
wcac004e[b]	PEM	No comments	0.14
Crescent Valley Survey Area			
wcra001e	PEM	Saturated heavy clay soil; seep wetland in depressional area at break of topography	0.03
wcra002s	PSS	Greasewood shrubs are on pedestals and show extreme signs of stress; seep wetland in depressional area at break of topography; area near seep is continually saturated and has formed gleyed soils; this depressional area within the playa sees regular hydrologic function and has created a wetland area that is dominated by greasewood	3.16
wcra003e	PEM	Sparse vegetation of saltgrass and salt cedar; salt crust, bio crust, position, hydro veg, saturation	0.10
wcra004e	PEM	Salt crust, bio crust, position, hydro veg, saturation	0.19
wcra005s	PSS	Greasewood is on pedestals and shows significant signs of distress; hydrology / hydric soils / veg, soil cracks	4.54
wcra006e[b]	PEM	hydric soils, hydrology, hydro veg	1.32
wcra006s[b]	PSS	Greasewood on pedestals	5.50
wcra007e	PEM	No comments	5.63
wcra007s	PSS	Distressed greasewood on islands/terraces; hydrology, hydro plants, and hydric soils; surface water on portions, saturation, stressed scrub	4.18
wcra008s	PSS	No comments	10.13
wcra009e	PEM	Overflow from cattle trough	0.10
wcra010e	PEM	Playa wetland; regularly flooded and saturated	12.94

Unique ID	Classification[a]	Comments	Area (acres)
wcra011e	PEM	Playa wetland is dominated by salt-grass and greasewood	18.48
wcra012s	PSS	No comments	25.28
wcra013e	PEM	Sparsely vegetated concave salt flat area with salt crusts; atypical soils: salt masking redox features	9.70
wcra014e	PEM	No comments	1.10
wcrc001e	PEM	Playa wetland; greasewood on pedestals throughout the wetland, atypical vegetation due to hard surface, patchy; atypical wetland soil, higher salt content	31.40
wcrc002e	PEM	Salt crusts on herbs, some distressed herbs; stream floodplain	0.27

[a] PEM = palustrine emergent; PSS = palustrine scrub-shrub (Cowardin et al. 1979)
[b] Examined for Proper Functional Condition (see Section 3.2.3.5)

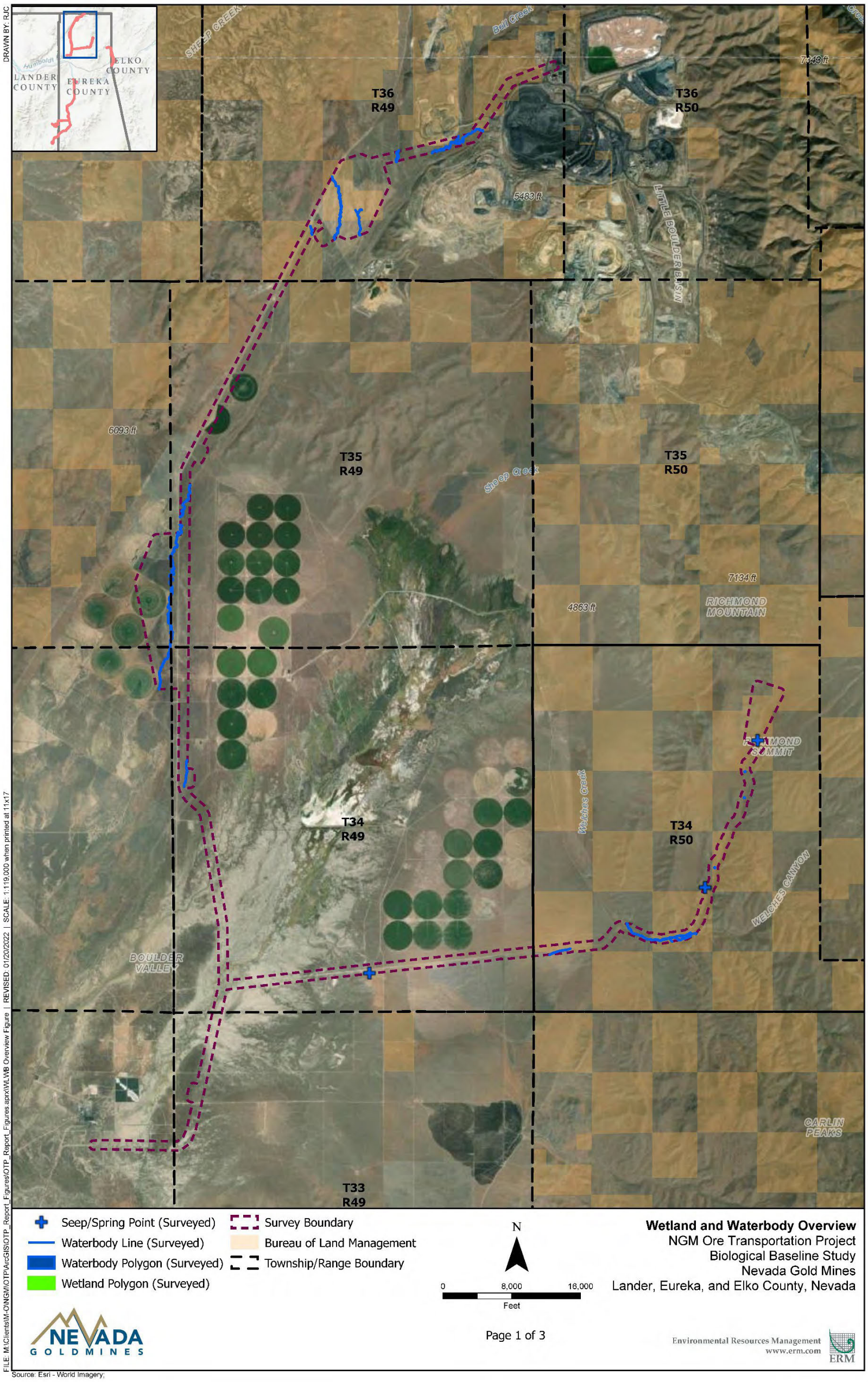


Figure 3.2-5a: Wetland and Waterbody Overview

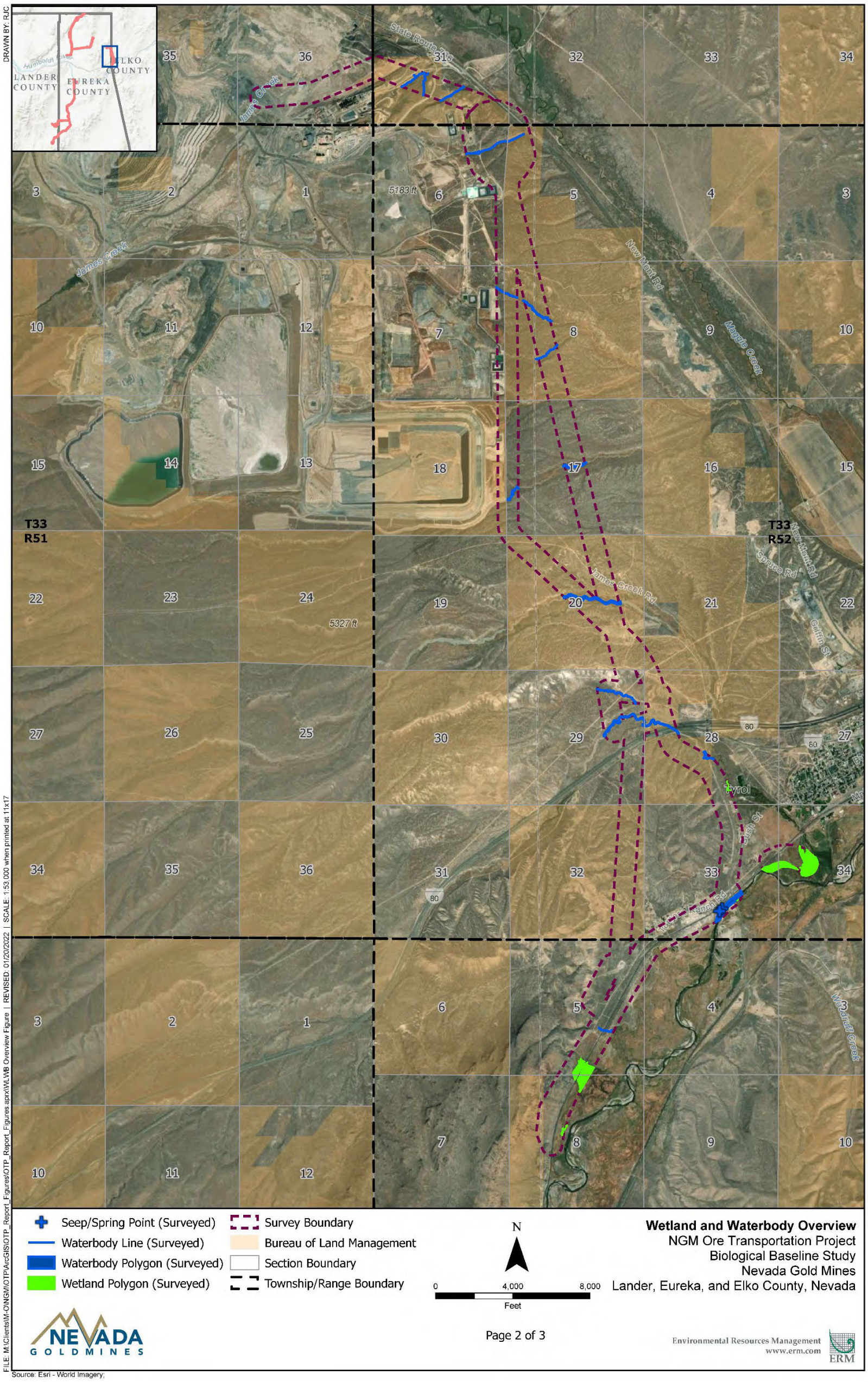


Figure 3.2-5b: Wetland and Waterbody Overview

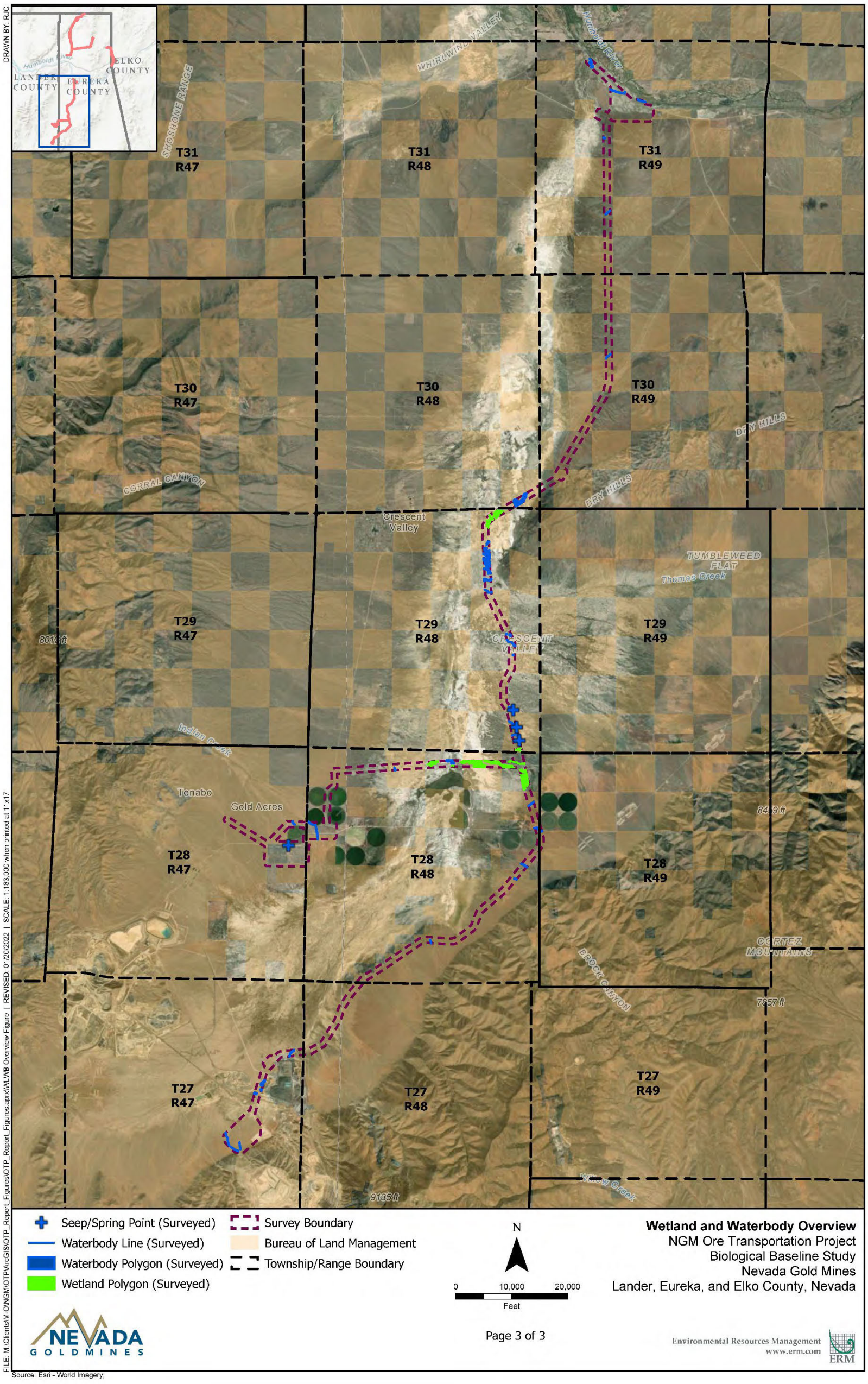


Figure 3.2-5c: Wetland and Waterbody Overview

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3.2.3.3. Waters

NHD-mapped waters features within the survey areas are presented in Figure 3.2-6 through Figure 3.2-8. The Humboldt River is the only stream feature within the Project Area mapped by NHD as perennial, and is adjacent to the southern portion of the Carlin Survey Area. The remainder of the NHD-mapped features are classified as ephemeral or intermittent. The locations of all NHD features were verified during field surveys. Water features were recorded when present. If no feature was identified, a non-water point was recorded.

The field survey mapped a total of 89 water features, for a total of 40.92 acres of open waterbodies and 107,866 feet (20.4 miles) of streams. The linear water features included natural stream channels as well as artificial or manipulated channels and ditches. Open waterbodies included impounded ponds for stock or mining use and natural ponds and playas.

Table 3.2-3 presents the water features documented within the survey areas, including water regime classification and acreage (for open waterbodies such as ponds and playas) or linear feet (for linear stream features). An overview of the surveyed water features in each survey area is presented in Figure 3.2-5, and more detailed figures of the features are provided in Appendix B-1. Twenty-six features are in the Goldstrike Survey Area (0.59 acre and 58,434 feet), 20 features are in the Carlin Survey Area (0.24 acre and 21,558 feet), and 43 features are in the Crescent Valley Survey Area (40.10 acres and 27,837 feet). Nearly all of the features were classified as ephemeral, with a smaller number of features classified as intermittent or perennial. The condition of these intermittent and perennial waters features is presented in Section 3.2.3.5, Proper Functioning Condition Assessment (Table 2-5). Representative photos of the waterbodies documented throughout the Project Area are included in Appendix B-2.

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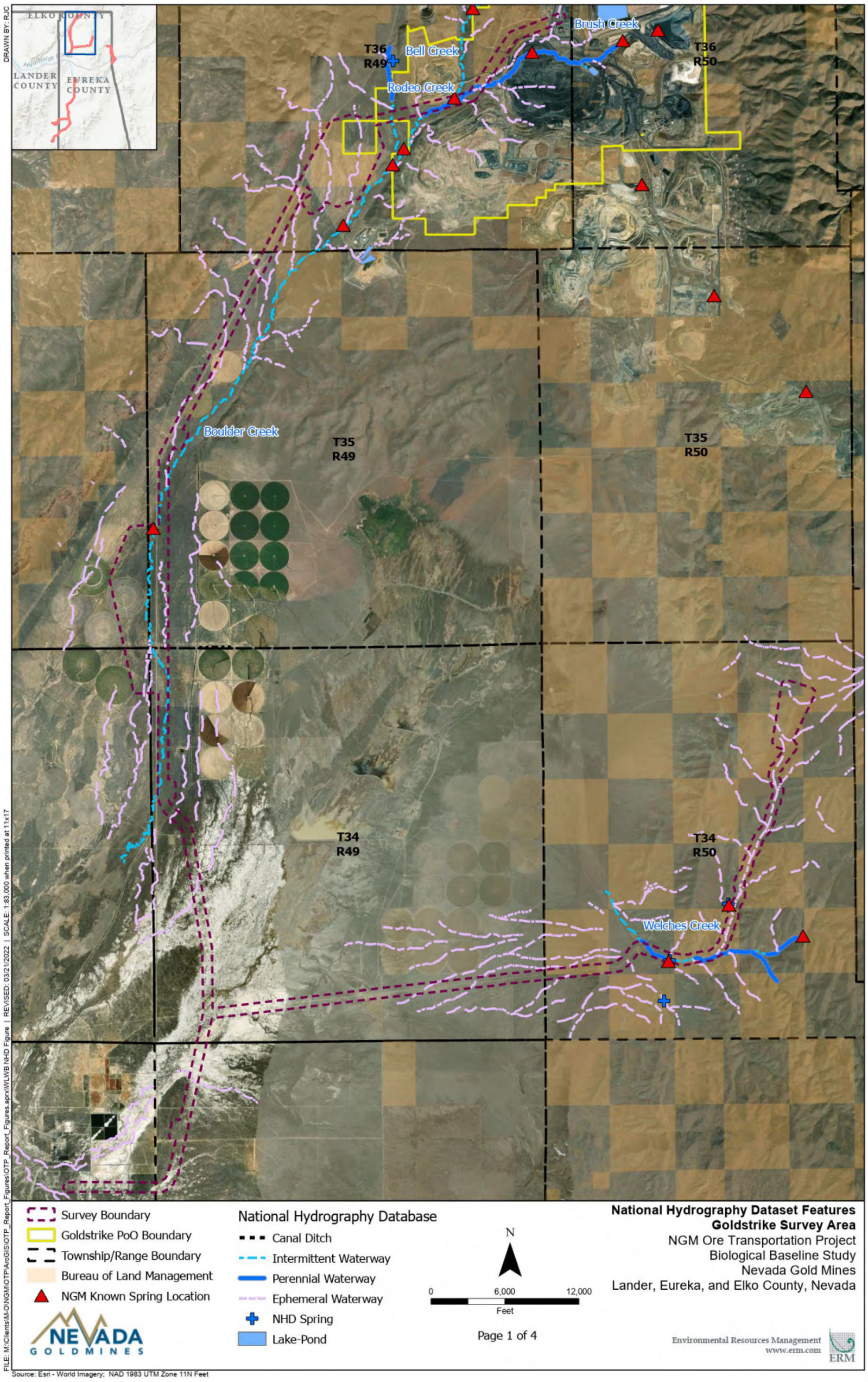


Figure 3.2-6: National Hydrography Dataset Features—Goldstrike Survey Area

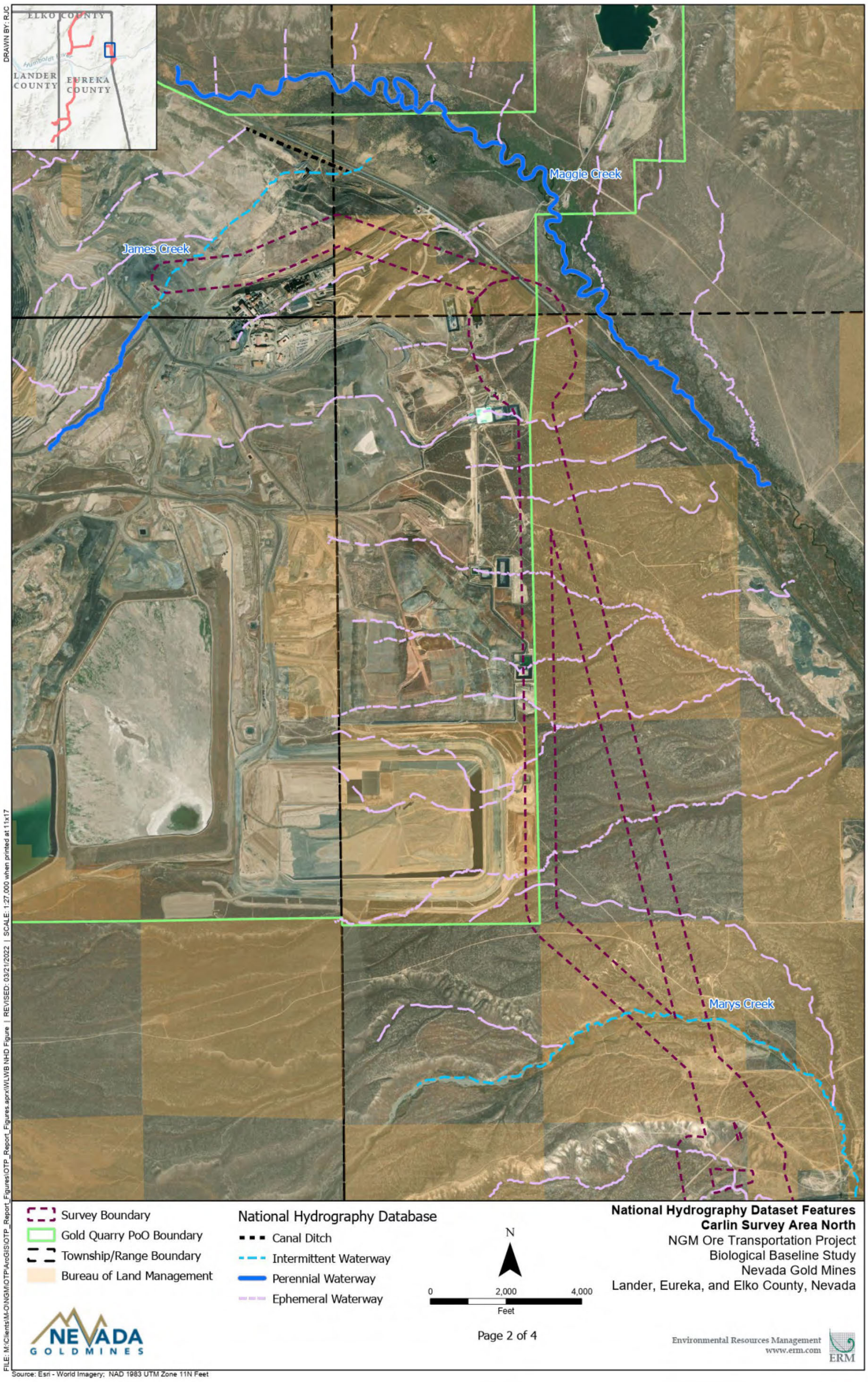


Figure 3.2-7a: National Hydrography Dataset Features—Carlin Survey Area North

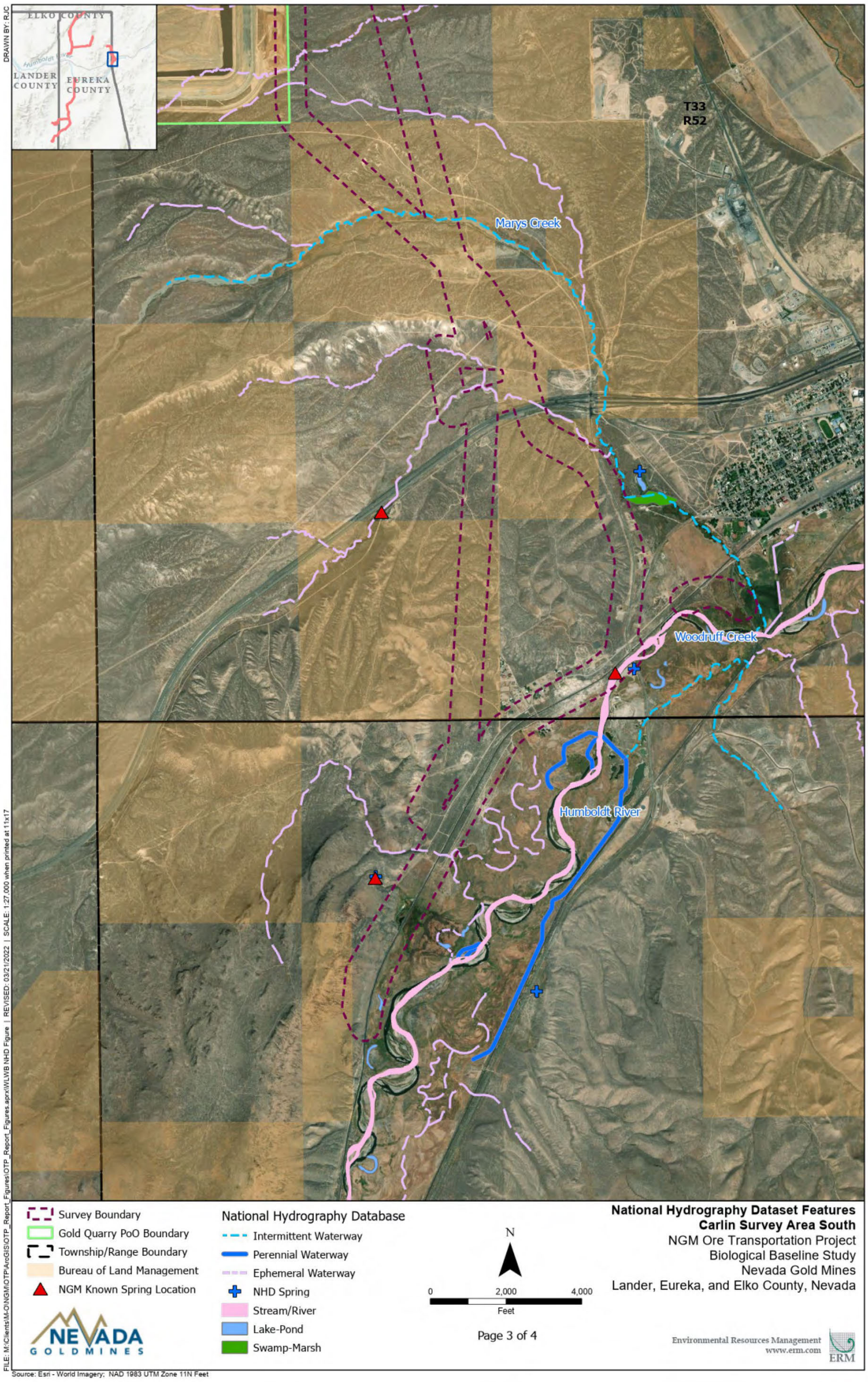


Figure 3.2-7b: National Hydrography Dataset Features—Carlin Survey Area South

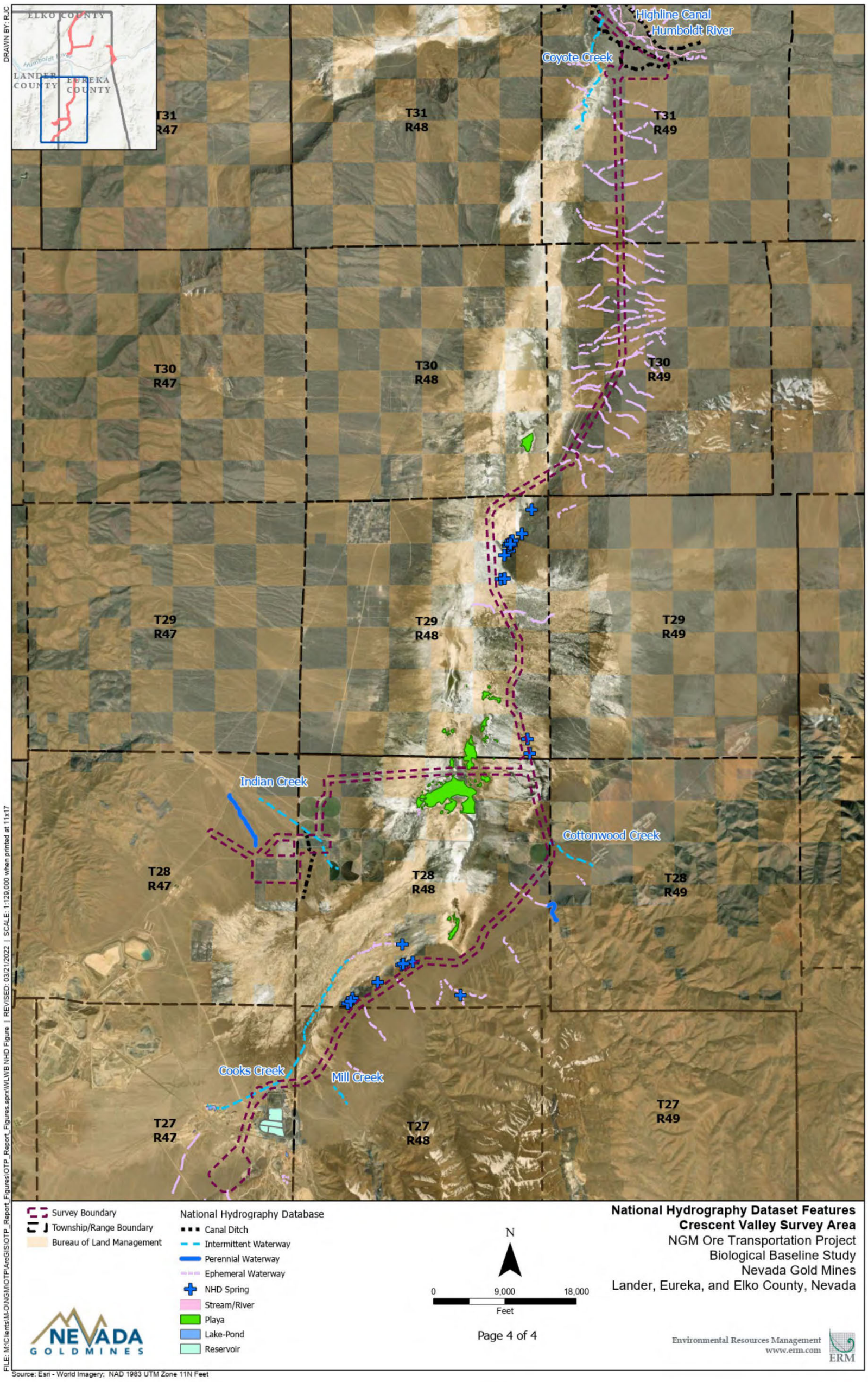


Figure 3.2-8: National Hydrography Dataset Features—Crescent Valley Survey Area

Table 3.2-3: Water Features Mapped in the Survey Areas

Unique ID	Water Type	Flow Regime	Surface Water Present?	Area (acres)	Linear Feet	Feature Name	Comments
Goldstrike Survey Area							
ogoa006e	Open Waterbody	Ephemeral	No	0.02	N/A	Unnamed	Bermed tank
ogoa004e	Open Waterbody	Ephemeral	No	0.06	N/A	Unnamed	Stock pond
ogoa002e	Open Waterbody	Ephemeral	No	0.07	N/A	Unnamed	Bermed stock pond
ogoa005e	Open Waterbody	Ephemeral	No	0.08	N/A	Unnamed	Low quality stock pond
ogoa003e	Open Waterbody	Ephemeral	No	0.13	N/A	Unnamed	Bermed stock pond
ogoa001e	Open Waterbody	Ephemeral	No	0.24	N/A	Unnamed	Stock pond
sgoa001e	Linear Feature	Ephemeral	No	N/A	554	Boulder Creek	Large ephemeral desert wash
sgoa002e	Linear Feature	Ephemeral	No	N/A	2,528	Unnamed	Ephemeral drainage through invasive annual grass and forb area
sgoa003p [a]	Linear Feature	Perennial	Yes	N/A	1,189	Welches Creek	Fringe PEM wetland
sgoa004i [a]	Linear Feature	Intermittent	No	N/A	1,935	Boulder Creek	No comments
sgoa005e	Linear Feature	Ephemeral	No	N/A	2,671	Unnamed	Very weakly defined bed/bank
sgoa006e	Linear Feature	Ephemeral	No	N/A	372	Unnamed	Very weakly defined bed/bank
sgoa007e	Linear Feature	Ephemeral	No	N/A	8,381	Unnamed	Dry at time of visit
sgoa008e	Linear Feature	Ephemeral	No	N/A	1,010	Unnamed	Weakly defined ephemeral stream; bed/bank recognizable
sgoc001e	Linear Feature	Ephemeral	No	N/A	23,263	Boulder Creek	Dry at time of visit; Ephemeral braided channel, Manipulated, Cattle Impact
sgoc002e	Linear Feature	Ephemeral	No	N/A	197	Unnamed	Dry at time of visit
sgoc003e	Linear Feature	Ephemeral	No	N/A	475	Unnamed	Dry at time of visit
sgoc004e	Linear Feature	Ephemeral	No	N/A	1,608	Unnamed	No comments
sgoc005e	Linear Feature	Ephemeral	No	N/A	407	Unnamed	No comments

Unique ID	Water Type	Flow Regime	Surface Water Present?	Area (acres)	Linear Feet	Feature Name	Comments
sgoc006i [a]	Linear Feature	Intermittent	No	N/A	1,652	Welches Creek	Perennial turns intermittent. Loses waterflow
sgoc007p [a]	Linear Feature	Perennial	Yes	N/A	881	Welches Creek	Fringe PEM wetland
sgoc008i [a]	Linear Feature	Intermittent	No	N/A	1,883	Welches Creek	Perennial stream loses water; very sparse pools
sgoc009e	Linear Feature	Ephemeral	No	N/A	1,932	Unnamed	No comments
sgoc011e	Linear Feature	Ephemeral	No	N/A	3,651	Rodeo Creek	No comments
sgoc012e [a]	Linear Feature	Ephemeral	No	N/A	642	Bell Creek	No comments
sgoc013e [a]	Linear Feature	Ephemeral	No	N/A	3,204	Rodeo Creek	No comments
Carlin Survey Area							
ocac001e	Open Waterbody	Ephemeral	No	0.03	N/A	Unnamed	No comments
ocac002e	Open Waterbody	Ephemeral	No	0.21	N/A	Unnamed	Dry at time of visit
scaa001e	Linear Feature	Ephemeral	No	N/A	567	Unnamed	No comments
scaa002e	Linear Feature	Ephemeral	No	N/A	1,000	Unnamed	Does not appear to function at this time; manipulated at mine upstream; filling in; banks degrading
scaa003e	Linear Feature	Ephemeral	No	N/A	966	James Creek	No comments
scac001p [a]	Linear Feature	Perennial	Yes	N/A	1,327	Humboldt River	No comments
scac002e	Linear Feature	Ephemeral	No	N/A	512	Unnamed	No comments
scac003e	Linear Feature	Ephemeral	No	N/A	72	Unnamed	No comments
scac004e	Linear Feature	Ephemeral	No	N/A	1,075	Unnamed	Manipulated
scac005e	Linear Feature	Ephemeral	No	N/A	126	Unnamed	No comments
scac006e	Linear Feature	Ephemeral	No	N/A	223	Unnamed	No comments
scac007e	Linear Feature	Ephemeral	No	N/A	1,067	Unnamed	Manipulated ephemeral stream through sagebrush uplands
scac008e	Linear Feature	Ephemeral	No	N/A	2,497	Unnamed	Dry at time of visit
scac009e	Linear Feature	Ephemeral	No	N/A	3,919	Unnamed	Dry at time of visit

Unique ID	Water Type	Flow Regime	Surface Water Present?	Area (acres)	Linear Feet	Feature Name	Comments
scac010e	Linear Feature	Ephemeral	No	N/A	111	Unnamed	Dry at time of visit
scac011e	Linear Feature	Ephemeral	No	N/A	1,995	Unnamed	No comments
scac012e	Linear Feature	Ephemeral	No	N/A	2,435	Marys Creek	Dry at time of visit
scac013e	Linear Feature	Ephemeral	No	N/A	1,596	James Creek	Dry at time of visit
scac014e	Linear Feature	Ephemeral	No	N/A	927	Unnamed	Dry at time of visit
scac015e	Linear Feature	Ephemeral	No	N/A	1,145	Unnamed	Dry at time of visit
Crescent Valley Survey Area							
ocrc009e	Open Waterbody	Ephemeral	No	0.03	N/A	Unnamed	Noticeable soil surface change including texture and presence of cracks, visible depressional area; dry at time of visit
ocrc007e	Open Waterbody	Ephemeral	No	0.03	N/A	Unnamed	Noticeable soil surface change including texture and presence of cracks, visible depressional area; dry at time of visit
ocrc005e	Open Waterbody	Ephemeral	No	0.04	N/A	Unnamed	Noticeable soil surface change including texture and presence of cracks, visible depressional area; dry at time of visit
ocrc004e	Open Waterbody	Ephemeral	No	0.08	N/A	Unnamed	Noticeable soil surface change including texture and presence of cracks, visible depressional area; dry at time of visit
ocra006e	Open Waterbody	Ephemeral	No	0.16	N/A	Unnamed	Excavated pit area
ocra005p [a]	Open Waterbody	Perennial	Yes	0.20	N/A	Unnamed	No comments
ocrc008e	Open Waterbody	Ephemeral	No	0.24	N/A	Unnamed	Noticeable soil surface change including texture and presence of cracks, visible depressional area; dry at time of visit
ocra003p [a]	Open Waterbody	Perennial	Yes	0.28	N/A	Unnamed	No comments
ocra002p [a]	Open Waterbody	Perennial	Yes	0.88	N/A	Unnamed	No comments

Unique ID	Water Type	Flow Regime	Surface Water Present?	Area (acres)	Linear Feet	Feature Name	Comments
ocra010e	Open Waterbody	Ephemeral	No	1.21	N/A	Unnamed	No comments
ocra004p [a]	Open Waterbody	Perennial	Yes	2.43	N/A	Unnamed	No comments
ocra001e	Open Waterbody	Ephemeral	Yes	2.43	N/A	Unnamed	Episodic ephemeral playa pond/lake
ocrc002e	Open Waterbody	Ephemeral	No	18.43	N/A	Unnamed	Noticeable soil surface change including texture and presence of cracks, visible depressional area; dry at time of visit
ocra007e	Open Waterbody	Ephemeral	No	4.11	N/A	Unnamed	Episodic ephemeral playa pond/lake
ocra008e	Open Waterbody	Ephemeral	No	0.85	N/A	Unnamed	Episodic ephemeral playa pond/lake
ocra009e	Open Waterbody	Ephemeral	No	0.26	N/A	Unnamed	Episodic ephemeral playa pond/lake
ocra0011e	Open Waterbody	Ephemeral	No	8.43	N/A	Unnamed	Episodic ephemeral playa pond/lake
scra001e	Linear Feature	Ephemeral	No	N/A	664	Unnamed	No comments
scra002i [a]	Linear Feature	Intermittent	No	N/A	1,214	Cottonwood Creek	Very manipulated
scra003e	Linear Feature	Ephemeral	No	N/A	869	Unnamed	No comments
scra004e	Linear Feature	Ephemeral	No	N/A	1,539	Unnamed	No comments
scra005e	Linear Feature	Ephemeral	No	N/A	908	Unnamed	No comments
scra006e	Linear Feature	Ephemeral	No	N/A	630	Unnamed	Confluence with scra005e
scra007e	Linear Feature	Ephemeral	No	N/A	1,002	Unnamed	No comments
scra008e	Linear Feature	Ephemeral	No	N/A	491	Unnamed	Self-contained ephemeral drain
scra009e	Linear Feature	Ephemeral	No	N/A	1,282	Unnamed	Ephemeral drainage through upland salt scrubland; very few flow indicators
scra010e	Linear Feature	Ephemeral	No	N/A	796	Unnamed	Weakly defined bed/bank; turns into swale within corridor
scra011e	Linear Feature	Ephemeral	No	N/A	2,156	Unnamed	Maintained ditch; no evidence of flow

Unique ID	Water Type	Flow Regime	Surface Water Present?	Area (acres)	Linear Feet	Feature Name	Comments
scra012e	Linear Feature	Ephemeral	No	N/A	1,743	Coyote Creek	Very weak ephemeral channel, many swale sections, but all continuous; borderline jurisdictional "stream"
scra013e	Linear Feature	Ephemeral	No	N/A	249	Unnamed	Weak ephemeral stream through upland greasewood
scra014e	Linear Feature	Ephemeral	No	N/A	1,032	Unnamed	Maintained ditch
scra015p [a]	Linear Feature	Perennial	Yes	N/A	2,997	Unnamed	Manipulated; culverts, discharge pipes, artificial channelized with berms
scra016e	Linear Feature	Ephemeral	No	N/A	897	Unnamed	Weak indicators of bed/bank in most places; however strong soil/veg indicators in some
scra017e	Linear Feature	Ephemeral	No	N/A	503	Unnamed	No comments
scra018e	Linear Feature	Ephemeral	No	N/A	2,600	Unnamed	Swale breaks; excavated/ditched
scra019e	Linear Feature	Ephemeral	No	N/A	958	Unnamed	No comments
scra020e [a]	Linear Feature	Ephemeral	No	N/A	836	Unnamed	Dry ephemeral stream, rocky bottom; both banks appear manipulated, artificially heightened by soil addition
scra021e	Linear Feature	Ephemeral	No	N/A	347	Unnamed	Potential historic channel, upland vegetation now moving in; wide, gravelly apparent stream bed
scra022e	Linear Feature	Ephemeral	No	N/A	316	Unnamed	Weak ephemeral channelization; from/to overland erosional flow
scrc001e	Linear Feature	Ephemeral	No	N/A	472	Unnamed	Dry at time of visit
scrc002e	Linear Feature	Ephemeral	No	N/A	750	Unnamed	Dry at time of visit
scrc003e	Linear Feature	Ephemeral	No	N/A	1,580	Unnamed	Dry at time of visit
scrc004e	Linear Feature	Ephemeral	No	N/A	1,040	Unnamed	Dry at time of visit

NA = data not available
[a] Examined for Proper Functional Condition, see Section 3.2.3.5

3.2.3.4. Seeps and Springs

Seeps and springs are common throughout the region. More than 1,600 seeps and springs have been catalogued with Eureka County alone (Eureka County 2016). NGM maintains a dataset of seep and spring locations based on surveys completed for their facilities. Seeps and springs features within the survey areas as mapped by the NHD and NGM are presented on Figure 3.2-5. Five seeps/springs were documented during the field surveys: three in the Goldstrike Survey Area and two in the Carlin Survey Area.

Nine seeps and springs were documented during the field assessment. Table 3.2-4 presents the seeps and springs features mapped within or near the survey areas. The surveyed wetland and/or waters feature associated with each seep or spring (as presented in Tables 2.2-2 and 2.2-3 above) is also cross referenced in Table 3.2-4. Some of the features were a short distance outside the limits of the survey area but were documented and have been included in this report. An overview of the surveyed seeps and springs in each survey area is presented in Figure 3.2-5, and more detailed figures of the features are provided in Appendix B-1. Representative photos of the seeps and springs are presented in Appendix B-2.

The three features in the Goldstrike Survey Area were all associated with stock tanks and adjacent stock ponds that were dry at the time of survey. Both features in the Carlin Survey Area were documented within the OHWM of the Humboldt River. One of the springs (pcac001) had been previously documented by NGM. One of the features in the Crescent Valley Survey Area was associated with a stock tank and a wetland that had formed adjacent to the tank. Two seeps were associated with ephemeral channels. The remaining seep was isolated and not associated with any other features.

Table 3.2-4: Seeps and Springs Mapped in the Survey Areas

Unique ID	Type / Comments	Associated Surveyed Wetland or Water Feature	NGM Sample ID
	Goldstrike Survey Area		
pgoa001	Potentially historic seep/spring associated with a pump operated stock tank	ogoa001e (dry stock pond)	
pgoa002	Potentially historic seep/spring associated with a mechanical pump operated tank	ogoa003e (dry stock pond)	
pgoa003	Potentially historic seep/spring associated with cattle trough with float and tap	ogoa006e (dry stock pond)	Spring 51
	Carlin Survey Area		
pcac001	Spring	scac001p (Humboldt River)	Spring 43
pcac002	Spring (hot)	scac001p (Humboldt River)	
	Crescent Valley Survey Area		
pcra001	Seep	wcra001e (wetland) scra007e (ephemeral channel)	

Unique ID	Type / Comments	Associated Surveyed Wetland or Water Feature	NGM Sample ID
pcra002	Seep	scra004e (ephemeral channel)	
pcra003	Seep/spring associated with cattle trough with spillover into a ponded/wetland area	wcra009e (wetland)	
pcra004	Seep	None	

BLM = Bureau of Land Management; ID = identification; NGM = Nevada Gold Mine

3.2.3.5. Proper Functioning Condition Assessment

All intermittent or perennial aquatic features including wetlands, waters, seeps, and springs identified during the field surveys were reviewed to determine the need for a PFC assessment, and the features selected were assessed using the PFC method for either lentic or lotic systems (USDI 2020 and 2015, respectively).

From August 17 through 19, 2021, a total of 26 sites were visited for PFC assessments. Table 3.2-5 provides details for each site that was assessed. Appendix B-3 provides figures, data forms, and photographs for each site. All visited sites are summarized below.

Seven of the assessed sites were evaluated as having PFC (PFC-010, PFC-013, PFC-015, PFC-016, PFC-017, PFC-020, and PFC-021). Characteristics of these sites included diverse plant and wildlife communities, geomorphic setting adequate to slow water flow, and presence of meandering stream channels for lotic areas.

Three of the assessed sites were evaluated as non-functional (NF; PFC-007, PFC-009, and PFC-012). Limiting factors noted at the NF-rated sites included unstable channels, the absence of a floodplain, and a lack of point bar development due to high energy water flows. Additionally, evidence of livestock grazing was observed and may be limiting the establishment of riparian vegetation and progression of normal channel evolution processes.

Sixteen of the assessed sites were observed to have undergone human-caused alterations that resulted in changes in potential and/or loss of riparian/wetland characteristics and functions. These alterations included dewatering (upstream or at site), diversion, channelization (ditching), and conversion to agriculture (hayfield). Following the completion of an Altered Potential Attachment form, if the alteration was determined to have resulted in artificial conditions for a substantial part of the site, no PFC assessment was conducted and the assessment was concluded. These features were noted as “Not Applicable (NA) / No riparian functions” or “NA / Limited riparian functions.” Four of these 16 sites were determined to not have any riparian or wetland functions and were therefore not assessed. No data forms were completed for these four sites; however, photos of these locations are included in Appendix B-3. Site PFC-003 was observed to be highly altered into a reservoir and corral area and is managed in such a way as to prevent wetland or riparian processes from occurring. Sites PFC-004, PFC-005, and PFC-006 are stock tanks and are not intended to be managed to allow for riparian or wetland functions. Additionally, the sites appear to have the water shut off when cattle are not being actively managed in the area.

Table 3.2-5: Aquatic Sites Assessed for Proper Functioning Condition in the Survey Areas

Site Name (Site ID)	Associated Surveyed Wetland or Water Feature	Description	Dominant Riparian-Wetland Species	Functional Rating/Type [a]	Comments [b]
Goldstrike Survey Area					
PFC-001 Boulder Creek Reach 1	sgoa004i	Altered potential Dry channel	No riparian species present	NA / No riparian functions	Although cut bank profiles indicate drainage historically supported hydric soils and functional floodplains, flows are now predominantly ephemeral. Large-scale mining operations upstream and in surrounding watershed have altered water supplies as well as sediment supply and transport capacity. Large deposits of sand, gravels, and cobbles are present across flood prone area within the historically incised channel.
PFC-002 Rodeo Creek Reach 1	sgoc012e, sgoc013e	Altered potential Dry channel	Mostly NA; scattered amounts of coyote willow (*Salix exigua)*	NA / No riparian functions	Currently functions as ephemeral drainage. Normal sediment and water supply regimes altered by large-scale upstream mining operations. Tributary to Boulder Creek.
PFC-003, 004, 005 Stock Tanks 1 – 3	None	Livestock watering troughs	No riparian species present	NA / No riparian functions	Not assessed. Troughs supported by mine dewatering pipeline. Stock water ponds have been excavated in vicinity of troughs. Troughs and associated ponds dry at time of inspection with the exception of the pond at Stock Tank 1.
PFC-006 Welches Creek	sgoc008i	Downstream of Reach 3 – Corral and Reservoir	No riparian species present	NA / No riparian functions	Not assessed. This area includes the corral and altered portions of the drainage below Reach 3. This area does not possess any wetland or riparian function and has been highly altered from a natural state.

Site Name (Site ID)	Associated Surveyed Wetland or Water Feature	Description	Dominant Riparian-Wetland Species	Functional Rating/Type [a]	Comments [b]
PFC-007 Welches Creek Reach 3	sgoc007p, sgoc008i	Deeply incised channel with interrupted flow pattern	Scattered amounts Nebraska sedge (*Carex nebrascensis)*, spikerush *(Eleocharis* sp.), and Kentucky bluegrass (*Poa pratensis)*.	NF Lotic	Rosgen G channel type transitioning to Rosgen F or C channel types in lower portion of reach. Some potential for floodplain development where gully becomes flatter and wider; however, current grazing practices preventing colonization and establishment of point bars with riparian species. Scattered riparian communities contracting in response to grazing pressure and lack of persistent soil moisture.
PFC-008 Welches Creek Reach 2	sgoc006i	Deeply incised intermittent channel	Mostly NA; scattered amounts spikerush (*Eleocharis* sp.)	NA / No riparian functions	Rosgen G channel type with intermittent flow characteristics. Limited opportunities for riparian plant establishment and for floodplain development.
PFC-009 Welches Creek Reach 1	sgoa003p, sgoc006i	Deeply incised perennial channel	Scattered amounts of arctic rush (*Juncus arcticus)* and spikerush *(Eleocharis* sp.)	NF Lotic	Rosgen G channel formed as a result of historic head cutting through meadows and fluvial terraces. Modern gully is 10-15 feet deep and 5-10 feet wide. Gully configuration—along with chronic livestock impacts in the form of trampling of moist soils and heavy utilization of limited riparian vegetation—is limiting point bar development and subsequent channel evolution towards a more functional state.

Site Name (Site ID)	Associated Surveyed Wetland or Water Feature	Description	Dominant Riparian-Wetland Species	Functional Rating/Type [a]	Comments [b]
Carlin Survey Area					
PFC-010 Marys Creek Reach 1	wcac004e	Wetland established in bottom of historic gully along lower reaches of Marys Creek	Broadleaf cattail (*Typha latifolia*), common threesquare (*Schoenoplectus pungens*), arctic rush (Juncus arcticus), and spikerush (*Eleocharis* sp.)	PFC Lentic	Functional wetland has developed where bottom of deep gully intercepts groundwater. Cut/fill patterns in bank profiles, buried fence posts, and incongruities in particles distributions all indicate watershed imbalances in sediment supply and transport for Marys Creek. Stream is intermittent above site. Perched coyote willow (*Salix exigua*) communities on adjacent terraces expanding into wetland.
PFC-011 Humboldt River UPRR Reach 2	wcaa001e, wcaa003e, wcaa003s	Altered potential. Historic hay meadow converted to uplands	Mostly NA; small scattered stands of broadleaf cattail (*Typha latifolia*)	NA / No riparian functions	Small fenced pasture boarded by railroad tracks and berms. Site dominated by beardless wildrye (*Leymus triticoides)*. Heavy infestations of weeds including musk thistle *(Carduus nutans)*, broadleaf pepperweed *(Lepidium latifolium),* and Canada thistle *(Cirsium arvense)*.
PFC-012 Humboldt River NV278 Reach 1	scac001p	Sand dominated, entrenched, meandering channel deeply incised in gentle terrain	Coyote willow *(Salix exigua)* with scattered facultative grass/forb communities	NF Lotic	Unstable channel type lacking floodplain development. Although upstream influences limit potential for development of a more functional channel type (i.e., transition from Rosgen F channel to Rosgen C channel), some potential exists for increased colonization and stabilization of point bars within the incised channel. Current livestock grazing practices are limiting establishment of riparian vegetation and progression of normal channel evolution processes.

Site Name (Site ID)	Associated Surveyed Wetland or Water Feature	Description	Dominant Riparian-Wetland Species	Functional Rating/Type [a]	Comments [b]
PFC-013 Carlin South Warm Springs Drainage Reach 1	None	Steep, spring-fed deeply entrenched channel. Rock and geomorphic setting provide stability, control and confinement	Mostly NA; scattered amounts of Nebraska sedge (*Carex nebrascensis)* on limited floodplain areas in lower part of reach	PFC Lotic	Site stabilized from historic modification of high volume spring source. Potential for riparian zone development limited by lack of floodplain development characteristic of Rosgen Aa channels. Where present, riparian plants heavily impacted by livestock. Vegetation is primarily Wood's rose (*Rosa woodsia)* and dense infestations of Scotch thistle (*Onopordum acanthium)* and Russian knapweed (*Acroptilon repens)*. Possible spring snails (*Pyrgulopsis* sp.) abundant on substrates along upper 2/3 of drainage.
PFC-014 Carlin South Warm Springs Drainage Reach 2	wcac002e	Altered potential. Drainage channelized to form diversion ditch	Scattered amounts of broadleaf cattail (*Typha latifolia)* and hardstem bullrush *(Schoenoplectus acutus)*; Facultative forb/grass communities dominate site	NA / No riparian functions	Historic drainage diverted to form ditch expediting water removal from area of fenced pasture. Ditch is stable and well vegetated with diverse mixture of facultative grasses and forbs. Pasture shows high level of disturbance from past agricultural uses. Heavy infestations of Scotch thistle (*Onopordum acanthium)* and Russian knapweed *(Acroptilon repens)*.
PFC-015 Carlin South Warm Springs Wetland Reach 1	wcac002e	Modified site. Stable, emergent wetland	Broadleaf cattail (*Typha latifolia)* with lessor amounts of hardstem bullrush *(Schoenoplectus acutus)*	PFC Lentic	Wetland maintained by groundwater discharge in areas of historic Humboldt River meanders as well as from diverted flows originating from Warm Springs. Wetland is intercepted by railroad, which causes site to be wetter on uphill side and drier on downhill side. Interspersed areas of open water within dense stands of emergent vegetation provide quality habitat for waterfowl and other marsh birds.

Site Name (Site ID)	Associated Surveyed Wetland or Water Feature	Description	Dominant Riparian-Wetland Species	Functional Rating/Type [a]	Comments [b]
PFC-016 Humboldt River UPRR Reach 1	wcac002e	Hay meadow supporting stable riparian-wetland plant communities	Coyote willow *(Salix exigua)*, hardstem bullrush *(Schoenoplectus acutus)*, Nebraska sedge *(Carex nebrascensis)*, and other sedges *(Carex* sp.); mesic grasses/forbs	PFC Lentic	Coyote willow (*Salix exigua)* communities expanding into historically hayed areas. Dense stands of Hardstem bullrush *(Schoenoplectus acutus)* as well as productive meadows are supported by groundwater discharge in depressions created by historic river meanders. Diverse facultative communities as infestations of broadleaf pepperweed (*Lepidium latifolium)* and Canada thistle (*Cirsium arvense)* are common on adjacent uplands.
Crescent Valley Survey Area					
PFC-017 Pivot Wetland Reach 1	wcra006e, wcra006s	Emergent wetland supported by agricultural practices	Broadleaf cattail *(Typha latifolia)*, common threesquare *(Schoenoplectus pungens)*	PFC Lentic	Dense stands emergent wetlands established along ditched area, which drains hay pivots. Some fluctuation in water levels is evident along margins of wetlands; however, age, vigor and distribution of emergent plant communities indicate long-term stability of water supply.
PFC-018 Cottonwood Creek Diversion Reach 1	scra002i	Altered potential. Dry diversion ditch	No riparian species present	NA / No riparian functions	Flows from canyon mouth diverted to supply water for pivots. Dry channel. Water available seasonally only. Heavy infestations of Russian knapweed *(Acroptilon repens)*.
PFC-019 Brock Creek Diversion Reach 1	scra020e	Altered potential. Dry diversion ditch	No riparian species present	NA / No riparian functions	Flows from canyon mouth diverted to supply water for pivots. Water available seasonally only.

Site Name (Site ID)	Associated Surveyed Wetland or Water Feature	Description	Dominant Riparian-Wetland Species	Functional Rating/Type [a]	Comments [b]
PFC-020, 021 Possible Wetland Reaches 1, 2	None	Wetlands formed in historic stock water ponds	Common threesquare *(Schoenoplectus pungens),* arctic rush *(Juncus arcticus),* Nebraska sedge *(Carex nebrascensis),* hardstem bullrush *(Schoenoplectus acutus)* and spikerush *(Eleocharis* sp.)	PFC Lentic	Outside of survey area. Two small, historic ponds within 100 feet of each other filled in and now completely occupied by stable, productive riparian-wetland plant communities. Positioned at bottom of dry alkaline meadows. High insect biodiversity. No evidence of recent use by livestock.
PFC-022, 023, 024, 025 Cortez PoO Wetlands Reaches 1 - 4	ocra004p, ocra005p, ocra003p, ocra002p	Series of excavated alkaline ponds	Scattered stands of Broadleaf cattail *(Typha latifolia),* common threesquare *(Schoenoplectus pungens),* hardstem bulrush (S. *acutus)*, and cosmopolitan bulrush (S. *maritimus)*	NA / Limited riparian functions	Ponds highly alkaline. Exposed shorelines show evidence of widely fluctuating water levels. Scattered stands of emergent wetland vegetation along perimeters. Swallows, shorebirds, wrens, blackbirds, American coots, and several species of ducks using ponds at time of inspection.
PFC-026 Indian Creek Pivot	scra015p	Altered potential. Dry diversion ditch	Mostly NA; Facultative grass/forb communities	NA / No riparian functions	Ditch draining Indian Creek watershed is intercepted by and diverted around active pivots. Ditch is also intercepted by road. No persistent flows or soil moisture. Small amounts mesic grasses and forbs in seasonally moist areas.

ID = identification; NF = Nonfunctional; NA = not applicable; PFC = Proper Functioning Condition

[a] Lentic = Still or very slow moving water including (but not limited to) springs, marshes, meadows, ponds and vegetated drainage-ways; Lotic = Moving water such as rivers, streams and creeks

[b] Rosgen Channel Types (Rosgen 1996):

A Channels: Steep (slopes 4 to 10 percent), low width to depth ratio, laterally confined. Bed forms typically a step/pool morphology with attendant plunge or scour pools. This channel type exhibits a high sediment transport potential and relatively low in-channel sediment storage capacity. **A** channels are over 10 percent.

C Channels: Slightly entrenched (has a floodplain), moderate to high width/depth ratio (wide, shallow), moderate to high sinuosity, mostly low gradients (1 to 2 percent). Generally, functional with high response potential to changes in management.

F Channels: Deeply incised, very high channel width to depth ratio at bankfull, may have high bank erosion rates as well as significant bar deposition. Accelerated channel aggradation and/or degradation with very high sediment supply and storage. Often observed to be working towards re-establishment of functional floodplain inside confines of gully walls. Gradients less than 2 percent.

G Channels: Entrenched (gullied, no floodplain), low width to depth ratio, moderate sinuosity, mostly moderate gradients (2 to 4 percent). G channels are essentially unstable gullies.

3.3. VEGETATION STUDIES

The survey area for obtaining baseline study data for vegetation includes the Project footprint plus a 200-foot buffer of the centerline (400-foot survey area), borrow source areas, access roads, and construction depot sites, for a total of 6,622.2 acres (Figure 2-1 through Figure 2-9). Vegetation studies were conducted to evaluate baseline vegetation community information and determine the presence of special status plant species, butterfly host plants, and noxious weed and invasive plant species. The following sections present the study methodology, results, and discussion for each of the resource sections included as part of the biological baseline studies for vegetation conducted in 2021.

Vegetation communities within the three survey areas (Goldstrike, Carlin, and Crescent Valley) consist of sagebrush steppe and grassland communities and riparian areas along perennial streams and rivers. Section 3.1, Ecological Site Description, describes vegetation communities and rangeland health. Vegetation communities in the Project Area include agricultural; lands developed for roads, railways, and residences; and recently mined areas. Agricultural activities, historical mining activities, livestock rotation, and wildfire have altered the landscape by disturbing native soils, vegetation, and local hydrology throughout portions of the Project Area. Soils and hydrology within the Project Area provide wildlife habitat including host species for special status butterflies, such as monarch butterflies, Nevada viceroy, and Mattoni's blue butterflies.

3.3.1. Special Status Plant Species

3.3.1.1. Background

In addition to administering conservation programs for species listed under the ESA, the BLM also administers programs for sensitive species under guidance from Manual 6840, Special Status Species Management (BLM 2008b). BLM Special Status Species are federal candidate species for listing as threatened or endangered under the provisions of the Act, and those designated by the Director or individual State Directors as BLM sensitive. In addition, the BLM has incorporated into the Special Status Species list the species and subspecies of native plants that are considered to be critically endangered and threatened with extinction (NAC § 527.010). There are 49 BLM plant species listed as sensitive on lands administered by the Battle Mountain and Elko Field offices. Table C.1-1 in Appendix C lists the BLM special status species, their habitat, and the potential for the species to occur in the Project Area.

The purpose of these surveys was to inform future impact analyses on the occurrence and status of special status plant species per the BLM policy, *Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species* (BLM 2009). The objective of the vegetation baseline studies was to collect sufficient information to characterize the affected environment for special status plant species that may be present in the Project Area.

Topography within the Project Area is valley floors and alluvial fans that are interspersed with ephemeral, intermittent and perennial streams. Portions of the Crescent Valley Survey Area

(see Figure 2-6 through Figure 2-9) contain playa areas and human-made structures that influence local hydrology and soils.

3.3.1.2. Study Methodology

A pre-field review of BLM special status species lists (BLM 2017b, 2019a); NDNH, NWI, NHD, USGS seeps and springs, NRCS SSURGO, and SWReGAP land cover type data, was completed to identify potentially suitable habitat and to assess which special status plant species were present in the Project Area.

The following protocols were used in this survey:

- *Vegetation and Soils – Baseline Data Collection* (BLM 2014a)
- *Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant* Species (BLM 2009)

Surveys for special status plant species were conducted concurrently with surveys for noxious weeds and invasive plants, and butterfly host plants per the BLM protocols identified above.

Field crews conducted pedestrian surveys for special status plant species from May 18, 2021, through August 31, 2021. Per protocol, if a special status plant species was observed, field crews recorded the Universal Transverse Mercator (UTM) coordinates, collected geo-referenced photographs, estimated the species population size, and noted associated habitat type and plant species.

3.3.1.3. Results and Discussion

Pre-Field Results

The potential for the 49 special status plant species to occur in the Project Area is based on range and habitat requirements, known distribution, SWreGAP land cover type, NNHD vegetation, soils, waters and wetlands, and location of known occurrences in relation to the Project Area (NatureServe 2021). Figure 3.3-1 through Figure 3.3-7 show the SSURGO soils, waters, wetlands, and topography that influence where special status plant species habitat could occur in the Project Area. Based on this evaluation, 14 BLM sensitive plant species are considered to have potential to occur in or near the Project Area. Table 3.3-1 presents information on the range and habitats associated with the 14 special status plant species and their potential to occur in the Project Area. However, there are no documented occurrences of the 14 special status plant species in the Project Area based on NDNH data.

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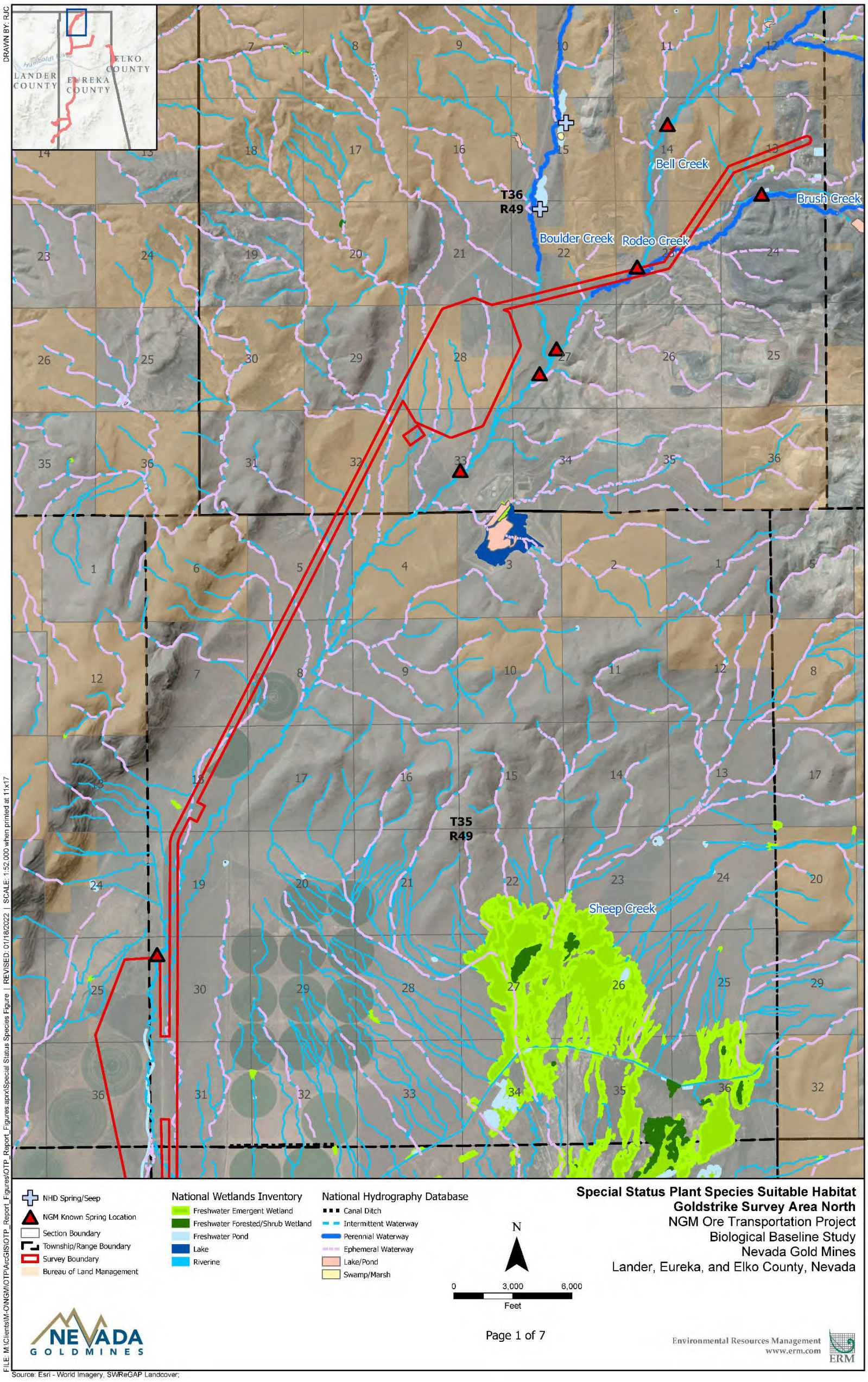


Figure 3.3-1: Special Status Species Suitable Habitat—Goldstrike Survey Area North

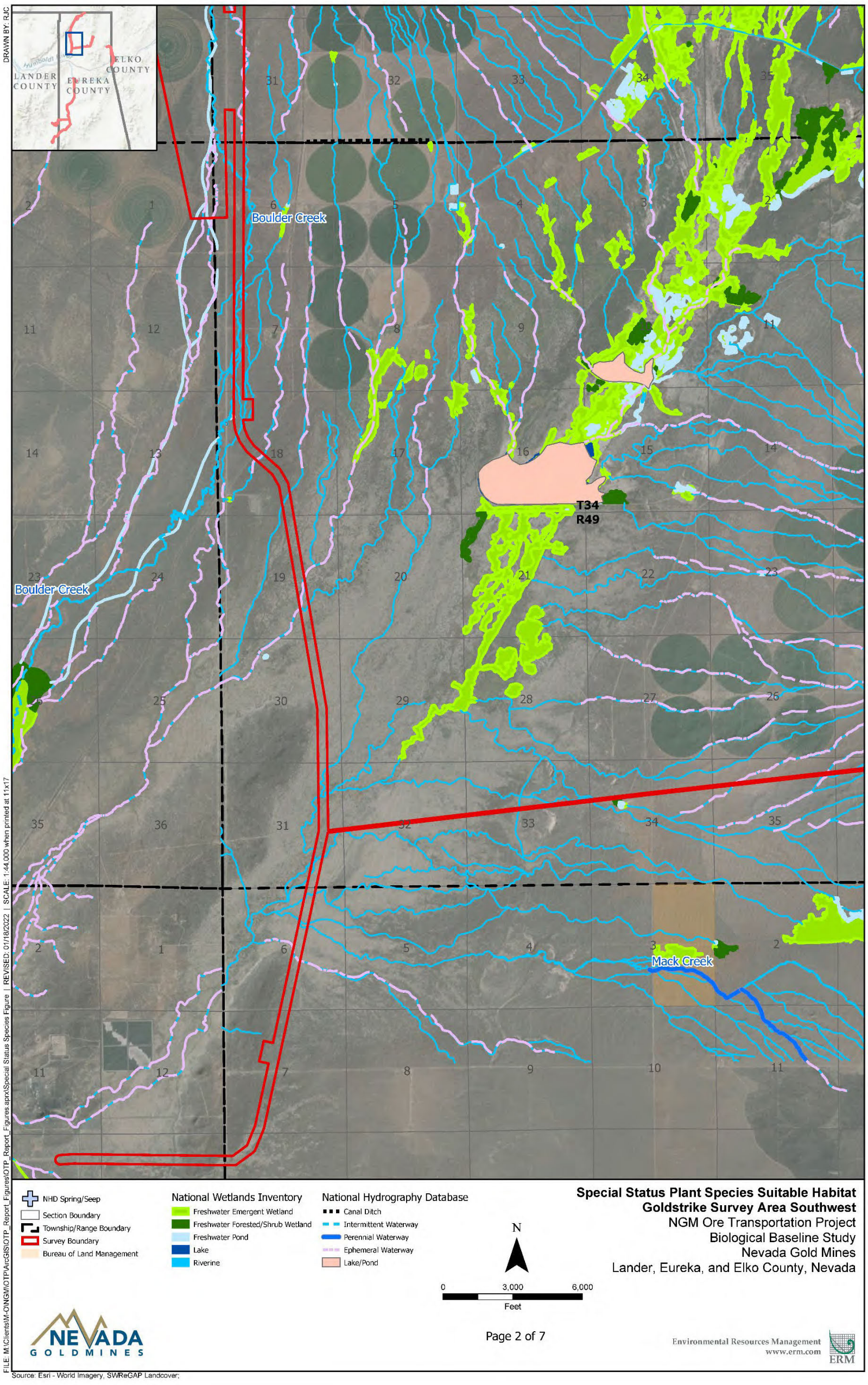


Figure 3.3-2: Special Status Species Suitable Habitat—Goldstrike Survey Area Southwest

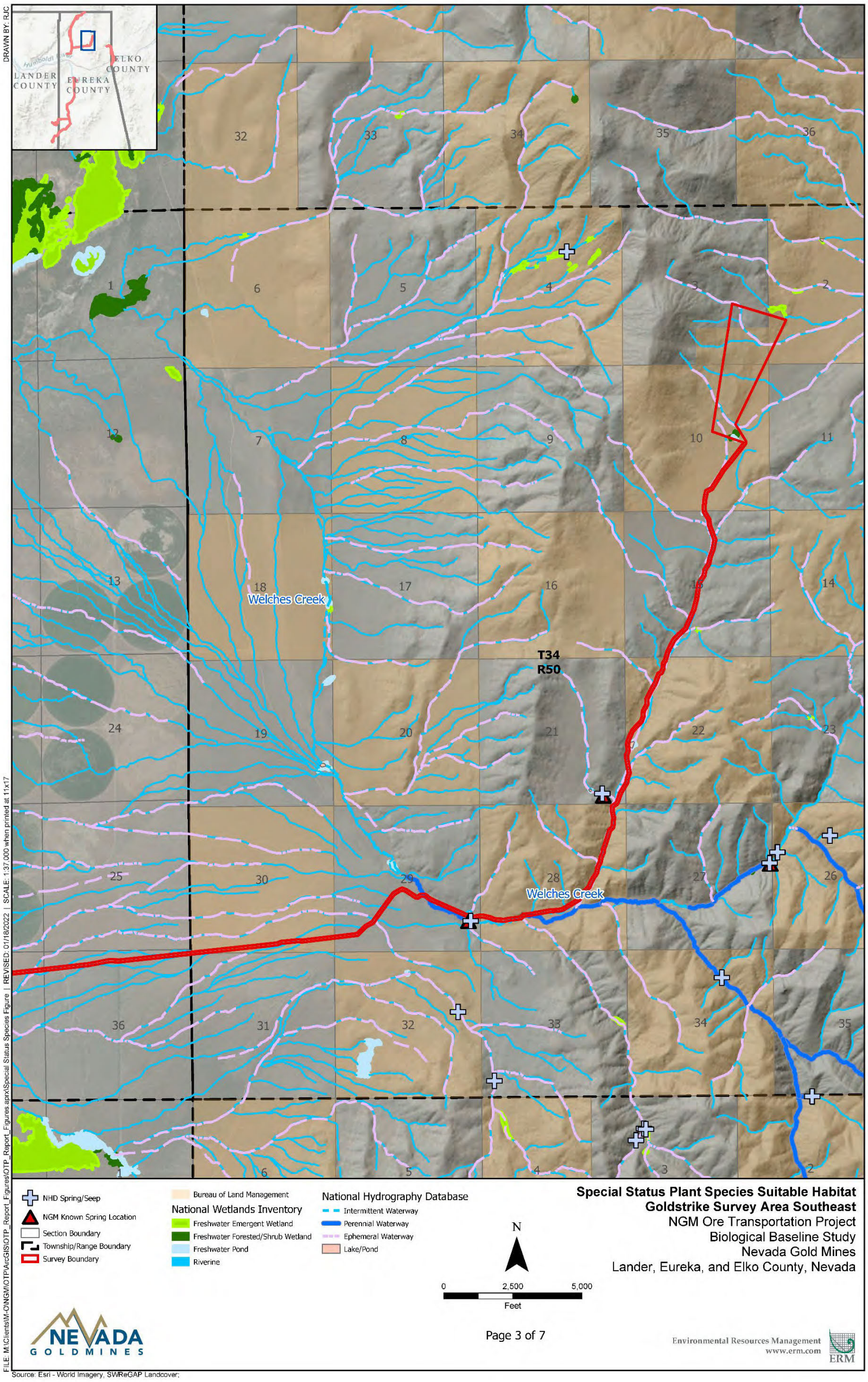


Figure 3.3-3: Special Status Species Suitable Habitat—Goldstrike Survey Area Southeast

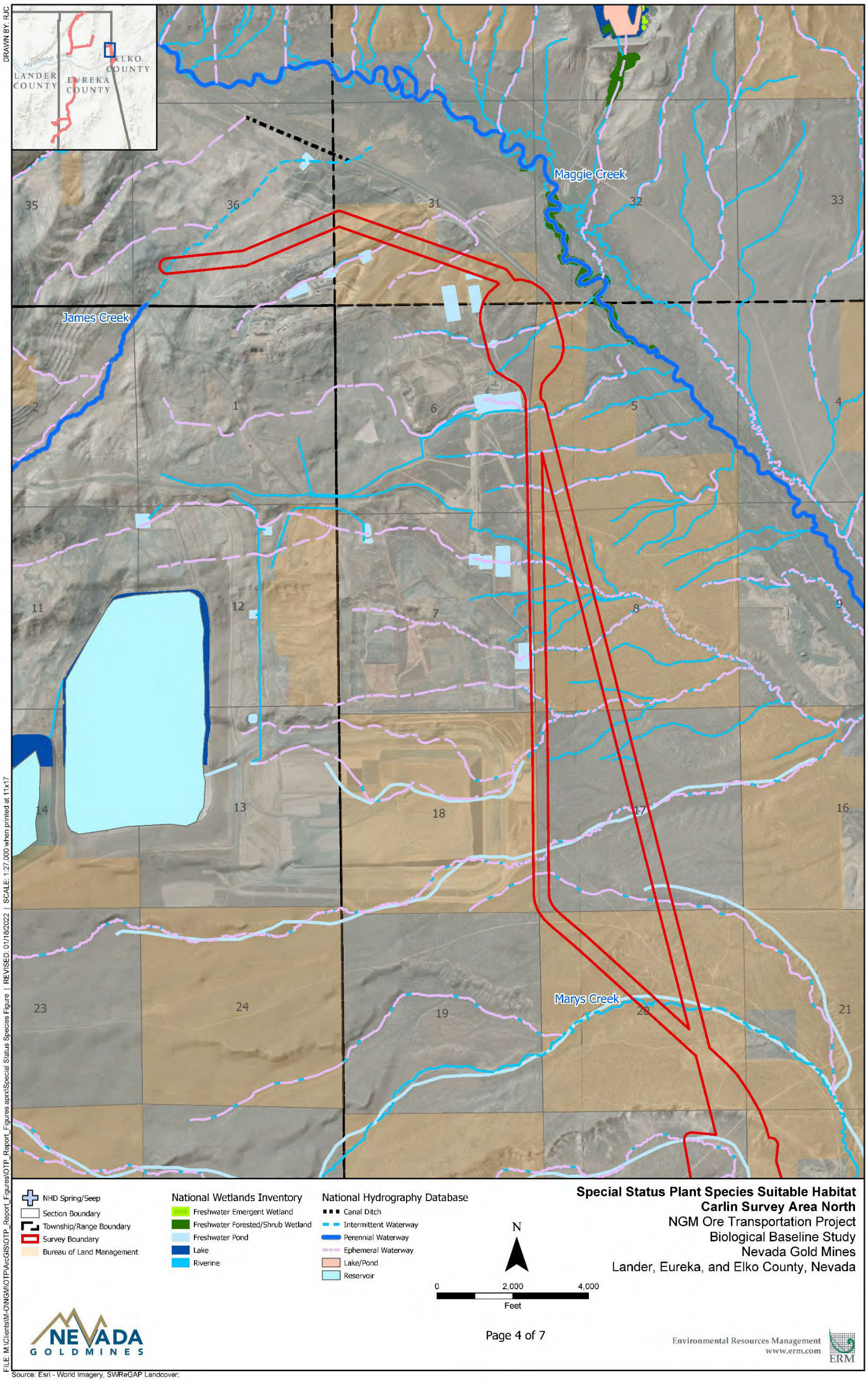


Figure 3.3-4: Special Status Species Suitable Habitat—Carlin Survey Area North

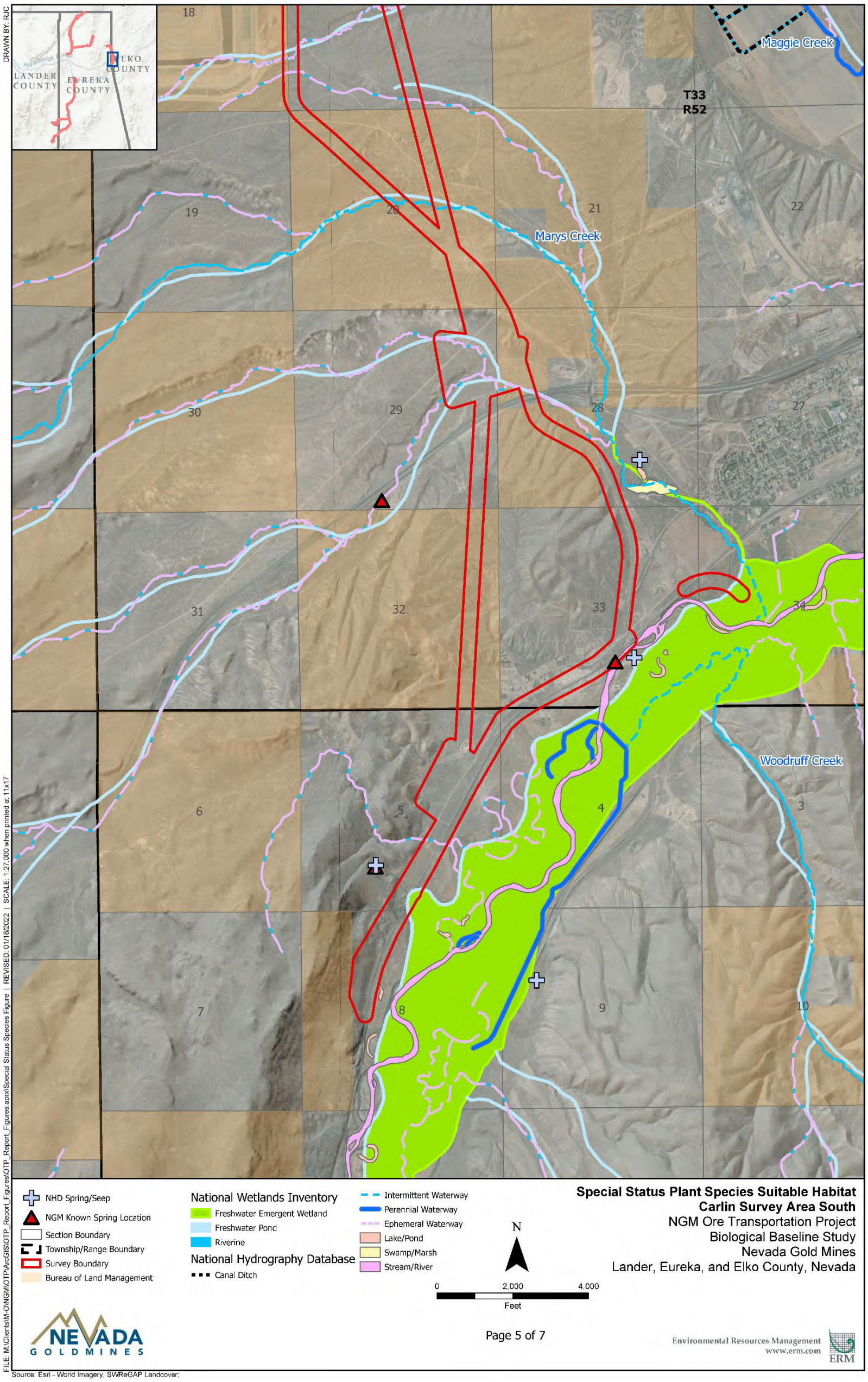


Figure 3.3-5: Special Status Species Suitable Habitat—Carlin Survey Area South

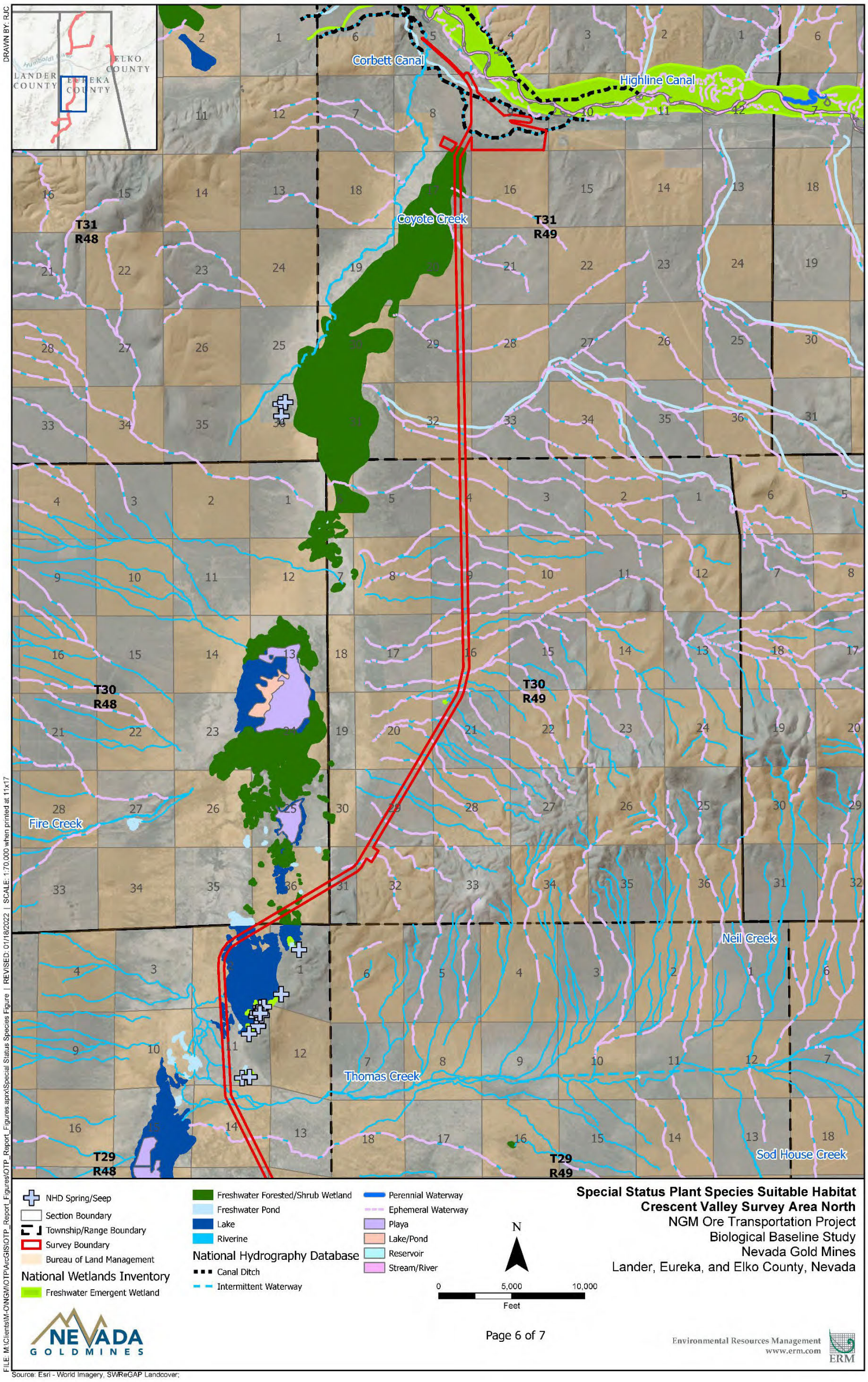


Figure 3.3-6: Special Status Species Suitable Habitat—Crescent Valley Survey Area North

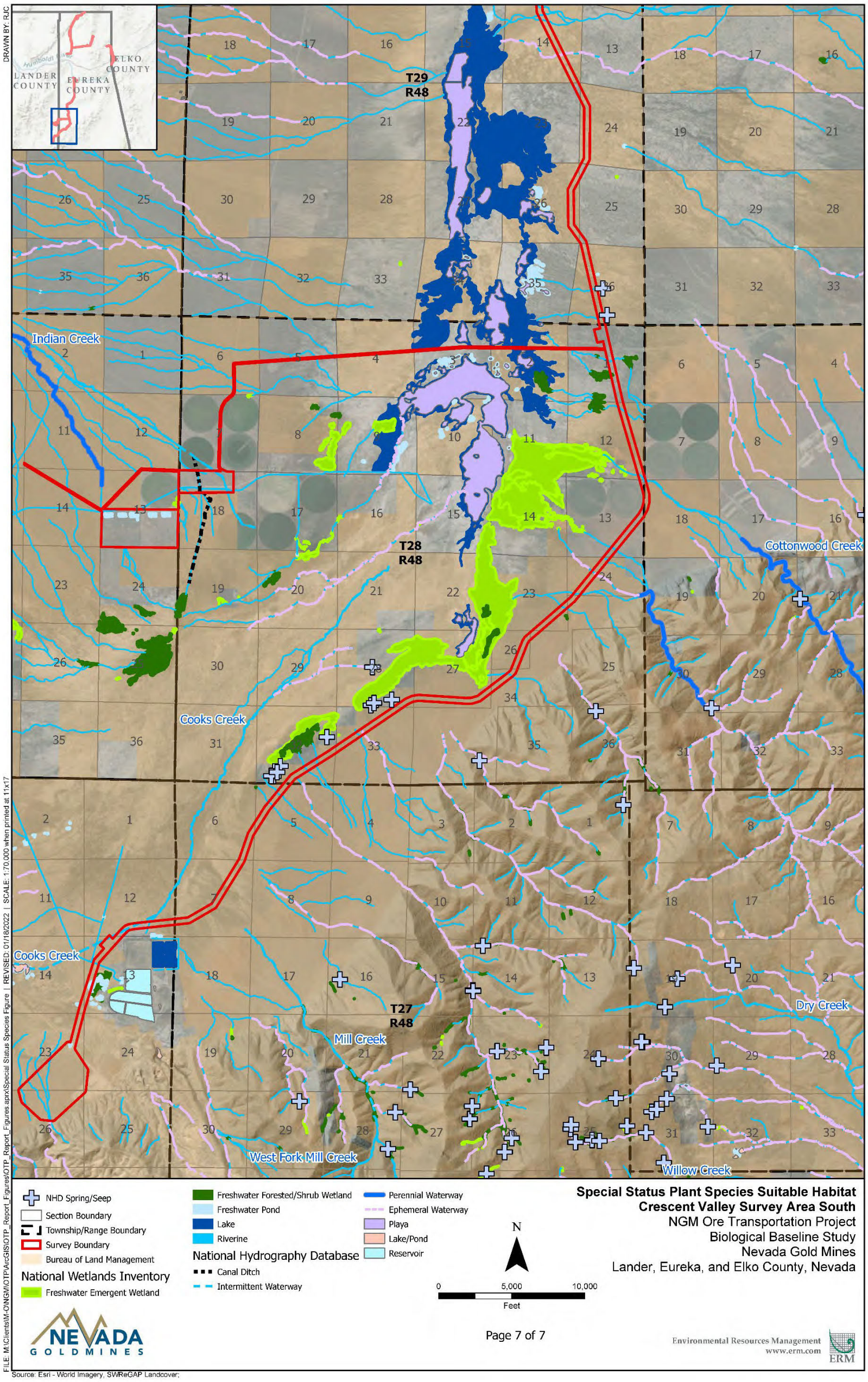


Figure 3.3-7: Special Status Species Suitable Habitat—Crescent Valley Survey Area South

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Table 3.3-1: Potential Special Status Plant Species within the Project Area

Species Name	Range and Habitat Requirements	Potential for Occurrence in or near Project Area	BLM District Office
Alkali ivesia (*Ivesia kingii* var. *kingii*)	Sagebrush scrub, alkali sink, wetland-riparian; meadows, playas. Known populations are from Inyo and Mono Counties, California, and from western Nevada, and southwestern Utah.	Low potential as the known populations are several hundred miles southwest of the Project Area.	Battle Mountain and Elko
Broad fleabane (*Erigeron latus*)	Shallow, relatively barren, vernally saturated, otherwise dry, gravelly to sandy soils or bedrock on flats and slopes of volcanic scablands or benches, mostly rhyolitic or basaltic in composition. Found at elevations of 5,250 to 6,560 in the sagebrush steppe and juniper vegetation communities.	Low potential as the known populations are from elevations higher than those in the Project Area.	Elko
Davis peppercress (*Lepidium davisii*)	Hard-bottomed clay playas on volcanic plains in the sagebrush zone with sparse associated *Atriplex confertifolia* and *Artemisia cana*, surrounded by *Artemisia tridentata* vegetation; during spring, the playas are usually inundated up to a foot deep; aquatic or wetland-dependent in Nevada.	Moderate potential as suitable habitat is within the Project Area.	Battle Mountain and Elko
Deeth buckwheat (*Eriogonum nutans* var. *glabratum*)	Sandy, gravelly soil; flats and slopes in saltbush and sagebrush vegetation communities at elevations from 4,900 to 6,200 feet.	Low potential as the known populations are from elevations higher than those in the Project Area.	Battle Mountain and Elko
Eastwood milkweed (*Asclepias eastwoodiana*)	In open areas on a wide variety of basic (pH usually 8 or higher) soils, including calcareous clay knolls, sand, carbonate or basaltic gravels, or shale outcrops, generally barren and lacking competition, frequently in small washes or other moisture-accumulating microsites, in the shadscale, mixed-shrub, sagebrush, and lower pinyon-juniper zones. Known to occur in Esmeralda, Lander, Lincoln, and Nye counties, Nevada at elevations between 3,500 to 7,000 feet.	Moderate potential as suitable habitat is within the Project Area.	Battle Mountain and Elko
Elko rockcress (*Boechera falcifructa*)	Dry, densely vegetated, relatively undisturbed, light-colored silty soils with a high cover of moss and other soil crust components on moderate to steep north-facing slopes in the sagebrush zone, dominated by moss, *Artemisia tridentata* var. *wyomingensis, Chrysothamnus viscidiflorus* var. *puberulus, and Poa secunda* var. *secunda*. Also reported but not confirmed from rock crevices.	Moderate potential as suitable habitat is within the Project Area.	Battle Mountain and Elko
Goose Creek milkvetch	Although most occurrences are restricted to specific sandy rhyolitic ash deposits, some	Low potential as the known populations	Elko

Species Name	Range and Habitat Requirements	Potential for Occurrence in or near Project Area	BLM District Office
(*Astragalus anserinus*)	have been observed spreading into sandy soils of the adjacent zonal sagebrush vegetation with little apparent rhyolitic ash content. Known in Nevada from the Goose Creek drainage, Delano Mountains, and Owyhee Desert.	are geographically distant from the Project Area.	
Grimy mousetails (*Ivesia rhypara* var. *rhypara*)	Mostly on dry, relatively barren, yellowish or light-colored outcrops or badlands of welded, sometimes hydrothermally altered and re-cemented, ash-fall tuff, and on shallow gravel grus derived therefrom, in one case on unsorted cobbly riverbed deposits mixed with underlying volcanic ash, on gentle to steep side, shoulder, or toe slopes with east to south to west aspects, with few and sparse associated species such as *Trifolium andersonii, Poa secunda*, *Ericameria nauseosa*, and *Achnatherum hymenoides*.	Moderate potential as suitable habitat is within the Project Area.	Elko
Grimes vetchling (*Lathyrus grimesii*)	Dry, open, shallow, silty clay soils usually overlain by a thin scree of reddish to yellowish brown gravel floated from an underlying cherty or partly quartzitized mudstone component of the Schoonover Formation, forming relatively barren patches on mostly steep slopes of all aspects, and supporting a sparse to moderately dense vegetation.	Low potential as the known populations are found on landforms not present in the Project Area.	Elko
Least phacelia (*Phacelia minutissima*)	Inhabits vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, in sagebrush swales, along creek bed high-water lines, or around springs, in flat to gently sloping areas; aquatic or wetland-dependent. Found at moderate elevations.	Moderate potential as suitable habitat is within the Project Area.	Elko
Lewis buckwheat (*Eriogonum lewisii*)	Dry, exposed, shallow, relatively barren and undisturbed, rocky residual soils on convex ridgeline knolls and crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes of all aspects, but with the densest stands on southerly aspects; occasionally found at lower elevations on clay hills derived from silty carbonate or calcium-rich siliceous rock.	Moderate potential as suitable habitat is within the Project Area.	Elko

Species Name	Range and Habitat Requirements	Potential for Occurrence in or near Project Area	BLM District Office
Meadow pussytoes (*Antennaria arcuata*)	Known from 34 extant occurrences (29 in Wyoming, 4 in Nevada, and 1 in Idaho). Bare, periodically disturbed soil in marginal, seasonally dry parts of moist, often hummocky, alkaline meadows, seeps, and springs, surrounded by sagebrush and grassland associations; aquatic or wetland dependent. Plant populations found at elevations of 4,900 to 7,900 feet.	Moderate potential as suitable habitat is within the Project Area.	Elko
Obscure buttercup (*Ranunculus triternatus*)	Meadow steppe habitat dominated by bunchgrasses and forbs; mostly found on north-facing upper slopes and crests of basalt ridges overlaid by loess deposits of varying depth.	Low potential as the known populations are found on landforms not present in the Project Area.	Elko
Owyhee prickley phlox (*Leptodactylon glabrum*)	Occurs in crevices in steep to vertical, coarse-crumbling volcanic canyon walls, especially on rhyolitic cliffs. It is intolerant of water paths or seeps that may form in the rock crevices. Populations have been found in the Little Humboldt River watershed in northern Nevada at elevations between 2,790 to 5,200 feet.	Low potential as the known populations are found on landforms not present in the Project Area.	Elko

Source: BLM 2017b, 2019a; NatureServe 2021

Section 3.1, Ecological Site Description, describes the soil texture and general characteristics in the Project Area. Soils in MLRAs 24 and 25 indicate soils in the Project Area developed from alluvium, calcareous shales and silts, tuffaceous sedimentary rocks, and sedimentary and volcanic geology (USGS 2021a; Stringham et al. 2015a, 2017). In addition to the soils, portions of the Project Area have been modified by agriculture, mining, utilities and roads.

The SWReGAP land cover in the Project Area consists of mostly Intermountain Basin Big Sagebrush Shrublands, Inter-Mountain Greasewood Flat, and Invasive Annual and Biennial Forblands (see Table 3.1-4 for additional detail). The vegetation communities in the Project Area include areas of mixed salt desert scrub, grasslands, emergent marshes and rocky outcrops and cliffs. Figures 2.1-1 through 2.1-3 show the SWreGAP land cover types in the Project Area. Elevations in the Project Area range from approximately 4,700 feet to 5,800 feet amsl. The lowest elevations are in the Carlin and Crescent Valley survey areas near the Humboldt River. The highest elevation is the Richmond Summit in the Goldstrike Survey Area. Slopes in the Project Area are flat to gently sloping except in the Richmond Summit area (Goldstrike Survey Area), Welches Canyon area (Goldstrike Survey Area), and southwest of Carlin area (Carlin Survey Area). In these areas, slopes range from gently sloping to moderately steep.

Field Survey Results

Field surveys were conducted in the Project Area for the 14 special status plant species from mid-May through early-July 2021. These systematic pedestrian surveys were conducted throughout the Project Area, and field crews examined microhabitats that could potentially support the special status plants species listed in Table 3.3-1. Playa areas, seeps and spring areas, and perennial streams were also surveyed. Playa edges, wetlands, and other unique habitat types were searched for the 14 special status plant species. During the surveys conducted during the 2021 field season, none of the 14 plant species listed in Table 3.3-1 were observed.

Although reference populations and regional rainfall amounts were monitored, potential remains for a false negative survey result. Based on the range and habitats where the 14 species listed in Table 3.3-1 could be present in the Project Area, the vegetation community composition is dominated by native plant species. Section 3.1, Ecological Site Description, describes the vegetation communities in the Project Area and the sites where the vegetation community has transitioned to a cheatgrass (*Bromus tectorum*) or annual forb dominated community. Cheatgrass is effective at using soil water in the upper soil layers, which may inhibit the establishment of native plant species (Germino et al. 2016; Kulpa et al. 2012). The presence of cheatgrass throughout the Project Area may affect the establishment of native plants, including special status species.

3.3.2. Butterfly Host Plants

3.3.2.1. Background

There are 25 BLM insect species listed as sensitive on lands administered by the Battle Mountain and Elko Field offices, and 3 of these species are butterflies. Within the Project Area, vegetation communities may contain milkweed (*Asclepias* spp*.),* slender buckwheat *(Eriogonum microthecum* var. *laxiflorum)* and other host plant species for Monarch butterfly *(Danaus plexippus),* Mattoni's blue butterfly *(Euphilotes pallecens mattonii),* and Nevada viceroy butterfly *(Limenitis archippus lahontani)* (USFWS 2011, Border et al. 2012, NatureServe 2021). Host plants for adult Nevada viceroy butterflies, which resemble adult Monarch butterflies, are willows *(Salix* spp*.),* cottonwoods *(Populus spp.)* and plants with composite flowers (Opler et at. 1999).

Pre-field assessment and field surveys were conducted within the Project Area (Project footprint plus a 200-foot-wide buffer of the centerline), as shown on Figure 2-1 through Figure 2-9. The purpose of the butterfly host plant surveys is to evaluate potential future Project impacts on host plants for Monarch, Mattoni's blue, and Nevada viceroy butterfly species. Surveys for these three butterfly species are presented in Section 3.4.12, Butterflies.

3.3.2.2. Study Methodology

A pre-field (desktop) assessment was conducted using data from NDNH, BLM, NWI, NHD, and SWreGAP land cover types to identify areas with the potential for host plant species to occur.

The following protocols were used in this survey:

- *Initial Survey Instructions for Western Monarch and Milkweed Habitat Suitability Assessment* (USFWS 2016)
- Crucial Habitat Assessment Tool (WAFWA 2021)

Pedestrian field surveys were conducted throughout the Project Area from June 12, 2021, through July 24, 2021. In areas where a butterfly host species was observed, field crews recorded the UTM, collected geo-referenced photographs, estimated the species population size, and noted associated habitat type and plant species. Areas where butterfly host plant species were found were also mapped by walking the area before collecting data, as small plants may be more difficult to observe, thus underestimating the area where the species occur. To capture plant species occurrence data at the appropriate scale, these general protocols were adhered to:

- Points were used for small occurrences measuring up to one-tenth acre in size.
- Lines were used for linear features such as roads, streams, and fence lines.
- Polygons were used for irregular shaped areas greater than one-tenth of an acre in size.

Butterfly host plant species were mapped separately, with each point, line, or polygon feature consisting of only one species. Milkweed species were identified to genus and, where possible, to species based on floristic characteristics. Field crews recorded the percent canopy cover of the butterfly host plant species.

3.3.2.3. Results and Discussion

Pre-Field Results

Milkweed species can be found within a wide range of habitats including xeric or riparian grasslands, shrublands, and woodlands or disturbed areas (Xerces Society 2012; and Border et al. 2012). There are 13 milkweed species native to Nevada. Six of these milkweed species have been found in Elko, Eureka, or Lander counties and have potential to occur in the Project Area (Table 3.3-2). Table C.1-2 lists the 13 milkweed species and their potential to occur in the Project Area. Section 3.1.3.2, Field Survey, describes the vegetation communities and surface soil textures. Section 3.1.3.1, Pre-Field Assessment, describes soil characteristics such as parent material, and Section 3.1.3.2 includes surface soil textures at each of the soil pits dug within the Project Area.

Table 3.3-2: Nevada Milkweed Species with Potential to Occur in Project Area

Common Name	Scientific Name	Range and Habitat
Pallid milkweed or Davis' milkweed	*Asclepias cryptoceras*	Species distribution includes locations in Elko, Eureka, and Lander counties. Species grows in dry, open, barren clay, sand, gypsum, or serpentine soils in sagebrush, salt desert shrublands, or pinyon-juniper vegetation communities. Plants are found at elevations between 2,460 to 8,200 feet and bloom May through June.
Desert milkweed	*Asclepias erosa*	Species distribution includes locations in Lander County. Dry washes, canyons, and roadsides in creosote, shadscale, and sometimes sagebrush vegetation communities. Plants are found at elevations between 500 to 6,725 feet and blooms April to August.
Hall's milkweed	*Asclepias halii*	Species distribution includes locations in Elko and Lander counties. Species found on rocky slopes or roadsides in sagebrush steppe, pinyon-juniper woodlands, ponderosa pine forests and mixed conifer forests. Plants are found at elevations from 6,000 to 8,000 feet and blooms from June to August.
Narrow leaf milkweed	*Asclepias fascicularis*	Species distribution includes locations in Elko County. Species found in pinyon-juniper, sagebrush, and mountain brush communities in moist to dry areas along streams, roadsides, and agricultural fields. Plants are found at elevations from 1,649 to 6,560 feet and bloom from June to August.
Showy milkweed	*Asclepias speciosa*	Species distribution includes locations in Elko, Eureka, and Lander counties. Tolerant of alkaline soils, the species is found in moist to moderately moist, soil in open and sunny areas including wetlands, meadows, and along streams, roads, and railways where there is adequate moisture. Plants are found at elevations between 500 to 8,200 feet and bloom May through August.
Spider milkweed	*Asclepias asperula*	Species distribution includes locations in Elko County. Species grows in gravelly and rocky soil or on exposed talus slopes in pinyon-juniper, sagebrush, and mountain brush communities, Plants are found at elevations between 4,100 to 9,022 feet and bloom from May to July.

Source: Kartesz 2015; Nabhan et al. 2015; Border et al. 2012

Slender buckwheat is found in sagebrush mixed grasslands, salt-desert scrub and juniper woodland vegetation communities. Slender buckwheat grows on sandy or gravel soils at elevations between 330 to 8,200 feet amsl and blooms April through November ('eFloras 2021; NatureServe 2021). Species distribution includes Elko, Eureka, and Lander counties (Kartesz 2015). SWreGAP land cover types where willow and cottonwood species are found along perennial streams include Great Basin Foothill and Lower Montane Riparian Woodland and Shrublands (USGS 2005). Composite flowering plants are present throughout the Project Area in all of the vegetation communities.

Field Survey Results

Pedestrian field surveys for butterfly host plants were conducted within the Project Area as part of special status plant surveys. Field crews documented two species of Monarch host plants (23 occurrences of narrow leaf milkweed [*Asclepias fascicularis*] and six occurrences of showy milkweed [*Asclepias speciose]*) in the Project Area. Table 3.3-3 shows the number of occurrences of milkweed and slender buckwheat butterfly host plants in the Project Area. Narrow leaf milkweed was most abundant and found near agricultural fields in the Project Area and riparian areas along the Humboldt River and Welches Creek (Figure 3.3-8 through Figure 3.3-12). One location of this species was found in the Crescent Valley Survey Area along an ephemeral stream along the east side of the loading/unloading loop. The six occurrences of showy milkweed were in Goldstrike and Carlin survey areas (Figure 3.3-10 and Figure 3.3-11).

Observations of these two species ranged from individual isolated plants to clusters of 30 to 50 plants found in four areas, two clusters in the Goldstrike Survey Area (Figure 3.3-9 and Figure 3.3-10), and one cluster in the Carlin and Crescent Valley survey areas (Figure 3.3-11 and Figure 3.3-12, respectively). The acreage of milkweed clusters in the survey areas is shown in Table 3.3-4. Approximately 0.3 acre of narrow leaf milkweed was found in the Goldstrike and Crescent Valley survey areas. A 0.02-acre (approximately 870 square feet) cluster of showy milkweed was found in the Carlin Survey Area.

In addition to the 29 milkweed species (23 narrow leaf milkweed and 6 showy milkweed) occurrences found during surveys, field crews observed slender buckwheat within the Welches Creek summit borrow source area (Figure 3.3-9 and Table 3.3-3). The slender buckwheat plants were found on a north-facing slope with rocky loamy soils at an elevation of approximately 5,990 feet (Figure 3.3-10).

Table 3.3-3: Milkweed and Slender Buckwheat Plant Occurrences in the Survey Areas

Species	Number of Occurrences			
	Goldstrike	**Carlin**	**Crescent Valley**	**Total**
Narrow leaf milkweed *(Asclepias fascicularis)*	13	1	9	23
Showy Milkweed (*Asclepias speciose*)	2	4	0	6
Total	**15**	**5**	**9**	**29**
Slender buckwheat (*Eriogonum microthecum* var. *laxiflorum*)	1	0	0	1
Total	**16**	**5**	**9**	**30**

Table 3.3-4: Milkweed Clusters (Acres) in the Survey Areas

Species	Acres			
	Goldstrike	Carlin	Crescent Valley	Total
Narrow leaf milkweed *(Asclepias fascicularis)*	0.2	0	0.06	0.3
Showy Milkweed (Asclepias speciose)	0	0.02	0	0.02

Host plants for the Nevada viceroy larvae include willows and cottonwoods; adults may feed on plants with composite flowers, such as rubber rabbitbrush (*Ericameria nauseosa*) and big sagebrush (*Artemisia tridentata*) (Sourakov 2009). Plants with composite flowers are found in all of the land cover types within the Project Area. Willow species were found in the Goldstrike and Carlin survey areas (Figure 3.3-10 and Figure 3.3-11). These small clusters of willows were found in riparian areas associated with Welches Creek and the Humboldt River. Cottonwood trees, which are also a Nevada viceroy host plant species, are near the Humboldt River outside of the Project Area.

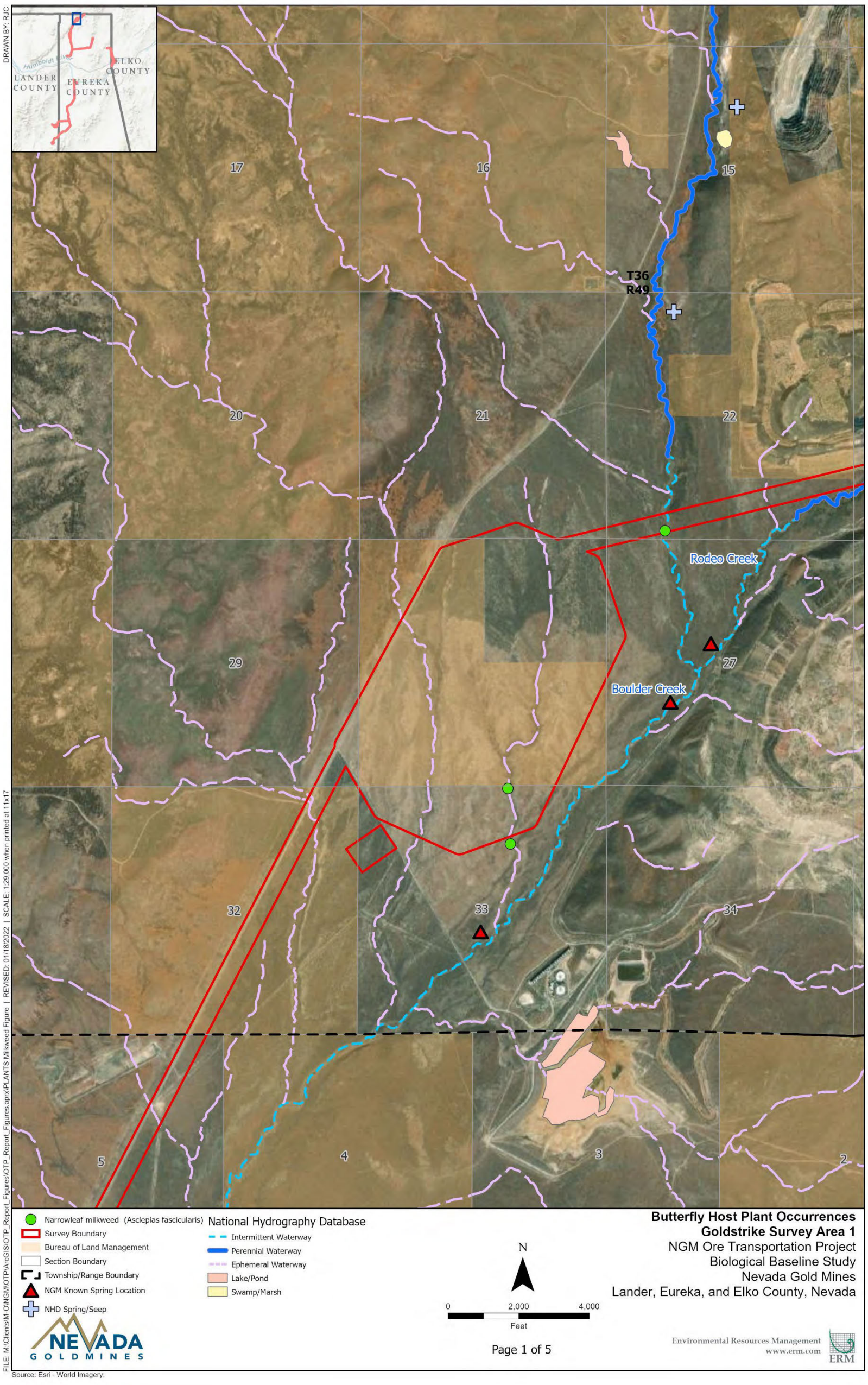


Figure 3.3-8: Butterfly Host Plant Occurrences—Goldstrike Survey Area 1

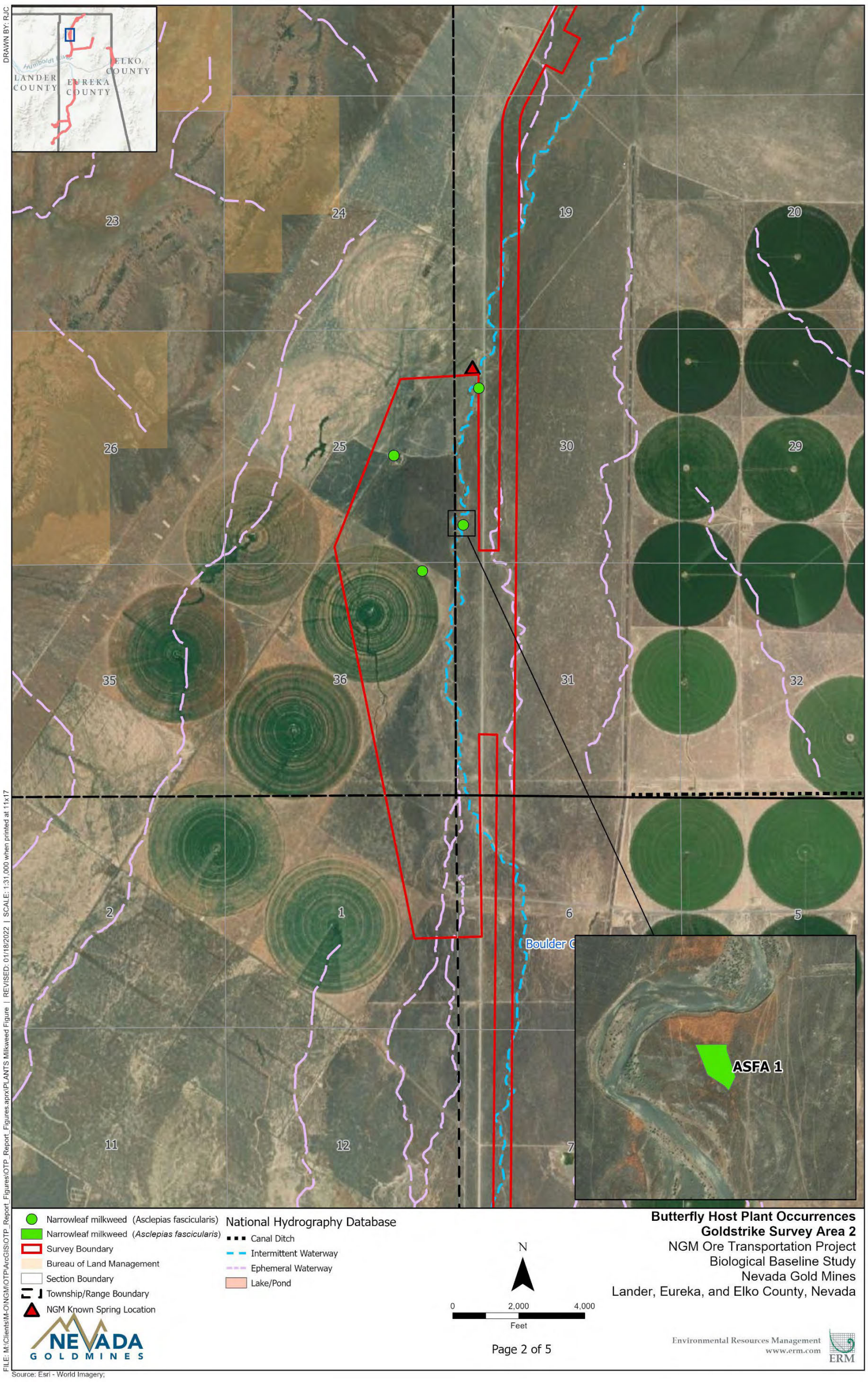


Figure 3.3-9: Butterfly Host Plant Occurrences—Goldstrike Survey Area 2

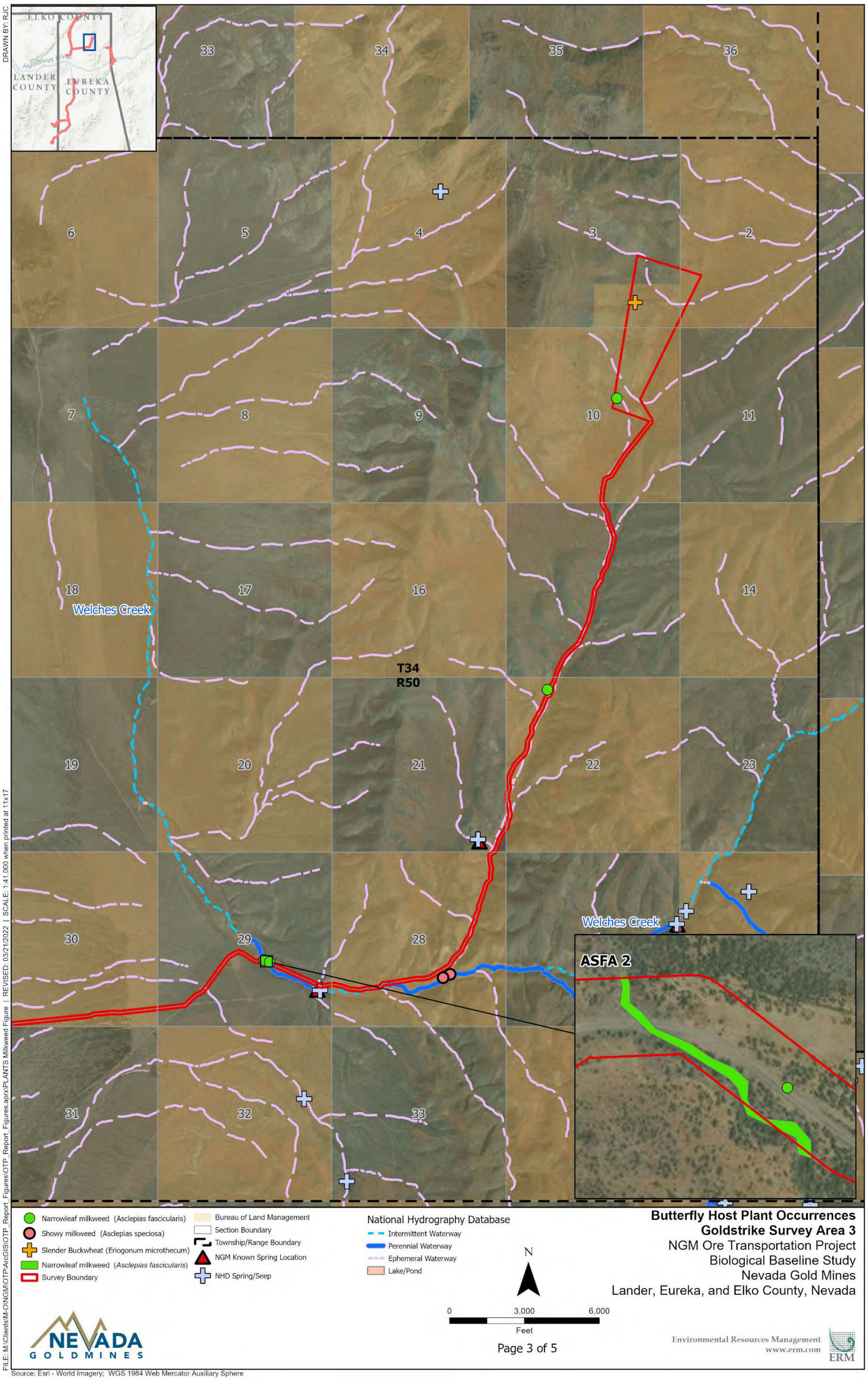


Figure 3.3-10: Butterfly Host Plant Occurrences—Goldstrike Survey Area 3

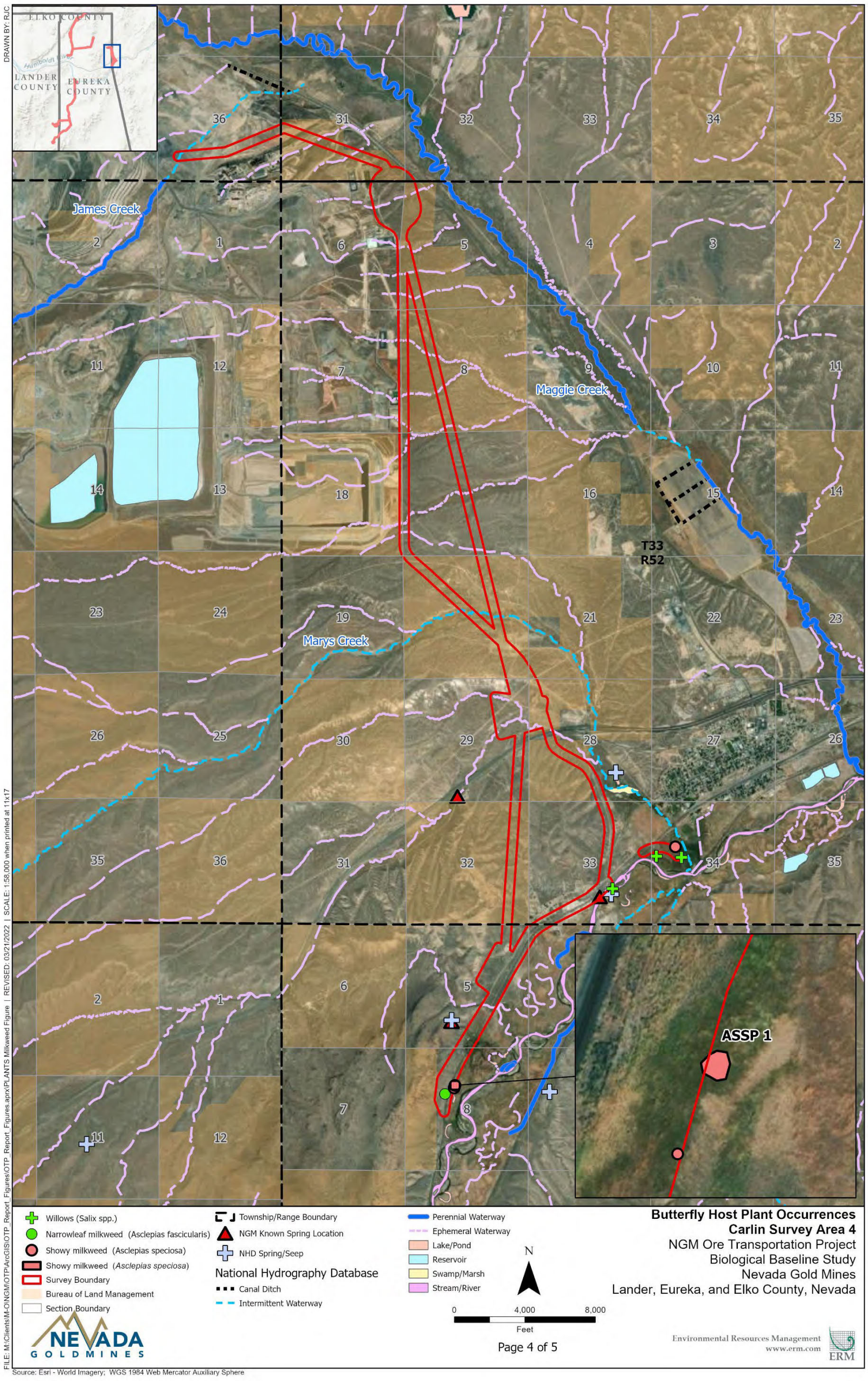


Figure 3.3-11: Butterfly Host Plant Occurrences—Carlin Survey Area 4

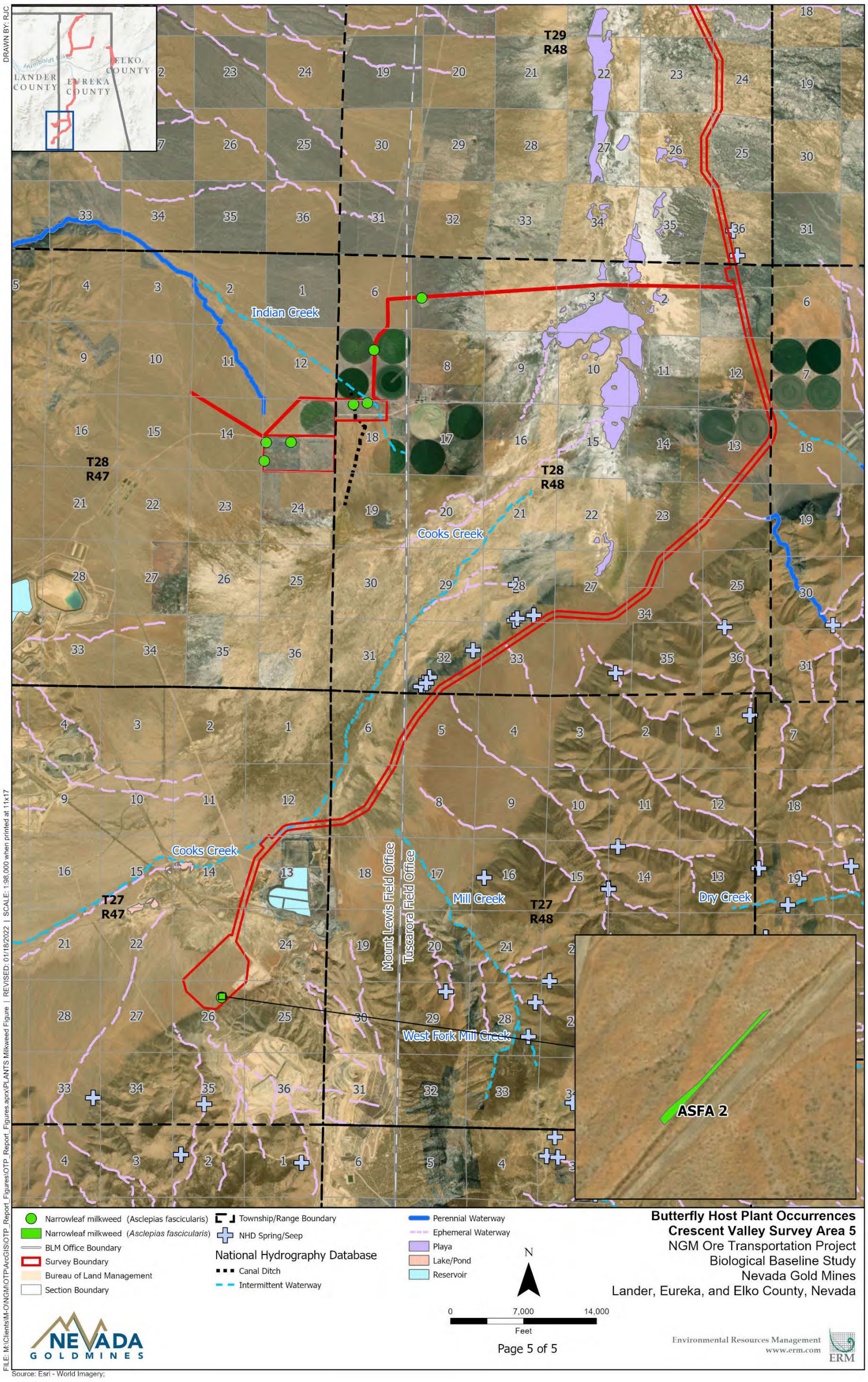


Figure 3.3-12: Butterfly Host Plant Occurrences—Crescent Valley Survey Area 5

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3.3.3. Noxious Weeds and Invasive Plants

3.3.3.1. Background

A “noxious weed” is defined in Nevada as any species of plant that is, or is likely to be, detrimental or destructive and difficult to control or eradicate (NRS 555.005). BLM considers plants “invasive” if they have been introduced into an environment where they did not evolve. Federal agencies are directed to prevent the introduction of noxious and invasive species and to follow an Invasive Species Management Plan (Federal Noxious Weed Act 1974 and 1990, Executive Order 13112, and Executive Order 13751). As such, the objective of this survey was to assess the current status of noxious weeds in the Project Area to inform future weed management measures.

NRS 555.150 requires every landowner or occupier within the State of Nevada, including private, city, county, or federal entities, to control all noxious weeds. NAC 555.101 lists the designation and categories of noxious weeds as described in NRS 555.130. Noxious weeds are classified as A, B or C (NRS 555.005).

- Category A weeds are generally not found or are limited in distribution throughout the state. Such weeds are subject to active exclusion from the state and active eradication wherever found, and require active eradication from the premises of a dealer of nursery stock.
- Category B weeds are generally established in scattered populations in some counties of the state. Such weeds are subject to active exclusion where possible and active eradication from the premises of a dealer of nursery stock.
- Category C weeds are generally established and generally widespread in many counties of the state.

In addition to noxious weeds listed by the Nevada Department of Agriculture (NDA), the Nevada Cooperative Extension identified 60 plant species as nuisance weeds. Nuisance weeds can have impacts similar to noxious weeds, but the species is not listed by NDA as a noxious weed. Nuisance weeds are plant species that can spread rapidly and compete with other plant species (Hefner and Kratsch 2018).

Through the National Resources Inventory, NRCS conducts a statistical survey of natural resource conditions and trends on non-federal land in the United States. Rangeland survey of non-federal lands includes information about non-native plant species. These non-native plant species were introduced from other areas and include invasive species and species that are considered beneficial. These species are categorized into five groups of non-native invasive weed (NNIW) species that once introduced become difficult to eradicate (NRCS 2010).

The NDA Noxious Weed Program cooperative weed management areas (CWMAs) work together to address issues associated with noxious weeds in their area. The Project Area includes portions of the Humboldt CWMA and Elko County (NDA 2021a; Elko County 2010). Priority weed species in the Humboldt CWMA are perennial pepperweed or broadleaved pepperweed (*Lepidium latifolium*), hoary cress or white top (*Cardaria draba*), medusahead

(*Taeniatherum caput-medusae*), Scotch thistle (*Onopordum acanthium*), musk thistle (*Carduus nutans*), Canada thistle (*Cirsium arvense*), Russian knapweed (*Rhaponticum [= Acroptilon] repens)*, spotted knapweed (*Centauria [maculosa] biebersteinii*), poison hemlock (*Conium maculatum*), and rush skeletonweed (*Chondrilla juncea*) (NDA 2021a).

3.3.3.2. Study Methodology

Information from NDA, Humboldt CWMA were used to identify potential noxious weed and non-native plant species that could be present in the Project Area. A list of potential federal, state, and county noxious weeds and invasive species was compiled for the field survey from these sources.

The following protocols were used in the field survey:

- *Tiered Sampling Method: Nevada's Protocol* (Wilson et al. 2006)
- *Vegetation and Soils – Baseline Data Collection* (BLM 2014a)

Noxious weeds and invasive plant species were surveyed within the entire Project Area (Project footprint plus a 200-foot-wide buffer of the centerline, as shown on Figure 2-1 through Figure 2-9). Vegetation surveys occurred from May 18, 2021, through August 31, 2021. Field surveys for noxious weeds and invasive plant surveys followed the Tier 1 methods in the established 2006 protocol (Wilson et al. 2006), which includes an emphasis on surveying disturbed sites (such as roadsides) and wet areas.

In Areas where an NDA Category A, B, and C noxious weed was observed, field crews recorded the UTM coordinates, collected geo-referenced photographs, estimated the species population size, and noted associated habitat type and plant species. Areas with any of the Category A, B, and C noxious weeds were mapped by walking the area before collecting data, as smaller plants may be more difficult to observe, thus underestimating the area where the species has become established.

To capture data (point, line, or polygon) at the appropriate scale, these general protocols were adhered to:

- Points were used for small infestations measuring up to one-tenth acre in size.
- Lines were used for linear features such as roads, streams, and fence lines.
- Polygons were used for irregular shaped areas greater than one-tenth of an acre in size.

Noxious weed species were mapped separately, with each point, line, or polygon feature consisting of only one species. Direct overlap of features was used if more than one species occupied the same location as long as the same size and shape were appropriate for the newly copied feature. Field crews recorded the percent canopy cover of noxious weed species.

3.3.3.3. Results and Discussion

Pre-Field Results

Information from the NDA, Humboldt CWMA, and the BLM Nevada Weeds and Invasives Program were reviewed to identify potential noxious weeds and invasive species that could be present in the Project Area. Table C.2-1 in Appendix C lists the Nevada noxious weeds by category.

Noxious weed species reported in the general Project Area include white top, Scotch thistle, muck thistle, Canada thistle, poison hemlock, and common St. Johnswort (*Hypericum perforatum*). Noxious weeds were reported to be especially common along roadsides and at the edges of seeps, springs, or streams (ESCO 2017; Graham and Johnson 2004). Previous studies in the general vicinity noted that the non-native invasive cheatgrass is nearly ubiquitous in northern Nevada (ERM 2018; ESCO 2017). Additional non-native species—crested wheatgrass (A*gropyron cristatum*) and burningbush (*Bassia scoparia*)—were also described as "prevalent... particularly in recently burned and reseeded areas" (ERM 2018).

Land use in the Project Area includes mining, agriculture, livestock grazing, roads, and rural residences. Disturbance, both from land use and natural events, can change vegetation communities. The severity of wildfires, disturbance duration and extent, and vegetation community dynamics influence a vegetation community's resistance to non-native species invasion (Wood et al. 2019). Section 3.1, Ecological Site Description, describes the SWreGAP land cover types in the Project Area, which include areas classified as invasive annual and biennial forblands and invasive annual grasslands. In addition to the surface vegetation community, the seed bank in the Project Area contains non-native invasive plant species seeds, which may prevent establishment of native plant species (Clements et al. 2007).

Field Survey Results

During the 2021 field surveys, 14 species of Category B and C noxious weed species were observed throughout the Project Area. The species, their NDA classification, number of areas, and acreages within the three survey areas are shown in Table 3.3-5. No Category A noxious weed species were observed.

Though most (142) of the 170 locations where Category B and C weeds were mapped are less than 1 acre, one area within the Goldstrike Survey Area (GS-Nox-168, approximately 5 miles north of Dunphy) is approximately 59 acres. Three species (white top, perennial pepperweed, and Tamarisk) were found in this area (Figure 3.3-13). Perennial pepperweed was the dominant species found in this area.

Section 3.1, Ecological Site Description, discusses the status of vegetation communities in the Project Area and their current state. Noxious weed species were found primarily in areas with surface disturbance, with the exception of white top, which was found throughout the entire Project Area (Figure 3.3-13 through Figure 3.3-15).

Table 3.3-5: Acres in Survey Areas with Category B and C Noxious Weeds

BLM Field Office	Survey Area	Number of Areas	Acres within Project Area	Acres outside of Project Area	Total Acres
Tuscarora Field Office	Goldstrike Area	52	128.5	14.3	142.8
	Carlin Area	43	76.8	4.3	81.1
	Crescent Valley Area	29	16.2	1.8	18.8
Mount Lewis Field Office	Crescent Valley Area	46	36.4	2.3	38.7
Project Area Total		170	257.9	22.7	281.4

[a] Noxious weeds where the infestation was less than 1/10 acre are not included in the acres.
[b] Field crews mapped the entire area where Category B and C weeds were established, which could extend outside of the Project Area.

Other noxious weed species observed in the Project Area included spotted knapweed, Russian knapweed, Scotch thistle, and perennial pepperweed. Additional noxious weeds associated with wetlands, depressions, and places where water collect are Canada thistle, musk thistle, perennial or field sowthistle (*Sonchus arvensis*), mayweed chamomile (*Anthemis cotula*), poison hemlock, and tamarisk (*Tamarix* sp.).

The most abundant and widespread species was white top, followed by Scotch thistle and perennial pepperweed. Three species are Class B species (Mayweed, spotted knapweed, and perennial sowthistle). The other 11 noxious weeds observed during the surveys are Class C species (NDA 2021a). While not observed during the surveys, medusahead and ventenata (*Ventenata dubia*; which is also known as wiregrass) have been found in Elko County (NDA n.d.). Appendix C, Table C.2-2 lists the noxious and non-native invasive weed species found during field surveys.

The Goldstrike and Crescent Valley survey areas (Figure 3.3-13 and Figure 3.3-15) include areas used for agriculture. Areas near the agricultural lands are generally where noxious weed species have become established. Noxious weeds are also established along roads, in the Project Area, and the Union Pacific Railroad (UPRR) railway (Figure 3.3-13 through Figure 3.3-19).

The UPRR railway, Interstate 80, and State Highway 278 bisect the Carlin Survey Area (Figure 3.3-14). Scotch thistle was observed at 101 locations, and one occurrence of mayweed chamomile was observed near the UPRR railway at the southern end of the Carlin Survey Area. Spotted and Russian knapweed were also observed in the Carlin and Crescent Valley survey areas (Table 3.3-6).

Table 3.3-6: Number of Noxious Weeds and Invasive Species Observations

Species Name	NDA Class (A, B, C)	Key Characteristics	Number of Observations in Survey Area			Total Number of Observations
			Goldstrike	Carlin	Crescent Valley	
Mayweed chamomile *(Anthemis cotula)*	B	Annual; reproduces by seed		1		1
White top (*Cardaria draba*)	C	Perennial; reproduces through roots and seeds	141	24	241	406
Musk thistle (*Carduus nutans)*	C	Biennial that reproduces by seed and has a deep fleshy taproot		21		21
Spotted knapweed (*Centaurea [maculosa] biebersteinii)*	B	Biennial; reproduces by seed and lateral roots	1	30	29	60
Canada thistle (*Cirsium arvense*)	C	Perennial; reproduces by both roots and seed		6		6
Poison hemlock (*Conium maculatum*)	C	Biennial that reproduces by seed and has a thick, deep taproot		3		3
Perennial or broadleaved pepperweed (*Lepidium latifolium*)	C	Perennial; reproduces by roots and seed	59	46	4	109
Scotch thistle (*Onopordum acanthium*)	C	Biennial; reproduces by seed	56	102	15	173
Russian knapweed (*Rhaponticum repens* formerly *Acroptilon repens*)	C	Perennial; reproduces by roots and seed		29	38	67
Perennial sowthistle (*Sonchus arvensis*)	B	Perennial; reproduces by seed and roots; seed is wind-dispersed		1	1	2
Tamarisk (*Tamarix* spp)	C	Perennial; reproduces by seed, roots and stem fragments	5	1	15	21

Source: NDA 2021b, Hefner and Kratsch 2018

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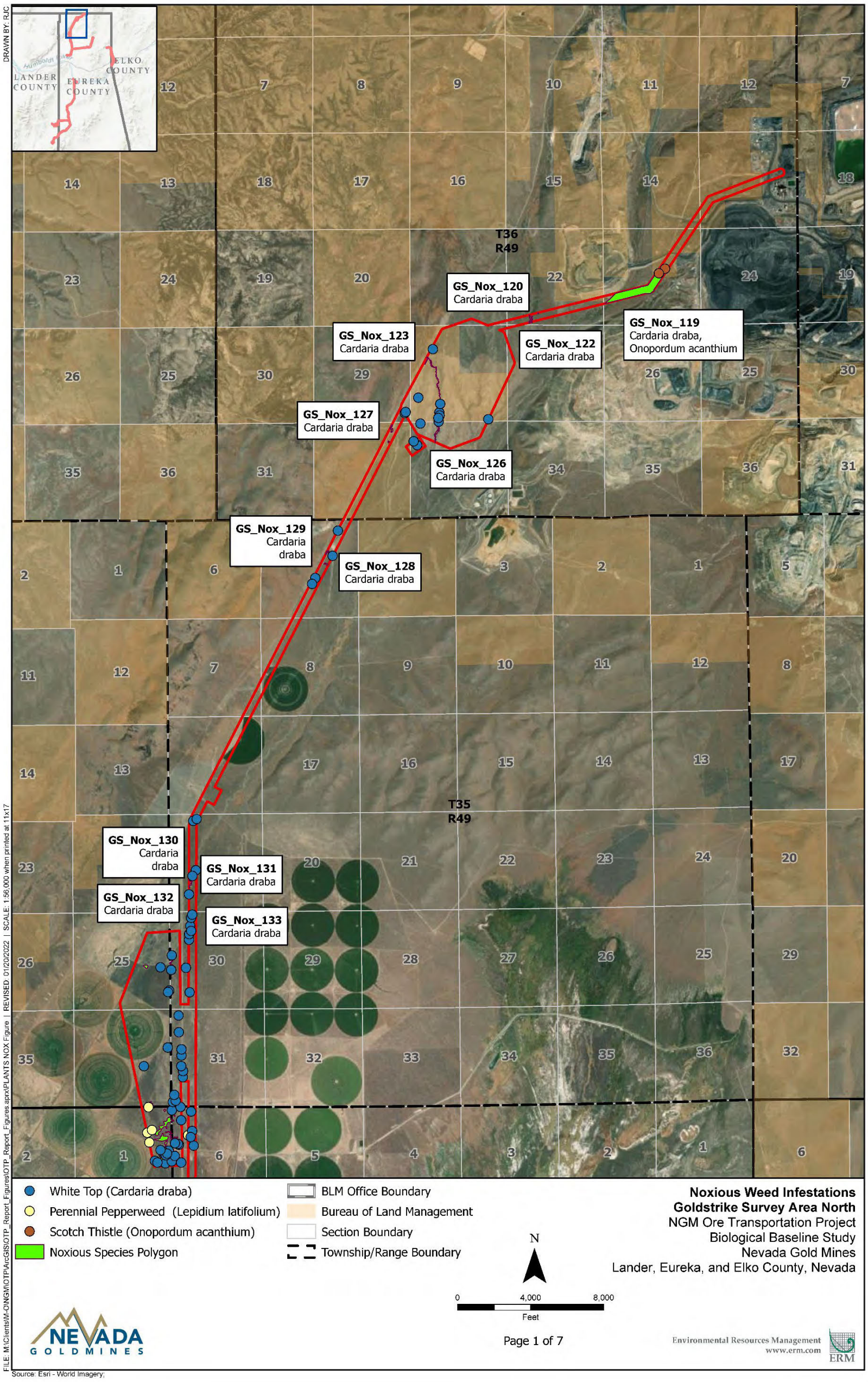


Figure 3.3-13: Noxious Weed Infestations—Goldstrike Survey Area North

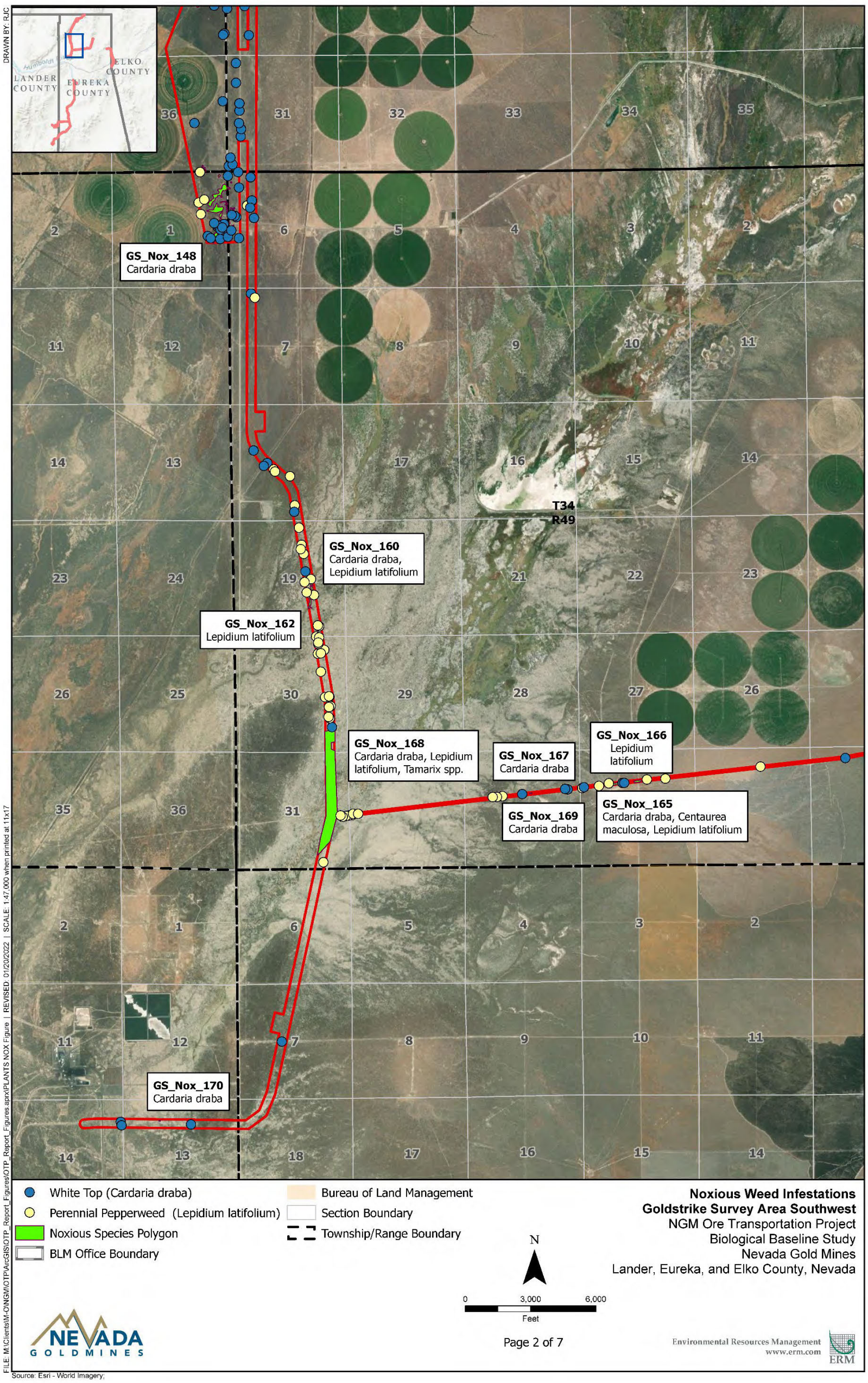


Figure 3.3-14: Noxious Weed Infestations—Goldstrike Survey Area Southwest

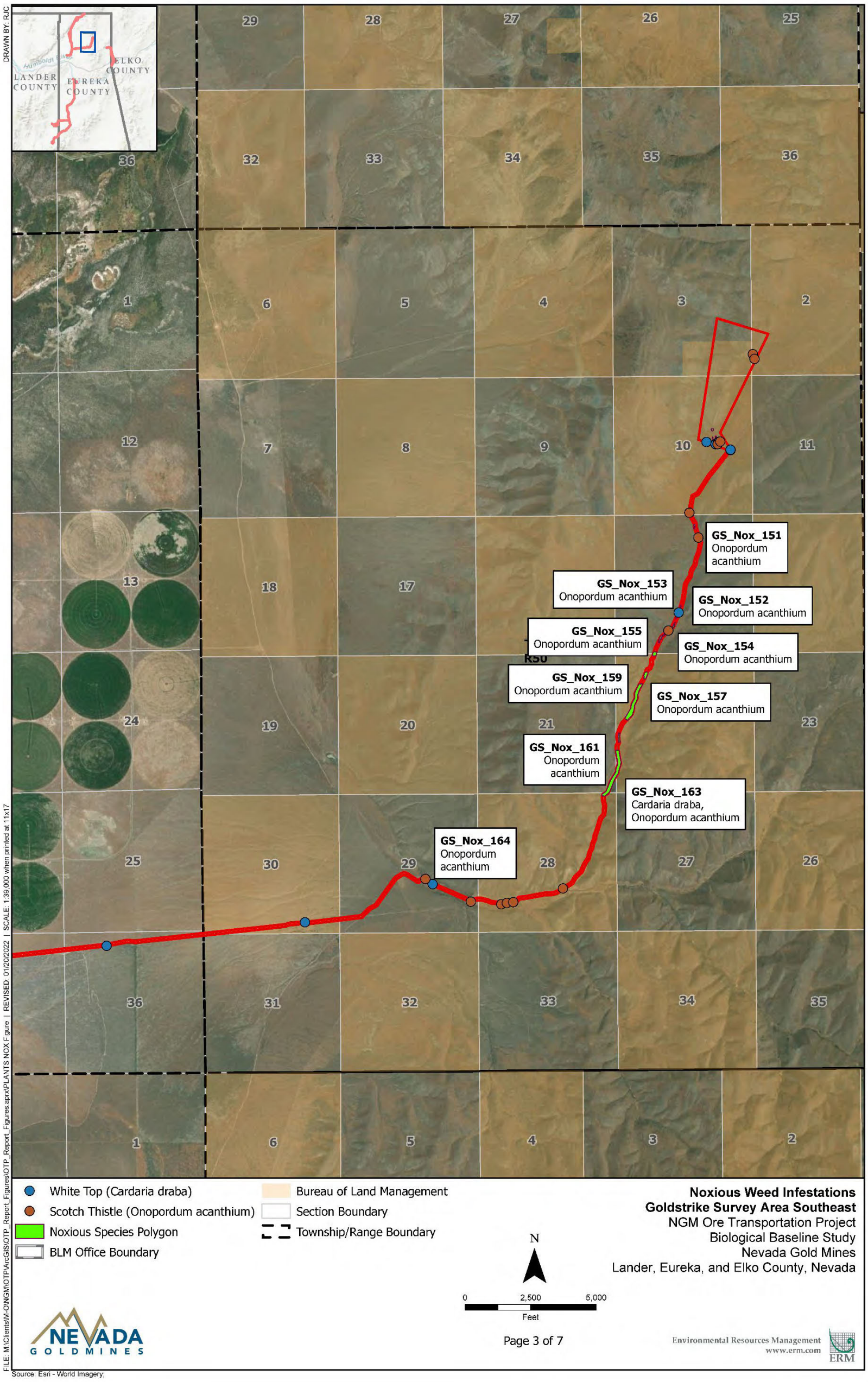


Figure 3.3-15: Noxious Weed Infestations—Goldstrike Survey Area Southeast

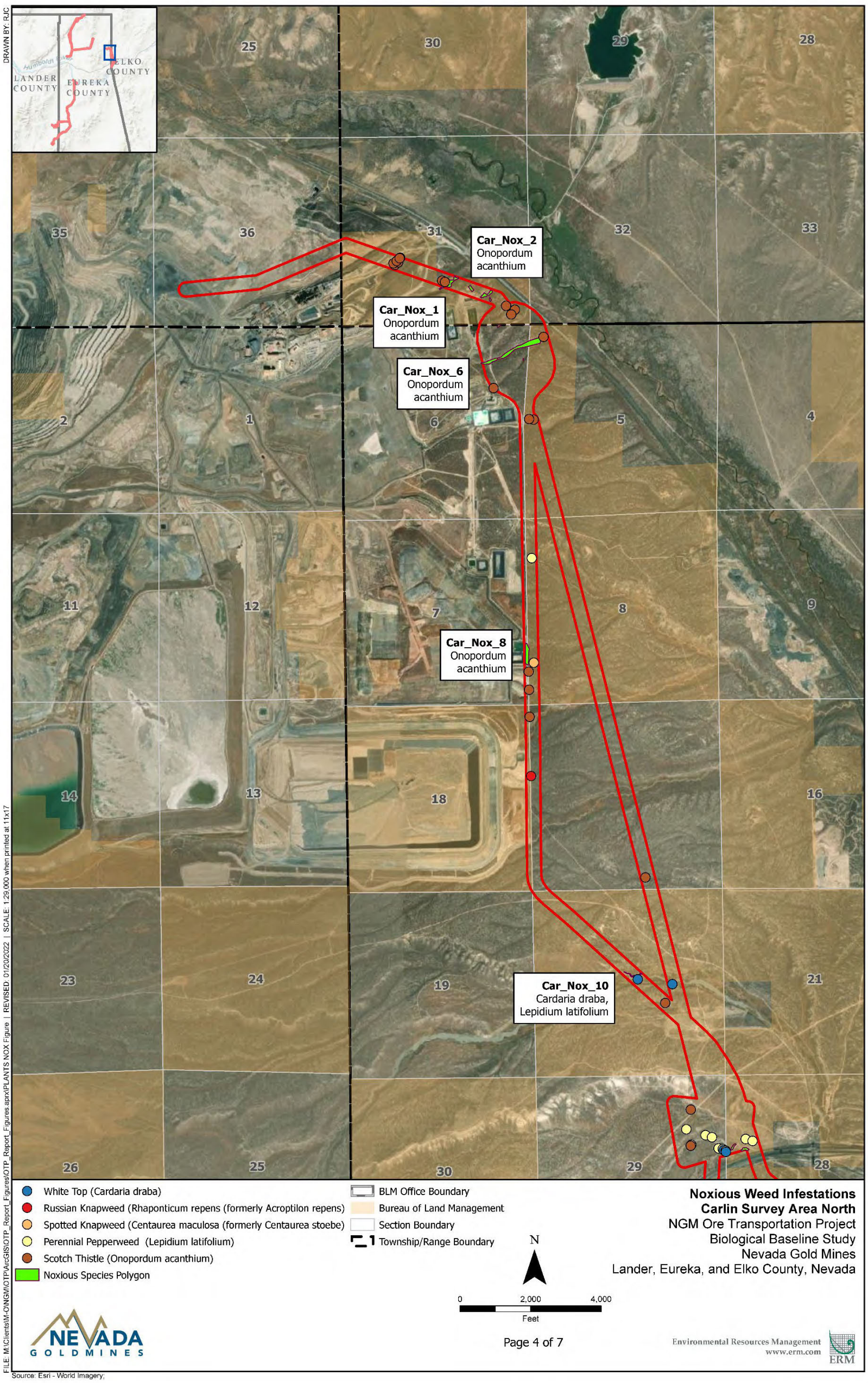


Figure 3.3-16: Noxious Weed Infestations—Carlin Survey Area North

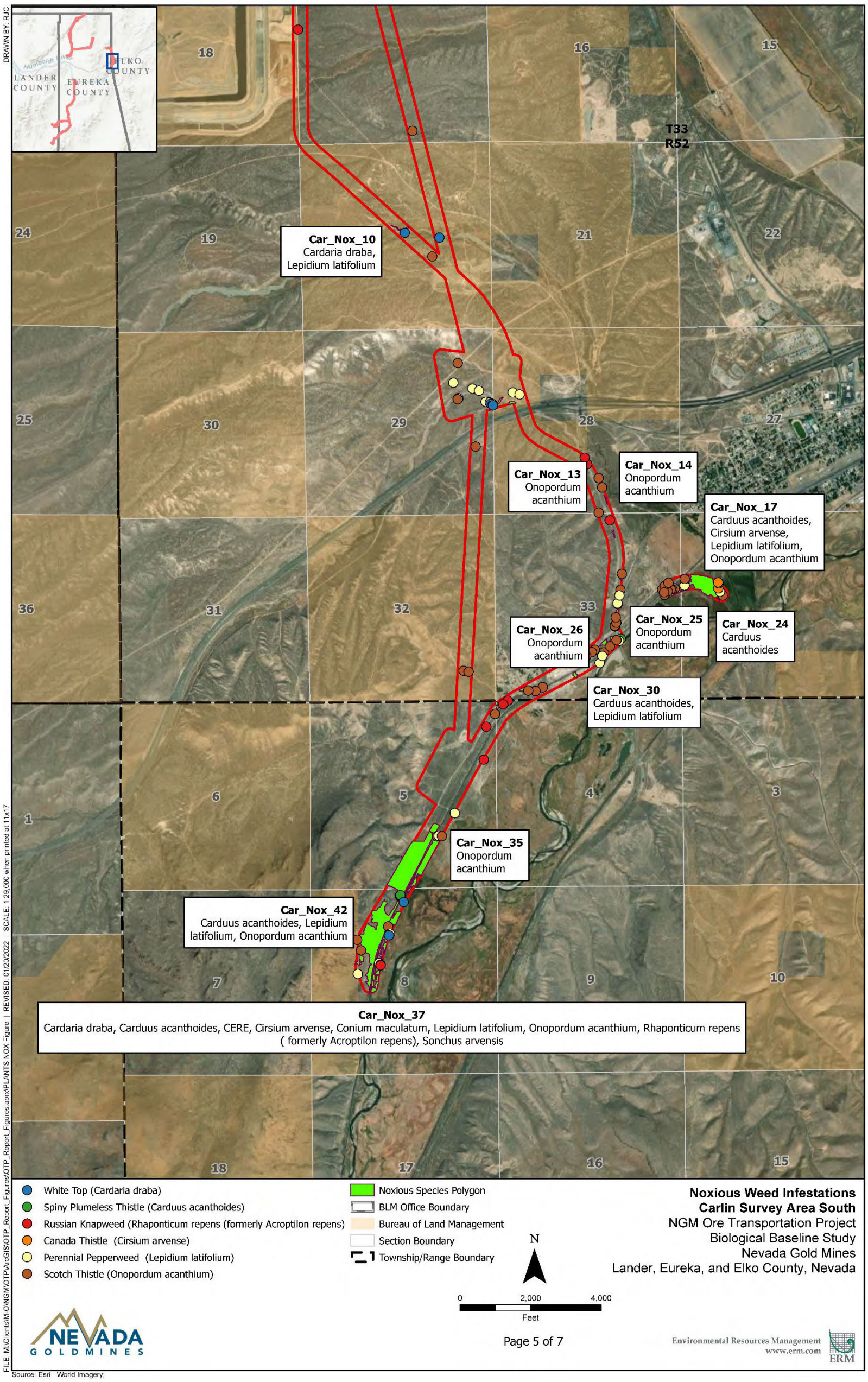


Figure 3.3-17: Noxious Weed Infestations—Carlin Survey Area South

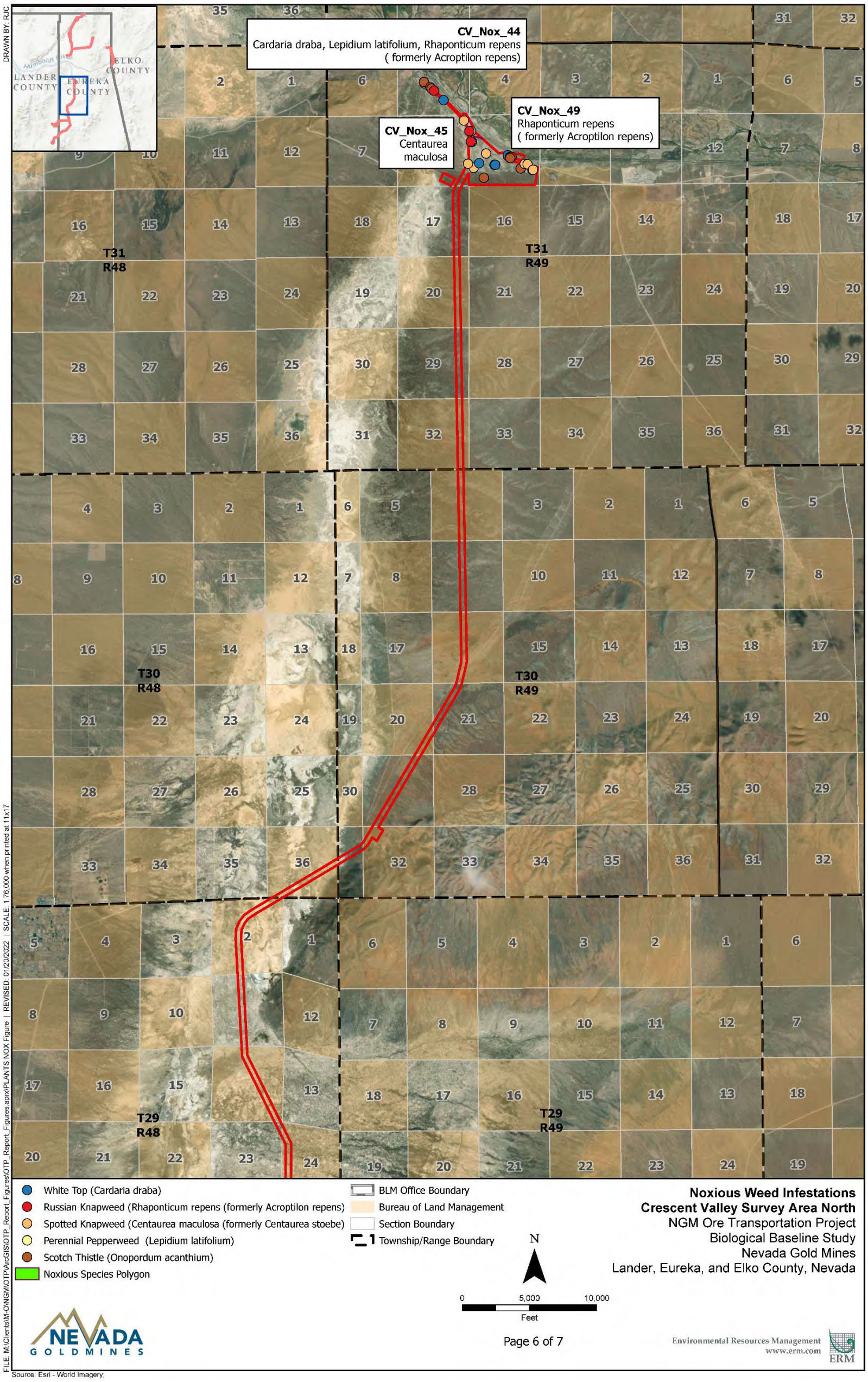


Figure 3.3-18: Noxious Weed Infestations—Crescent Valley Survey Area North

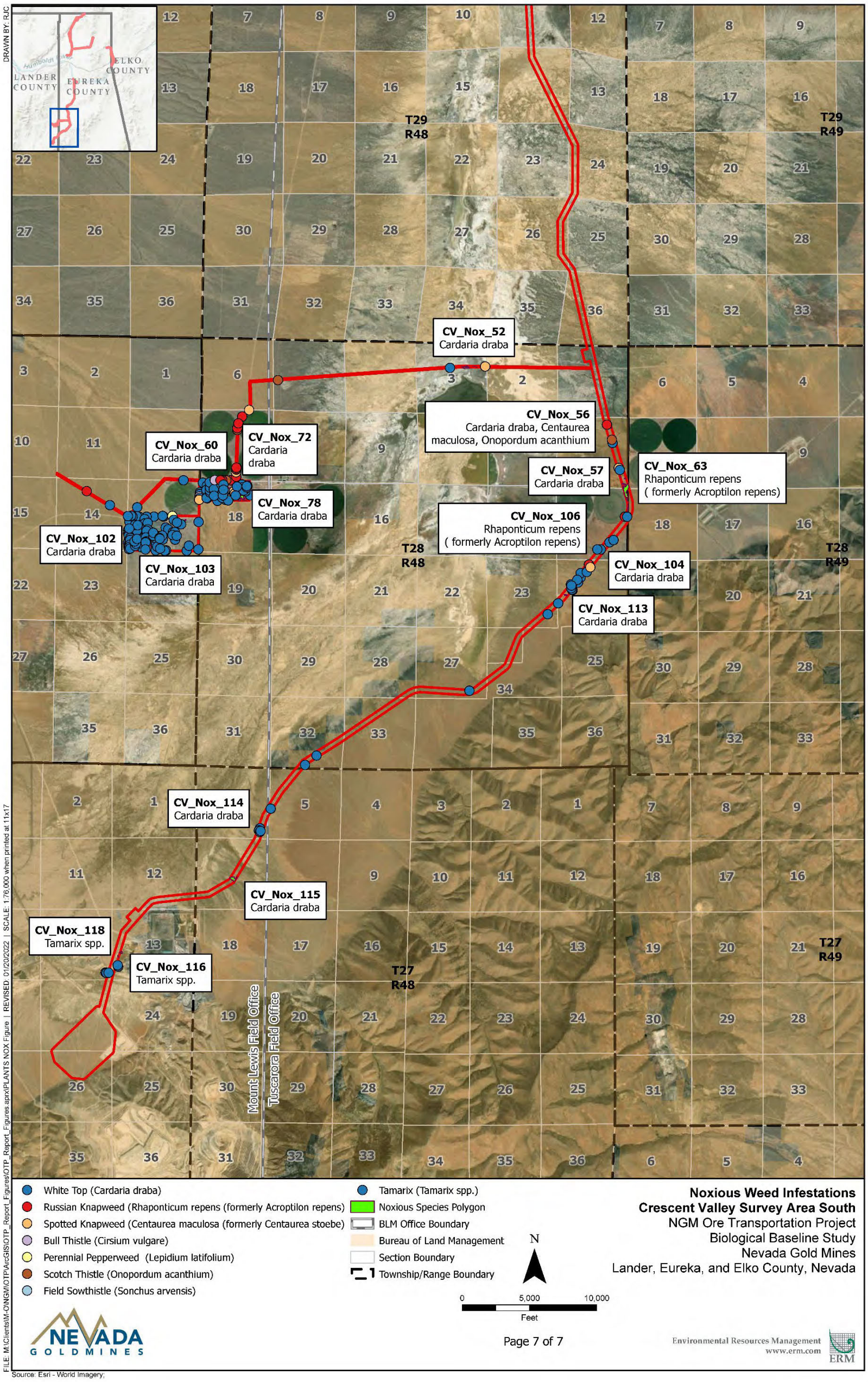


Figure 3.3-19: Noxious Weed Infestations—Crescent Valley Survey Area South

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3.4. WILDLIFE STUDIES

The survey area for obtaining baseline study data for wildlife includes the Project footprint plus a 200-foot buffer of the centerline (400-foot survey area), borrow source areas, access roads, and construction depots (Figure 2-1 through Figure 2-9). Wildlife studies occurring for the Project were approved by BLM and NDOW and include avian, mammal, aquatic, and invertebrate species. The following sections present the study methodology, results, and discussion for each of these resource sections included as part of the biological baseline studies conducted in 2021.

3.4.1. Wildlife Habitat

Wildlife habitat within the Project Area consists of shrubland and grassland communities with some forblands and riparian areas. Within the majority of the Project Area, these habitats are dominated by invasive vegetation as discussed in Section 3.1, Ecological Site Descriptions, and Section 3.3, Vegetation Studies. Agricultural, developed, and recently mined areas make up a lesser component of the Project Area. Agricultural activities, historical mining activities, livestock rotation, and wildfire have altered the landscape by disturbing native soils, vegetation, and local hydrology throughout portions of the survey area. These habitats within the survey area support a variety of general wildlife species including big game, fish, birds, mammals, bats, reptiles, amphibians, and butterflies.

The NDOW Wildlife Action Plan (WAP) describes wildlife conservation strategies based on 22 “Key Habitats” that occur in the state (Wildlife Action Plan Team 2012). These Key Habitats were derived from SWReGAP, the USGS Geographic Names Information System, and the USGS NHD. The WAP identifies Species of Conservation Priority and groups them into species assemblages. Conservation strategies are directed towards these species' assemblages and consequently address conservation issues related to Key Habitats.

3.4.1.1. Mapping Methods

Section 3.1, Section 3.2, and Section 3.3 present data related to the plant communities occurring in the Project Area. Plant community data was used in conjunction with other supplementary sources, including aerial imagery and SWReGAP data to further describe vegetation communities.

3.4.1.2. Results and Discussion

There are 12 WAP Key Habitats occurring within the Project Area, as shown on Figure 3.4.1-1 through Figure 3.4.1-5. The total acreage of each Key Habitat in the Project Area is shown in Table 3.4.1-1. As mentioned, these Key Habitats are derived in part from the SWReGAP data shown on Figure 2.1-1 through Figure 2.1-3. Descriptions of these Key Habitats are provided below.

Table 3.4.1-1: WAP Key Habitat Acreages in the Project Area

WAP Key Habitat	Acreage in the Project Area
Agricultural Lands	182.2
Barren Landscapes	277.9
Cliffs and Canyons	28.2
Desert Playas and Ephemeral Ponds	155.0
Developed Landscapes	5.8
Grasslands and Meadows	1,482.8
Intermountain Cold Desert Shrub	1,721.2
Intermountain Rivers and Streams	20.1
Lakes and Reservoirs	1.7
Lower Montane Woodlands and Chaparral	0.5
Marshes	5.6
Sagebrush	2,746.0
Total [a]	**6,627**

[a] Approximately 4.9 acres differ from the Project Area acreage due to overlap in the Nevada dataset.

Agricultural Lands

Agricultural Lands in Nevada typically occur from 600 to 7,500 feet in elevation, predominantly in valley bottoms. These areas are considered high value habitats for wildlife, including migratory and breeding birds, mule deer (*Odocoileus hemionus*), and some raptors. Agricultural Lands provide potential wildlife habitat in the form of flooded fields, unharvested crops, and fallow soils. This Key Habitat totals 182.2 acres within the Project Area, most of which occurs in the Goldstrike Survey Area with some in the Crescent Valley Survey Area.

Barren Areas

Historically disturbed areas or areas experiencing ongoing disturbance make up Barren Areas. These locations lack resources, limiting vegetative cover. Although these areas have restricted plant cover, they provide potential habitat for some wildlife species. For example, burrowing owls (*Athene cunicularia*) are known to inhabit Barren Areas, including along roadways. This Key Habitat may also provide corridors for wildlife migration between adjacent habitats. Barren Areas within the Project Area consist of roads, historical or active grazing areas, and historical or active mining areas. Barren Areas make up a significant portion of the total Project Area (277.9 acres).

Cliffs and Canyons

The Cliff and Canyon Key Habitat occurs sparsely within the Project Area (28.2 acres), predominantly within the Welches Creek Borrow Source of the Goldstrike Survey Area. These areas consist of steep slopes or vertical cliff faces with little or no vegetative cover. Cliffs and Canyons provide important shelter from predators and nesting, roosting, and denning areas for wildlife. Various raptor and bat species may utilize this Key Habitat. Additionally, other mammals and reptiles may utilize these areas for protection from predators, denning, or basking.

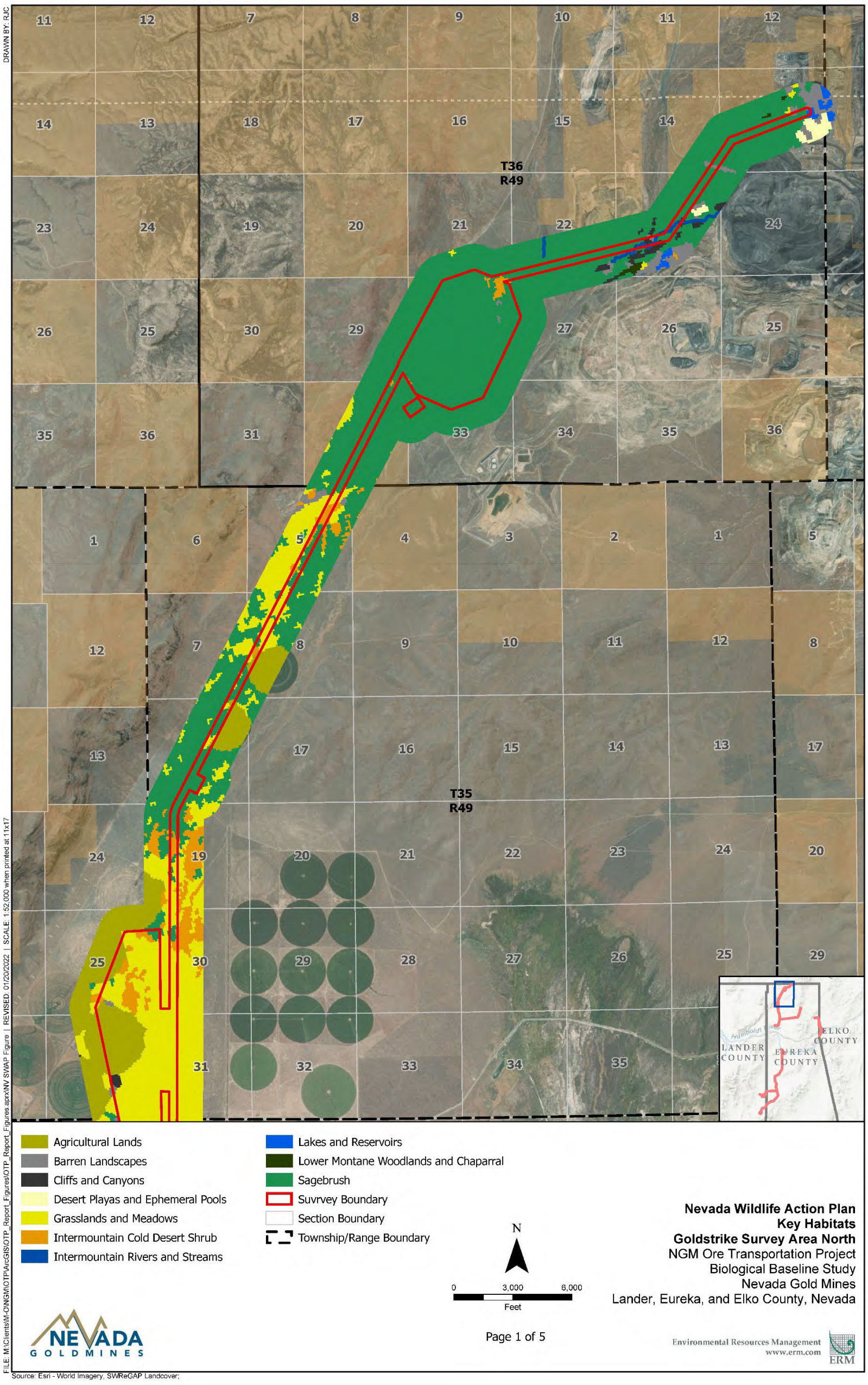


Figure 3.4.1-1: Nevada WAP Key Habitats—Goldstrike Survey Area North

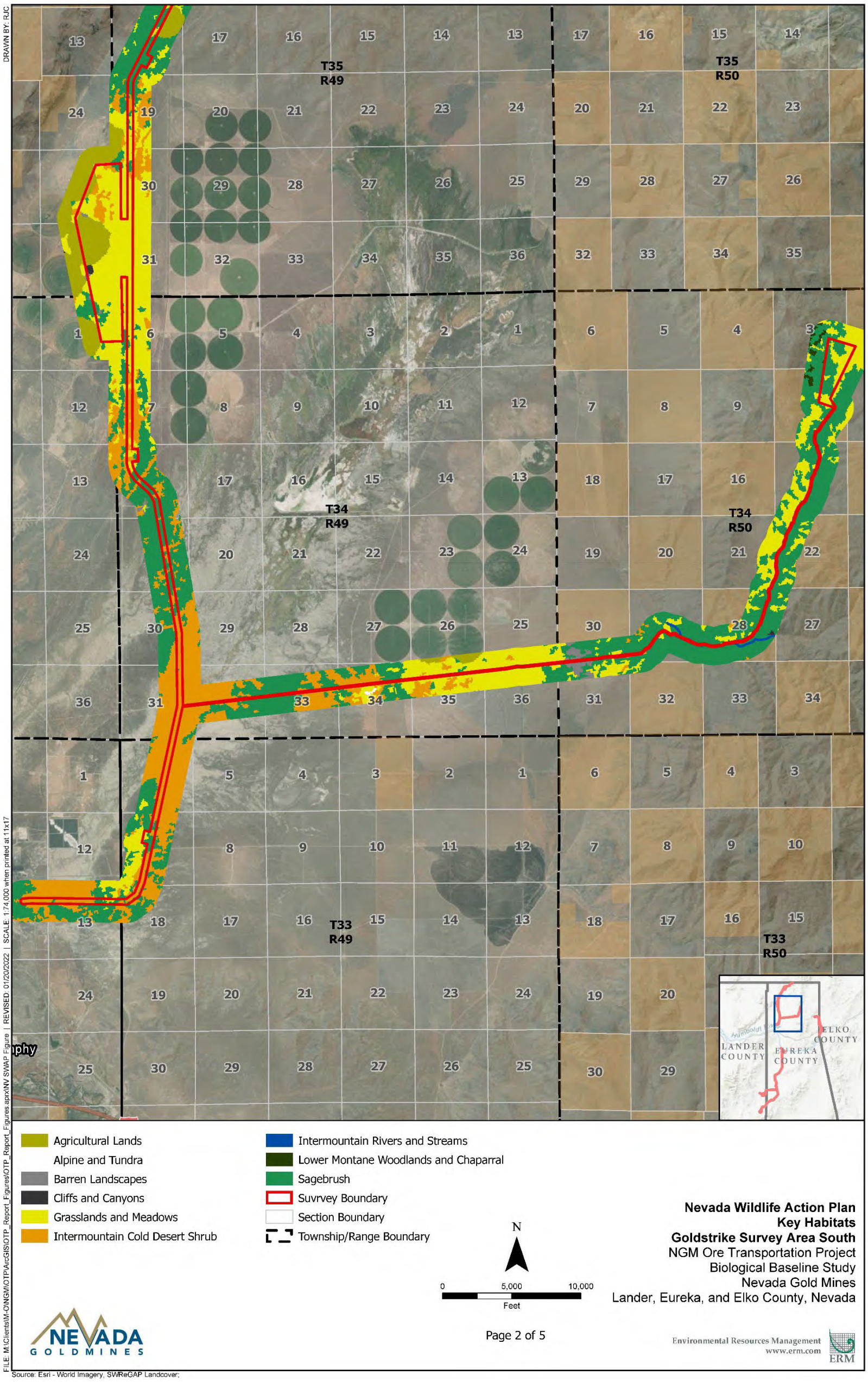


Figure 3.4.1-2: Nevada WAP Key Habitats—Goldstrike Survey Area South

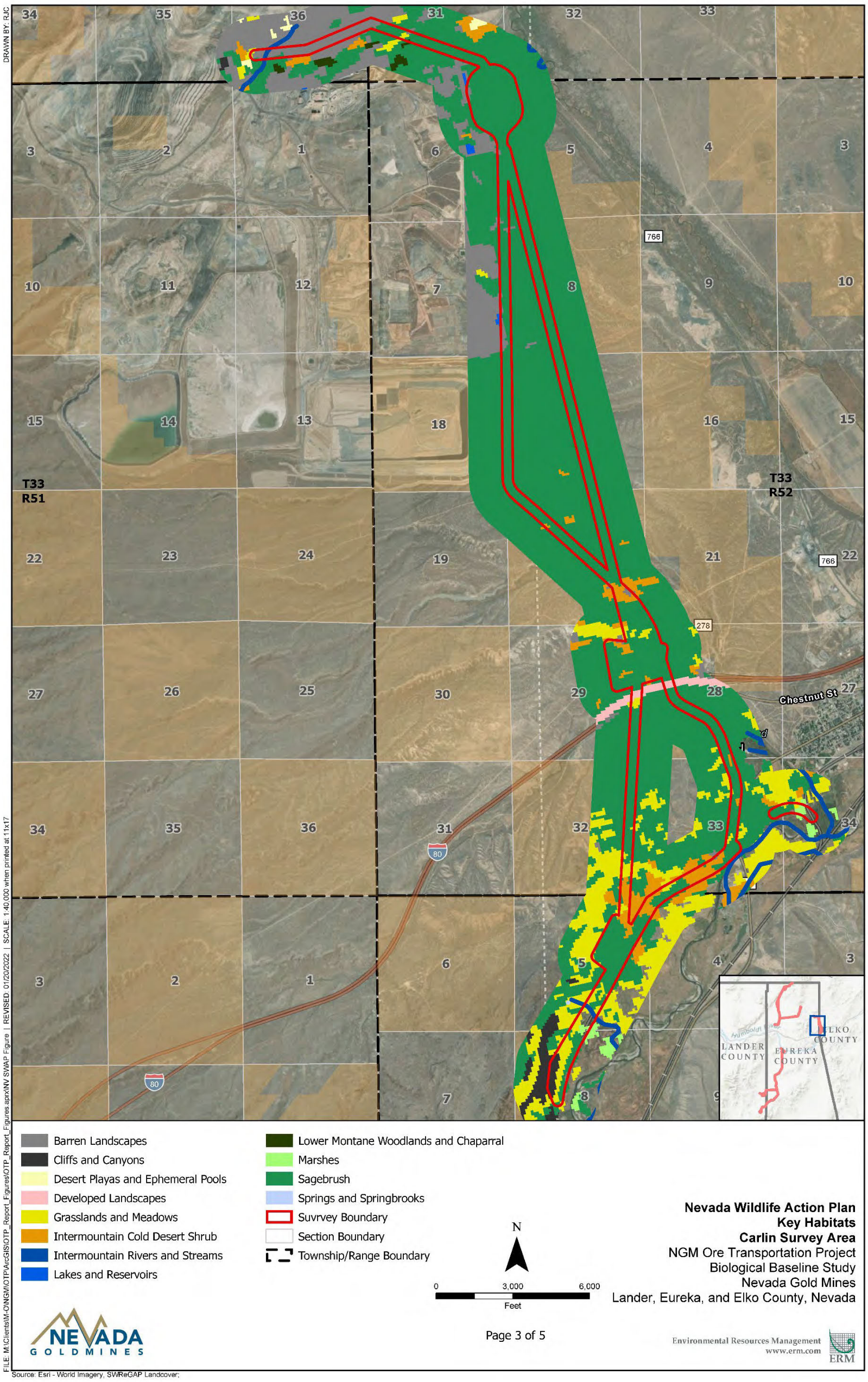


Figure 3.4.1-3: Nevada WAP Key Habitats—Carlin Survey Area

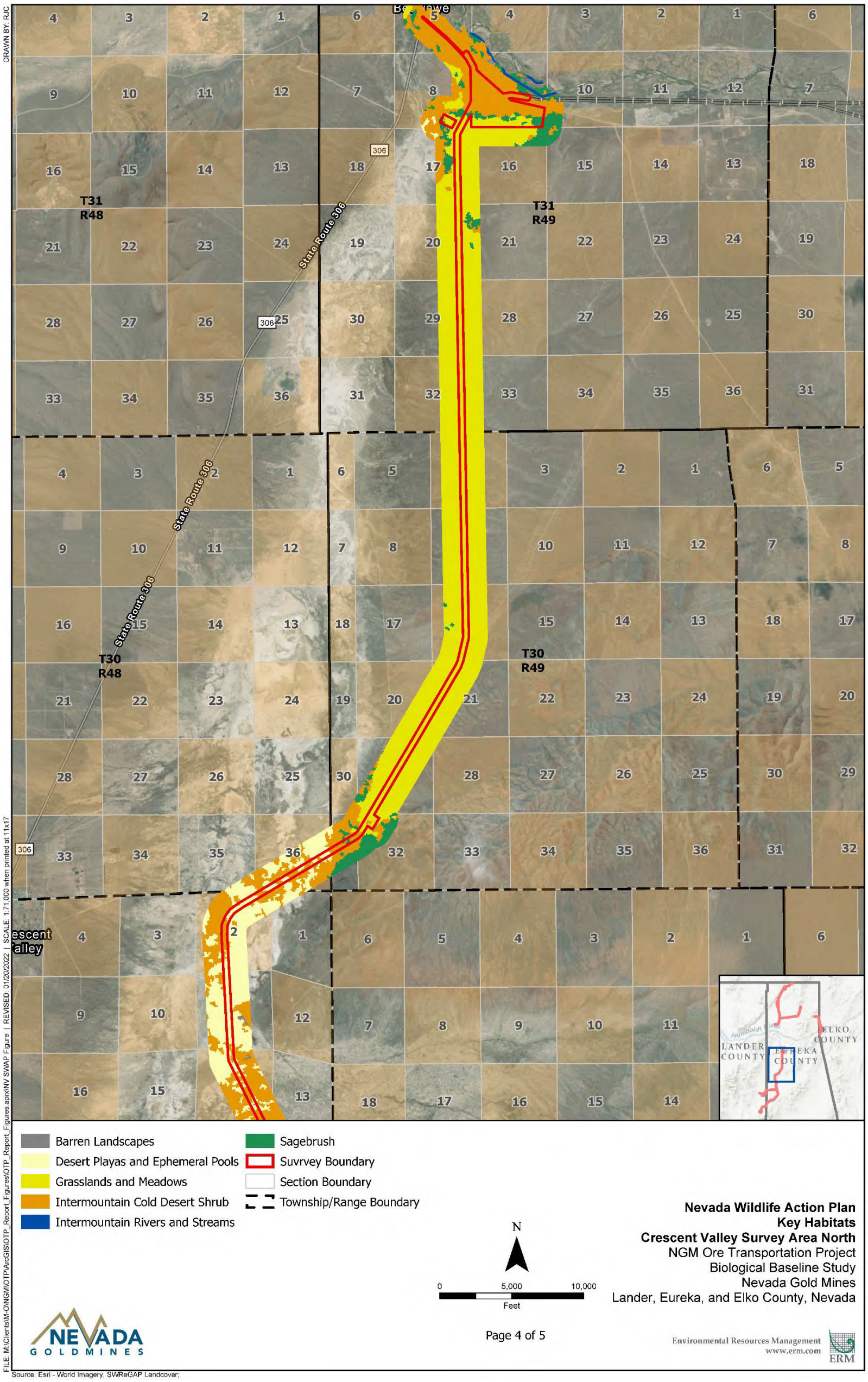


Figure 3.4.1-4: Nevada WAP Key Habitats—Crescent Valley Survey Area North

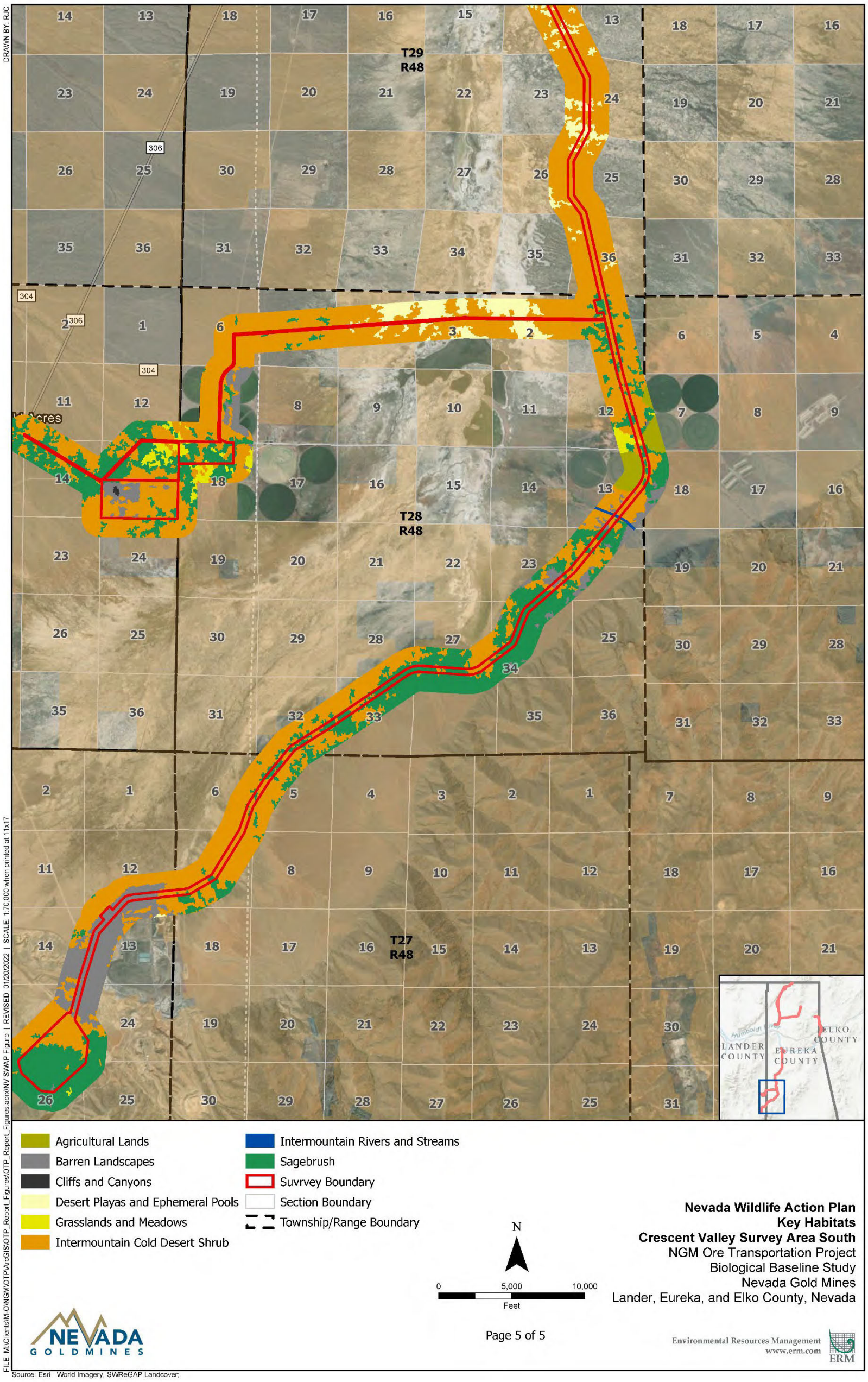


Figure 3.4.1-5: Nevada WAP Key Habitats—Crescent Valley Survey Area South

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Desert Playas and Ephemeral Pools

Desert Playas and Ephemeral Pools are composed of barren or intermittently vegetated playas on valley bottoms. These habitats are formed by irregular flooding and subsequent evaporation. The associated value of Desert Playas and Ephemeral Pools depends upon the amount and duration of available water. The alteration of aquatic resources within and adjacent to the Project Area may reduce the viability of this Key Habitat. When unaltered, these habitats support various migratory and breeding bird species and some aquatic invertebrate and vertebrate species. Desert Playas and Ephemeral Pools occur predominantly within the Crescent Valley Survey Area, with select areas in the northern section of the Goldstrike Survey Area for a total of 155 acres in the Project Area.

Developed Landscapes

This Key Habitat is characterized by land transformation and includes residential, urban, industrial, and commercial areas. Developed Landscapes can be categorized as open space-low density or medium-high density development. Open space-low density developments retain some form of a plant community. Parcels that are being developed are also considered open space-low density and may have fallow soils and ruderal weed species. Medium-high density development results in reduced soil substrates available for vegetation. This development involves urban, industrial, and commercial land use and features such as ornamental vegetation, smaller covered structures, irrigated lawns, or rock walls. Developed Landscapes and adjacent transitional regions can provide potential habitat for a wide variety of wildlife species including small mammals such as prey and bat species, large mammals or predator species, migratory and breeding birds, and some raptors. This habitat type occurs infrequently throughout the Project Area (5 acres), predominantly in the portion adjacent to the Carlin Survey Area.

Grasslands and Meadows

Grassland and Meadows consist of short-statured grass species and forbs, largely devoid of taller vegetation. With less compacted soils, these areas provide suitable habitat for burrowing species. As a result, raptors may be drawn to Grasslands and Meadows as well. This habitat may also be utilized by a variety of species for foraging. The vegetation community composition largely determines wildlife use. Additionally, recovering burn areas are commonly categorized as grasslands. Grasslands are ubiquitous throughout the Project Area (1,482.8 acres) and occur frequently in the form of invasive annual grasslands or forblands following some form of disturbance. Marginal and limited meadow habitat occurs within and adjacent to the Project Area west of the Carlin Survey Area.

Intermountain Cold Desert Shrub

This Key Habitat occurs in poorly drained valley bottoms with saline soils. This habitat is often dominated by salt-tolerant shrubs. Perennial bunchgrasses may be present and provide food sources for a variety of species. Friable soils contribute to potential habitat for burrowing

species. As a result, raptors and bat species may also utilize Intermountain Cold Desert Shrub. Some species commonly associated with Sagebrush habitat may utilize these areas as secondary habitat. Similar to Grasslands and Meadows, Intermountain Cold Desert Shrub habitat occurs regularly throughout the Project Area (1,721.2 acres).

Intermountain Rivers and Streams

Riparian areas and floodplains adjacent to rivers and streams make up the Intermountain Rivers and Streams Key Habitat. The presence of surface water allows for complex ecosystems with high biodiversity. These highly productive habitats may be utilized by a wide variety of species for foraging, hunting, nesting, and denning. Intermountain Rivers and Streams may also provide migration corridors for local or long-distance migratory species. Birds, amphibians, fish, and bats are commonly found in these habitats. Herbaceous vegetation dominates with some shrub and sapling species present. Intermountain Rivers and Streams occur primarily along perennial aquatic resources. Streams within the survey area are mostly ephemeral and intermittent, containing seasonal runoff and isolated seep and spring sources. Historical Intermountain Rivers and Streams habitat likely occurred at the northern reaches of the Project Area prior to disturbance. Presently, this Key Habitat type is most prevalent along the Humboldt River in the portion of the Project Area immediately west of the Carlin Survey Area and occurs sporadically throughout the remaining Project Area (20.1 acres).

Lakes and Reservoirs

This habitat type includes natural lakes and reservoirs or other impoundments. Seasonal and climatic variation allows these Key Habitats to change in size and storage, maintaining transitional shoreline and emergent areas immediately adjacent to the resource. These habitats are important for migratory and breeding birds, including waterfowl and shorebirds, as well as some fish species. A very limited number of open waterbodies occur throughout the Project Area (1.7 acres), with the majority being ephemeral, manipulated, or potentially historical.

Lower Montane Woodlands and Chaparral

Lower Montane Woodlands and Chaparral habitat consists of predominantly dense woodlands occurring in areas of higher elevation. Soils are loose and gravely, and steep slopes, cliffs, and rock outcrops are common throughout this Key Habitat. Open areas in wooded areas are dominated by scattered shrubs and some hardwoods. In the lower elevation areas of this habitat, shrub species may dominate woodland species. This Key Habitat provides important shelter areas for avian species, bats, and other small mammals. These forests may also provide thermal protection for wildlife. This Key Habitat occurs on only 0.5 acre of habitat in the Project Area.

Marshes

Marsh habitat occurs in areas where soil is inundated or saturated throughout a portion of the year. Marshes can hold water seasonally or year-round. The duration and extent of soil saturation dictates the vegetation communities present in these habitats, ranging from

herbaceous species to tree species. This potentially productive Key Habitat includes wetlands and is important for many migratory and breeding bird species and some amphibians. This habitat relies on hydrology and degrades quickly when hydrologic flow is altered. Few Marshes occur sporadically throughout the Project Area (5.6 acres), predominantly in the Crescent Valley Survey Area.

Sagebrush

Sagebrush habitat is common in valley, foothill, and mountain environments throughout the Great Basin. This Key Habitat generally occurs in mosaics with other habitats. A variety of specialized small mammals, birds, and reptiles depend on Sagebrush habitat for shelter, nesting, and as a source of food. This habitat type is highly susceptible to disturbance and can easily degrade with increasing invasive annual plant species. Over a significant portion of the Project Area (2,746 acres), sagebrush species are at least subdominant, occurring throughout the middle and lower elevations. The majority of the Sagebrush habitat within the Project Area is degraded to varying degrees.

3.4.2. General Wildlife

3.4.2.1. Background

Habitat within the Project Area has the potential to support a variety of flora and fauna. The sections below discuss wildlife species that are not designated as threatened or endangered by the USFWS nor NDOW and includes amphibians, migratory and breeding birds, fish, bats, big game, other small mammals, reptiles, and mollusks. Threatened and endangered wildlife species are discussed in detail in Section 3.4.7, Threatened and Endangered Species, following the general wildlife sections. The objective of the wildlife baseline survey is to collect sufficient information to characterize the affected environment for wildlife and wildlife habitat within the Project Area. Other current and historical data collected in the Project Area for NGM environmental baseline programs will be incorporated into analyses and used as reference to show past and current conditions.

3.4.2.2. Study Methodology

Desktop review of existing literature, GIS data, and survey information from BLM, USFWS, NDOW, NDNH, and WAFWA were used to assess general wildlife species that potentially occur in the Project Area. Wildlife species with potential to occur were identified and mapped within the Project Area and up to a 200-foot buffer of the centerline.

The following protocol was used in this survey:

- BLM Nevada *Statewide Wildlife Survey Protocols* (BLM 2014b)

Species for which field surveys were conducted are discussed in later sections. Incidental observations of general wildlife within the Project Area were recorded by biologists during these species-specific surveys. See Table D.1-3 of Appendix D for a comprehensive list of species observed during these surveys.

3.4.2.3. General Wildlife Results and Discussion

The Great Basin Desert supports a range of habitats across widely varying elevations, including salty lakes, sagebrush valleys, and pinyon-juniper forests. The unique combination of variability in elevation and diversity of habitat has contributed to some wildlife evolving small, isolated populations adapted to niche habitats creating pockets of increased biodiversity (Wildlife Action Plan Team 2012). The WAP assessed wildlife species vulnerability and designated Species of Conservation Priority. See Table D.1-1 in Appendix D for a full list of these species. Additionally, six biological communities described in the NDOW WAP are found in the Project Area: shadscale zone, sagebrush zone, pinyon-juniper community, montane community, alpine community, and riparian community (Wildlife Action Plan Team 2012).

Review of NDOW's WAP indicates that based on the six biological communities present, 57 wildlife species potentially occur in the Project Area. Table 3.4.2-1 lists the 50 Species of Conservation Priority with potential to occur within the Project Area. The remaining species are not expected due to the absence of potential habitat within the Project Area. See Table D.1-2 in Appendix D for details regarding species not expected to occur. The WAP's primary focus is centered on proactively preventing species from being listed as threatened or endangered. The following sections further discuss the various terrestrial and aquatic species, including those with special conservation statuses.

Table 3.4.2-1: Potential Nevada Wildlife Action Plan Species within the Project Area

Common Name	Scientific Name	Nevada Wildlife Action Plan Habitats
Amphibians		
Columbia spotted frog (Great Basin pop.)	*Rana luteiventris*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes,
Northern leopard frog	*Lithobates pipiens*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes
Western toad	*Anazyrus boreas*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes
Birds		
Bald Eagle	*Haliaeetus leucocephalus*	Intermountain Rivers and Streams, Lakes and Reservoirs
Black Rosy-finch	*Leucosticte atrata*	Agricultural Lands, Cliffs and Canyons, Desert Playas and Ephemeral Pools, Grasslands and Meadows, Lower Montane Woodlands and Chaparral, Intermountain Cold Desert Shrub, Sagebrush
Brewer's Sparrow	*Spizella breweri*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Sagebrush
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Lower Montane Woodlands and Chaparral, Sagebrush

Common Name	Scientific Name	Nevada Wildlife Action Plan Habitats
Ferruginous Hawk	*Buteo regalis*	Agricultural Lands, Cliffs and Canyons, Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Sagebrush
Golden Eagle	*Aquila chrysaetos*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Lower Montane Woodlands and Chaparral, Sagebrush
Gray-crowned Rosy-Finch	*Leucostcte tephrocots*	Agricultural Lands, Cliffs and Canyons, Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Sagebrush
Great Basin Willow Flycatcher	*Empidonax traillii adastus*	Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes
Greater Sage-grouse	*Centrocercus urophasianus*	Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Marshes, Sagebrush
Loggerhead Shrike	*Lanius ludovicianus*	Agricultural Lands, Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Marshes, Sagebrush
Long-billed Curlew	*Numenius americanus*	Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Lakes and Reservoirs, Marshes, Sagebrush
Mountain Quail	*Oreortyx pictus*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Lower Montane Woodlands and Chaparral, Sagebrush
Northern Goshawk	*Accipiter gentilis*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Lower Montane Woodlands and Chaparral, Sagebrush
Peregrine Falcon	*Falco peregrinus*	Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Rivers and Streams, Marshes
Pinyon Jay	*Gymnorhinus cyanocephalus*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Lower Montane Woodlands and Chaparral, Sagebrush
Sage Thrasher	*Oreoscoptes montanus*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Sagebrush
Short-eared Owl	*Asio flammeus*	Grasslands and Meadows, Intermountain Rivers and Streams, Lower Montane Woodlands and Chaparral, Marshes
Western Snowy Plover	*Charadrius nivosus nivosus*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs
Gastropods		
Large gland Carico pyrg	*Pyrgulopsis basiglans*	Marshes
Sada's pyrg	Pyrgulopsis sadai	Marshes
Fish		
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	Intermountain Rivers and Streams

Common Name	Scientific Name	Nevada Wildlife Action Plan Habitats
Bats		
Allen's big-eared bat	*Idionycteris phyllotis*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lower Montane Woodlands and Chaparral, Marshes
Brazilian (or Mexican) free-tailed bat	*Tadarida brasiliensis*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lower Montane Woodlands and Chaparral, Marshes
Cave myotis	*Myotis velifer*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lower Montane Woodlands and Chaparral, Marshes
Fringed myotis	*Myotis thysanodes*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Rivers and Streams, Lower Montane Woodlands and Chaparral, Marshes
Hoary bat	*Lasiurus cinereus*	Agricultural Lands, Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lower Montane Woodlands and Chaparral, Marshes
Little brown myotis	*Myotis lucifugus*	Cliffs and Canyons, Lakes and Reservoirs
Long-eared myotis	*Myotis evotis*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Lakes and Reservoirs, Lower Montane Woodlands and Chaparral, Marshes, Sagebrush
Silver-haired bat	*Lasionycteris noctivagans*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Lower Montane Woodlands and Chaparral, Marshes
Spotted bat	*Euderma maculatum*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Lakes and Reservoirs, Lower Montane Woodlands and Chaparral, Marshes, Sagebrush
Western red bat	*Lasiurus blossevillii*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Lower Montane Woodlands and Chaparral, Marshes
Western small-footed myotis	*Myotis ciliolabrum*	Agricultural Lands, Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Lower Montane Woodlands and Chaparral, Sagebrush
Big Game		
Bighorn sheep	*Ovis canadensis spp.*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Grasslands and Meadows, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Lower Montane Woodlands and Chaparral, Sagebrush
Small Mammals		
American water shrew	*Sorex palustris*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes

Common Name	Scientific Name	Nevada Wildlife Action Plan Habitats
Botta's pocket gopher	*Thomomys bottae*	Desert Playas and Ephemeral Polls, Intermountain Cold Desert Shrub, Sagebrush
Dark kangaroo mouse	*Microdipodops megacephalus ssp.*	Desert Playas and Ephemeral Polls, Intermountain Cold Desert Shrub, Sagebrush
Merriam's shrew	*Sorex merriami*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes
Northern river otter	*Lontra canadensis*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes
Pale kangaroo mouse	*Microdipodops pallidus*	Desert Playas and Ephemeral Polls, Intermountain Cold Desert Shrub, Sagebrush
Preble's shrew	*Sorex preblei*	Desert Playas and Ephemeral Pools, Intermountain Rivers and Streams, Lakes and Reservoirs, Marshes
Pygmy rabbit	*Brachylagus idahoensis*	Desert Playas and Ephemeral Polls, Intermountain Cold Desert Shrub, Sagebrush
Reptiles		
Desert horned lizard	*Phrynosoma platyrhinos*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Sagebrush
Great Basin collared lizard	*Crotaphytus bicinctores*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Sagebrush
Greater short-horned lizard	*Phrynosoma hernandesi*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Sagebrush
Long-nosed leopard lizard	*Gambelia wislizenii*	Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Sagebrush
Northern rubber boa	*Charina bottae*	Cliffs and Canyons, Desert Playas and Ephemeral Pools, Intermountain Cold Desert Shrub, Intermountain Rivers and Streams, Sagebrush
Mollusks		
California floater	*Anodonta californiensis*	Intermountain Rivers and Streams, Lakes and Reservoirs

Source: Wildlife Action Plan Team 2012

3.4.2.4. BLM Sensitive Status Species

The BLM, in coordination with state and federal wildlife agencies, identifies species that inhabit BLM-managed public lands and are considered "at-risk" for potential inclusion in the ESA. These "at-risk" species are designated by the BLM as Sensitive Status Species and are managed according to the Special Status Species Management Manual, 6840 (BLM 2008b). A total of 62 BLM Sensitive Status Species have the potential to occur within the Project Area. A comprehensive list of BLM Sensitive Status Species that occur on lands administered by the Battle Mountain and Elko Field offices can be found in Table D.1-1 of Appendix D. Table 3.4.2-2 lists the number of Sensitive Status Species by taxa that may occur within the Project Area.

Table 3.4.2-2: Taxa of BLM Sensitive Status Species within the Project Area

Taxa	Count
Amphibians	4
Arachnids	1
Birds	20
Fish	2
Mammals[a]	21
Reptiles	5
Insects	3
Mollusks	6
Total:	62

Source: BLM 2017b and 2019a

[a] Taxa of mammals includes bats

Big game and Sensitive Status Species of fish within the Project Area are discussed below. Birds, small mammals, bats, amphibians, and insects are further analyzed in later report sections herein where species-specific surveys are discussed. Threatened and endangered species that may occur within the Project Area are further detailed in Section 3.4.7, Threatened and Endangered Species.

3.4.2.5. Big Game

There are three NDOW hunting units within or overlapping the Project Area (065, 068, and 141), as shown on Figure 3.4.2-1. All three hunting units include pronghorn antelope (*Antilocapra Americana*) and mule deer (*Odocoileus hemionus)*—both classified as game species under NAC 503. Hunting unit 068 also includes elk (*Cervus canadensis*), which is also a designated game species under NAC 503, and California bighorn sheep (*Ovis canadensis californiana*), which is a designated game species under NAC 503 and a BLM Sensitive Status Species (BLM 2017b). The information in the following paragraphs summarize information from NDOW's hunting unit maps (NDOW n.d.) and *2020-2021 Big Game Status* report (NDOW 2021a).

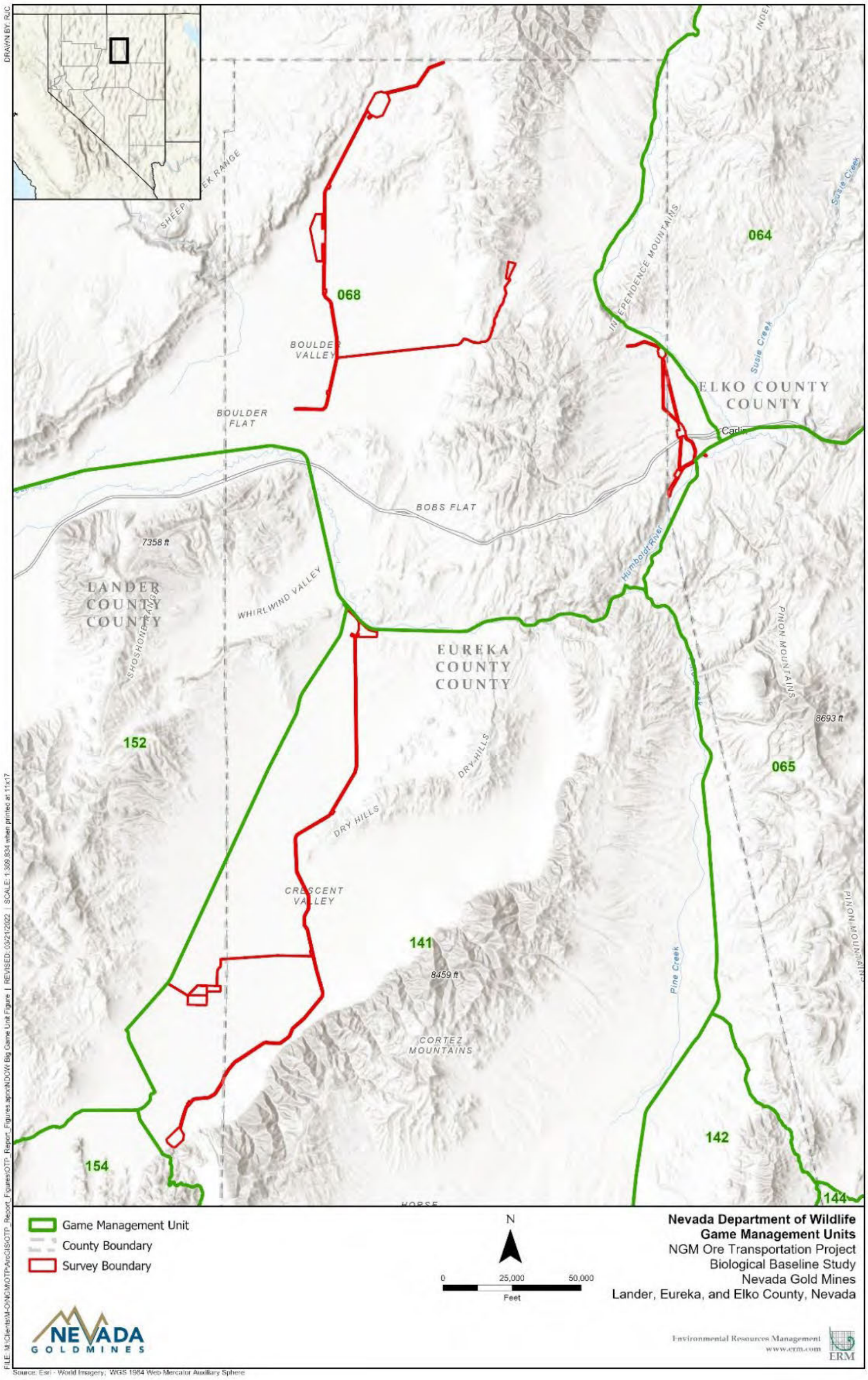


Figure 3.4.2-1: NDOW Big Game Hunting Units within the Project Area

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Mule Deer

Mule deer use hunting units 065, 068, and 141 for year-round habitat and crucial winter habitat, but populations have been declining across all three areas due to large-scale range fires, a lack of consistent precipitation, the conversion of native shrubs to invasive grasses, and human impact (NDOW 2021a). The exploration of oil, gas, and minerals is affecting the habitat and movement corridors for mule deer, but radio collar monitoring has helped identify movement corridors for segments of this deer herd. Current and potential habitat impacts from increased mining activity within unit 141 are being recognized, and crucial mule deer habitat has been developed (NDOW 2021a). In addition, NGM has an active role in the Mule Deer Working Coalition to assist in managing mule deer habitat and populations in Area 6, which includes hunting unit 068.

Pronghorn Antelope

Pronghorn antelope herds have been stable or steadily increasing within hunting units 065, 068, and 141. The long-term success of these herds will depend on the restoration efforts and proper grazing management. Recovery of the areas burned by wildfires is crucial for providing year-round forage species. Rehabilitation efforts have taken place in crucial wintering habitat areas and have successfully reintroduced crested wheatgrass and forage kochia on the landscape, providing important winter forage species for antelope (NDOW 2021a). Radio collar monitoring has helped identify movement corridors for various antelope herds.

Elk

Elk populations are only located in hunting unit 068, which encompasses the Carlin Survey Area. The population in this hunting unit is comprised of two sub-herds with differing migration strategies during winter but have overlapping summer ranges in the Bull Run Mountains and North Independence Range (NDOW 2021a). Fires from 2018 have affected large portions of seasonal habitat used by elk, which will negatively affect suitability of habitat in the short-term particularly if drought continues as was observed in 2021. However, the flush of perennial grasses and forbs can provide long-term improvements for elk habitat if ranges can naturally recover.

Bighorn Sheep

California bighorn sheep in this region has been actively managed by the NDOW since 2012 to keep population counts at a sustainable level. Management efforts will be crucial to keep sheep herd at or below its current level to ensure favorable conditions for the various species that also rely on this crucial winter range (NDOW 2021a).

Fish

The Project Area is located within the Humboldt River Basin. Most of the surface waters in the Project Area are ephemeral and/or intermittent streams, providing aquatic conditions only seasonally and/or with associated storm runoff or in locations of isolated seeps and springs.

Flowline figures based on the NHD are included in D.9 of Appendix D for each region of the Project Area.

Areas of perennial stream flow are limited to specific reaches of Welches and Rodeo creeks and tributaries of the Humboldt River in the Carlin Survey Area. These areas potentially provide suitable habitat for BLM Special Status Species Lahontan cutthroat trout and the inland Columbia Basin redband trout (*Oncorhynchus mykiss gairdneri*), as well as other fish species found throughout Northeastern Nevada. The Lahontan cutthroat trout is federally threatened and is discussed in more detail in Section 3.4.7, Threatened and Endangered Species.

3.4.2.6. Incidental Wildlife Observations

A comprehensive list of wildlife observations within the Project Area is included in Table D.1-2 of Appendix D. Table D.1-2 includes species that were observed during field surveys and/or observed incidentally throughout the Project Area. Not mentioned above or further discussed below is one incidental sighting of an American mink (*Neogale vison*) and mink den, which occurred within the Carlin Survey Area. While this was the only mink observation and the only observation outside of specifically surveyed species, it gives good indication of potential species success in this region.

3.4.3. Migratory and Breeding Birds

3.4.3.1. Background

Avian species that migrate annually from summer breeding grounds to a different winter range are protected under the Migratory Bird Treaty Act (MBTA). Birds that are protected under the MBTA include but are not limited to raptors, passerines (songbirds), and water birds. The purpose of the migratory and breeding bird surveys is to identify the species that occur within the Project Area as shown on Figure 2-1 through Figure 2-9 to inform the future NEPA analysis. All birds within the Project Area except non-native species are protected under the MBTA.

Birds in the Project Area are those associated with the habitats described in Section 3.4.1, Wildlife Habitat. Seasonal flooding of desert playas and ephemeral pools may support migrating waterfowl and other bird species. Rock outcrops and cliffs, and human-made structures provide potential nest sites for raptors and other birds. The USFWS lists 24 species as Birds of Conservation Concern (BCC) in the Great Basin bird conservation region, and there are 19 BLM special status bird species that could be present within lands administered by the Battle Mountain and Elko Field Offices.

3.4.3.2. Study Methodology

Surveys for migratory birds were designed to identify the presence of bird species protected under the MBTA. Existing literature, GIS data, and survey information from BLM, USFWS, NDOW, NDNH, Great Basin Bird Observatory, and SWReGAP land cover types were evaluated during the desktop assessment. Based on NDOW's species account report, birds that may be present within the Project Area include shorebirds, aquatic birds, ducks, raptors, and passerines.

The following protocols were used in this survey:

- *Nevada Comprehensive Bird Conservation Plan* (GBBO 2010)
- *National Protocol Framework for the Inventory and Monitoring of Breeding Landbirds using Point Counts (*Knutson et al. 2016)

Two qualified biologists conducted migratory bird surveys following the protocols listed above, and sites were selected based on the SWreGAP land cover types within the Project Area. Multiple point count survey sites were established where the land cover has continuous acreages with a width greater than 980 feet. Additional survey points were not added if the same land cover type was encountered nearby. Survey points were visited one time each to document the presence of species. For each bird observation, biologists recorded the survey point location, collected photographs in the four cardinal directions, and recorded notes on habitat, species identified, and the estimated distance of observation. Surveys were conducted from June 21 through July 5, 2021, during favorable weather conditions. Favorable weather conditions are defined as when there is good visibility, little or no precipitation, and winds less than 12 miles per hour (mph). Bird surveys were conducted from approximately 30 minutes before sunrise up to 4 hours after sunrise. At each migratory bird survey site, visual and auditory observations were made for 10 minutes. During the surveys, biologists documented the bird species observed. Figure 3.4.3-1 through Figure 3.4.3-3 show the location of the breeding bird survey points and SWreGAP land cover type. Copies of the datasheets and photographs of the survey points are included in Appendix D.2, Migratory Bird Species.

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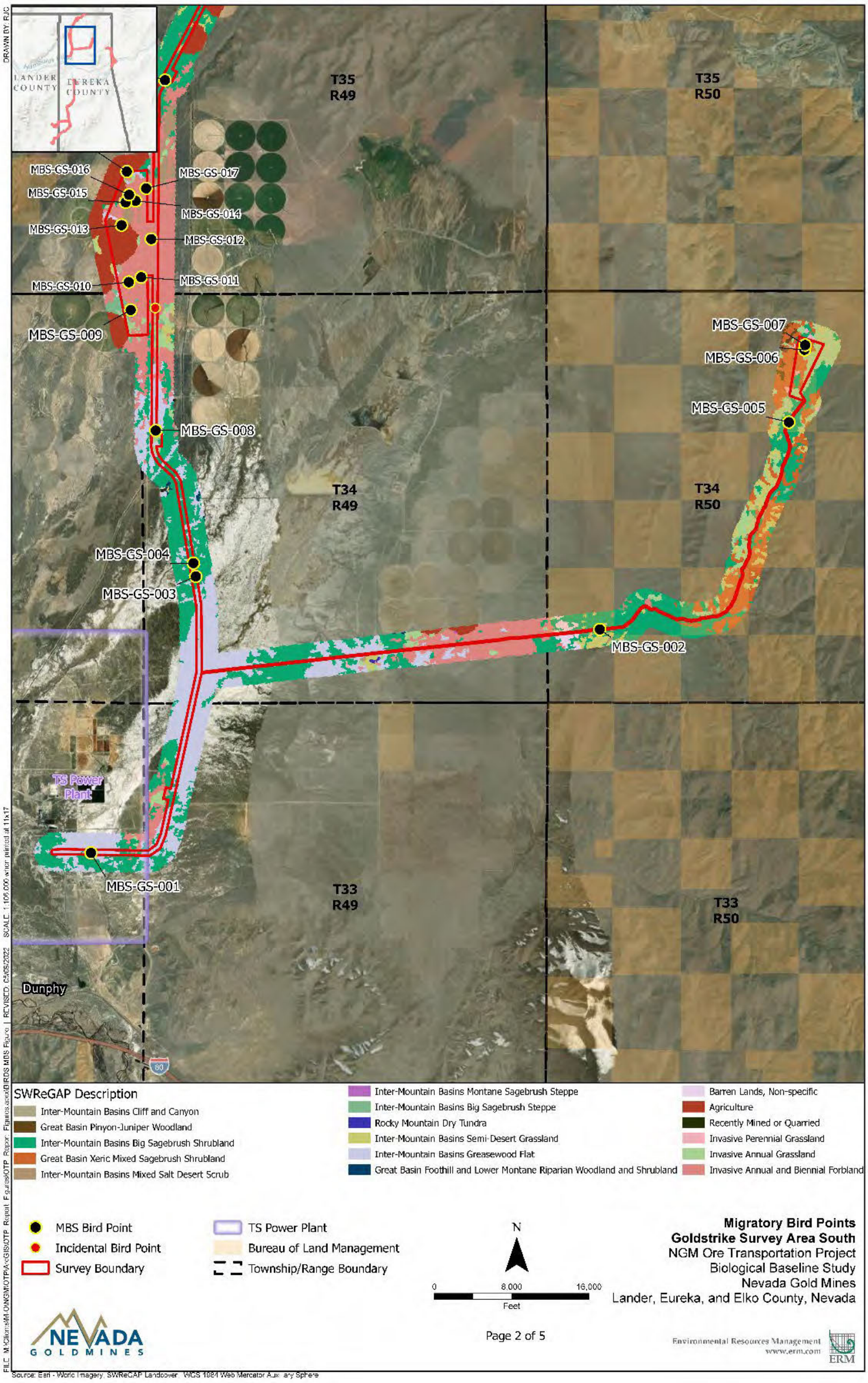


Figure 3.4.3-1: Migratory Bird Survey Points—Goldstrike Survey Area South

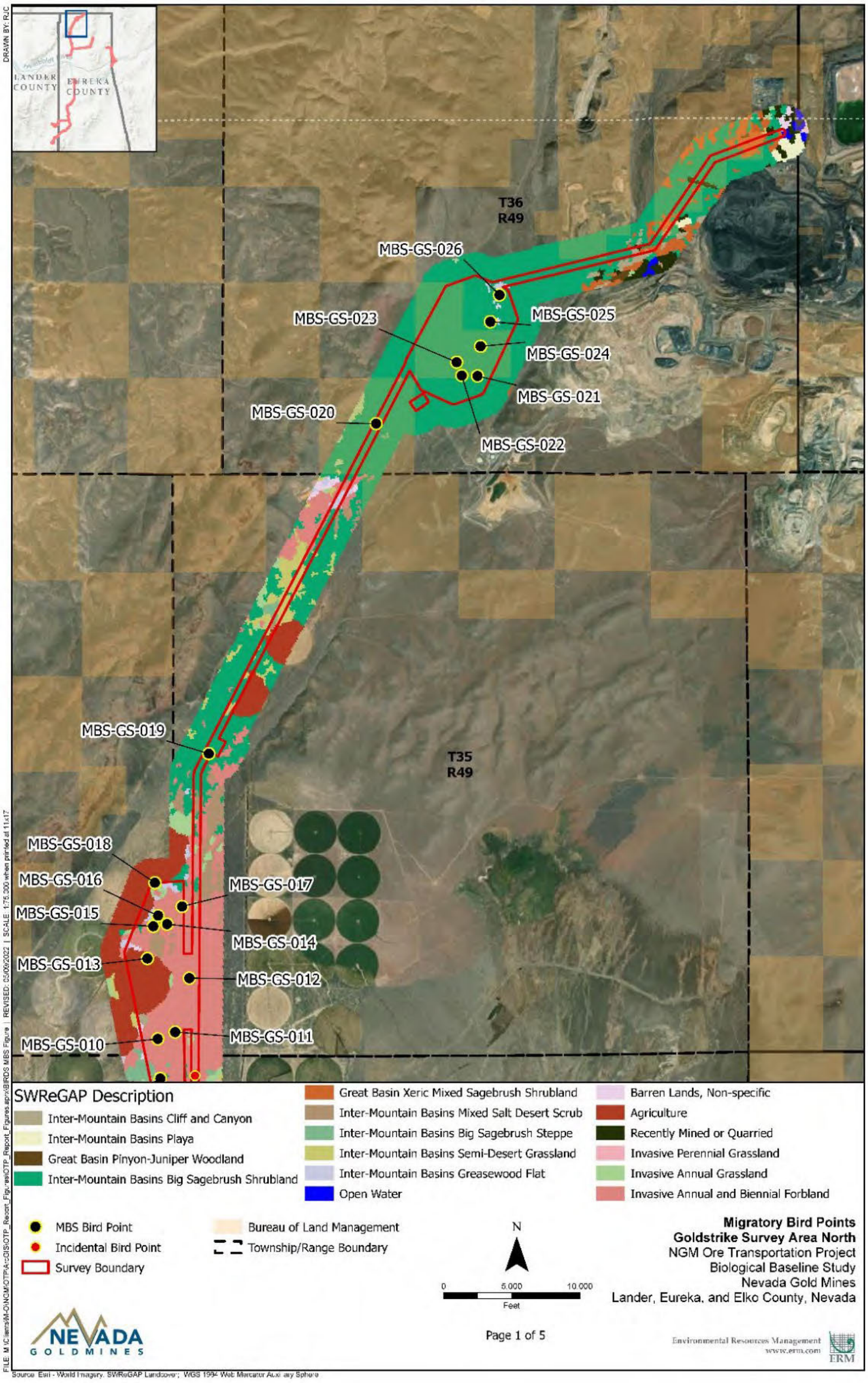


Figure 3.4.3-1: Migratory Bird Survey Points—Goldstrike Survey Area North

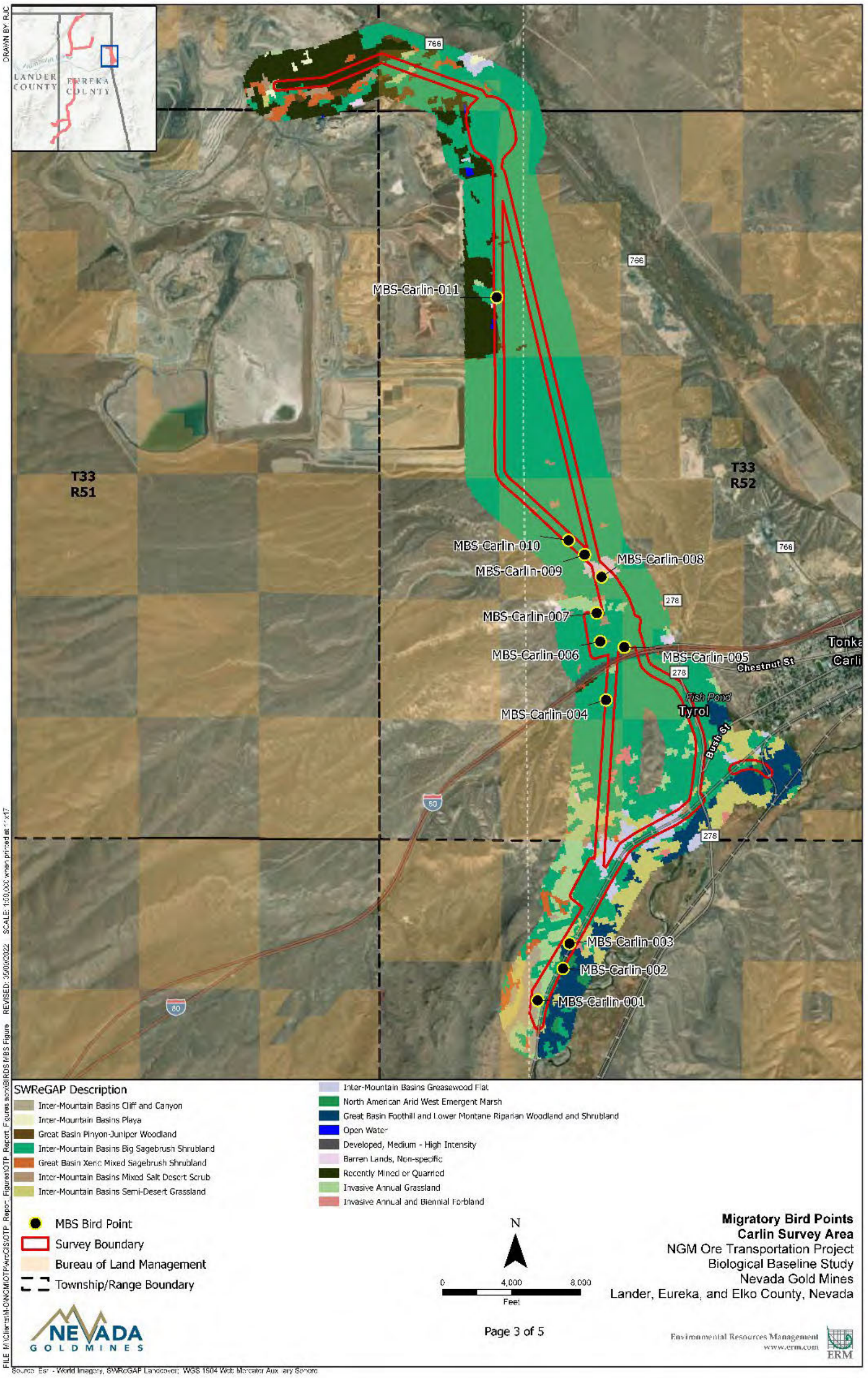


Figure 3.4.3-2: Migratory Bird Survey Points—Carlin Survey Area

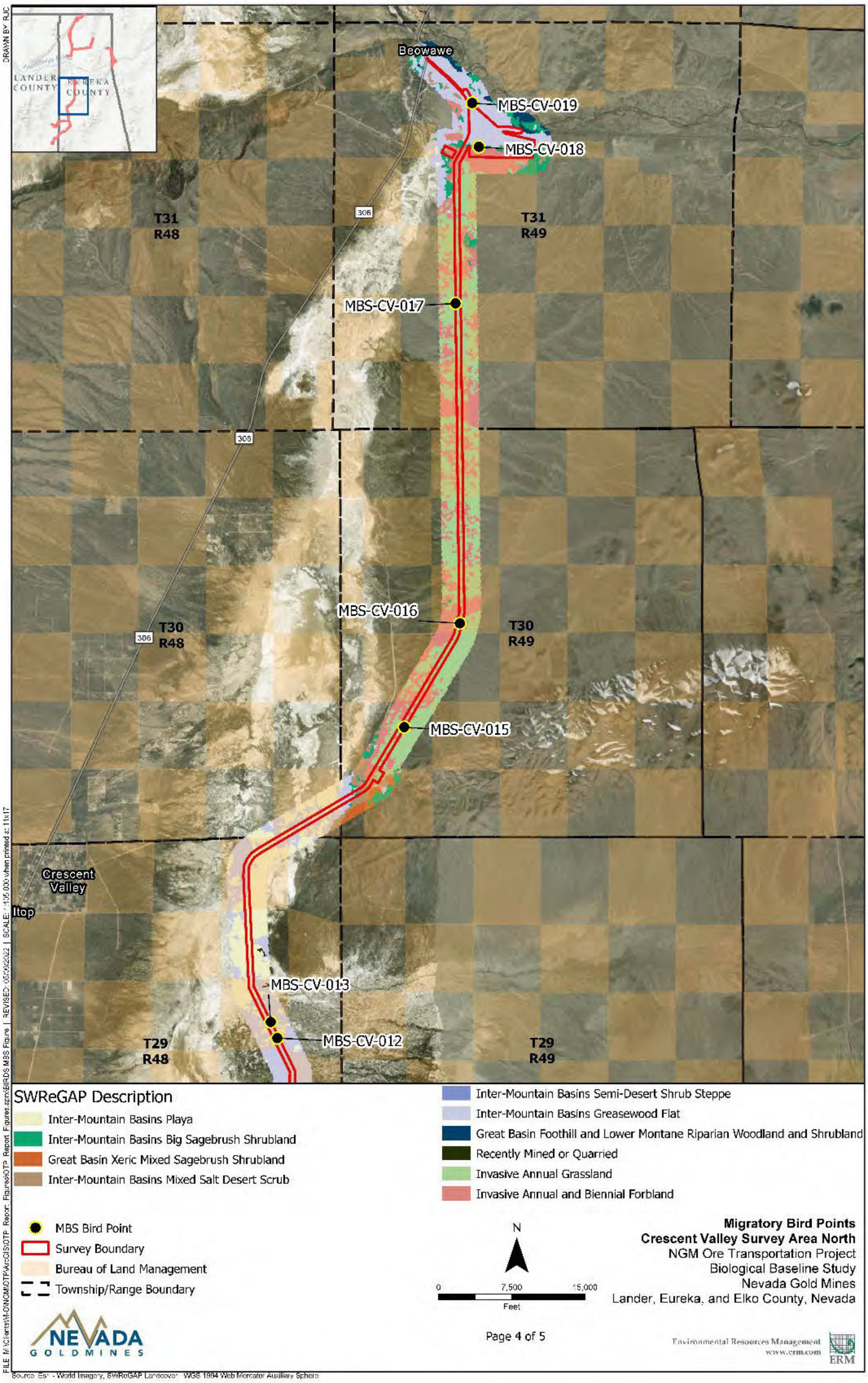


Figure 3.4.3-3: Migratory Bird Survey Points—Crescent Valley Survey Area

Pre-Field Assessment

During the pre-field desktop assessment, a total of 55 survey sites were identified within each of the 14 SWReGAP land cover types with the exception of Developed or Recently Mined/Quarried land cover types (Lowry et al. 2005). Based on the SWreGAP land cover types present in the Project Area, 26 survey points were established in the Goldstrike Survey Area, 11 in the Carlin Survey Area, and 18 in Crescent Valley Survey Area. The location of survey points was determined based on field conditions at the time of survey and were adjusted as needed. Table 3.4.3-1 provides the number of survey points in each SWreGAP land cover type for each of the three survey areas.

Table 3.4.3-1: Number of Migratory Bird Survey Points in each Southwest Regional GAP Land Cover Type

SWReGAP Land Cover Type	Survey Area	Number of Survey Points	Total Number of Survey Points
Agriculture	Goldstrike	2	2
Barren Lands	Carlin	1	1
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	Carlin	2	2
Great Basin Xeric Mixed Sagebrush Shrubland	Goldstrike	1	1
Inter-Mountain Basins Big Sagebrush Shrubland	Goldstrike	10	20
	Carlin	5	
	Crescent Valley	5	
Inter-Mountain Basins Big Sagebrush Steppe	Goldstrike	1	1
Inter-Mountain Basins Cliff and Canyon	Carlin	1	1
Inter-Mountain Basins Greasewood Flat	Goldstrike	2	9
	Carlin	1	
	Crescent Valley	6	
Inter-Mountain Basins Mixed Salt Desert Scrub	Goldstrike	1	5
	Carlin	1	
	Crescent Valley	3	
Inter-Mountain Basins Playa	Crescent Valley	1	2
	Goldstrike	1	
Invasive Annual and Biennial Forbland	Goldstrike	6	7
	Crescent Valley	1	
Invasive Annual Grassland	Goldstrike	1	4
	Crescent Valley	2	
	Goldstrike	1	
Total		55	

All birds that occur within the Project Area are protected under the MBTA, with the exception of non-native species such as common starling (*Sturnus vulgaris)* and chukar partridge (*Alectoris chukar*). The MBTA prohibits the take or disturbance of a migratory bird or its parts, nests, or eggs. In the Project Area, 10 USFWS BCC, 18 BLM special status species, and five NDOW

sensitive species potentially occur in the Project Area and are listed in Table 3.4.3-2. No bird species listed under the ESA as threatened, endangered, or candidate species are known to occur within the Project Area, although listed species could occur in adjacent areas if suitable habitat is present. Figures in Appendix D-2 include site numbers and the species observed.

Table 3.4.3-2: Potential Special Status Migratory Birds within the Project Area

Species	Agency Status	Habitat	Likelihood of Occurrence
Bald Eagle (*Haliaeetus leucocephalus*)	BLM Sensitive; NDOW Sensitive	Near lakes, reservoirs, rivers, marshes, and coasts; Scattered breeding occurrences in Northern Nevada	Likely; Records document species along the Humboldt River
Black-chinned Sparrow (*Spizella atrogularis*)	USFWS BCC	Dry brushlands, including sagebrush, rabbitbrush, and chaparral habitats	Likely as habitat is present in the Project Area
Black Rosy-finch (*Leucosticte atrata*)	BLM Sensitive	Alpine shrubs and herbaceous cover, interspersed with talus, cliffs and snow pockets; Winter in shrublands within six miles of suitable roost sites	Unlikely; Records of species present near Elko, Nevada, approximately 40 miles east
Brewer's Sparrow (*Spizella breweri*)	BLM Sensitive; NDOW Sensitive	Arid sagebrush steppe greasewood, perennial upland grasses	Likely
Burrowing Owl (*Athene cunicularia*)	BLM Sensitive; USFWS BCC	Breed throughout Nevada in salt desert scrub, Mojave shrub, sagebrush habitat, and agricultural landscapes	Likely
Columbian Sharp-tailed Grouse (*Tymanuchus phasianellus columbianus*)	BLM Sensitive	Sagebrush-grassland and mountain shrub habitats in areas dominated by perennial bunchgrasses	Likely; Records of species near Tuscarora
Ferruginous Hawk (*Buteo regalis*)	BLM Sensitive; USFWS BCC	Breeds in shrublands with isolated pinyon pines or junipers available for nesting and adequate prey	Likely
Golden Eagle (*Aquila chrysaetos*)	BLM Sensitive	Open country, especially around mountains, hills, and cliffs; Use a variety of habitats ranging from arctic to desert, including tundra, shrublands, grasslands, coniferous forests, farmland, and areas along rivers and streams	Likely
Gray-crowned Rosy-finch (*Leucosticte tephrocotis*)	BLM Sensitive	Nests in alpine areas and winters in lower elevation open areas sometimes into forests and towns, especially where there are feeders	Likely

Species	Agency Status	Habitat	Likelihood of Occurrence
Great Basin Willow flycatcher (*Empidonax traillii adastus*)	BLM Sensitive	Montane riparian habitat with lowland riparian areas, including wet meadows	Possible
Green-tailed Towhee (*Pipilo chlorurus*)	USFWS BCC	Sage flats, sagebrush shrub-steppe, high desert, open slopes in the Great Basin, and disturbed habitats	Possible
Loggerhead Shrike (*Lanius ludovicianus*)	USFWS BCC; BLM Sensitive; NDOW Sensitive	Open country with short vegetation and well-spaced shrubs or low trees, agricultural fields, pastures, riparian areas, and desert scrublands	Likely
Long-billed Curlew (*Numenius americanus*)	USFWS BCC; BLM Sensitive	Breed in native dry grasslands and sagebrush prairies, favoring nearby damp low spots	Likely
Peregrine Falcon (*Falco peregrinus*)	BLM Sensitive; NDOW endangered	Breed in open landscapes with cliffs, occur in nearly any open habitat during migration and their winter range	Possible
Pinyon Jay (*Gymnorhinus cyanocephalus*)	USFWS BCC; BLM Sensitive	Pinyon-juniper woodlands, sagebrush, scrub oak, and chaparral communities	Possible
Prairie Falcon (*Falco mexicanus*)	NDOW Sensitive	Breed in open landscapes with cliff habitats; Other habitats include open, tree-less terrain such as prairies, deserts, riverine escarpments, canyons, foothills, and mountains in the arid west	Likely
Sage Thrasher (*Oreoscoptes montanus*)	USFWS BCC; BLM Sensitive	Breeds exclusively in shrub-steppe habitats, requiring dense ground cover for concealment and some bare ground	Likely
Sandhill Crane (*Antigone canadensis*)	BLM Sensitive	Open wetland habitats surrounded by shrubs or trees, marshes, bogs, wet meadows, prairies, and other moist habitats	Possible
Short-eared Owl (*Asio flammeus*)	BLM Sensitive	Large, open areas with low vegetation including prairie and coastal grasslands, heathlands, meadows, shrub-steppe, savanna, tundra, marshes, dunes, and agricultural areas; Winter habitat include large open areas within woodlots, stubble fields, fresh and saltwater marshes, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets	Unlikely; Recorded observations at the Ruby Lake National Wildlife Refuge and Antelope Valley—both locations are more than 50 miles from the Project Area

Species	Agency Status	Habitat	Likelihood of Occurrence
Swainson's Hawk (*Buteo swainsonii*)	BLM Sensitive	Open habitats for foraging; Hay and alfalfa fields, pastures, grain crops, and row crops, or perched atop adjacent fence posts and overhead sprinkler systems	Likely
Western Snowy Plover (*Charadrius nivosus nivosus*)	USFWS BCC; BLM Sensitive	Sparsely vegetated sand beaches, dry salt flats, dune habitat, river bars, and along alkaline or saline lakes, reservoirs, and ponds	Possible; Recorded near South Fork Reservoir, approximately 30 miles east of Project Area
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	USFWS BCC; BLM Sensitive	Shrubby areas with standing water or along streams	Possible; No recent records of the species in Elko, Eureka, or Lander counties

Source: BLM 2017b, 2019a; USFWS 2021a; Sullivan et al. 2009

BCC = Birds of Conservation Concern; BLM = Bureau of Land Management; NDOW = Nevada Department of Wildlife; USFWS = U.S. Fish and Wildlife Service

Migratory bird species typical of the region include both generalist species and species associated with specific vegetation communities such as sagebrush, grassland, or pinyon juniper. Streamside habitats supportive of riparian specialists are found in the Project Area but are limited to areas alongside perennial and intermittent stream reaches and in the vicinity of some seeps and springs. Open water habitats near the Project Area could support migrating waterfowl and shorebirds. Playas in the Project Area may provide ephemeral open water habitats that support these species. Additionally, cliff and rocky outcrops throughout the Project Area may provide nesting habitat to raptors.

3.4.3.3. Results and Discussion

Habitats within the Project Area provide breeding habitat for songbirds and other upland bird species. Data collected during the survey provided a broad assessment of species present and their breeding status. A list of all birds observed in the Project Area, including incidental observations during other biological surveys, is shown in Table 3.4.3-3. Collectively, 36 bird species were documented in the Project Area, including raptors as well as non-native birds and game birds that are not protected under MBTA. Incidental observations of common ravens (*Corvus corax*) and their nests, raptors such as a Golden Eagle (*Aquila chrysaetos*) and a pair of Swainson's hawks (*Bueto swainsoni*) are included in Section 3.4.4, Eagles and Other Raptors. No birds were observed at two survey sites (MB-GS-012 and MB-GS-017) in the Goldstrike Survey Area. Both of these survey point sites are located in SWreGAP invasive annual and biennial forbland land cover type. Biologists observed 22 bird species within the Inter-mountain Big Sagebrush SWreGAP land cover type.

Horned lark (*Eremophila alpestris*), western meadow lark (*Sturnella neglecta*), and common raven were the most commonly observed species, comprising 52 percent of all observations. Ferruginous Hawk (*Buteo regalis*), mallard (*Anus platyrhynchos*), Swainson's Hawk, and Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*) were only observed in flight during

the surveys. In total, five BLM special status species including four that are NDOW sensitive and two that are also USFWS BCC were observed at 23 of the survey locations. These five species are Brewer's Sparrow (*Spizella brewe*r), Burrowing Owl (*Athene cunicularia*), Ferruginous Hawk (*Buteo regalis*), Swainson's Hawk (*Buteo swainsonii*), and Long-billed Curlew (*Numenius americanus*). In addition to birds protected under the MBTA, one game bird (chukar partridge) and two non-native species (house sparrow and common starling) were observed. Table D.2-1 in Appendix D lists the bird species observed at each of the survey point sites.

Table 3.4.3-3: Bird Species Observed within the Survey Areas

Species Name	Survey Area Number of Observations			Total Number of Survey Observations
	Goldstrike	Carlin	Crescent Valley	
American Goldfinch (*Spinus tristis*)	1			1
Belted Kingfisher (*Ceryle alcyon*)		1	2	3
Black-throated Sparrow (*Amphispiza bilineata*)	14	7	10	31
Brewer's Blackbird (*Euphagus cyanocephalus*)		3	2	5
Brewer's Sparrow [a] (*Spizella brewer*i)	1	1	2	4
Burrowing Owl [b] (*Athene cunicularia*)			1	1
Chipping Sparrow (*Spizella passerine*)	1		1	2
Cliff Swallow (*Petrochelidon lunifrons*)		13		13
Common Nighthawk (*Chordeiles minor*)		1		1
Common Raven (*Corvus corax*)	26	4	16	46
Ferruginous Hawk [b] (*Buteo regalis*)	1			1
Gray Flycatcher (*Empidonax wrightii*)			2	2
Green-tailed Towhee [c] (*Pipilo chlorurus*)		1		1
Horned Lark *(Eremophila alpestris*)	15	5	13	33
Lark Sparrow (*Chondestes grammacus*)	5		4	9
Loggerhead Shrike [c] (*Lanius ludovicianu*s)	2	1	1	4
Long-billed Curlew [d] (*Numenius americanus*)	9		3	12
Mallard (*Anus platyrhynchos*)		1		1
Mourning Dove (*Zenaida macroura*)	2			2
Northern Mockingbird (*Mimus polyglottos*)		1	1	2
Prairie Falcon (*Falco mexicanus*)	1	1		2
Red-tailed Hawk (*Buteo jamaicensis)*	1	2		3
Red-winged Blackbird (*Agelaius phoeniceus*)		12	2	14
Sagebrush Sparrow (*Artemisiospiza nevadensis*)	7	3	14	24
Savannah Sparrow (*Passerculus sandwichensis*)			1	1
Say's Phoebe (*Sayornis saya*)			1	1
Song Sparrow (*Melospiza melodia)*	1		1	2
Swainson's Hawk [a] (*Buteo swainsonii*)	1			1
Turkey Vulture (*Cathartes aura*)	2			2
Western Kingbird *(Tyrannus verticalis*)		1		1

Species Name	Survey Area Number of Observations			Total Number of Survey Observations
	Goldstrike	Carlin	Crescent Valley	
Western Meadowlark (*Sturnella neglecta*)	44	15	33	92
White-crowned Sparrow (*Zonotrichia leucophrys)*		2		2
Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)	1			1
Birds not included in the Migratory Bird Treaty Act				
Chukar Partridge (*Alectoris chukar*)	2			2
Common Starling (*Sturnus vulgaris)*			7	7
House Sparrow (*Passer domesticus)*			2	2

[a] BLM and NDOW Sensitive
[b] BLM Sensitive
[c] USFWS BCC; BLM and NDOW Sensitive
[d] USFWS BCC; BLM Sensitive

Six passerine bird species, including BLM and NDOW sensitive species Brewer's sparrow (*Spizella breweri*), and common ravens were observed during point counts in all three survey areas. The number of bird species observed in each Survey Area were very similar, with 19 different bird species in Goldstrike and Carlin, and 18 different bird species in Crescent Valley. Four passerine bird species were observed at both the Carlin and Crescent Valley survey areas: Belted Kingfisher (*Ceryle alcyon*), Brewer's Blackbird (*Euphagus cyanocephalus*), Northern Mockingbird (*Mimus polyglottos*), and Red-winged Blackbird (*Agelaius phoeniceus*). Chipping Sparrow (*Spizella passerine),* Lark Sparrow (*Chondestes grammacus*), Long-billed Curlew (*Numenius americanus*), and Song Sparrows (*Melospiza melodia*) were documented at both Crescent Valley and Goldstrike survey areas.

The Goldstrike Survey Area had the greatest number of raptor species with four different species (i.e., Prairie Falcon [*Falco mexicanus*], Red-tailed Hawk [*Buteo jamaicensis*], Ferruginous Hawk, and Swainson's Hawk) observed during the surveys. Prairie falcons and red-tailed hawks were documented during surveys only at the Carlin and Goldstrike survey areas.

Breeding Observations

During the migratory bird surveys, biologists recorded evidence of breeding, based on nest sightings, birds observed carrying nesting materials, or mating behaviors. Table 3.4.3-4 lists the 10 species including five BLM special status species (Brewer's Sparrow, Burrowing Owl, Ferruginous Hawk, Long-billed Curlew, and Swainson's Hawk) where breeding evidence was observed during the surveys. Breeding evidence for Brewer's sparrows and loggerhead shrikes (*Lanius ludovicianus*) was observed in all three survey areas. Although long-billed curlews were observed in both the Goldstrike and Crescent Valley survey areas, breeding observations of this species were documented only in the Goldstrike Survey Area.

Burrowing Owls and ferruginous hawks had confirmed breeding observations in Crescent Valley and Goldstrike survey areas respectively. Section 3.4.5 provides information on the Burrowing Owl survey results. Incidental observations in Crescent Valley Survey Area included two raven's

nests. Incidental observations in the Goldstrike Survey Area included a Swainson's hawk nest on a power pole near milepost 9.8 (see Appendix D, Figure D.2-1 through Figure D.2-3).

Table 3.4.3-4: Survey Area Migratory Bird Species with Breeding Evidence

Bird Species	Survey Area	Survey Locations with Breeding Evidence
Black-throated Sparrow (*Amphispiza bilineata*)	Crescent Valley	1
Brewer's Sparrow [a] (*Spizella brewer*i)	Carlin	1
	Crescent Valley	2
	Goldstrike	1
Burrowing Owl [a] (*Athene cunicularia*)	Crescent Valley	1
Chukar Partridge (*Alectoris chukar*)	Goldstrike	1
Common Raven (*Corvus corax*)	Crescent Valley	8
	Goldstrike	1
Ferruginous Hawk [a] (*Buteo regalis*)	Goldstrike	1
Loggerhead Shrike [a] (*Lanius ludovicianus*)	Carlin	1
	Crescent Valley	1
	Goldstrike	2
Long-billed Curlew [a] (*Numenius americanus*)	Crescent Valley	1
	Goldstrike	4
Swainson's Hawk [a] (*Buteo swainsonii*)	Goldstrike	1
Western Meadowlark (*Sturnella neglecta*)	Goldstrike	1

[a] BLM sensitive species

Breeding birds may not be detected due to being obscured by vegetation, birds not vocalizing, or vocalizations not being heard due to background noise.

Bird Density and Diversity

Bird density and species diversity were calculated for each of the three survey areas. Species diversity is a measure of the variety and abundance of species within a data set and includes two components: species richness (the number of different species in a community) and species evenness (the relative abundance of each species within the community). Species richness was assessed based on the range and mean number of species detected at survey points to calculate the Shannon Diversity Index using the number of species recorded in each habitat type over the sampling period. The Shannon Diversity Index measures the diversity of species in a community; values range from 1.5 to 3.5, with larger values indicating greater species richness. Species evenness was assessed by calculating the Shannon Equitability index (see Table 3.4.3-5). The term "evenness" refers to how similar the abundances of different species are in the community.

The mean number of species observed per survey point ranged from 2.5 to 3.5 and averaged 3.0 when combining results from all three survey areas (Table 3.4.3-5). Carlin and Crescent

Valley survey areas had a higher number of species present as shown by the Shannon Diversity Index values of 2.4 and 2.3, respectively.

The Shannon Equitability Index (H) values range from 0 to 1, with values of 1 indicating the species in the three areas showing complete evenness. The term “evenness” is a measure of how similar species observations are between the three survey areas. The range of Shannon Equitability Index values (H) for the three areas ranged from 0.74 to 0.82, indicating that during the 2021 field surveys, similar species were observed in the three survey areas.

Table 3.4.3-5: Number of Species per Survey Point and Species Diversity by Survey Area

Survey Point	Number of Species		Shannon Diversity Index	Shannon Equitability Index (H) [a]
	Mean	Range		
Carlin Area	3	2-7	2.4	0.82
Crescent Valley Area	3.5	2-6	2.3	0.78
Goldstrike Area	2.5	1-7	2.2	0.74
Survey Area	3	1-7	NA	NA

NA = not applicable
[a] The Shannon Equitability Index (H) normalizes the Shannon Diversity Index to a value between 0 and 1. Lower values of H indicate more species diversity while higher values indicate less species diversity; for example, a community with a single species would have a value of 1.

Species Accumulation Curves

A species accumulation curve is a visual representation of the accumulation of the number of species detected with increasing sampling effort. Species accumulation curves are also used to determine if the level of survey effort was sufficient to detect most of the upland bird species present in the survey area. The 2021 point count survey data was divided into the three survey areas and then organized by date and time that the survey occurred. The species detected were listed by individual survey point to assess the rate at which new species were encountered in the survey area. Only bird species observed during the point count surveys were included in the species accumulation survey. The rate of species detection was then graphed and fitted with a logarithmic trend line shown in Figure 3.4.3-4.

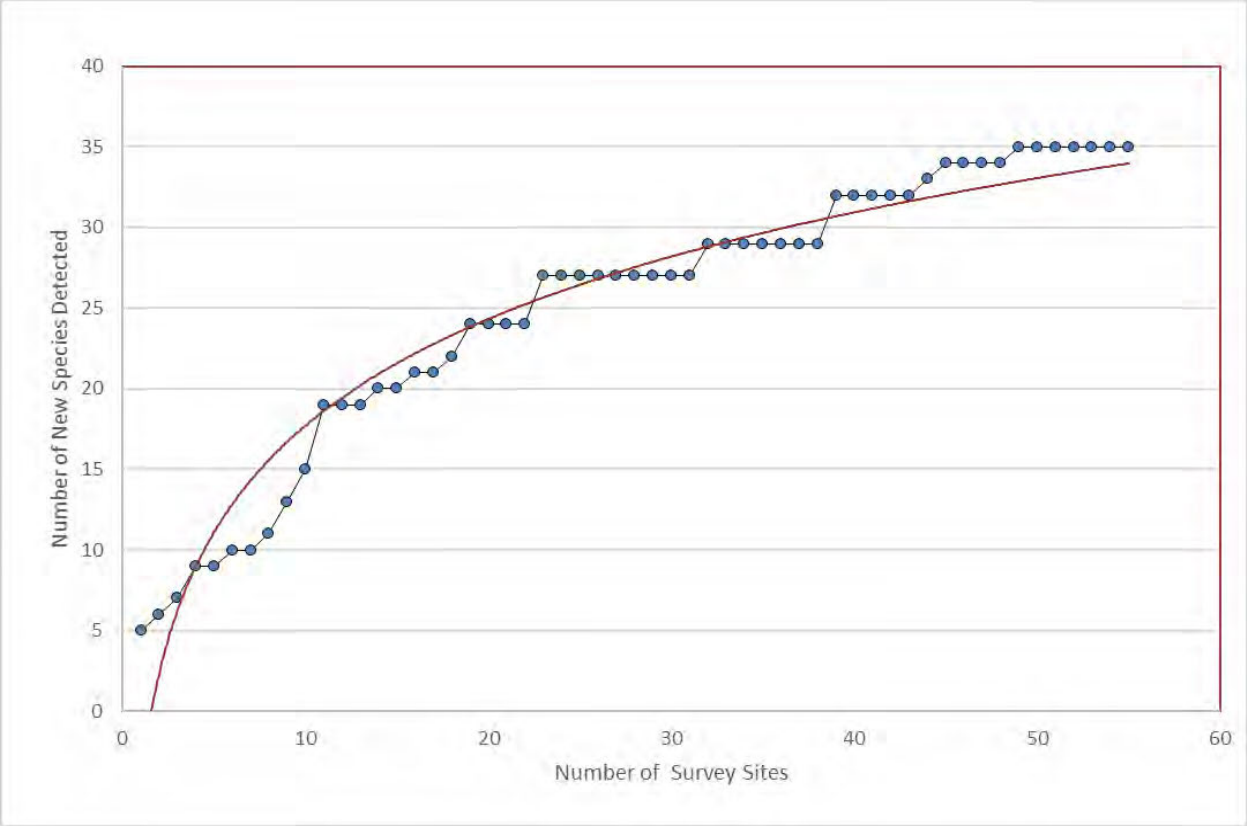


Figure 3.4.3-4: Detection of Bird Species

The species accumulation curve in Figure 3.4.3-4 shows that the rate of new species detection had begun to plateau after completing surveys at 30 survey points, indicating that the 2021 field survey effort was likely sufficient to detect most of the migratory bird species present in the three survey areas.

3.4.4. Eagles and Other Raptors

3.4.4.1. Background

Raptors are protected under the MBTA, and bald and golden eagles have additional protection under the BGEPA (16 USC § 668-668c) of 1940. The BGEPA prohibits the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export, or import of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. As defined in the BGEPA, a “take” includes disturbing a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle or decrease in its productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior.

The purpose of the eagle and raptor surveys is to identify the species that nest within a 10-mile buffer of the Project to inform the future NEPA analysis. The 10-mile buffer is applied to the Project per recommendations from USFWS.

3.4.4.2. Study Methodology

A desktop assessment using publicly available data from NDNH, sensitive data requested from NDOW, and survey data from NGM (Stantec 2018, 2021; JBR 2012a, 2012b, 2013; SRK 2013) was completed to identify suitable habitat and locations of known eagle and raptor nests within the Project Area. To focus on more recent observations and potential nest sites, data were limited to observations from 2010 to present.

No field surveys were completed for eagles and raptors in 2021; however, surveys are proposed for 2022. Incidental observations of raptors were recorded during migratory bird surveys (Section 3.4.3, Migratory and Breeding Birds). Common ravens construct stick nests that may be reused by raptors; and were recorded in the field survey reports discussed above.

The following protocols were referenced for this survey and would be used for future raptor and eagle surveys:

- *Golden Eagle Protection Best Practices, Nevada Mineral Exploration and Mining Industry* (Nevada Mining Association 2018)
- *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance* (Pagel et al. 2010)

3.4.4.3. Results and Discussion

Pre-Field Assessment

Most of Nevada and all of the Project Area is located in the Great Basin Bird Conservation Region (9), for consideration of USFWS BCC. The Project Area also lies within the BLM Elko and Battle Mountain districts, for consideration of BLM sensitive eagle and raptor species. The Project Area contains multiple diverse habitats (e.g., rocky outcrop and cliff/canyon habitats, open valleys, grasslands/forblands, agricultural lands, riparian areas, trees, and transmission line corridors) that may provide suitable nesting and foraging habitat for raptors (Table 3.4.2-1). Eleven species of raptors have the potential to occur within and near the Project Area and are included along with their species status and preferred habitat in Table 3.4.4-1. Of the raptor and eagle species potentially present, two are listed as endangered by NDOW, seven are BLM Sensitive species, and five are USFWS BCC.

Table 3.4.4-1: Potential Raptor Species within the Project Area

Species	Agency Status	Habitat	Likelihood of Occurrence
Bald Eagle (*Haliaeetus leucocephalus*)	BLM Sensitive; NDOW Endangered	Lakes, reservoirs, rivers, marshes, and coasts with scattered breeding occurrences in northern Nevada	Possible, particularly along the Humboldt River
Ferruginous Hawk (*Buteo regalis*)	BLM Sensitive; USFWS BCC [a]	Arid and semi-arid grasslands; open or rolling prairies; foothills or middle elevation plateaus	Likely; Records from past surveys
Golden Eagle (*Aquila chrysaetos*)	BLM Sensitive; USFWS BCC	Open country, shrublands, grasslands, nesting in mountainous cliff habitat	Likely; Records from past surveys and NDOW
Great Horned Owl (*Bubo virginianus*)	N/A	Nests in trees near open areas; Can utilize desert canyons, mountain forests, and agricultural areas	Likely; Records from past surveys
Peregrine Falcon (*Falco peregrinus*)	BLM Sensitive; NDOW Endangered	Breed and nest in open landscapes with cliffs at elevations up to 12,000 feet	Possible
Prairie Falcon (*Falco mexicanus*)	USFWS BCC [a]	Treeless terrain, including prairies, deserts, canyons, and foothills in arid environments, preferring nest sites on cliff ledges	Likely; Records from past surveys and NDOW
Red-tailed Hawk (*Buteo jamaicensis*)	N/A	Grasslands, sagebrush, pinyon -juniper, and riparian/shrub habitats.	Likely; Records from past surveys and NDOW
Short-eared Owl (*Asio flammeus*)	BLM Sensitive; USFWS BCC	Large, open areas with low vegetation, including prairies, meadows, shrub-steppe, savanna, dunes, and agricultural areas	Possible foraging habitat; Unlikely nesting habitat within Project Area
Swainson's Hawk (*Buteo swainsonii*)	BLM Sensitive	Nest in trees near open habitats, including agricultural fields, grasslands, and shrub-steppe habitat	Likely; Records from past surveys
Turkey Vulture (*Cathartes aura*)	N/A	Nests in caves, rock ledges, and abandoned raptor nests adjacent to rangeland, forests, and open areas.	Possible
Western Burrowing Owl (*Athene cunicularia hypugaea*) [b]	BLM Sensitive; USFWS BCC [a]	Breed throughout Nevada in salt desert scrub, Mojave shrub, sagebrush habitat, and agricultural landscapes	Likely; Records from past surveys and NDOW

Table Source: BLM 2017b, 2019a, and USFWS 2021a

BCC = Birds of Conservation Concern; BLM = Bureau of Land Management; N/A = data not available; NDOW = Nevada Department of Wildlife; USFWS = U.S. Fish and Wildlife Service

[a] Ferruginous Hawk, Prairie Falcon, and Western Burrowing Owl are USFWS BCCs in some locations, but not within the Project Area.

[b] Western Burrowing Owl is discussed further in Section 3.4.5, Burrowing Owl.

Historical Data

There are extensive NDOW records of mapped nesting sites for eagles and raptors in the Project Area extending back to the 1970s. This survey is focused on 2010 to 2014 for the most recent years available (data were not available after 2014). During this timeframe, there were 195 mapped nest sites within a 10-mile buffer of the Project Area, as shown in Table 3.4.4-2 and Figure 3.4.4-1. Where the exact species identity was unclear, the nest site was recorded as a general *Buteo* (raptor), Eagle/*Buteo* (eagle or raptor), or *Buteo*/Corvid (raptor or common raven) nest. Nest observations for Burrowing Owl were not included, but are discussed in Section 3.4.5, Burrowing Owls. The Crescent Valley Survey Area contained double the number of nest sites according to the NDOW data as compared to the Carlin or Goldstrike survey areas.

Table 3.4.4-2: NDOW Raptor Species/Nest Sites within Survey Areas, 2010–2014

Species Name/Nests	Survey Area Number of Observations			Total Number of Observations
	Carlin	Crescent Valley	Goldstrike	
Buteo [a]	3	15	8	26
Buteo/Corvid [a]	8	5	4	17
Corvid [a]	3	15	10	28
Eagle [a]	21	29	8	58
Eagle/*Buteo* [a]	10	17	14	41
Falcon (probable and confirmed) [a, b, c, d]	4	7	0	11
Ferruginous hawk [a]	0	6	0	6
Owl [e]	0	1	0	1
Unknown [a, d]	1	6	0	7
Total	**50**	**101**	**44**	**195**

Source: Data acquired via sensitive data request from NDOW, April 2021

[a] Stick Nest
[b] Ledge
[c] Scrape
[d] Data not available
[e] Cavity

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Several survey reports were referenced due to their proximity to the Project Area, which are discussed below. In some cases, the survey areas may have been outside of the Project Area 10-mile buffer. Additionally, duplicate recordings of nest sites between the surveys is possible from overlap of survey areas. Therefore, specific observations discussed in the paragraphs below may not align with the combined results in Table 3.4.4-3.

According to fieldwork conducted by Stantec (2021) for the Cortez Mine, 106 occupied or unoccupied raptor and eagle nest sites were documented within the Crescent Valley Survey Area and Carlin Survey Area. Of those nests, 32 were determined to be occupied by raptor species (3 Ferruginous Hawk, 1 Great Horned Owl, 8 Golden Eagle, 7 Prairie Falcon, and 13 Red-tailed Hawk) during survey flights or ground surveys and 33 were occupied by common ravens. Observations of 53 of the identified nests were determined to be Golden Eagle nests; if individuals were not observed or the nest was not occupied, then this was concluded from the size and materials used in the nest or previous occupancy records. While 45 of the Golden Eagle nest sites were unoccupied in the Crescent Valley Survey Area, it is possible that some were alternate nest sites located within the same single eagle territory (Stantec 2021) (Table 3.4.4-3).

A part of the Goldstrike Survey Area was also surveyed in 2018 within a 10-mile radius of the Rossi Mine boundary (Stantec 2018). Within this survey area, 37 nest sites were identified, 13 of which were identified as Golden Eagle. Of these 13 nests, 2 were occupied and 11 were unoccupied. One occupied Prairie Falcon nest and three occupied Red-tailed Hawk nests were also observed during this survey (Table 3.4.4-3).

According to aerial and ground surveys conducted within 10-miles of the Gold Quarry Mine near the Carlin and Goldstrike survey areas, four occupied and one unoccupied Golden Eagle nest sites were identified northwest of Carlin (JBR 2012a). Two occupied Ferruginous Hawk nests, two occupied Prairie Falcon nests, five occupied Red-tailed Hawk nests, and one occupied Swainson's Hawk nest were also documented (JBR 2012a) (Table 3.4.4-3). An additional survey in 2012 near the Goldstrike Survey Area documented no occupied Golden Eagle nests, and two occupied red-tailed hawk nests were documented within 10 miles of the Green Lantern Project (JBR 2012b) (Table 3.4.4-3). In 2013, a follow-up survey within a 10-mile buffer around the Gold Quarry and Green Lantern projects (excluding previously surveyed areas) was conducted (JBR 2013). During these aerial and ground surveys (overlapping portions of the Carlin, Goldstrike, and Crescent Valley survey areas), 3 occupied and 26 unoccupied Golden Eagle nests were documented. Additionally, one occupied Ferruginous Hawk nest, three occupied Prairie Falcon nests, and two occupied Red-tailed Hawk nests were documented. Additional surveys specific to Golden Eagles were conducted within portions of a 10-mile buffer for the Green Lantern and Gold Quarry projects (SRK 2013). One occupied and five unoccupied Golden Eagle nests, three occupied Prairie Falcon nests, and three occupied Red-tailed Hawk nests were observed during this survey with the Goldstrike and Carlin survey areas (Table 3.4.4-3).

Table 3.4.4-3: Raptor Observations and Nest Sites within Survey Areas

Species Name	Number of Nest Observations						Total Occupied Nests	Total Unoccupied Nests
	Carlin		Crescent Valley		Goldstrike			
	Occupied	Unoccupied	Occupied	Unoccupied	Occupied	Unoccupied		
Common Raven (*Corvus corax*)	4	0	33	12	6	5	43	17
Ferruginous Hawk (*Buteo regalis*)	3	2	3	3	0	2	6	7
Great Horned Owl (*Bubo virginianus*)	0	0	1	0	0	0	1	0
Golden Eagle (*Aquila chrysaetos*)	6	25	8	46	4	17	18	88
Prairie Falcon (*Falco mexicanus*)	5	6	7	8	4	1	16	15
Red-tailed Hawk (*Buteo jamaicensis)*	6	0	13	15	10	4	29	19
Swainson's Hawk (*Buteo swainsonii*)	1	0	0	0	0	0	1	0
Turkey Vulture (*Cathartes aura*)	0	0	0	1	0	0	0	1
Unknown	0	10	0	33	0	34	0	77

Source: Stantec 2018, 2021; JBR 2012a, 2012b, 2013; SRK 2013

[a] As nest status was not available for all data sources, this table reflects only nests labeled specifically as occupied or unoccupied. These totals may differ from the discussion above.

[b] Some survey reports noted Canada goose or pack rat nests, which are not summarized here.

The Crescent Valley Survey Area contained more observations of occupied and unoccupied eagle and raptor nests (315 nests) than the Goldstrike and Carlin survey areas (138 nests and 118 nests, respectively). However, annual surveys have been consistently conducted collectively for the Cortez Mine Plan of Operations, Robertson Plan of Operations, and Goldrush Baseline Study Area. This is a much larger area than the other two survey areas, which could result in the number of nests being higher in the Crescent Valley Survey Area.

Tables D.3-1 and D.3-2 of Appendix D contain observations from the historic NDOW data (2010 to 2014) and the survey reports discussed above. Data is included for the species observed, nest status (if available), data source, and the survey area and BLM field office associated with the data point.

Field Assessment

No eagle or raptor surveys were conducted in 2021 due to missing the field survey window. Incidental observations of raptors were recorded during the migratory and breeding bird surveys and are shown in Table 3.4.4-4. There were eight observations of five different raptor species identified during these surveys. One nest on a power pole was also recorded and associated with a nearby Swainson's Hawk observation in the Goldstrike Survey Area. No other raptor nests were recorded during the migratory bird species surveys.

Table 3.4.4-4: Raptor Species Observed within the Survey Areas

Species Name	Survey Area Number of Observations			Total Number of Survey Observations
	Carlin	Crescent Valley	Goldstrike	
Burrowing Owl (*Athene cunicularia*)	0	1	0	1
Ferruginous Hawk (*Buteo regalis*)	0	0	1	1
Prairie Falcon (*Falco mexicanus*)	1	0	1	2
Red-tailed Hawk (*Buteo jamaicensis)*	2	0	1	3
Swainson's Hawk (*Buteo swainsonii*)	0	0	1	1
Total	**3**	**1**	**4**	**8**

3.4.5. Burrowing Owls

3.4.5.1. Background

Burrowing Owls are a BLM special status species and protected under MBTA. Most of the breeding population in the state is known to migrate from northern Nevada to the southern United States, northern Mexico, and central America during the winter months; however, Burrowing Owls have been recorded year-round in Nevada. The nesting season for Burrowing Owls is between March 1 and August 31 in the Elko BLM District and between April 1 and July 31 in the Battle Mountain BLM District (BLM 2014b).

Burrowing Owls live in open habitats with sparse vegetation, such as prairies, open grasslands, or shrub steppe generally with canopy coverage of less than 30 percent (CBOC 1993). In Nevada, this species breeds in salt desert scrub, Mojave scrub, and some sagebrush habitat, as well as agricultural landscapes and other disturbed areas. Burrowing Owls typically also use burrows created by fossorial mammals and human-made structures for shelter, protection, and nesting (Henny and Blus 1981).

3.4.5.2. Study Methodology

A desktop assessment was performed using NDNH occurrence data and the USGS Gap Analysis Project (GAP) modeled habitat layer for Burrowing Owls, which applies a deductive habitat model to remotely sensed data layers within the species' known range (USGS GAP 2018). These data were reviewed to identify potential suitable habitat in the Project Area. Figure 3.4.5-1 through Figure 3.4.5-3 show the results from the USGS GAP analysis and NDNH data in the three survey areas.

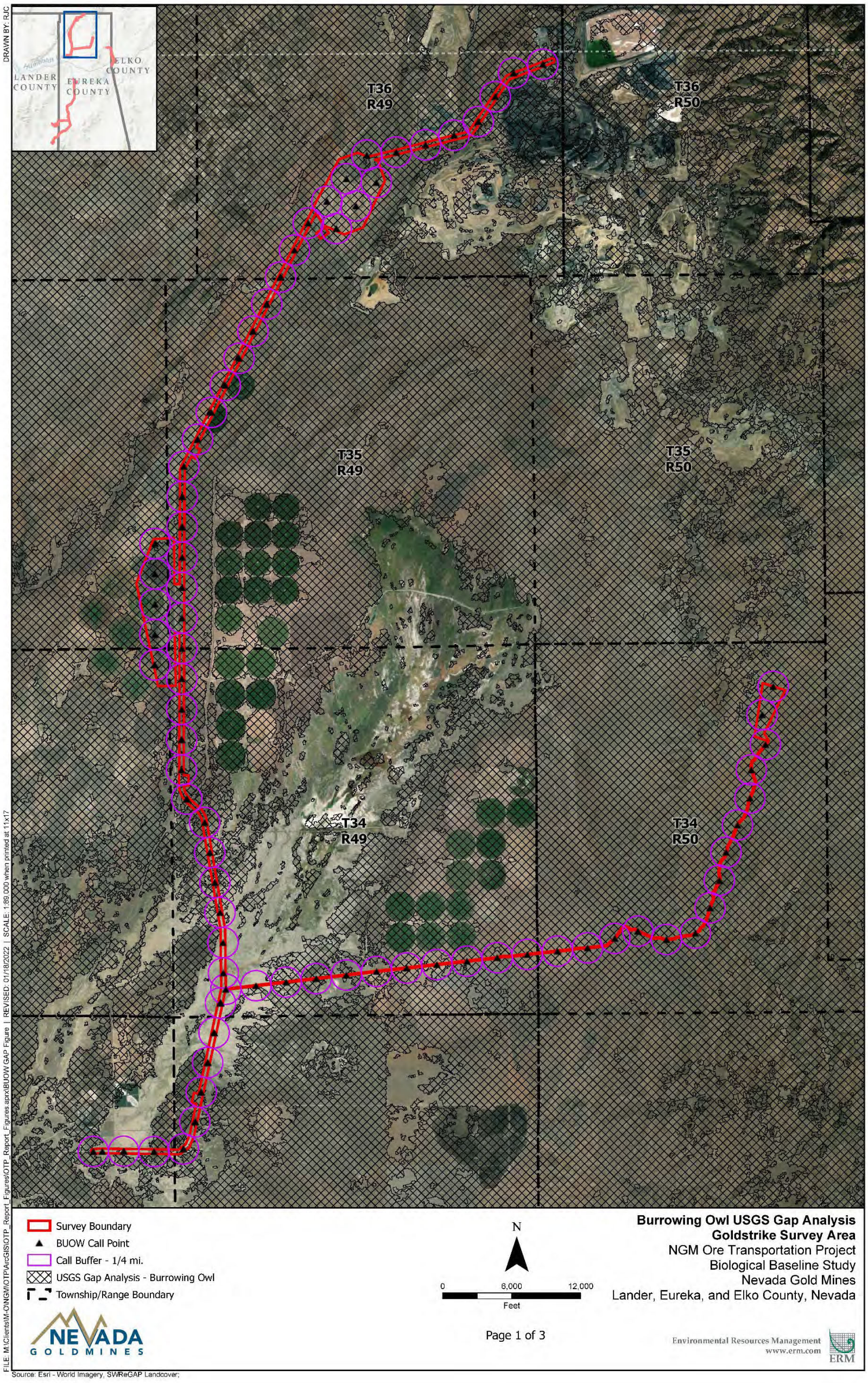


Figure 3.4.5-1: Burrowing Owl USGS GAP Analysis—Goldstrike Survey Area

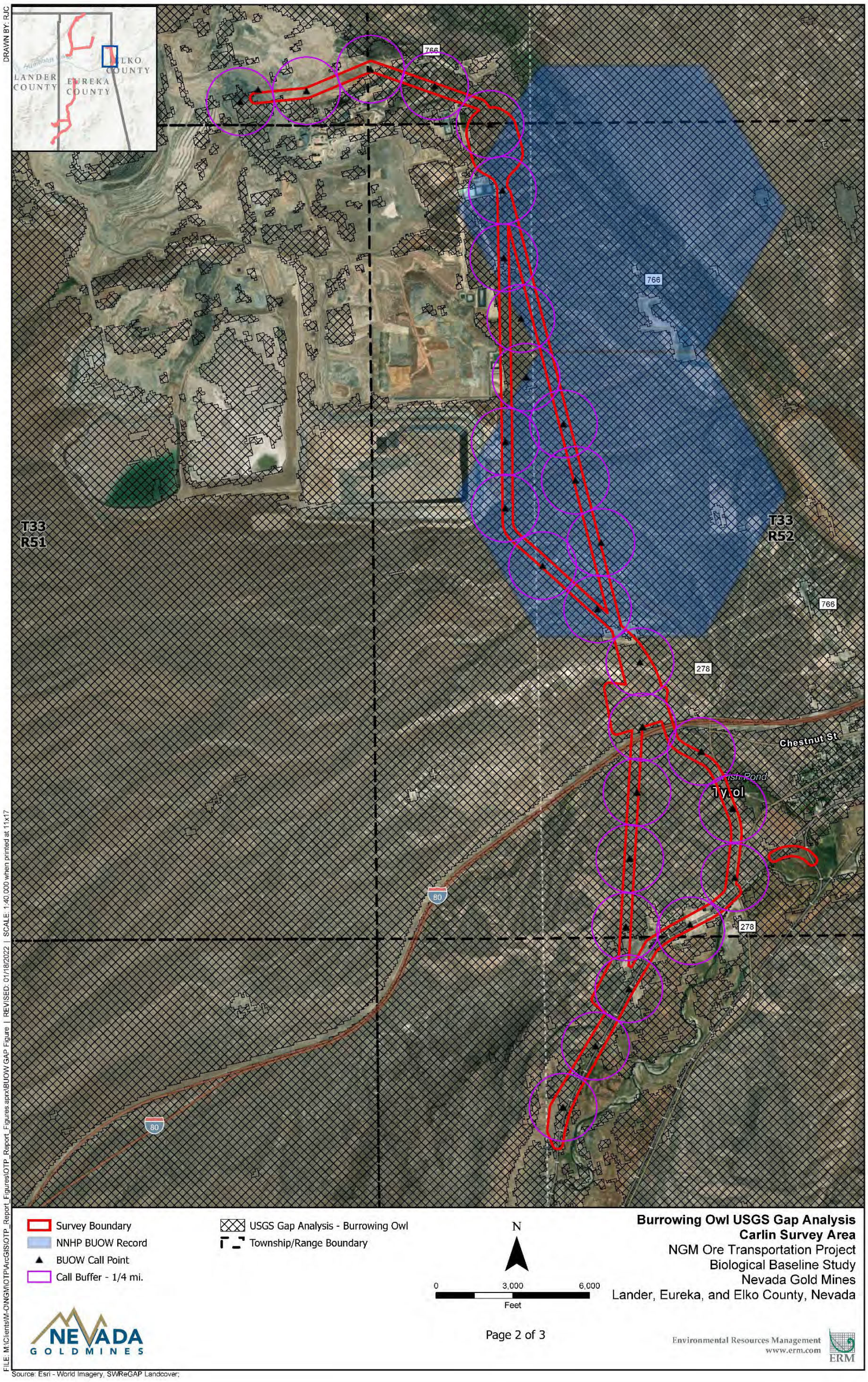


Figure 3.4.5-2: Burrowing Owl USGS GAP Analysis—Carlin Survey Area

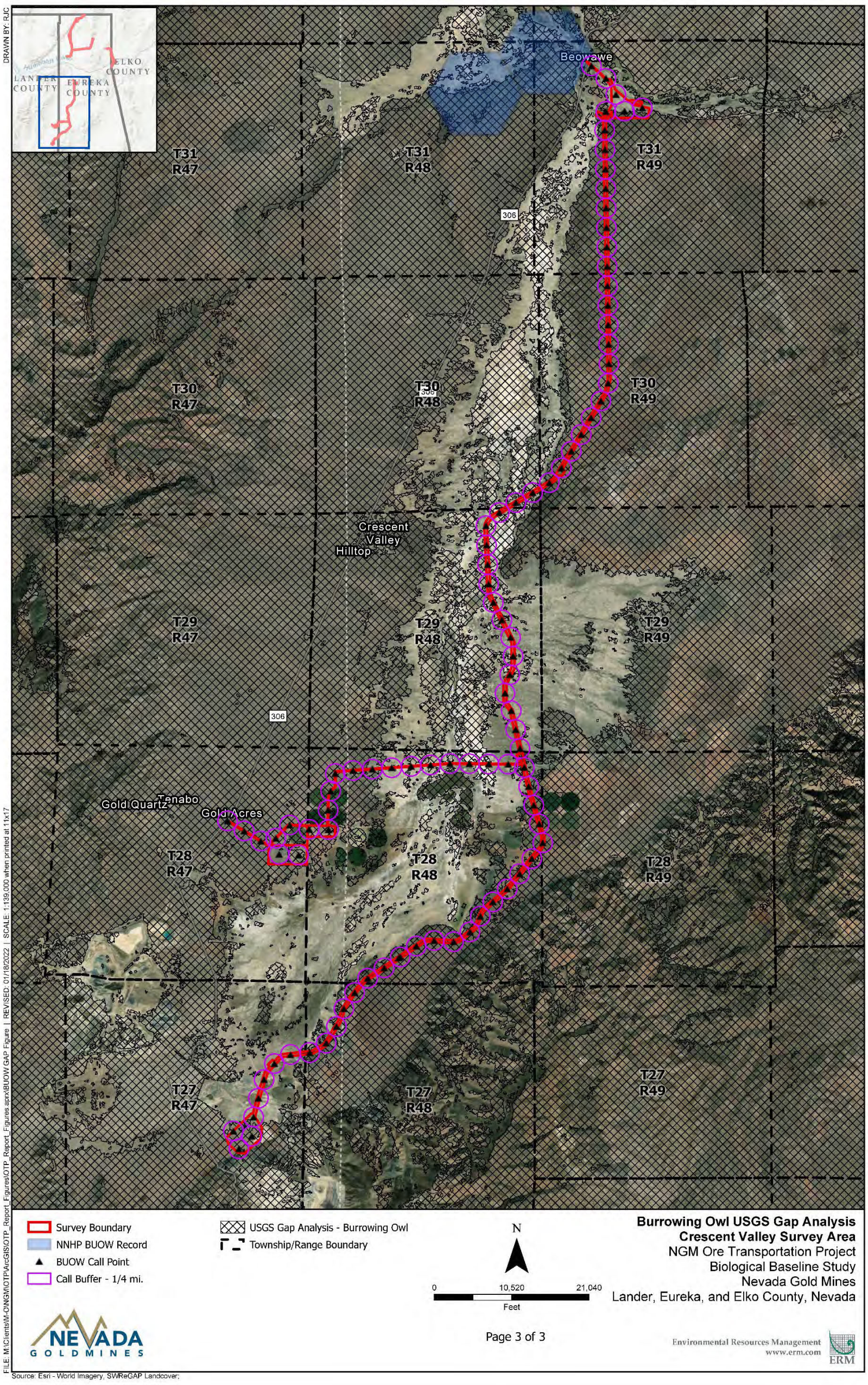


Figure 3.4.5-3: Burrowing Owl USGS GAP Analysis—Crescent Valley Survey Area

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Comprehensive field studies were conducted to discover the current distribution of Burrowing Owl activity within the Project Area. The following protocols were used in this survey:

- *Statewide Wildlife Survey Protocols* (BLM 2014b)
- *Wildlife Survey Protocols* (BLM 2011)

Field surveys were conducted on three separate survey events between May 28 and June 4 2021, during the nesting season using a total of 201 call survey stations (call points). Based on the GAP layer desktop assessment and guidance from the BLM, call points were arranged 0.5 mile apart throughout the entire Project Area with additional call points within the borrow sources, as shown on Figure 3.4.5-1 through Figure 3.4.5-3. Surveys and calls were conducted in the early morning (30 minutes before sunrise until 2 hours after sunrise) and early evening (2 hours before sunset until 30 minutes after sunset) (BLM 2011). As described in the protocols mentioned above, poor weather conditions may impact the ability to detect Burrowing Owls; therefore, call surveys were conducted when wind speed was no more than 20 mph (the higher wind speed was approved by BLM during the surveys based on daily conditions during the survey), the ambient temperature was greater than 68 °F, and there was no precipitation.

At each call point, surveyors broadcasted the primary male (coo-coo) and alarm (quick-quick-quick) calls at 80 to 90 decibels (measured approximately 3.3 feet from the speaker) and rotated in each cardinal direction during the broadcast. The observers stood and scanned the 360-degree area for Burrowing Owls during the entire call point survey period. The call survey period and sequence of activities were conducted as follows:

- 3 minutes of silence
- 30 seconds call-broadcast of primary call (coo-coo)
- 30 seconds of silence
- 30 seconds call-broadcast of primary call (coo-coo)
- 30 seconds of silence
- 30 seconds call-broadcast of alarm call (quick-quick-quick)
- 30 seconds of silence
- 4 minutes of silence

Surveys were conducted for 10 minutes at each call point to allow adequate time for Burrowing Owls to detect the calls from inside of burrows or for those not present on the site when the call site survey started (BLM 2011). During surveys, observers continually searched 360 degrees around the broadcast call site. Observers also listened for Burrowing Owls while conducting the survey and recorded auditory confirmations concurrently with the visual sightings.

All call points were recorded, and photographs were taken in each cardinal direction. The UTM coordinates and/or delineation of these features and the status of burrows were also recorded. Burrows were considered active if owls were seen entering or exiting the burrow or if there was owl sign (fresh scat or pellets) at the burrow.

3.4.5.3. Results and Discussion

Suitable habitat for Burrowing Owls was identified throughout the Project Area during the desktop assessment, and field surveys were completed at a total of 201 call points: 28 in Carlin Survey Area, 80 in Goldstrike Survey Area, and 93 in Crescent Valley Survey Area. Appendix D.4.2 contains representative photographs for the Burrowing Owl call points. The Carlin Survey Area call points were primarily located in areas with sagebrush habitat, while both Goldstrike and Crescent Valley survey area call points were in areas that have a combination of sagebrush, grassland, greasewood, and invasive (cheat grass / clasping pepperweed / other) habitat types.

Figure 3.4.5-4 through Figure 3.4.5-8 show the location of the call points from the field surveys and location of all identified burrows throughout the Project Area and their status (active or inactive). The survey areas were broken down based on the distribution of active burrows and Burrowing Owls: Goldstrike was divided into 6 defined areas (Goldstrike A-F), Crescent Valley was divided into 5 defined areas (Crescent Valley A-E), and Carlin remained as one defined area due to only one documented active burrow. A comprehensive summary of active and inactive burrows is shown in Table D.4-1 of Appendix D.

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During field surveys, burrows were observed at 54 of the 201 call points, 31 of which were active. Active burrows were observed in all three survey areas: 1 call point in Carlin Survey Area, 22 call points in Goldstrike Survey Area, and 8 call points in Crescent Valley Survey Area (Figure 3.4.5-4 through Figure 3.4.5-8; Table 3.4.5-1; Table D.4-1 Appendix D). Active burrows were observed primarily in sagebrush or grassland habitat with minimal vegetation coverage and loam soil.

Table 3.4.5-1 summarizes active burrows and Burrowing Owl observations within the survey areas and briefly describes habitat and soil type where the observations occurred. Site identifications (IDs) for Burrowing Owl call points begin with “BUOW” (Burrowing Owl), followed by the survey area (“CR”-Carlin, “GS”-Goldstrike, and “CV”-Crescent Valley) and the call point number.

Table 3.4.5-1: Summary of Active Burrows and Burrowing Owl Observations

Survey Area	Habitat and Field Notes	Site ID [a]	Survey Dates	Active Burrows Present	Number of Owl Sightings
Carlin	Primarily sagebrush community with clay/loam soil. The canopy cover is 0-25 inches high. No predators were seen at the site. The observed burrow showed minimal activity.	BUOW-CR12	7/22/2021	Yes	1 (adult)
Goldstrike A	Primarily consists of invasive plant species (cheat grass / clasping pepperweed / other), loam soil, 0–25-inch canopy cover, no predators seen.	BUOW-GS16	6/18/2021	Yes	1
		BUOW-GS16 BOB	5/19/2021	Yes	1 (adult)
		BUOW-GS16 BOB	5/19/2021	Yes (3)	1 (adult)
Goldstrike B	Habitat consists of invasive plant species (cheat grass / clasping pepperweed / other) with loam soil and 0-25 inches of canopy cover.	BUOW-GS27 BOB	5/19/2021	Yes	1 (adult)
		BUOW-GS27	5/19/2021	Yes	1 (adult)
		BUOW-GS34 BOB	7/5/2021	Yes	1 (adult)

Survey Area	Habitat and Field Notes	Site ID [a]	Survey Dates	Active Burrows Present	Number of Owl Sightings
Goldstrike C	Habitat is primarily invasive plant species (cheat grass / clasping pepperweed / other) with loam soil and 0-25 inches of canopy cover.	BUOW-GS41 BOB	5/19/2021	Yes	1 (adult)
Goldstrike D	This area has loam soil and canopy cover that is 0-25 inches high. Common Ravens, predators of the Burrowing Owl, were seen on site.	BUOW-GS50 BOB	6/21/2021	Yes	1 (adult)
Goldstrike E	Habitat consists primarily of grassland with some invasive plant species (cheat grass / clasping pepperweed / other) with loam soil and has 0-25 inches of canopy cover. There were burrows with feathers, pellets, and whitewash at BUOW-GS69 on 6/23/2021 and 6/30/2021, but no owls were observed.	BUOW-GS67 BOB	6/30/2021	Yes	1 (adult)
		BUOW-GS67 ALT	6/30/2021	Yes	0
		BUOW-GS67	7/7/2021	Yes	0
		BUOW-GS68	6/30/2021	Yes	0
		BUOW-GS69	6/23/2021	Yes	0
		BUOW-GS69	6/30/2021	Yes	1 (adult)
		BUOW-GS69	6/30/2021	Yes	0
		BUOW-GS69	7/4/2021	Yes	1 (adult)
		BUOW-GS69	7/4/2021	Yes	1 (adult)
		BUOW-GS69	7/5/2021	Yes	1 (adult)
		BUOW-GS69	7/5/2021	Yes	0
		BUOW-GS69 BOB	6/30/2021	Yes	2 (adults)

Survey Area	Habitat and Field Notes	Site ID [a]	Survey Dates	Active Burrows Present	Number of Owl Sightings
		BUOW-GS69 BOB	6/30/2021	Yes	0
		BUOW-GS69 ALT	6/30/2021	Yes	1 (adult)
Goldstrike F	Habitat is a combination of invasive plant species (cheat grass / clasping pepperweed / other) and dry, non-native grass/forb community. The soils are primarily loam and there is 0-25 inches of canopy cover.	BUOW-GS74 BOB	5/17/2021	Yes	2 (adults)
Crescent Valley A	Primarily greasewood habitat with loam soil and 26-50 inches of canopy cover.	BUOW-CV16 BOB	7/27/2021	Yes	7 (adults)
Crescent Valley B	Primarily sagebrush community and grassland with loam soil and 0-50 inches of canopy cover. Common ravens were seen in the area. Two adult owls were seen on 5/24/2021, and four adult owls were seen on 7/20/2021 at BUOW-CV23.	BUOW-CV23	7/20/2021	Yes	6 (adults)
		BUOW-CV23 ALT	6/29/2021	Yes	2 (adult + chick)
		BUOW-CV23 BOB	6/21/2021	Yes	0
Crescent Valley C	Active burrows were seen at this call point, but no owls were observed. There were copious amounts of scat, sign, cowpie decoration, bones, and feathers observed on-site. Habitat in this area is primarily mixed salt scrub - shadscale dominated with loam soil and 0-25 inches of canopy.	BUOW-CV38	5/27/2021	Yes	0

Survey Area	Habitat and Field Notes	Site ID [a]	Survey Dates	Active Burrows Present	Number of Owl Sightings
Crescent Valley D	Habitat consists of a combination of invasive plant species (cheat grass / clasping pepperweed / other) and dry, non-native grass/forb community. The soils are primarily loam and there is 0-25 inches of canopy cover. Two adult owls were observed on 5/20/2021 and on 6/16/2021. Tracks and feathers were seen at the mouth of this burrow.	BUOW-CV74	5/20/2021, 6/16/2021	Yes	4 (adults)
Crescent Valley E	A burrow was found on the walk to CV85. The habitat in this area is primarily grassland with loam soil and 0-25 inches of canopy cover.	BUOW-CV85	6/8/2021	Yes	0

BUOW = Burrowing Owl; CR = Carlin; CV = Crescent Valley; GS = Goldstrike; ID = identification
[a] ALT indicates that another burrow from the same owl (or pair of owls) was identified near the original call point. Burrowing Owls often have multiple burrows and may travel to another burrow for protection when the owls are flushed. When this behavior was observed, the second burrow was recorded as an “ALT” site. “BOB” indicates that another burrow from a different owl was identified around the original site.

There were 38 Burrowing Owl observations throughout the survey period (Table 3.4.5-1). Of the 38 sightings, 1 owl was observed in the Carlin Survey Area, 16 owls were observed in the Goldstrike Survey Area, and 21 owls were observed in the Crescent Valley Survey Area. Only one of the owls observed was a chick while the remaining were adults or fully fledged juveniles. Goldstrike E near the loading/unloading loop (seen in Figure 3.4.5-4) was heavily populated with Burrowing Owls and burrows. Call point BUOW-GS69, located inside the loading/unloading loop in Goldstrike E, had the most observations of active burrows (7) of all the call points. This area is primarily grassland with some invasive plant species, such as cheat grass and clasping pepperweed. Call point BUOW-CV16-BOB located in Crescent Valley A had the most observations of individual Burrowing Owls (7) of all the call points. This area is primarily made up of greasewood habitat.

Carlin is the smallest of the three survey areas, but there may be other reasons for relative differences in Burrowing Owl activity. Areas with a high abundance of small burrowing mammals and perching features such as near-to-the-ground fence posts and mounds create good Burrowing Owl habitat (NDOW 2021b).

3.4.6. Greater Sage-grouse

3.4.6.1. Background

The greater sage-grouse (hereafter referred to as "sage-grouse") is designated as a sensitive species by the BLM and as a game bird under NAC 503. The sage-grouse was also listed as a candidate under the ESA until October 2, 2015, when the USFWS determined that listing was unwarranted (80 Federal Register 191 pgs. 59858-59942).

Sage-grouse are a sagebrush-obligate species dependent on multiple shrub-steppe habitats for food, shelter, and rearing (Braun et al. 1976; Connelly et al. 2000). The various sagebrush-steppe communities that sage-grouse rely on are managed by federal, state, and local authorities (BLM 2019c). Sage-grouse have variable seasonal migratory behavior but demonstrate high fidelity to seasonal ranges, returning to the same areas for foraging, courtship, and nesting (Connelly et al. 2000). During the spring breeding season—approximately March 1 through May 15 in Elko, Eureka, and Lander counties—Nevada (BLM 2014b), males gather on leks to perform courtship displays. Typical lek habitat consists of open areas including bare soil, short-grass steppe, windswept ridges, and exposed knolls in close proximity to denser shrub-steppe habitat with substantial cover (Connelly et al. 2004).

3.4.6.2. Study Methodology

Data requested by NDOW identified eight sage-grouse leks within a 4-mile buffer of the Project. Two additional leks were added to the study per request from the agencies. Specific coordinate information for sage-grouse leks is confidential per the data-sharing agreement and confidentiality agreement between NDOW and ERM; therefore, the 10 lek locations shown on Figure 3.4.6-1 are approximate.

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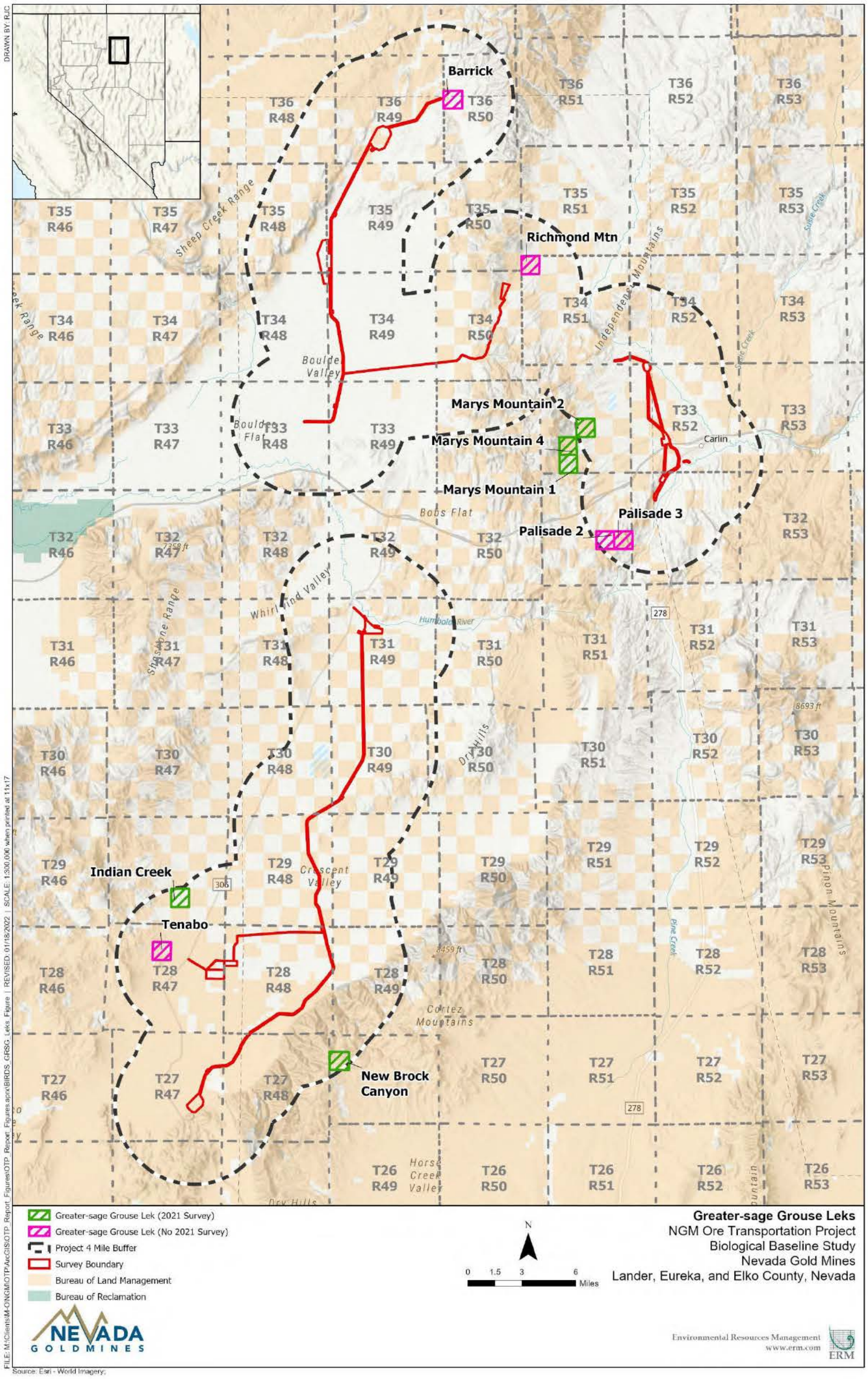


Figure 3.4.6-1: Greater Sage-grouse Leks within the Project Area

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Ground-based lek counts were conducted by NDOW for the northern Project Area leks and ERM for the southern Project Area leks. ERM surveys were conducted in conjunction with lek monitoring for the Cortez District (ERM 2021b). Table 3.4.6-1 shows the number of times each lek was surveyed in 2021.

Table 3.4.6-1: Overview of Leks Surveyed in 2021

BLM Field Office	Lek	Lek ID	2021 Surveyor	Number of Surveys in 2021
Mount Lewis	Indian Creek	SHO-018	ERM	1
Mount Lewis	Tenabo	SHO-006	Not Surveyed	0
Tuscarora	Barrick	TUS-078	Not Surveyed	0
Tuscarora	Mary's Mountain 1[a]	COR-007	Not Surveyed	0
Tuscarora	Mary's Mountain 2	COR-006	NDOW	1
Tuscarora	Mary's Mountain 4[a]	COR-031	NDOW	1
Tuscarora	New Brock Canyon	COR-032	ERM	3
Tuscarora	Palisade 2	COR-018	Not Surveyed	0
Tuscarora	Palisade 3	COR-015	Not Surveyed	0
Tuscarora	Richmond Mountain	NOFO-139	Not Surveyed	0

Source: ERM 2021b; NDOW 2021c

BLM = Bureau of Land Management; ERM = ERM-West, Inc.; ID = identification; NDOW = Nevada Department of Wildlife

[a] Lek located outside of Project Area 4-mile buffer zone, but included per agency request.

Lek monitoring surveys were completed using the following protocol and guidance:

- *Lek Count/Lek Route Protocols* (NDOW 2013)
- Project-specific coordination with the NDOW Eastern Regional Office (ERM 2021b).

For each survey, four counts were obtained at 15-minute intervals between 30 minutes before sunrise and 1.5 hours after sunrise at each surveyed lek (NDOW 2013). If no sage-grouse were observed during a lek survey, biologists would walk the lek listening for lekking activity and searching for sage-grouse signs (i.e., cecal tar, pellets, feathers). The following data was collected for each survey:

- Date
- Arrival time
- Departure time
- Time of sunrise
- Weather (temperature, cloud cover, wind speed and direction, ground conditions)
- Survey start time
- Survey end time
- Number of males and females per count
- Additional notes (e.g., presence of predators, notes on behavior, presence of sign)

Lek count data from NDOW and ERM were used to analyze count data and lek status.

3.4.6.3. Results and Discussion

The 10 leks included in the survey are located throughout three Nevada counties, four Population Management Units (PMUs), and three Biologically Significant Units (BSUs). A PMU is an area where leks are grouped based on the occurrence of short-term genetic interchange across populations, and a BSU is an area where sage-grouse interaction occurs across multiple PMUs and is representative of sage-grouse habitats and seasonal distribution within the sub-region (USFS 2015). Table 3.4.6-2 lists the leks by applicable BLM Field Office and county and displays the relevant PMU and BSU.

Table 3.4.6-2: Greater Sage-grouse Leks within the Project Area

BLM Field Office	County	Lek	Lek ID	PMU	BSU
Mount Lewis	Lander	Indian Creek	SHO-018	Shoshone	Central Great Basin
Mount Lewis	Lander	Tenabo	SHO-006	Shoshone	Central Great Basin
Tuscarora	Elko	Barrick	TUS-078	Tuscarora	Owyhee
Tuscarora	Eureka	Mary's Mountain 1[a]	COR-007	Cortez	Central Great Basin
Tuscarora	Eureka	Mary's Mountain 2	COR-006	Cortez	Central Great Basin
Tuscarora	Eureka	Mary's Mountain 4[a]	COR-031	Cortez	Central Great Basin
Tuscarora	Eureka	New Brock Canyon	COR-032	Cortez	Central Great Basin
Tuscarora	Eureka	Palisade 2	COR-018	Cortez	Central Great Basin
Tuscarora	Eureka	Palisade 3	COR-015	Cortez	Central Great Basin
Tuscarora	Eureka	Richmond Mountain	NOFO-139	North Fork	Central Elko

Table: NDOW 2021c

BLM = Bureau of Land Management; BSU = Biologically Significant Unit; ID = identification; PMU = Population Management Unit

[a] Lek located outside of Project Area 4-mile buffer zone, but included per agency request

Four of the 10 leks within the Project Area were surveyed in 2021. Table 3.4.6-3 depicts the year of the last survey performed for each lek, as well as the year lekking activity was last observed. It also states the current status of each lek as assigned by NDOW lek status definitions. Applicable lek statuses are (NDOW 2017):

- Active – two or more males on lek for at least twice in the past 5 years
- Pending – two or more males on lek only once in the past 5 years
- Inactive – zero to one male on lek during every visit for the past 5 years; (minimum of 2 visits within the past 5 years)
- Historic – zero to one male on lek during every visit in the last 30 years (minimum of 5 visits)
- Unknown – no other conditions have been met

Table 3.4.6-3: Date of Last Survey and Current NDOW Lek Status

Lek	Lek ID	Last Survey	Last Activity	NDOW Lek Status [d]
Indian Creek	SHO-018	2021	2000	Inactive
Tenabo [a]	SHO-006	2018	Unknown	Unknown
Barrick [b]	TUS-078	Unknown	Unknown	Unknown
Mary's Mountain 1 [c]	COR-007	2019	2016	Inactive
Mary's Mountain 2	COR-006	2021	2018	Active
Mary's Mountain 4 [c]	COR-031	2021	2016	Inactive
New Brock Canyon	COR-032	2021	2021	Active
Palisade 2	COR-018	2019	2010	Inactive
Palisade 3	COR-015	2019	2019	Active
Richmond Mountain [b]	NOFO-139	2014	Unknown	Unknown

Table Source: NDOW 2021c and ERM 2021b

ID = identification; NDOW = Nevada Department of Wildlife
[a] Tenabo was first located in 1947. Male attendance data cannot be located; therefore, the last activity is unknown. This lek was removed from surveys during coordination between NDOW and ERM in 2019.
[b] Lek data not included in NDOW historical lek data; therefore, last survey, last activity, and/or status is unknown.
[c] Lek located outside of Project Area 4-mile buffer zone, but included per agency request.
[d] Lek status is assigned based on NDOW 2021c Lek Count Data and NDOW 2017 lek status definitions.

A majority of consistent lek data collection occurred between 2010 and 2021. Historical high count lek data from 2010 to 2021 is presented by BLM Field Office in Table 3.4.6-4 and Table 3.4.6-5. Of the four surveyed leks in 2021, only one lek (New Brock Canyon) had birds on lek during surveys.

Table 3.4.6-4: Mount Lewis Field Office, Historical High Count Data 2010-2021

Lek	Lek ID	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Indian Creek	SHO-018			0					0	0	0	0	0
Tenabo	SHO-006							0	0	0			

Source: EEM 2021; NDOW 2021c

ID = identification
[a] Not pictured in this table, Indian Creek lek data dates back to 1971.
[b] Tenabo was first located in 1947. Male attendance data cannot be located (NDOW 2021c).

Table 3.4.6-5: Tuscarora Field Office, Historical High Count Data 2010-2021

Lek	Lek ID	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Barrick [a]	TUS-078												
Mary's Mountain 1 [b]	COR-007	0		0	0		0	4	0	0	0		
Mary's Mountain 2	COR-006	9		14	7	3	10	12	9	5	0		0
Mary's Mountain 4 [b]	COR-031	2					7	5	0	0	0		0
New Brock Canyon	COR-032			37	22	51	50	59	37	51	39	40	30
Palisade 2	COR-018	14		0			0	0	0	0	0		
Palisade 3	COR-015	11		12			3	4	7	3	12		
Richmond Mountain	NOFO-139	0		0		0							

Source: ERM 2021b; NDOW 2021c

ID = identification
[a] No lek data provided (NDOW 2021c)
[b] Lek located outside of Project Area 4-mile buffer zone, but included per agency request.
[c] Not pictured in this table, Palisade 2 has high counts in 1991, 2001, and 2002.

3.4.7. Threatened and Endangered Species

3.4.7.1. Background

Threatened and endangered wildlife species are protected under the ESA of 1973 (16 USC § 1531, *et seq.*). Under Section 7(a)(2) of the ESA, federal agencies are required to determine whether projects may affect or jeopardize the continued existence of threatened and endangered species and/or critical habitat. Threatened and endangered species habitat were identified and mapped within the Project Area, which includes the Project footprint plus a 200-foot-wide buffer of the centerline (400-foot survey area), as shown on Figure 2-1 through Figure 2-9. The purpose of this assessment is to determine if any threatened and endangered species occur in the Project Area in order to inform future impact analysis.

3.4.7.2. Study Methodology

The USFWS Information for Planning and Consultation (IPaC) was queried to identify federally threatened and endangered species with the potential to occur in the Project Area. The USFWS IPaC query identified two federally listed species and one candidate species: Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*; threatened), gray wolf (*Canis lupus*; threatened and proposed for listing as endangered), and the monarch butterfly (*Danaus plexippus*; candidate species for listing under the ESA). A desktop assessment of potential suitable habitat in the Project Area for these species was conducted using data from NDNH, SWReGAP land cover, NRCS SSURGO, NHD, and NWI.

The following protocols were used in this survey:

- *Statewide Wildlife Survey Protocols* (BLM 2014b)
- USFWS Species-Specific Protocols
- *Initial Survey Instructions for Western Monarch and Milkweed Habitat Suitability Assessment* (USFWS 2016)

A field reconnaissance was conducted to identify potentially suitable habitat for the Lahontan cutthroat trout (hereafter referred to as LCT) in the Project Area. Field surveys were not conducted for the gray wolf, although scat and tracks were to be recorded along with geo-referenced photographs if evidence of gray wolf was observed during other field surveys. Surveys for monarch butterfly were conducted by identifying locations with known occurrences of milkweeds, which could be used by this species. Section 3.3.2, Butterfly Host Plants, discusses locations of documented milkweeds.

3.4.7.3. Results and Discussion

Pre-Field Results

Lahontan Cutthroat Trout

The LCT is an inland subspecies of cutthroat trout endemic to the Lahontan Basin of northeast California, southeast Oregon, and northern Nevada. The Project Area is located within the

Humboldt River Basin. Historically, the LCT thrived throughout the majority of the Humboldt River and its tributaries (USFWS 1995). In Nevada, most remaining populations of LCT occupy higher elevation, low-order streams (Dunham et al. 1999).

LCT are known to have occurred in the following sub-basins or areas: Mary's River; East Humboldt River area; South Fork Humboldt River; North Fork Humboldt River; Maggie Creek; Pine Creek; Rock Creek; Reese River; and Little Humboldt River (USFWS 1995). Potential habitat for LCT in the vicinity of the Project Area is limited primarily to the Humboldt River. Most streams in the Project Area are ephemeral or intermittent and support aquatic conditions for only limited periods in response to runoff from storm events and snowmelt. Therefore, aquatic conditions throughout the Project Area are variable and heavily dependent on annual patterns of precipitation, snowmelt, and drought. Ephemeral and intermittent streams are more prone to the effects of regional drought conditions and, in addition to inadequate flow, tend to lack necessary habitat characteristics required by LCT, including larger substrate and instream cover. Stream-dwelling LCT require relatively cool, silt-free waters and habitat that provides refuge from high-flow velocities, rocky-riffles, and well-vegetated, stable streambanks (USFWS 2019).

In total, there are four perennial streams, four intermittent streams, and 57 ephemeral streams in the Survey Area (Figure 2.2-2a through Figure 2.2-2c). There is no designated Critical Habitat in the Project Area for the LCT (USFWS 2021b). A detailed discussion of wetlands and waterbodies surveyed across the Project Area is included in Section 3.2., Water Resources Surveys.

Gray Wolf

The gray wolf formerly occurred in most of the conterminous United States and Mexico. Because of widespread habitat destruction and human persecution, the species now occupies only a small part of its original range in these regions. Gray wolves can live in almost any habitat in the Northern Hemisphere but tend to occupy forests, tundra, and grassy plains as well as deserts and mountains. They usually live in packs, forming social bonds and establishing a dominance hierarchy. A pack's territory can be 31 to 1,200 square miles, and they hunt a variety of large herbivores such as deer, elk, moose, and bighorn sheep.

Based on the desktop assessment, there could be potential habitat for gray wolves within the Project Area, including sagebrush shrubland, desert grasslands, greasewood flats and forbland, each of which provides food sources for their preferred prey species. Despite the potential habitat, according to NDOW, the most recent gray wolf observation was of a single gray wolf in 2017. Records indicate the last sighting prior to 2017 was in 1922, making it very unlikely to be present in the Project Area.

Monarch Butterfly

Areas with milkweed species may support Monarch butterflies (Xerces Society 2012). Data and literature from the BLM and NDNH were reviewed to determine potential Monarch butterfly habitat in the Project Area. Milkweed species (*Asclepias* spp.) are a known host plant for the Monarch butterfly. There are 13 species of milkweed native to Nevada; however, 6 species are

more likely to be present in the Project Area: eastwood milkweed (*Asclepias eastwoodiana*), spider milkweed (*Asclepias asperula* ssp. *asperula*), pallid milkweed (*Asclepias cryptoceras*), desert milkweed (*Asclepias erosa*), narrow-leaved milkweed (*Asclepias fascicularis*), and showy milkweed (*Asclepias speciose***)** (Xerces Society 2012).

Milkweed species can be found within a wide range of vegetation communities, including communities along roadsides and open areas on a wide variety of basic soils. The habitable soil types include calcareous clay knolls, sand, carbonate or basaltic gravels, shale outcrops, barren areas, and small washes or other moisture accumulating microsites, shadscale, mixed-shrub, sagebrush, and lower pinyon-juniper zones. Based on NDNH vegetation data, there is potential milkweed habitat throughout the Crescent Valley, Carlin, and Goldstrike survey areas indicating the potential for Monarch butterflies in the Project Area.

Field Reconnaissance Results

Lahontan Cutthroat Trout

A field reconnaissance was conducted in areas that desktop assessment and the PFC assessment indicated could potentially support suitable habitat for LCT. No suitable habitat was documented during 2021 fieldwork within any of the survey areas. Streams and other aquatic features were evaluated from May 24, 2021, to August 25, 2021 (as described in Section 3.2, Water Resources Surveys), and representative photographs of habitat conditions in the study areas are presented in Appendix B.2.

A habitat evaluation was also conducted in April 2022 on Indian Creek in the vicinity of Crescent Valley in reference to suitability for LCT. This evaluation was based on a potential historical sighting of LCT by BLM.[4] At the time of the field assessment, all segments of Indian Creek in the Project Area were dry, with flowing water limited to one section approximately 1 mile in length located 1 mile upstream of the northern survey boundary. The depth of water in this section averaged 5 inches, and the average wetted width of stream was approximately 2 feet. Fish were not observed at any location on Indian Creek during the habitat assessment. Evidence of livestock grazing and cattle activity (trampling, stream crossings, etc.) was common throughout the areas evaluated and appears in many locations to have adversely impacted bank stability, structure, and vegetative cover. Riparian vegetation along Indian Creek was minimal or absent in most areas at the time of survey, and when present, was comprised dominantly of upland vegetative species. Observations of Indian Creek suggest that typical connectivity and habitat conditions do not support resident LCT. Further, the absence of a downstream connection to more perennial waters, or habitat that could provide refugia to stranded fish after a period of peak flow and increased connectivity, suggest that LCT are unable to enter the Project Area from any source water downstream. If LCT historically occurred in this segment of Indian Creek, it likely originated from a location upstream where flows are less seasonally dependent and physical habitat features are supportive to self-sustaining

[4] Descriptive data (date, species confirmation, size of fish) were unreported for this observation. No other historical data indicate the presence of LCT in this region of Indian Creek.

populations of LCT. The technical memorandum and photographs of this assessment are provided as Appendix E.

Flow data of the Humboldt River near Carlin (USGS Gage 10321000) in the vicinity of the Project Area documented periods of peak discharge and median daily discharge well below the 77-year median statistics for these values in 2021 (Figure 3.4.7-1). Peak discharge, typically observed in this region of Nevada in response to snowmelt in late spring and early summer, was the lowest observed value since 2013 in both 2020 and 2021. In the absence of a more typical runoff period, it is expected that a majority of the ephemeral and intermittent streams would be dry or mostly dry at the time of surveys; however, even in years of adequate flow, site habitat characteristics make nearly all of these locations unsuitable for LCT.

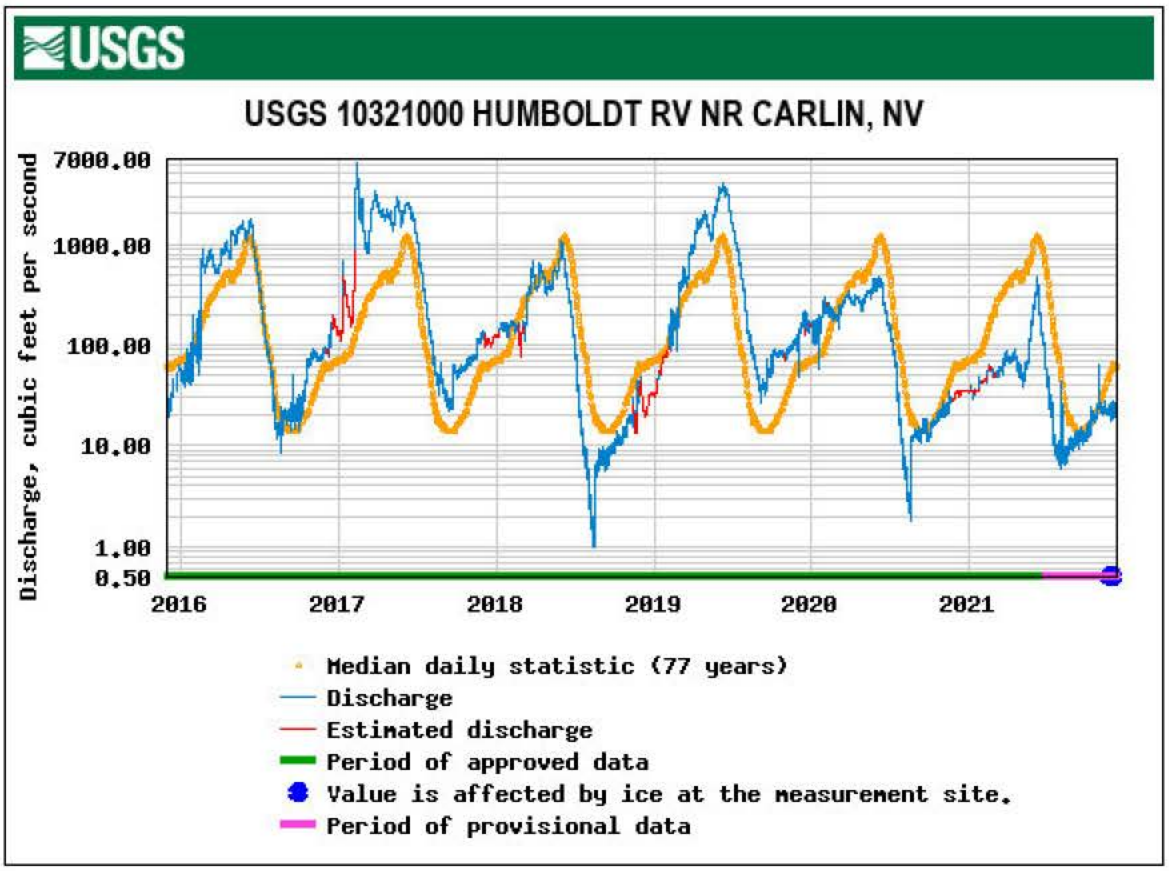


Figure 3.4.7-1: Humboldt River Discharge Near Carlin

The larger size and perennial flow make the most suitable habitat in the vicinity of the Project Area the Humboldt River, which lies just outside the Project Area boundary. The Humboldt River in this location adjacent to the Project Area had adequate flows to support LCT at the time of surveys (Appendix B.2, scac001p). However, the Project is not expected to impact biological resources outside the Project Area boundary.

In the Goldstrike Survey Area, evaluations of Welches Creek, a perennial stream, documented some reaches with aquatic conditions in July surveys (Appendix B.2, sgoa003p and sgoc007p).

Welches Creek was the only perennial stream within the Project Area that was not dry. However, the size of this stream, shallow depth, fine sediments, and fragmented state of these sites on Welches Creek could not support LCT. Both general reconnaissance surveys and the focused habitat evaluation suggest LCT are not likely to occur in the Project Area.

Gray Wolf

No species-specific field surveys were conducted for the gray wolf based on the desktop assessment and historical species data indicating low potential for packs in this region. No incidental observations of scat or tracks were documented during wildlife surveys conducted from May 24, 2021, through July 30, 2021, suggesting gray wolf are not present within the Project Area.

Monarch Butterfly

No Monarch butterflies were identified within the Project Area; however, milkweed species were detected at 29 sites from June 12, 2021, to July 24, 2021. The species identified were Narrow Leaved milkweed (Asclepias fascicularis) and Showy milkweed (Asclepias speciosa), predominantly observed in the Goldstrike Survey Area throughout sagebrush shrubland and semi desert grassland vegetation. More details of the study methodology and field results can be found in Section 3.3.2, Butterfly Host Plants.

3.4.8. Pygmy Rabbit

3.4.8.1. Background

The pygmy rabbit (*Brachylagus idahoensis*) is a BLM special status species in Nevada and is a Game Mammal under NAC 503. Pygmy rabbits are extreme habitat specialists (Gabler et al. 2001) occurring throughout most of the Great Basin. In particular, they are found within sagebrush plains and alluvial fans in clumps of mature sagebrush that are tall and dense relative to the surrounding sagebrush (Ulmschneider 2004), accompanying deep, friable soils. Cover and height of woody vegetation are critical habitat features (Green and Flinders 1980); although, pygmy rabbits have been observed occupying clusters of sagebrush that were taller than the surrounding sagebrush shrubs (Larrucea and Brussard 2008). Pygmy rabbits utilize the sagebrush for food (Green and Flinders 1980) and refuge from predators (Gabler et al. 2001), while softer soils allow burrow construction with multiple entrances (Weiss and Verts 1984). The NDOW WAP indicates that livestock grazing at unsustainable levels can result in loss of sagebrush habitat unless sagebrush habitat is left intact, and soils are not overly compacted (Wildlife Action Plan Team 2012). Additionally, fire impacts, cheatgrass invasion, and pinyon-juniper encroachment decreases habitat suitability for pygmy rabbits as they lead to reduced shrub cover.

A desktop assessment and surveys were conducted within the Project Area, which includes the Project footprint plus a 200-foot-wide buffer of the centerline (400-foot survey area), as shown on Figure 2-1 through Figure 2-9. The purpose of the pygmy rabbit surveys is to identify

potential habitat and document the presence of the species within the Project Area to inform the future NEPA analysis.

3.4.8.2. Study Methodology

A desktop assessment using the USGS GAP modeled habitat layer for pygmy rabbits, SWReGAP, NRCS SSURGO, and NDNH was conducted to identify potential habitat and areas with the highest potential of occurrence within the Project Area.

The following protocols were used in this survey:

- *Statewide Wildlife Survey Protocols* (BLM 2014b)
- *Surveying for Pygmy Rabbits* (Brachylagus idahoensis) (Ulmschneider 2004)
- Pygmy Rabbit Protocol for the Long Canyon Project (*Long Canyon* n.d.)

In addition to the GAP modeled habitat, land cover areas identified as Inter-Mountain Big Sagebrush Shrubland, Great Basin Xeric-Mixed Sagebrush Shrubland, and Inter-Mountain Basins Big Sagebrush Steppe were used to target areas for the field survey of potential pygmy rabbit habitat. Areas identified during desktop review as supporting the above habitat components are presented in Figure 3.4.8-1 through Figure 3.4.8-4.

The following characteristics were used during desktop review to identify areas to survey:

- Elevations ranging from 5,600 to 7,800 feet amsl
- Deep loamy soils
- Friable soils
- Flat to moderate slopes
- Vegetation communities where dense sagebrush and/or rabbitbrush species dominate
- Tall/dense stands of sagebrush
- Dense shrub canopy cover

The desktop assessment was used during the field surveys as a preliminary tool to understand potential habitat distribution across the entire Project Area. Once in the field, adjustments to survey locations were made as needed to account for on-the-ground conditions, including impacts of fire, grazing, and anthropogenic activity.

Field surveys were conducted from May 24, 2021, through July 30, 2021, within areas identified as having potentially suitable pygmy rabbit habitat. Pygmy rabbit presence was evaluated by conducting visual surveys primarily for appropriately sized burrows and pellets. Biologists conducted GPS-tracked pedestrian transects at 100-foot center-to-center spacing in areas characterized as potential habitat, such as the presence of deep loamy soils and established sagebrush and/or rabbitbrush community. Tightly spaced meandering transects were conducted where taller, denser, sagebrush stands were found in order to cover the entire stand. All burrows and tracks were recorded using GPS units. Burrows located during the pedestrian surveys of potential habitat were classified as active, inactive, or collapsed. Pellets occurring in piles under sagebrush, piles along runways, and/or as single pellets of appropriate size (typically ranging from 5 to 7 millimeters [0.2 to 0.3 inche] in diameter) were considered pygmy rabbit sign and classified as fresh (moist, do not crumble, dark in color) or old (dry, crumble easily, brown or

gray in color). Observation of pygmy rabbit individuals, their mounded burrows, or scat/tracks were documented with a georeferenced photo and GPS point or polygon. Observations of individuals, burrows, pellets, and soil types and descriptions of vegetation were also recorded.

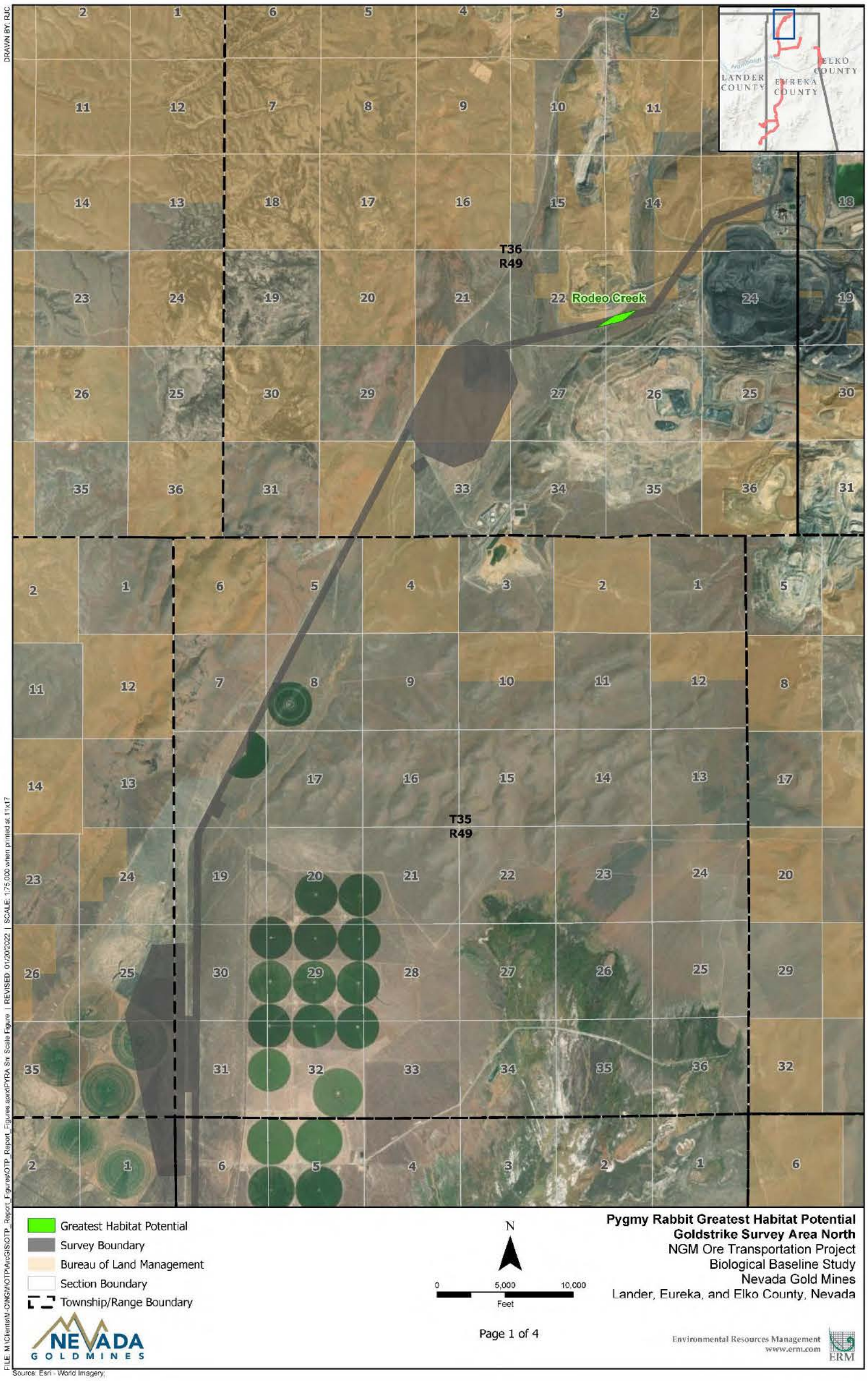


Figure 3.4.8-1: Pygmy Rabbit Greatest Habitat Potential—Goldstrike Survey Area North

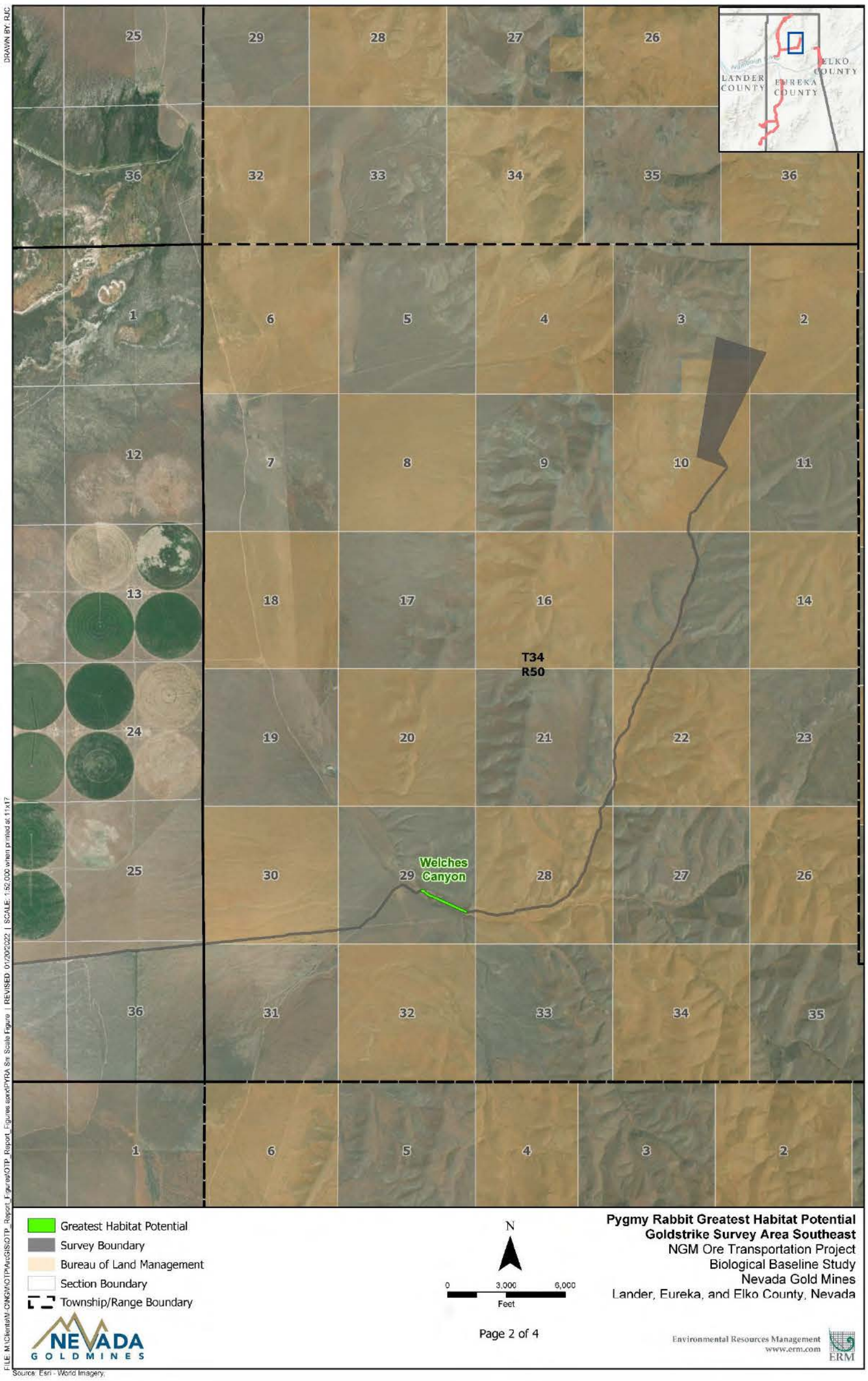


Figure 3.4.8-2: Pygmy Rabbit Greatest Habitat Potential—Goldstrike Survey Area Southeast

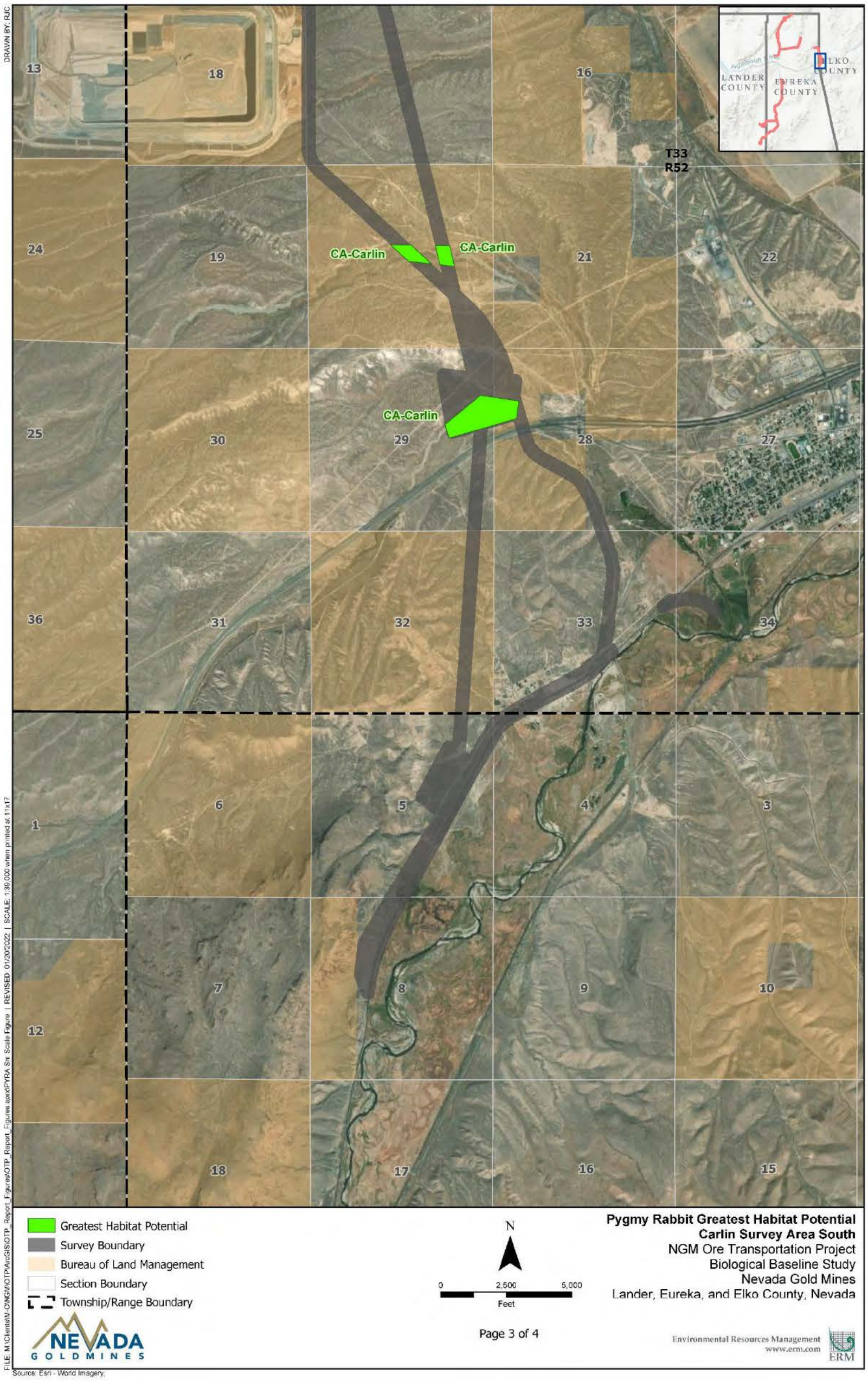


Figure 3.4.8-3: Pygmy Rabbit Greatest Habitat Potential—Carlin Survey Area South

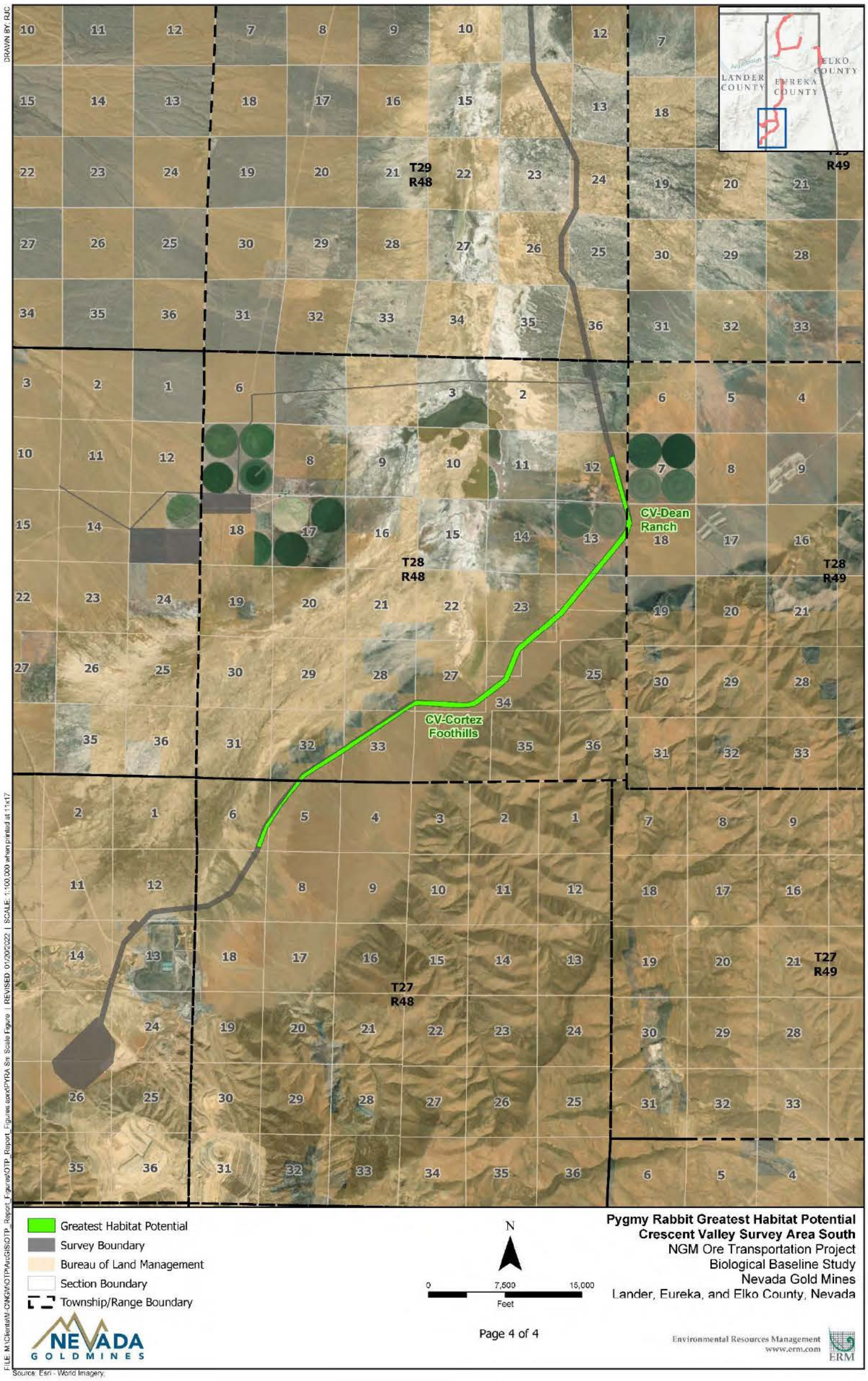


Figure 3.4.8-4: Pygmy Rabbit Greatest Habitat Potential—Crescent Valley Survey Area South

3.4.8.3. Results and Discussion

Field biologists identified potential pygmy rabbit habitat within Goldstrike, Carlin, and Crescent Valley survey areas. The field team surveyed a total of 704 transect miles, as shown in Appendix D.5.1. The Project Area consists of valleys and lower elevation slopes dominated by Great Basin sagebrush or saltbush-greasewood vegetation communities. Prevailing drought conditions, recent fires in the area, and local grazing regimes have reduced areas supporting suitable habitat for pygmy rabbit. As described in detail below for each survey area, no pygmy rabbits were observed during the surveys; however, potential pygmy rabbit habitat was identified within each of the survey areas and, therefore, there is potential for the species to occur within the Project Area.

Areas identified as having the most suitable potential habitat for pygmy rabbit generally supported intact communities of sagebrush and deep, friable soils. Locations with these characteristics were documented in the following areas: Rodeo Creek and the mouth of Welches Creek in the Goldstrike Survey Area; the wash bottoms of the Carlin Survey Area; and the Cortez foothills and Cortez Loop in the Crescent Valley Survey Area.

Figure 3.4.8-1 through Figure 3.4.8-4 present the areas of the greatest habitat potential based on field observations. Table 3.4.8-1 presents suitable habitat in the survey areas, vegetation and soils, and burrow information. Tracks for pygmy rabbit surveys are shown on Figures D.5-1 through D.5-3. Photographs from the field surveys within each of the survey areas is presented in Appendix D.5.2.

Table 3.4.8-1. Pygmy Rabbit Habitat Suitability and Sign within the Survey Areas

Survey Area	Site Name	Habitat	Sign/ Pellets	Individuals Observed	Possible Burrows
Goldstrike	GS-Rodeo Creek	Potential	No	No	No
Goldstrike	GS-Welches Canyon	Potential	No	No	No
Carlin	CA-Carlin	GHP	No	No	No
Crescent Valley	CV-Dean Ranch	GHP	No	No	No
Crescent Valley	CV-Cortez Foothills	GHP	No	No	No

GHP = Greatest habitat potential; SM = sub-marginal habitat

Goldstrike Survey Area

Desktop review of the Goldstrike Survey Area indicated potential pygmy rabbit habitat near the Goldstrike loading/unloading loop to the north, Welches Canyon, and more fragmented habitat observed along Boulder Valley. During the field surveys, the most suitable pygmy rabbit habitat was documented along Rodeo Creek to the northeast of the loading/unloading loop (Figure 3.4.8-1); however, no pygmy rabbit burrows or signs were identified in the Goldstrike Survey Area.

Rodeo Creek within the Welches-Bosco NRCS SSURGO soil map unit is characterized as having very deep, excessively drained soils formed in mixed alluvium, and is commonly associated with basin big sagebrush, cheatgrass, and basin wildrye. Dense stands of

sagebrush, rabbitbrush, and invasive species (including white top and Scotch thistle) were observed and abundant in some places along Rodeo Creek during field surveys. This area supports the highest quality potential habitat for pygmy rabbits in the Goldstrike Survey Area.

ESD survey data (ESD Site WE_3, Appendix A, Figure A.7-1) also documents big sagebrush and yellow rabbitbrush northeast of Rodeo Creek, as well as various species of grass, including basin wildrye, crested wheatgrass, and cheatgrass. The soils at this location were fine sandy clay loam, which are the preferred soils for pygmy rabbit. This area could provide suitable habitat for pygmy rabbits.

Habitat observed south of Rodeo Creek from the loading/unloading loop through Boulder Valley generally lacks sagebrush habitat and is dominated by invasive and noxious weed species. Evidence of the 2017 Rooster Comb Fire is still apparent in this area and has further reduced the suitability of this habitat for pygmy rabbit. The area south of Rodeo Creek is not currently suitable habitat for pygmy rabbits.

Potentially suitable habitat in the Goldstrike Survey Area was also identified in the vicinity of Welches Creek, which is also within the Welches-Bosco association NRCS SSURGO soil map unit, similar to Rodeo Creek. However, during field surveys, big sagebrush was generally absent in this area except near the mouth of Welches Creek and the canyon bottom. Grazing within the canyon has prevented the regeneration of shrub and forb communities. The ESD survey (ESD Site WE_2, Appendix A, Figure A.7-3) documented big sagebrush, rabbitbrush, and greasewood in addition to silty, clay loam soils only at the mouth of Welches Creek. Though fragmented, this area could provide limited areas of suitable habitat to pygmy rabbits.

Grazing was evident throughout the area from the northeast side of Welches Creek to the Summit Borrow Source. Sagebrush shrubs appeared “tree-like” as a result of grazing activity, and bare ground comprised most of the interspace. Soils in this area are highly compacted, and no vegetative understory was observed. Sagebrush is generally absent in this area, likely due to the 2011 Chukkar Canyon and 2015 Boulder fires. The bare uplands of Welches Canyon are not suitable habitat conditions for pygmy rabbits.

Carlin Survey Area

The Carlin Survey Area is within the Welch-Bosco NRCS SSURGO soil map unit, and this area was identified as potentially supporting suitable habitat for pygmy rabbit during the desktop review. Field evaluations of the Carlin Area documented two areas in wash bottoms that contain dense stands of sagebrush Figure 3.4.8-3. Several small mammal burrows were also observed in these areas, as well as cottontail and jackrabbit scat, as shown in Appendix D.5.2, Photo CA-05.

ESD surveys conducted along the wash bottom areas, including ESD Sites WC_4, CF_2, and CF_2a documented a high percentage of big sagebrush and deep, sandy loam soils (Appendix A, Figure A.7-4). In other locations across the Carlin Survey Area, including areas containing sagebrush communities, the soils were highly compacted, and no visible understory was observed, which may have indicated recent grazing activity. Overall, the Carlin Survey Area

supports only relatively small, localized areas of habitat potentially suitable to pygmy rabbits as shown on Figure 3.4.8-3.

Crescent Valley Survey Area

Areas with sagebrush communities were documented during desktop assessment of the Crescent Valley Survey Area. The northern section of the Crescent Valley Survey Area to the south of Beowawe is dominated by greasewood and saline soils made of silty clay loam. Further south, the landscape transitions into playa with more abundant greasewood communities accompanied by saltgrass and shadescale.

The greatest habitat potential in the Crescent Valley Survey Area is located along the Cortez foothills within a large sagebrush community, as shown on Figure 3.4.8-4. ESD Site 822_6 identified this area as a dense community of big sagebrush and greasewood, covered by a thick shrub community, including scattered annual grasses and pepperweed, and alluvial fans with deep, silty clay loam soils (Appendix A, Figure A.7-7). Shrubs present in this location were not dense, and the soils were slightly compacted. Although several burrows were observed in this area, only cottontail or jackrabbit scat was observed. Additionally, single burrow entrances, and not the multiple entrances associated with pygmy rabbits, were documented. Although older scat (grey pellets) was observed next to one burrow that could be of pygmy rabbit (size between 5 to 7 millimeters [0.2 to 0.3 inches] in diameter), the burrow lacked significant diggings, and no fresh diggings were found. The habitat where these pellets were located would provide only marginal habitat for pygmy rabbits, indicating these pellets were likely those of a cottontail rabbit.

Habitat to the south near the Cortez loading/unloading loop was degraded and dominated by invasive and noxious weed species. The habitat is also fragmented by roadways and in close proximity of current mining operations with frequent anthropogenic disturbance. Only one location supportive of a sagebrush shrub community is often confined to a narrow band along the drainages.

3.4.9. Dark and Pale Kangaroo Mice

3.4.9.1. Background

Pale kangaroo mice (*Microdipodops pallidus*) and dark kangaroo mice (*Microdipodops megacephalus*) are BLM special status species in Nevada and Protected Mammals under NAC 503. The dark kangaroo mouse prefers xeric habitats containing loose, friable (meaning exhibiting a crumbly texture) sandy soils (Hafner et al. 1998) associated with shadscale (*Atriplex confertifolia*), rabbitbrush (*Chrysothamnus* spp.), horsebrush (*Tetradymia* spp.), and sagebrush (*Artemisia* spp.) communities (NatureServe 2021) that have an abundance of Indian ricegrass, as noted by Great Basin Ecology (GBE 2016). They typically occur in sandy habitats below elevations where pinyon-juniper occur and above communities of greasewood and saltbrush (Hafner and Upham 2011).

The pale kangaroo mouse is a more highly specialized sand-obligate compared to the dark kangaroo mouse. The pale kangaroo mouse is restricted to habitats with fine, windblown, sandy soils with little or no gravelly overlay; associated with alkali sink and desert scrub; and dominated by shadscale, saltbush, greasewood or big sagebrush (*Artemisia tridentata*) (BLM 2019a). Additionally, the pale kangaroo mouse typically occurs at lower elevations than the dark kangaroo mouse (Hafner and Upham 2011).

Both species primarily forage on seeds and insects (NatureServe 2021; Roach 2016). The NDOW WAP suggests that disturbances such as fire, invasive species, human disturbance and improper livestock grazing decrease habitat suitability (Wildlife Action Plan Team 2012). A desktop assessment and field surveys were conducted within the Project Area, which includes the Project footprint plus a 200-foot-wide buffer of the centerline (400-foot survey area), as shown on Figure 2-1 through Figure 2-9.

3.4.9.2. Study Methodology

A desktop assessment using the USGS GAP modeled habitat layer for kangaroo mouse, SWReGAP, NRCS SSURGO, and NDNH was conducted to identify areas with the most suitable potential habitat.

The following protocols were used in this survey:

- *Statewide Wildlife Survey Protocols* (BLM 2014b)
- *Kangaroo Mouse Survey Protocol for the Barrick Cortez Inc. Plan of Operations* (GBE 2016)

Pedestrian field surveys were conducted throughout the Project Area from May 24 through July 30, 2021. Surveys consisted of single transects within the entirety of the Project right-of-way and meandering transects within the borrow sources, access roads, and depots locations. The survey team scanned each side of the pedestrian transect for potential burrows or kangaroo mouse tracks and focused on habitat consisting of soils with a high sand or sand gravel component (over 12-inches of depth to a restrictive layer) and suitable vegetation. All survey tracks were recorded, and geo-referenced photos were taken for any signs of kangaroo mice, including scat, tracks, or potential burrows. Observations regarding the habitat (e.g., soil types, adjacent vegetation) were also recorded for each burrow site.

3.4.9.3. Results and Discussion

Field surveys were conducted in areas identified during desktop assessment as having potential habitat for kangaroo mouse, covering 178 transect miles over the Project Area (Table 3.4.9-1). Most areas surveyed offered only limited potential habitat for kangaroo mouse, as shown on Figure 3.4.9-1 through Figure 3.4.9-5. Three locations, each within the Crescent Valley Survey Area, were identified as having the greatest potential habitat for kangaroo mouse in the Project Area (Figure 3.4.9-4 and Figure 3.4.9-5). A summary of the desktop review findings and field survey observations for each survey area is discussed below. No kangaroo mice were observed during 2021 field surveys; however, potential habitat was identified and, therefore, there is potential for this species to occur in the Project Area. Trapping will be conducted in 2022 in the areas identified as the greatest habitat potential for kangaroo mouse. Survey tracks and

photographs from the field surveys within each of the survey areas is presented in Appendix D.6.

Table 3.4.9-1 Kangaroo Mouse Habitat Potential in the Survey Areas

Survey Area	Site ID	Habitat Type
Goldstrike Area	Boulder Valley	Limited Suitable Habitat
	Boulder Valley North	Limited Suitable Habitat
	Boulder Playa	Not Suitable Habitat
	Boulder South	Not Suitable Habitat
Carlin	Carlin North Loop	Limited Suitable Habitat
	Carlin North Washes	Limited Suitable Habitat
	Carlin North 1	Not Suitable Habitat
	Carlin North 2	Not Suitable Habitat
	Carlin South	Not Suitable Habitat
Crescent Valley	Crescent Playa Margin 1	GHP
	Crescent Playa Margin 2	GHP
	Cortez Foothills North	GHP
	Crescent Valley North	Limited Suitable Habitat
	Cortez Foothills South	Limited Suitable Habitat
	Crescent Playa 1	Not Suitable Habitat
	Crescent Playa 2	Not Suitable Habitat

GHP = Greatest Habitat Potential; ID = identification

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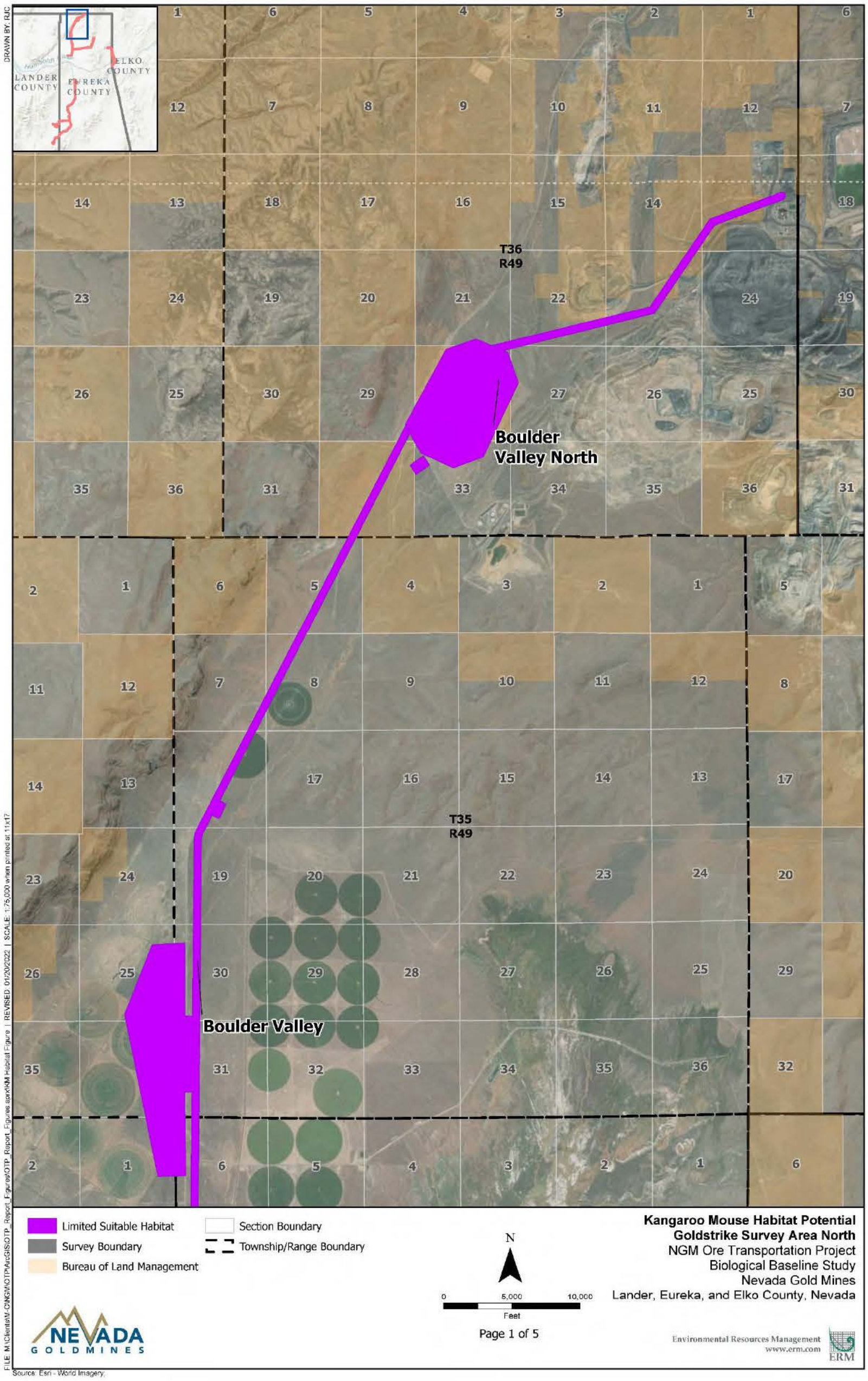


Figure 3.4.9-1: Kangaroo Mouse Habitat Potential—Goldstrike Survey Area North

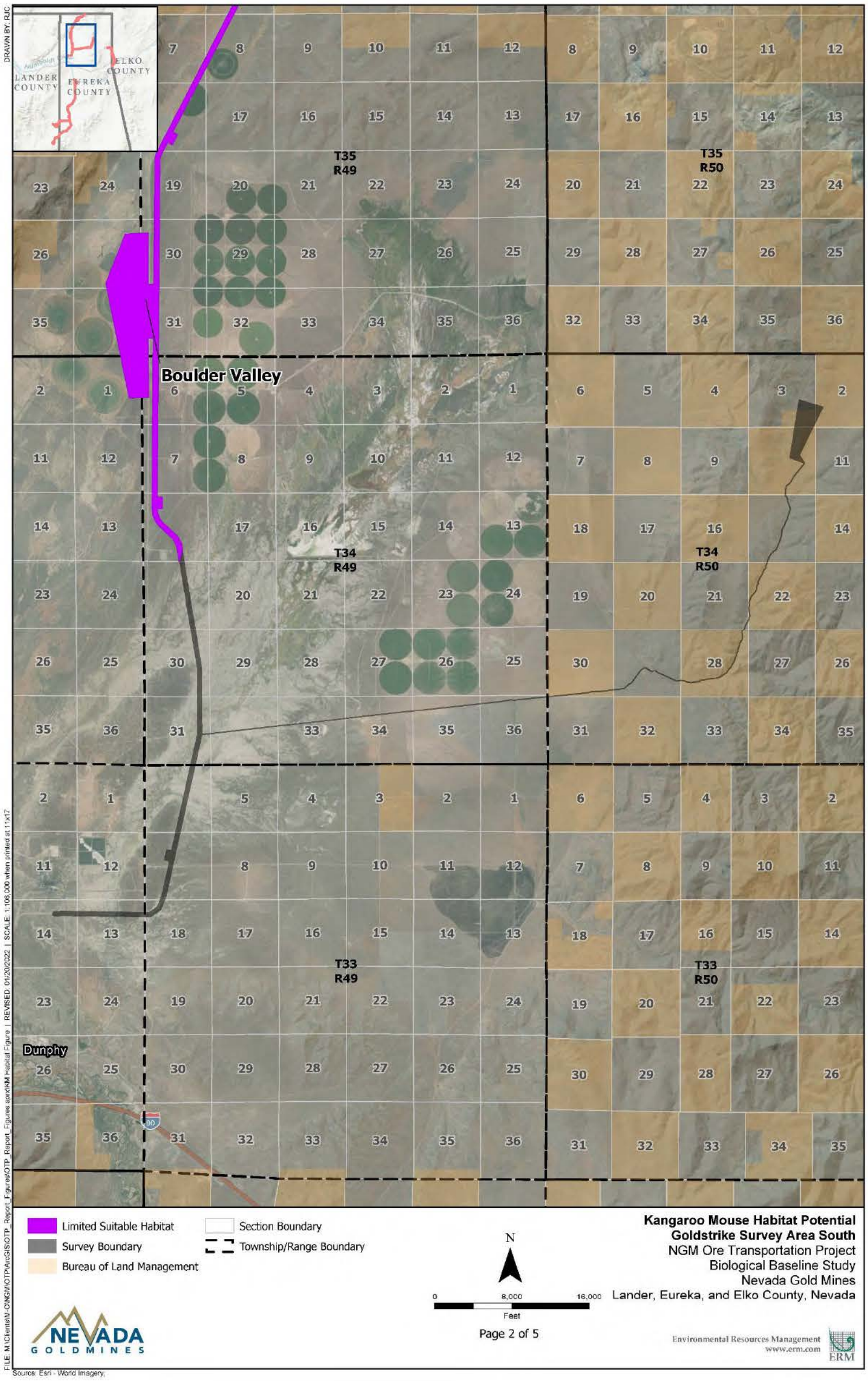


Figure 3.4.9-2: Kangaroo Mouse Habitat Potential—Goldstrike Survey Area South

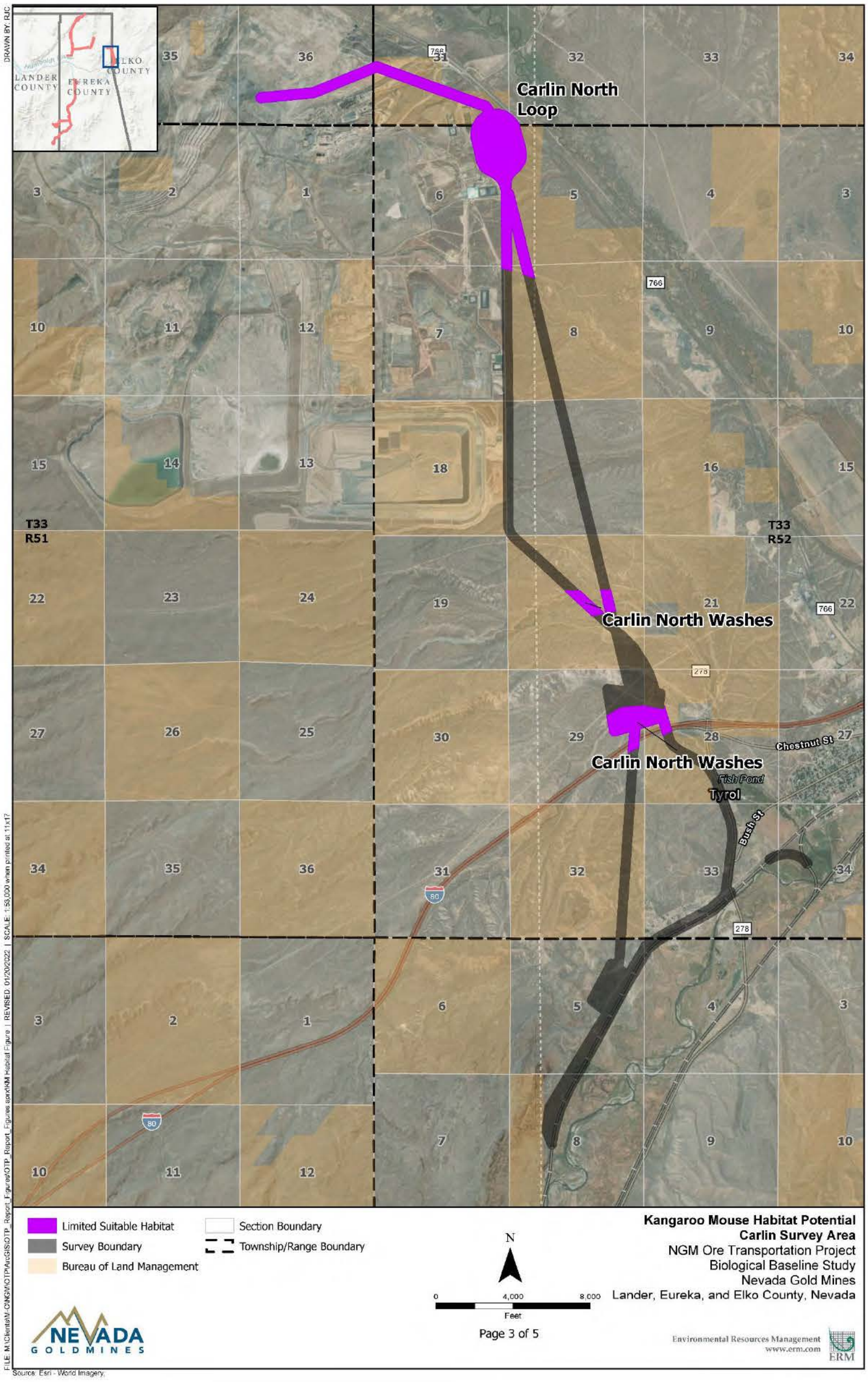


Figure 3.4.9-3: Kangaroo Mouse Habitat Potential—Carlin Survey Area

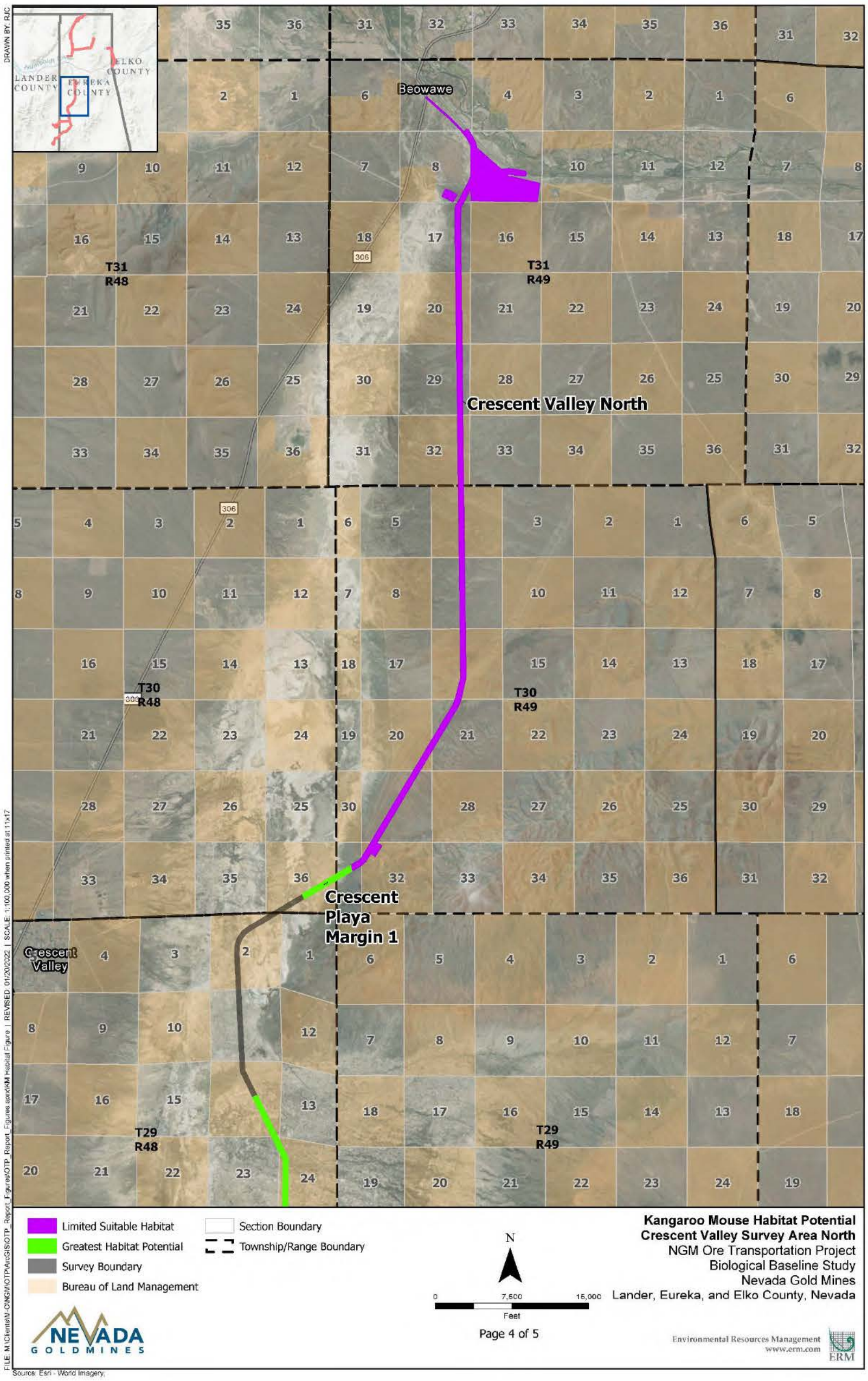


Figure 3.4.9-4: Kangaroo Mouse Habitat Potential—Crescent Valley Survey Area North

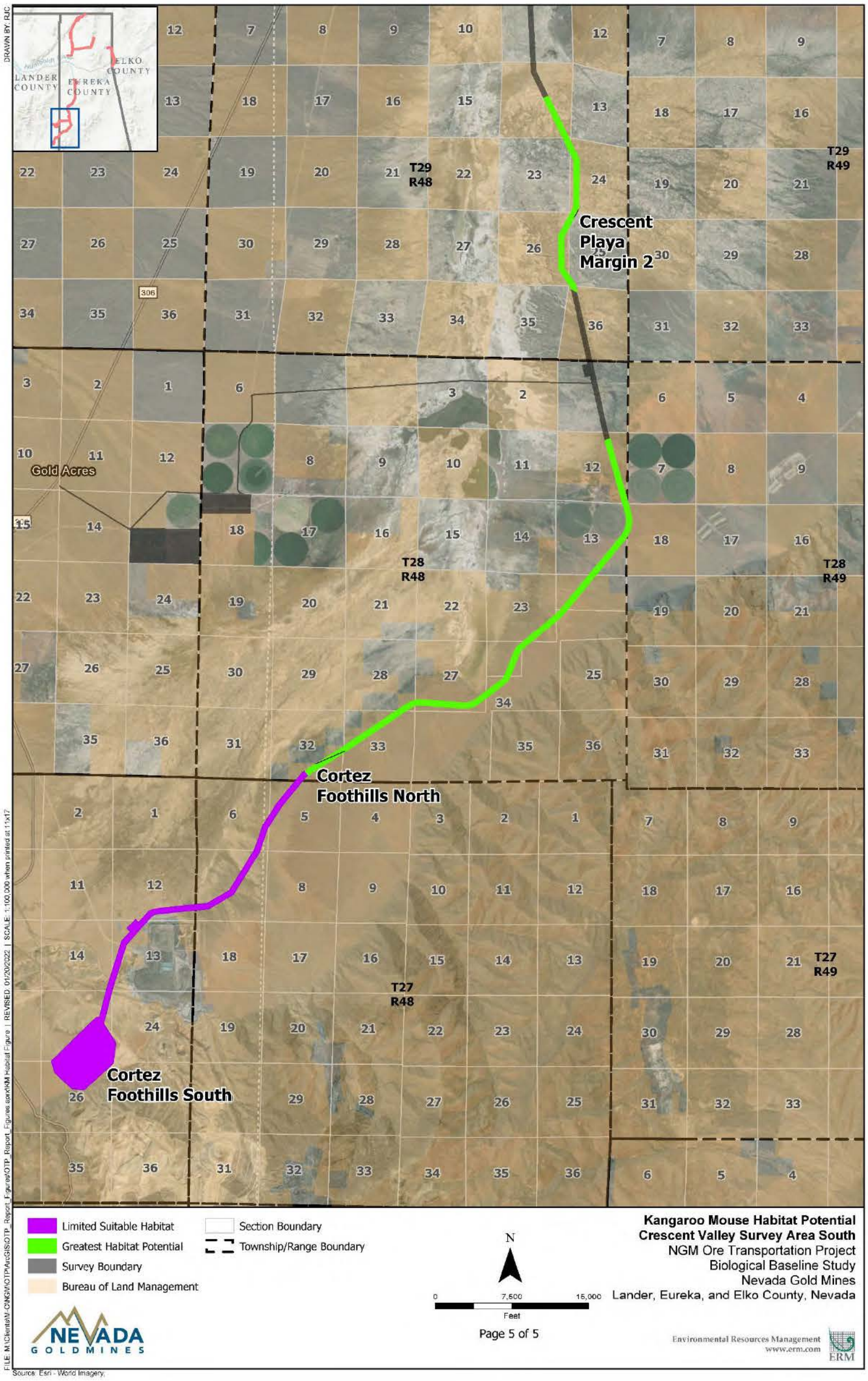


Figure 3.4.9-5: Kangaroo Mouse Habitat Potential—Crescent Valley Survey Area South

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Goldstrike Survey Area

Suitable habitat for kangaroo mouse in the Goldstrike Survey Area was very limited. No suitable habitat was identified in either the Boulder South or Boulder Playa areas. Some small mammal burrows were observed in both of these areas; however, vegetative and soil characteristics do not provide preferred foraging or habitat conditions required by kangaroo mouse. Surveys in Boulder South documented both grazing and a high abundance of weeds, with silty and saturated soils. Observations of the Boulder Playa Area suggest it is prone to flooding in most years, and preferred forage species of kangaroo mouse were not common.

The Boulder Valley and Boulder Valley North areas had only limited areas of suitable habitat. The Boulder Valley Area continues to undergo impacts from the 2017 Rooster Comb Fire, which has led to a dominance of weedy species in some areas and reduced cover by preferred forage species throughout. Evidence of heavy grazing was also observed on the west side of the Boulder Valley area. The soils in Boulder Valley are silty with some gravel.

Survey of the Boulder Valley North area documented silty soils and a dominance of grassy vegetation, with impacts from the 2017 Rooster Comb Fire still evident. Biologists evaluating this area recorded fair habitat conditions to the northeast portion.

Carlin Survey Area

Field surveys of the Carlin Survey Area documented limited areas of potential suitable habitat. No suitable habitat was identified in surveys of Carlin South, Carlin North 1, or Carlin North 2. Compacted, silty soils and heavy grazing activities were characteristic of each of these locations. The washes in the northern area of Carlin and the Carlin loading/unloading loop contain limited suitable habitat for kangaroo mouse. Soils near the washes have higher concentrations of sand and small gravel, and in both locations, grasses were abundant and multiple kangaroo rat burrows were observed. However, these areas were restricted to the locations of bottom washes.

Crescent Valley Survey Area

The greatest potential habitat for kangaroo mouse in the Project Area was documented within the Crescent Valley Survey Area in three general locations: Crescent Playa Margin 1, Crescent Playa Margin 2, and the Cortez Foothills North (Figure 3.4.9-5). In other locations of Crescent Valley, only limited areas of suitable habitat were observed, including Crescent Valley North, Crescent Playa 1, Crescent Playa 2, and Cortez Foothills South.

Locations with the greatest potential habitat for kangaroo mouse were observed in Cortez Crescent Playa Margin 1, Crescent Playa Margin 2, and Cortez Foothills North. Soils in these locations were generally sandy and friable, with relatively larger areas with forage grass species. Grazing impacts, though observed, were limited. Although numerous small mammal burrows were observed in each of the survey locations, there were no kangaroo mice observed during the surveys.

Surveys at Crescent Valley North documented abundant weed species and silty soils, though some isolated locations of Indian Ricegrass were observed. Overall, this location offered very minimal habitat for kangaroo mouse. Crescent Playa 1 and Crescent Playa 2 areas supported silty soils and a lack of preferred forage species. Both areas are also prone to flooding, as standing water and saturated soils were common observations in both locations. Cortez Foothills South had similar characteristics as Crescent Playa 1 and Crescent Playa 2 sites, but evidence of grazing was also observed. Within the Cortez Foothills South area, greasewood, rabbitbrush, and sagebrush species were documented but were found only in isolated and relatively small areas. Overall, this location has only limited habitat for kangaroo mouse (result of significantly degraded range conditions) and only pockets of preferred habitat conditions.

3.4.10. Bats

3.4.10.1. Background

A total of 16 bat species on lands administered by the Battle Mountain and Elko Field offices are designated as BLM special status species (BLM 2017b, 2019a). Of these, one species, the spotted bat (*Euderma maculatum*), is listed as state-threatened under NAC 503. Additionally, BLM special status species are listed as species of conservation priority by the Wildlife Action Plan Team (2012) and/or as Nevada protected or sensitive species under NAC 503 (NDNH 2021). Bats in the Project Area are those associated with the habitats described in Section 3.4.1, Wildlife Habitat. Particularly, WAP key habitats within the Project Area (see Table 3.4.1-1) including Cliffs and Canyons as well as Lower Montane Woodlands and Chaparral may provide roosting sites for bats, and waterbodies (i.e, desert playas and ephemeral ponds; intermountain rivers and streams; lakes and reservoirs; and marshes) may provide foraging and drinking opportunities for bats. The Grasslands and Meadows WAP key habitat found within the Project Area may also provide foraging habitat for bats. In general, wetland habitats produce insect prey for foraging bats while structures associated with woodlands may provide roosting opportunities (Williams et al. 2006).

The purpose of the bat surveys, which included a desktop assessment and acoustic field surveys, is to assess the potential occurrence of these special status bat species within the Project Area based on habitat suitability and acoustic findings (e.g., presence/probable absence) in order to evaluate future Project impacts to these species and their habitats.

3.4.10.2. Study Methodology

Methods included an assessment of which bat species may be present by conducting literature and desktop reviews, and field surveys using bat automated recording units. A survey of recorded bat echolocation calls was conducted to determine species presence.

Acoustic Survey

Acoustic field surveys were conducted to determine the bat species that may be present within the Project Area. The survey area for bat acoustic surveys encompassed the Project footprint plus up to a 0.25-mile buffer, including borrow sources, access roads, and depots locations. Bat

survey data locations were selected based on coordination with BLM. Survey data locations included detector sites within Carlin, Crescent Valley, and Goldstrike survey areas (see Figure 3.4.10-1 through Figure 3.4.10-3).

The following protocol was used in this survey:

- *Passive Acoustic Monitoring Protocol for Bat Species in Northern Nevada* (Helmig and Martin 2020)

Full spectrum bat acoustic detectors, specifically Wildlife Acoustics ® SM4 FS and Song Meter Mini using Wildlife Acoustics® SMM-U1 or SMM-U2 microphones, were deployed during three survey events in May 2021, July/August 2021, and September 2021. Site selection was based on criteria outlined in Helmig and Martin (2020) and Loeb et al. (2015); detectors were deployed in areas providing the greatest opportunity to detect a diversity of bat species (e.g., placed near a water source and/or foraging area). Survey locations were selected based on their potential as foraging habitat and/or suitable roosting habitat. Potential foraging habitat, which includes the presence of riparian areas and areas that attract flying insects, was considered and selected where possible, as shown in Table 3.4.10-1. Figures showing the location of the acoustic survey sites and SWreGAP land cover are included in Appendix D.7, Figures 7-1 through Figure 7-15.

Bat detector microphones were elevated at each survey location and ranged from 2 to 4 meters above ground. Microphone height varied based on weather patterns (e.g., microphones were placed at 2 meters above ground during high wind nights). Acoustic survey data sheets providing additional detail regarding site information (e.g., GIS coordinates; setup and removal weather conditions; and land use) and detector information (e.g., make, model, and microphone information), including photos of the acoustic survey locations, are included in Appendix D.7.4.

Field surveys were conducted during three separate events. The first survey period was conducted in May (beginning on May 18, 2021), the second in July (beginning on July 19, 2021), and the third in late September (beginning on September 20, 2021). The detectors were programmed to record from 30 minutes before sunset to 30 minutes after sunrise for a minimum of six consecutive nights during each survey event. If weather conditions were not favorable to bat activity (i.e., rain, wind, or low temperatures), detectors remained deployed until a minimum of six consecutive nights of optimal weather conditions were observed. Data from each detector location was recorded following established protocols and survey forms (Helmig and Martin 2020) and is included in Appendix D.7.4.

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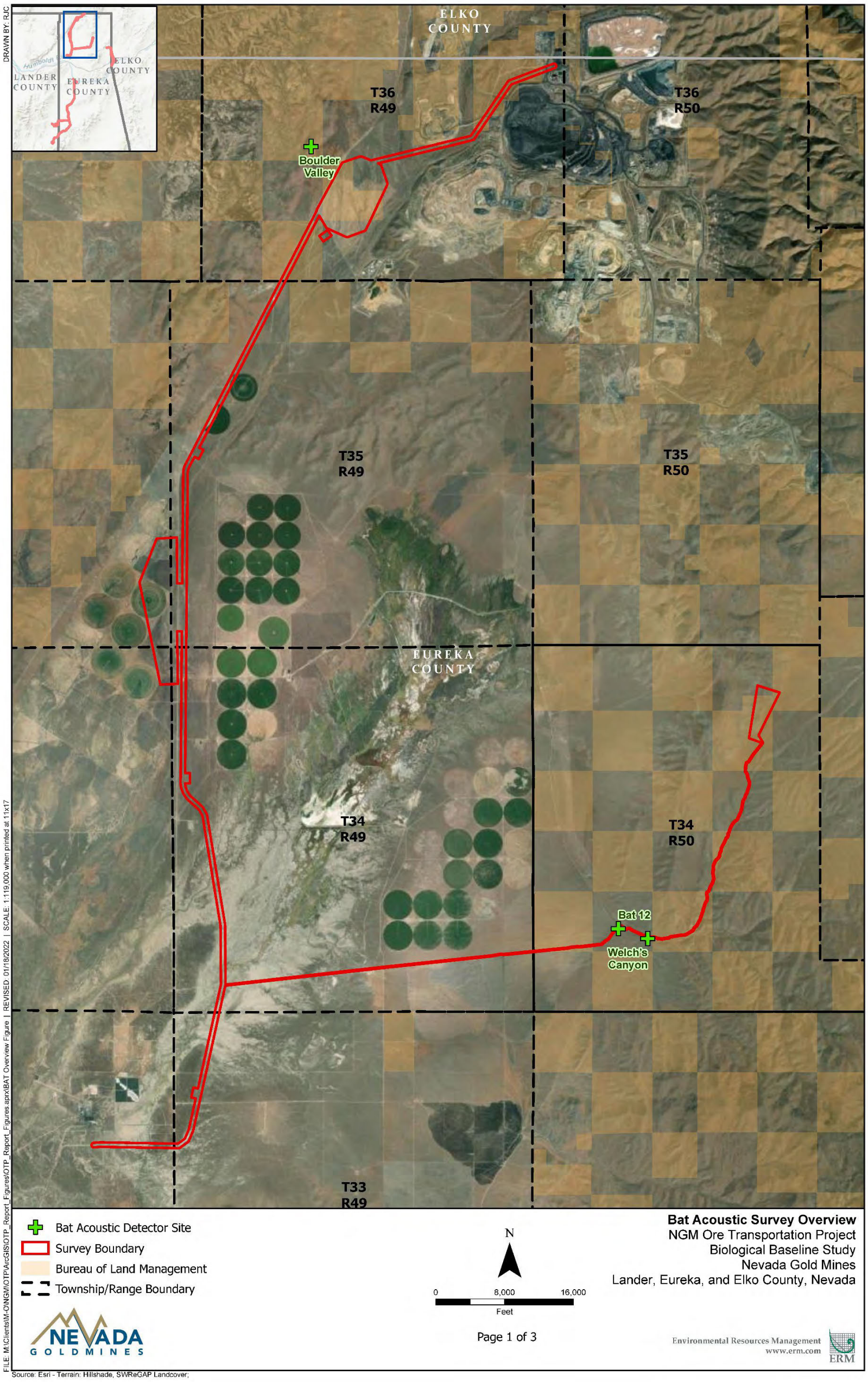


Figure 3.4.10-1: Bat Acoustic Survey Overview—Goldstrike Survey Area

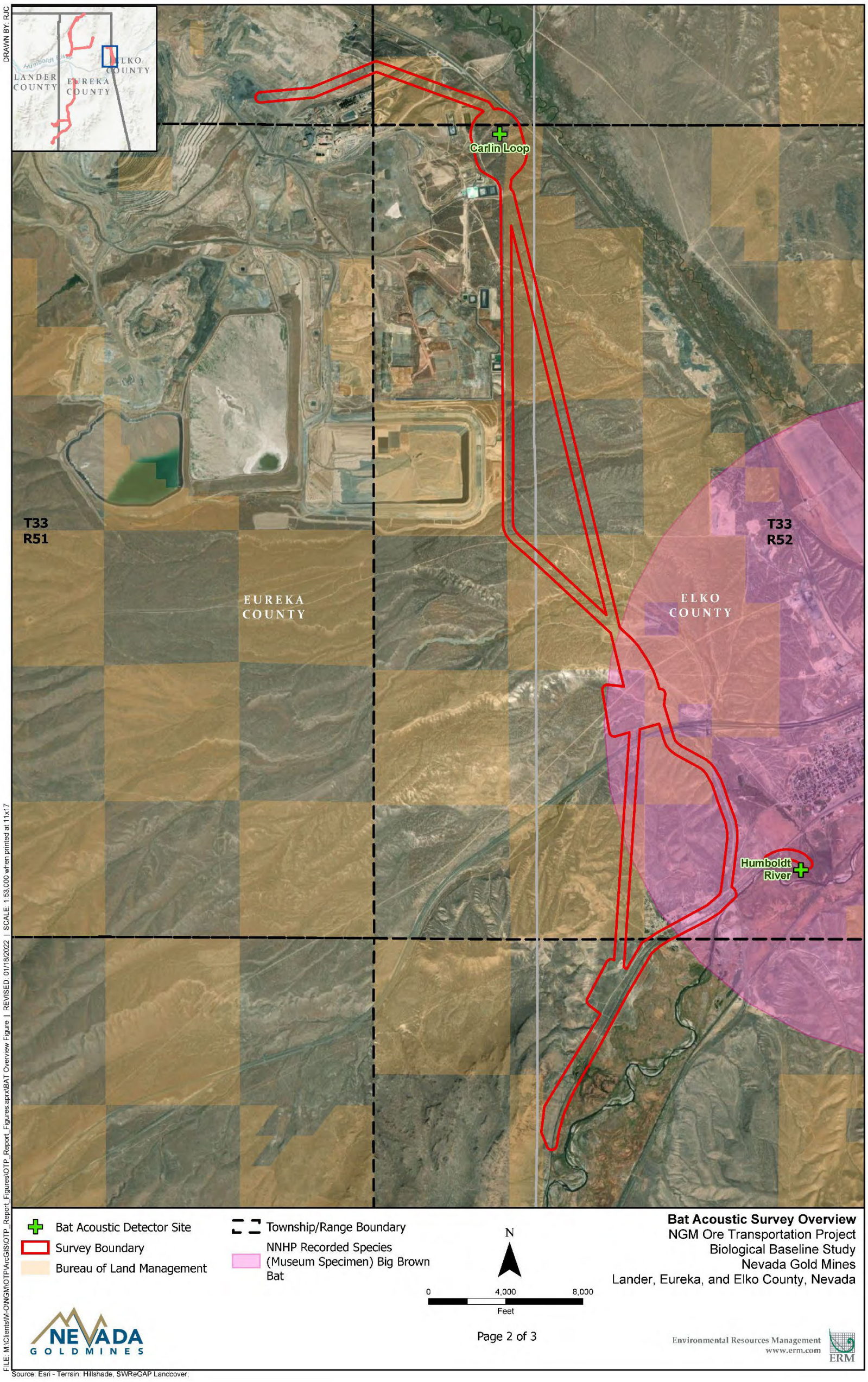


Figure 3.4.10-2: Bat Acoustic Survey Overview—Carlin Survey Area

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Table 3.4.10-1. Survey Location Selection Criteria

Project Area/ Detector Site	Potential Suitable Foraging Habitat	Potential Suitable Roosting Habitat	Habitat Assessment [a]
Goldstrike			
Bat 12	X		Grazed pasture near Welch's Canyon
Boulder Valley		X	Grassy canyon with exposed rock face
Welch's Canyon	X		Shrubland with perennial stream and nearby woodland
Carlin			
Carlin Loop	X		Open shrubland
Humboldt River	X	X	Riparian woodland and shrubland vegetation
Crescent Valley			
Bat 1	X		Shrubland with desert scrub
Beowawe East	X		Riparian shrubland
Beowawe West	X	X	Shrubland vegetation and riparian woodland
Dean Ranch	X	X	Small woodland adjacent to stock tanks and water sources
DR Pivots	X		Emergent wetland marsh with shrubland/forbland vegetation
Hot Springs East	X	X	Primary successional grassland adjacent to exposed rocky outcrops
Hot Springs West	X		Open shrubland on playa edge with possible ephemeral wetland habitat
Playa North	X		Ephemeral wetland on playa edge
Playa South	X		Open shrubland on playa edge with ephemeral wetland habitat
Thomas Creek	X		Playa/shrubland with ephemeral wetland habitat

[a] See Appendix D.7 for figures showing the location of the acoustic survey sites and SWreGAP land cover.

Acoustic Analysis of Bat Calls

Acoustic survey data (sonogram files) was processed using the software program Kaleidoscope Pro, version 5.4.2 (Wildlife Acoustics 2021). The call library used was version 5.1.0, and files were processed on the "0 Balanced (Neutral)" setting. Other signal parameters were left at default settings. Kaleidoscope Pro has a built-in call library for North American species, which runs auto-ID on recorded calls, based on clustering analyses. Auto-ID is a first step of analysis and provides likely occurrences, reducing manual analysis time. While Auto-ID is both efficient and generally accurate, variation in recording quality and overlap in species calls requires additional manual review to assess confidence in species presence. Bat call analysis was conducted with the Auto-ID for bats using the Nevada Bats of North America 5.4.0 version.

Several challenges are present in identifying bat species by echolocation calls. While foraging, bats emit calls with different frequencies (in kilohertz) and durations (in milliseconds). These are separated into three phases: search, approach, and feeding buzz (also called terminal phase [Murray et al. 2001]). Search-phase calls tend to be spaced apart from one another and are relatively consistent within species. Approach-phase and feeding buzz calls are emitted progressively closer to one another, as the bat identifies and targets the prey item; however, these calls vary greatly within species and even within individuals, so are not considered a good diagnostic for species identification (Simmons, Fenton, and O'Farrell 1979; Fenton and Bell 1981). Even with clear search-phase calls recorded, reliable differentiation between species can be challenging. In particular, several species in the genus *Myotis* have overlapping characteristics of echolocation calls around the 40 kilohertz frequency range (Maxell et al. 2015). Additionally, big brown bats (*Eptesicus fuscus*) and silver-haired bats (*Lasionycteris noctivagans*) have very similar call characteristics and are not always possible to identify to species (Maxell et al. 2015). However, other species contain less overlap and can be identified with greater confidence (e.g., spotted bat, which produces very low frequency calls).

Kaleidoscope Pro's automated results were the starting point for analysis; the results were then reviewed and interpreted by an experienced bat biologist familiar with western bat species and experienced in acoustic analysis of bat calls and the identification of bat species by acoustic characteristics. To confirm presence of each potential species identified by Kaleidoscope Pro, the bat biologist reviewed or vetted a subset of files identified to each species. The bat biologist also reviewed files classified as "NoID" and "Noise" files, with a focus on identifying low intensity files with characteristic call features.

Although there are inherent limitations to acoustic analysis (see Section 1.1.1 in Helmig and Martin 2020), the goal of manual bat call review or vetting was to identify the strongest call types and assess likely presence of species along the Project Area. Calls were not identified to species unless they contained clear pulses indicative of search phase behavior. Presence of species was determined according to confidence levels and assigned a rank of high, medium, or low. Rankings were defined based on the following criteria:

- **High confidence** in presence was assigned to species identified in multiple clear recordings, which included diagnostic characteristics for species identification

(e.g., presence of harmonics or pronounced inflections in call). In some cases, if diagnostic features are unique (e.g., upward hook for Townsend's big-eared bat [*Corynorhinus townsendii*]), a lower number of files or lower quality of call files may lead to high confidence.

- **Medium confidence** in presence was assigned to species where manual review found some evidence to suggest a particular species, including diagnostic characteristics for species identification; however, confidence was limited due to low number of files, poor quality of files, and/or the defining characteristics present overlapped multiple species.
- **Low confidence** in presence was assigned to species where manual review found little evidence for species identification, including the review of only one bat file; high degree of overlap between multiple species; and/or low quality or "quiet" calls.
- **Not likely present** was assigned to species where manual review found no evidence to support the species identification made by the automated program. This includes files where Kaleidoscope Pro made clear misidentifications (false positives), and files where no portion of the call files identified contained search phase behavior.

All acoustic file data is retained by the Project and can be provided to BLM upon request.

3.4.10.3. Pre-Field Assessment

A desktop review identified known and potential bat habitats within 0.25 mile of the Project Area. This review included USGS, BLM, NDOW, NHD, NWI, and NDNH data. Specifically, potential bat species within the Project Area were determined based on reviews of NDOW's species accounts for mammals and the Revised Nevada Bat Conservation Plan (Bradley et al. 2006), as well as communications with the BLM (BLM 2017b, 2019a). Known and historical locations of special status bat species were provided by the BLM and NDNH. The desktop review focused on potential bat hibernacula (abandoned mine lands, shafts, or caves), identification of forested areas with suitability for roosting or foraging, and identification of water features.

Evaluation of Species Presence

Table 3.4.10-2 lists the bat species, associated habitat that may be present within the Project Area, and likelihood of occurrence based on species ranges, available habitat, and known and/or historical record of occurrence. This list was used as the potential species list for identifying recorded bat calls.

An overview map with the locations of known special status bat occurrences is shown in Figure 3.4.10-1 through Figure 3.4.10-3.

Table 3.4.10-2: Potential Bat Species within the Project Area

Species	Agency Status	Habitat	Likelihood of Occurrence [a]
Big brown bat (*Eptesicus fuscus*)	BLM NV Sensitive	Caves and Mines, Cliffs and Canyons, Developed Landscapes, Agricultural Lands, Woodlands and Riparian Areas	Likely; Records document species overlapping Carlin and Humboldt River acoustic detector site
Fringed myotis (*Myotis thysanodes*)	BLM NV Sensitive; NDOW State Protected	Sagebrush, Aspen, Lower Montane Woodlands and Chaparral, Cliffs and Canyons, Caves and Mines, Developed Landscapes	Possible
Hoary bat (*Lasiurus cinereus*)	BLM NV Sensitive	Intermountain Riparian, Warm Desert Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands	Possible
California myotis (*Myotis californicus*)	BLM NV Sensitive	Salt Desert Scrub, Woodlands and Riparian Areas, Caves and Mines, Cliff and Canyons	Likely; Records document species west of Beowawe West and south of Dean Ranch acoustic detector sites, respectively
Little brown myotis (*Myotis lucifugus*)	BLM NV Sensitive	Intermountain Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands, Caves and Mines, Cliffs and Canyons, Developed Landscapes	Possible
Long-eared myotis (*Myotis evotis*)	BLM NV Sensitive	Aspen, Intermountain Coniferous Forests and Woodlands, Lower Montane Woodlands and Chaparral, Caves and Mines	Likely; Records document species captured during mist net surveys south of Dean Ranch acoustic detector site
Long-legged myotis (*Myotis volans*)	BLM NV Sensitive	Montane Coniferous Forest, Salt Desert Scrub, Sagebrush	Possible
Yuma myotis (*Myotis yumanensis*)	BLM NV Sensitive	Caves and Mines, Cliffs and Canyons, Developed Landscapes, Agricultural Lands, Woodlands and Riparian Areas	Possible
Canyon bat (*Parastrellus hesperus*)	BLM NV Sensitive	Salt Desert Scrub, Sagebrush, Caves and Mines, Cliffs and Canyons	Likely; Records document species detected during acoustic surveys south of Dean Ranch acoustic detector site
Brazilian (Mexican) free-tailed bat (*Tadarida brasiliensis*)	BLM NV Sensitive; NDOW State Protected	Warm Desert Riparian, Intermountain Riparian, Lower Montane Woodlands, Aspen, Intermountain Coniferous Forest, Cliffs and Canyons, Caves and Mines, Developed Landscapes	Possible
Silver-haired bat (*Lasionycteris noctivagans*)	BLM NV Sensitive	Intermountain Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands	Likely; Records document species detected during acoustic surveys south of Dean Ranch acoustic detector site

Species	Agency Status	Habitat	Likelihood of Occurrence [a]
Spotted bat (*Euderma maculatum*)	BLM NV Sensitive; NDOW State Threatened	Intermountain Riparian, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forest and Woodlands, Cliffs and Canyons, Caves and Mines, Developed Landscapes	Possible
Western red bat (*Lasiurus blossevillii*)	BLM NV Sensitive; NDOW State Sensitive	Wooded Riparian, particularly cottonwood/willow or mesquite bosque	Possible
Pallid bat (*Antrozous pallidus*)	BLM NV Sensitive; NDOW State Protected	Salt Desert Shrub, Sagebrush, Caves and Mines, Cliffs and Canyons Woodlands and Riparian Areas,	Likely; BLM records documented at Mill Canyon in 2018
Townsend's big-eared bat (*Corynorhinus townsendii*)	BLM NV Sensitive; NDOW State Sensitive	Lower Montane Woodlands and Chaparral, Caves and Mines	Likely; Records document species, including maternity colony west of Beowawe West and hibernaculum west of Dean Ranch acoustic detector sites, respectively
Western small-footed myotis (*Myotis ciliolabrum*)	BLM NV Sensitive	Salt Desert Shrub, Sagebrush, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forest, Cliffs and Canyons, Caves and Mines, Developed Landscapes, Agricultural Lands	Likely; Records document species west of Beowawe West acoustic detector site

Source: BCI 2021; BLM 2019a; Keinath 2003; NAC 503; NDNH 2021; NDOW 2021d; Wildlife Action Plan Team 2012

[a] Desktop assessment included review of all records; some records are historical (e.g., big brown bat records are from 1912), and some of these species may no longer be present within the Project Area. However, bat surveys are not common and therefore, for the purpose of this table, any record of presence is assumed to indicate likely presence.

3.4.10.4. Results and Discussion

Echolocation calls were recorded on bat acoustic detectors at 15 survey locations within the Project Area between May and September 2021. Two acoustic detector sites, Bat 1 and Bat 12, were only operational for the May deployment as a result of discussions with the BLM in June regarding bat acoustic detector locations. After the May deployment, the bat detector placed at Bat 12 was moved approximately 0.5 mile away to detector site Welch's Canyon, which was deployed and operational for dates in late-July/early August and September. Additionally, detectors were not deployed and operational at Humboldt River and Boulder Valley sites in May, but as a result of discussions with the BLM, were deployed and operational early July and subsequent dates in late-July/early August and September. Acoustic detectors were set at each site for a minimum of six consecutive nights of surveying. Erroneous noise files that did not represent bat activity were removed. Dean Ranch had the majority of recorded activity for each deployment period (i.e., May, July/August, and September), with over 3,000 files recorded in July/August. Hot Springs West and Hot Springs East typically recorded the fewest files for each deployment period, which included less than 20 files per acoustic detector and deployment (Appendix D-7, Table D.7-1).

Acoustic Survey of Bat Calls

Results from the Kaleidoscope Pro Auto-ID suggested potential presence of all bat species of special concern, with the exception of the spotted bat. A total of 6,543 files were identified to species, with the largest portion of identified files (1,379 call files, approximately 21.1 percent) identified as Brazilian (Mexican) free-tailed bat (*Tadarida brasiliensis*). The next most common species was hoary bat (*Lasiurus cinereus*), with 963 files (approximately 14.7 percent), followed closely by the long-legged myotis (*Myotis volans*), with 957 files (approximately 14.6 percent). Additional files were identified as follows:

- Little brown bat (*Myotis lucifugus*) *n*=904, 13.8 percent
- Western small-footed myotis (*Myotis ciliolabrum*) *n*=781, 11.9 percent
- Silver-haired bat (*Lasionycteris noctivagans*) *n*=644, 9.8 percent
- Big brown bat (*Eptesicus fuscus*) *n*=306, 4.7 percent
- Townsend's big-eared bat (*Corynorhinus townsendii*) *n*=187, 2.9 percent
- Long-eared myotis (*Myotis evotis*) *n*=136, 2.1 percent
- Canyon bat (*Parastrellus hesperus*) *n*=49, 0.7 percent
- Yuma myotis (*Myotis yumanensis*) *n*=46, 0.7 percent
- Cave myotis (*Myotis velifer*) *n*=46, 0.7 percent
- California myotis (*Myotis californicus*) *n*=45, 0.7 percent
- Pallid bat (*Antrozous pallidus*) *n*=40, 0.6 percent
- Western red bat (*Lasiurus blossevillii*) *n*=40, 0.6 percent
- Fringed myotis (*Myotis thysanodes*) *n*=8, 0.1 percent
- Western mastiff bat (*Eumops perotis californicus*) *n*=8, 0.1 percent
- Western yellow bat (*Lasiurus xanthinus*) *n*=2, <0.1 percent
- Big free-tailed bat (*Nyctinomops macrotis*) *n*=2, <0.1 percent

See Appendix D-7, Tables D.7-1 through D.7-13, for results of the Kaleidoscope Pro Auto-ID.

Based on manual vetting, bat calls were identified with high, medium, or low confidence for potential bat species of concern within the Project Area, with the exception of the spotted bat, which was not identified through the Kaleidoscope Pro Auto-ID or through manual vetting (see Table 3.4.10-3; and Appendix D-7, Table D.7-14).

Manual vetting confirmed with high confidence the presence of eleven species of special concern. Appendix D-7, Figure 7-1 through Figure 7-15, includes confirmed bat species detections based on high confidence for each acoustic detector site. Additional species including long-legged myotis, California myotis, and pallid bat were verified with medium confidence (Table 3.4.10-3). Multiple clear calls were identified to species, and diagnostic features were present that allowed for confidence in identification (Appendix D.7.3). Overall, there was high confidence in hoary bat presence among all three survey areas (Goldstrike, Carlin, and Crescent Valley) and nearly all bat acoustic detector sites, with the exception of Bat 1. There was medium to high confidence in silver-haired bat presence among all survey areas and bat acoustic detector sites, with the exception of Bat 1 and Hot Springs West.

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Bats were detected at all sites, but most commonly detected in the southwest portion of the Project Area, specifically within the Crescent Valley Survey Area. Numerous bat species within the Crescent Valley Survey Area were identified with medium to high confidence including Townsend's big-eared bat (medium and high confidence) and pallid bat (medium confidence only) (Table 3.4.10-3). These species, including hibernaculum for Townsend's big-eared bat, have previously been documented west of the Crescent Valley Survey Area, and acoustic results support species presence within the Crescent Valley Survey Area.

There is a diversity of bat species present, with recorded calls suggesting at least 15 special status species. Numerous species not documented in known occurrence data, but with the potential to occur within the Project Area (Table 3.4.10-1), were confirmed present with medium to high confidence. *Myotis* species confirmed with high confidence included fringed myotis, little brown myotis, and Yuma myotis. Non-*Myotis* species that were confirmed with high confidence include Brazilian free-tailed bat, hoary bat, and western red bat.

3.4.11. Amphibians

3.4.11.1. Background

A total of five amphibian species on lands administered by the Battle Mountain and Elko field offices are designated as BLM special status species (BLM 2017b, 2019a). Of these, three species have the potential to occur in the Project Area, as shown in Table 3.4.11-1 (BLM 2017b, 2019a). Two species, the Columbia spotted frog, Great Basin population (*Rana luteiventris*) and the northern leopard frog (*Lithobates pipiens)* are listed as state-threatened under NAC 503. Additionally, BLM special status species are listed as species of conservation priority by the Wildlife Action Plan Team (2012) and/or as Nevada protected or sensitive species under NAC 503 (NDNH 2021).

A desktop assessment and field surveys were conducted to assess the potential occurrence of amphibian species within the Project Area, which includes the Project footprint plus a 200-foot buffer of the centerline (400-foot survey area), as shown on Figure 2-1 through Figure 2-9. The results from this survey will be used to inform the future NEPA to assess potential impacts to any individuals, communities, and/or habitats.

Table 3.4.11-1: Potential Amphibian Species within the Project Area

Species	Agency Status	Habitat	Likelihood of Occurrence
Columbia spotted frog (Great Basin population) (*Rana luteiventris*)	BLM Sensitive NDOW State Threatened	Intermountain Riparian, Wet Meadow, Springs and Springbrooks, Marshes, Lakes and Reservoirs. Closely associated with water, especially oxbow ponds, beaver ponds, and other deep pools with submerged or emergent vegetation	Possible

Species	Agency Status	Habitat	Likelihood of Occurrence
Northern leopard frog (*Lithobates pipiens*)	BLM Sensitive NDOW State Threatened	Marshes, Lakes and Reservoirs, Wet Meadow, Intermountain Riparian, Springs and Springbrooks; Breeding in marshes, ponds, or backwaters with foraging commonly occurring in nearby wet meadows	Possible
Western toad (*Anaxyrus boreas*)	BLM Sensitive NDOW State Sensitive Species	Lower Montane Woodlands, Intermountain Coniferous Forests and Woodlands, Intermountain Riparian, Aspen, Grasslands and Meadows, Springs and Springbrooks, Lakes and Reservoirs; Often associated with seasonal wetlands for breeding and nearby riparian and meadow habitat for foraging	Likely
Boreal toad (*Anaxyrus* nov. sp.)	BLM Sensitive	Wide variety of habitats including desert springs and streams, meadows, marshes, mountain wetlands and agricultural land. It is also known around ponds, lakes, reservoirs, and slow moving rivers and streams; undertake seasonal migrations to and from breeding sites	Not likely; Recent *Anaxyrus* new species limited to Nye County, and genetic analysis groups populations near the Project with western toad (above)
Amargosa toad (*Anaxyrus nelsoni*)	BLM Sensitive	Open, ponded or flowing water with riparian vegetative cover in erly to mid successional stage	Not likely; documented only from the Oasis Valley in southern Nevada

Source: BLM 2017b, 2019a; Wildlife Action Plan Team 2012

3.4.11.2. Study Methodology

A review of existing literature and data from BLM, USFWS, NDOW, and NDNH was conducted for potential occurrence of the species of concern within the Project Area. The desktop assessment used NHD, NWI, USGS, and SWReGAP data to identify target areas for conducting field surveys. Priority areas for surveys included seeps, springs, and wetlands with adequate vegetation. Transects were established along potential suitable habitat features based on the review and field observations during the wetland and waterbody surveys (see Section 2.2, Water Resources).

The following protocols were used and adapted to the Project Area as appropriate for this survey:

- *Instruction Manual and Frog Survey Protocols for Region 1 National Wildlife Refuges, East-side Zone (Great Basin and Great Northern LCCs)* (Rombough 2012)
- *Survey Protocol for the Northern Leopard Frog* (Kendell 2002)
- *Columbia Spotted Frog Visual Encounter Survey Protocol* (Hatch and Simandle 2004)

Amphibian field surveys were conducted in suitable habitat in July 2021 when tadpoles and adults were expected to be present. Biologists conducted a time-restrained visual encounter

survey in accordance with the protocols listed above. After noting location, start time, and surveyors, transect surveys were conducted for a minimum of 20 minutes through suitable habitat with emphasis on shorelines of streams, wetlands, and other habitat types most likely to support targeted amphibians. Observers looked under surface cover when present. The total time spent surveying, the total area searched, the number of individuals observed, and GPS locations and photographs were recorded at each of the surveyed locations.

3.4.11.3. Results and Discussion

Pre-Field Results

The presence of ranid frogs has been documented in the general Project vicinity since 1912, when the University of Michigan's Walker-Newcomb expedition to northeast Nevada collected paratypes of the Columbia spotted frog along Maggie Creek and several other streams and noted the presence of northern leopard frogs; both species were described as common (Thompson 1913). More recent studies documented continued presence of Columbia spotted frogs in upper Maggie Creek, over 2 miles upstream (northwest) of the Carlin Survey Area and at a somewhat higher elevation than the Project (NDOW 2015). There are three populations of Columbia spotted frogs in Nevada: Jarbidge-Independence Range, Ruby Mountains, and Toiyabe Mountains. The Carlin Survey Area is near the southern limit of the largest of these populations—the Jarbidge-Independence population. The Crescent Valley and Goldstrike survey areas do not overlap or approach any of these populations and are not within the known range of this species according to the recent species status assessment (USFWS 2015).

Historic northern leopard frog localities (specific documented occurrences) in northeast Nevada are mostly from 1911 to 1916 along or near the Humboldt River (AmphibiaWeb 2021; Rogers and Peacock 2012). In 2001, surveys were completed at historic northern leopard frog localities and additional areas of suitable habitat in eastern Nevada. During their survey, frogs were present at few locations, and the nearest extant northern leopard frog population was approximately 30 miles east of the Carlin Survey Area (Rogers and Peacock 2012). There have been no other nearby reports of northern leopard frogs since 1916 (AmphibiaWeb 2021), and most Nevada populations are thought to be extirpated (Rogers and Peacock 2012).

The western toad is widespread in the Great Basin region (Gordon 2020), and historical presence was documented in several areas in northern Eureka County, including as part of the Goldrush baseline survey in Lander and Eureka Counties (ERM 2018). The Goldrush baseline survey reported seven toads from three locations (ERM 2018). Older records are also documented in the Humboldt River floodplain (AmphibiaWeb 2021).

Field Results

Field surveys were completed along potential suitable habitat features identified during the wetland and waterbody surveys throughout the Project Area as shown on Figure 3.4.11-1 through Figure 3.4.11-3. The completed transects, waterbody type, linear feet surveyed, and observations for each survey area are shown in Table 3.4.11-2. One special status adult western toad was observed in a seasonal cattail-dominated wetland in the Carlin Survey Area

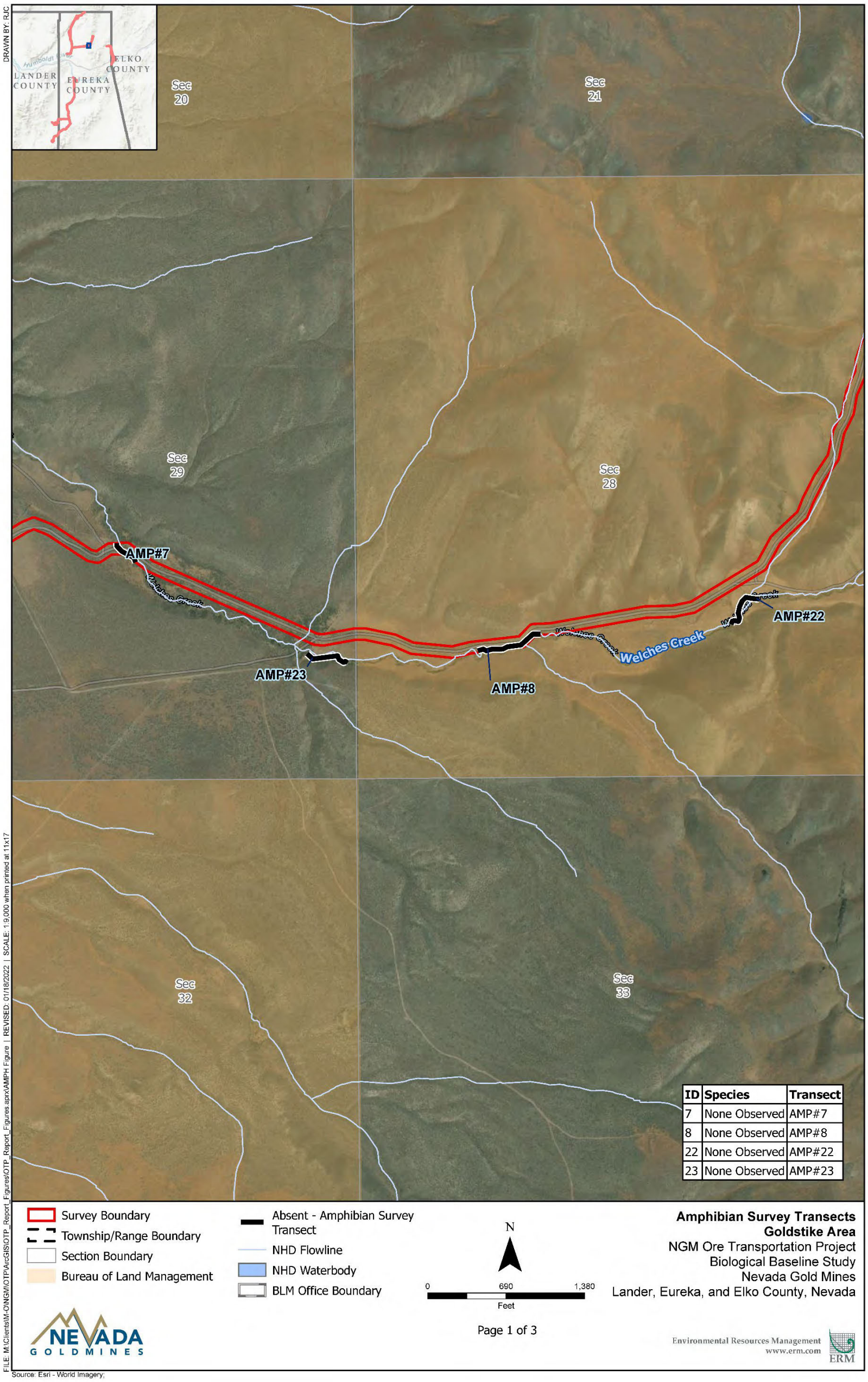


Figure 3.4.11-1: Amphibian Observations—Goldstrike Survey Area

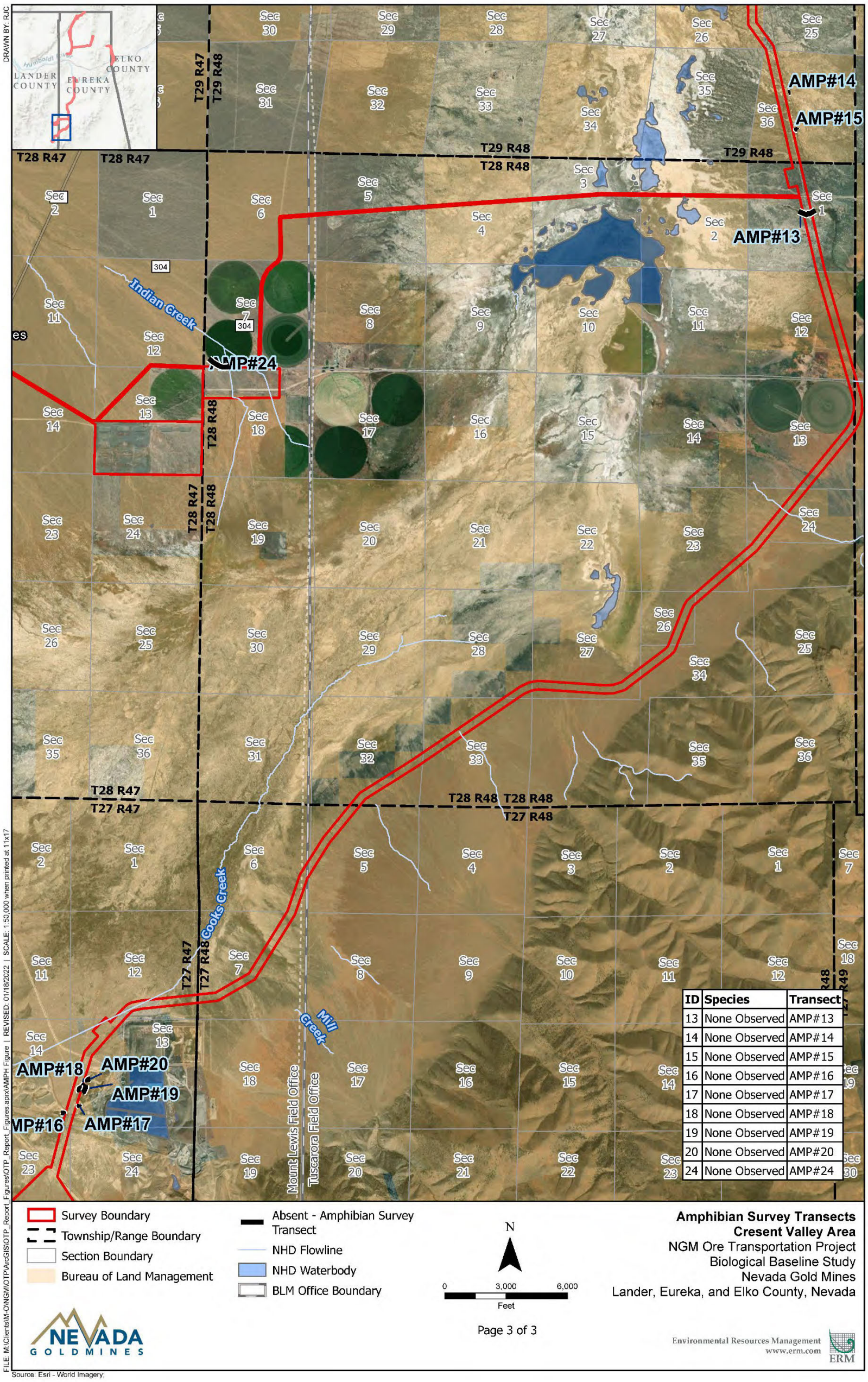


Figure 3.4.11-3: Amphibian Observations—Crescent Valley Survey Area

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The scarcity of amphibian observations except for bullfrogs in the Humboldt River may be related to drought conditions at the time of the surveys. The statewide drought severity peaked the week of July 7, 2021, and the Project Area remained at moderate drought (D1) levels despite some precipitation later in the year (NOAA 2021b). Recent studies have documented a negative correlation between amphibian captures and extended drought (Bucciarelli et al. 2020).

Western toads may be present at additional locations in all three survey areas, with surface activity limited by drought conditions. At this time, presence of western toads is assumed where suitable habitat conditions (riparian areas and seasonal wetlands) are present based on recent surveys in nearby locations (Gordon 2020; ERM 2018) and because the species tends to occur as scattered populations throughout northern Nevada where adequate seasonal water is available. Additional amphibian surveys are planned for 2022 on transects associated with stream, riparian, and wetland areas identified in Figure 3.4.11-1 through Figure 3.4.11-3.

Presence of northern leopard frog is considered less likely due to presence of bullfrogs and an absence of recent nearby records. Columbia spotted frogs were documented within Maggie Canyon within maximum known dispersal distance (3.7 miles; USFWS 2015) of the Carlin Survey Area, although barriers to movement (developed land) make presence in the Survey Area unlikely; however, as stated above, additional amphibian surveys will be conducted in 2022. The other two survey areas are outside of the known range for this species.

3.4.12. Butterflies

3.4.12.1. Background

The Basin and Range topography of Nevada supports a number of range-restricted butterflies, many of them poorly studied. The BLM Battle Mountain and Elko districts identifies 9 of these as special status butterfly species (BLM 2017b, 2019a). Three species have ranges that include or potentially include the Project Area and were selected by BLM as species to target for surveys, as shown in Table 3.4.12-1 (BLM 2017b, 2019a).

Monarch butterfly (*Danaus plexippus*; candidate species for listing under the ESA as discussed in Section 3.4.7, Threatened and Endangered Species), Nevada viceroy butterfly (*Limenitis archippus lahontani*), and Mattoni's blue butterfly (*Euphilotes pallecens mattonii*) have the potential to occur within the Project. Milkweed species (*Asclepias* spp.) are a known host plant for the monarch butterfly. The Nevada viceroy adult butterfly, a riparian specialist, resembles adult monarch butterflies and utilizes species in the *Salicaceae* family (*Salix* spp. and *Populus* spp.) for host plants, but also favors composite flowers for feeding (Opler et at. 1999). The slender buckwheat (*Eriogonum microthecum*) is the host plant for the Mattoni's blue butterfly.

The survey area for these butterfly species and their preferred host plants includes the Project footprint plus a 200-foot buffer of the centerline (400-foot survey area), as shown on Figure 2-1 through Figure 2-9. The purpose of these surveys is to identify the species that occur with the Project to inform the future NEPA analysis. Host plant surveys are reported in Section 3.3.2, Butterfly Host Plants.

Table 3.4.12-1: Potential Butterfly Species within the Project Area

Species	Agency Status	Habitat	Likelihood of Occurrence
Big Smoky wood nymph (*Cercyonis oetus alkalorum)*	BLM Sensitive	Grassy, alkaline flats; known only from the Big Smoky Valey between the Toiyabe and Toquima ranges in central Nevada	Not likely; Records in central Nevada
Great Basin small blue (*Philotiella speciosa septentrionalis)*	BLM Sensitive	Distribution unknown but type locality is from Fort Churchill Road in Lyon County. Trend unknown considered critically imperiled in Nevada	Not likely; Single record in Lyon County
Mattoni's blue (*Euphilotes pallescens mattonii*)	BLM Sensitive	Found primarily in the upper and lower Sonaran Zones, praires, and sand dunes; found in pinyon-juniper wodlands and rolling prairie grasslands; host plant for the larvae is the buckwheat (*Eriogonum microthecum nutt.* var. *laxiflorum*).	Possible
Monarch butterfly (*Danaus plexippus plexippus)*	USFWS Candidate; BLM Sensitive	Widespread and scattered; requires milkweed (*Asclepiaecae*) or dogbane (*Apocynaceae*) as host plants for larvae; migratory in southern part of state	Possible
Nevada viceroy *(Limenitis archippus lahontani)*	BLM Sensitive	Known from along the Humboldt River and lower tributaries with additional colonies near Fallon and Fernely (WAP 2012)	Likely; NDNH Record near the Project area
Railroad Valley skipper (*Hesperia uncas fulvapalla)*	BLM Sensitive	From alkali meadows on the floor of Railroad Valley in Nye County	Not likely; Recorded only in Nye County
White Mountains skipper (*Hesperia miriamae longaevicola)*	BLM Sensitive	Above tree line (over 10,500 ft) on highest peaks of White Mountains in western NV	Not likely; Recorded only above treeline in the White Mountains
White River Valley skipper (*Hesperia uncas grandiose)*	BLM Sensitive	Alkaline meadows and saltgrass flats in early summer in the White River Valley. Austin and Leary (2008) also documented the subspecies using its apparent hostplant, Mexican rush (*Juncus mexicanus*), in Big Smoky Valley in Nye County	Not likely; Recorded only in Nye County
White River wood nymph (*Cercyonis pegala pluvialis)*	BLM Sensitive	Occurs in bottomland habitats along the White River near the White Pine and Nye county line and in the Steptoe Valley southeast of Ely	Not likely; Recorded only near the White Pine - Nye County line

Source: BLM 2017b, 2019a; Wildlife Action Plan Team 2012

3.4.12.2. Study Methodology

A desktop assessment was conducted using data from NDNH, BLM, NHD, NWI, and SWReGAP to identify areas with potential suitable habitat and documented occurrences to target during the field surveys for host plants and butterflies.

The following tools and protocols were used in this survey:

- *Initial Survey Instructions for Western Monarch and Milkweed Habitat Suitability Assessment* (USFWS 2016)
- Crucial Habitat Assessment Tool (WAFWA 2021)
- *Mattoni's Blue Butterfly Monitoring Protocol*, Version 1 (Helmig 2020)

The field surveys for butterflies focused on areas where host plants or other suitable habitat elements were identified during vegetation surveys. Riparian corridors, willow stands, and mesic areas were surveyed for Nevada viceroy from June 12 through July 24, 2021. Surveys for Mattoni's blue butterfly were conducted before or after the heat of the day and avoided windy conditions (wind speed below 10 mph) from June 12 through July 24, 2021. Per protocol, field staff used butterfly nets and supplies for specimen collection if little blue butterflies were found in order to capture and identify the species. Incidental observations of monarch, Nevada viceroy, or Mattoni's blue butterflies or caterpillars were also recorded during other surveys. Weather information and a description of habitat were recorded, along with GPS coordinates and photographs.

3.4.12.3. Results and Discussion

Pre-Field Results

Table 3.4.12-1 lists the three butterfly species with potential to occur in the Project Area, their agency status, associated habitat, and likelihood of occurrence based on species ranges, available habitat, and known and/or historical record of occurrence. As described in Section 3.3.2, Butterfly Host Plants, six milkweed species and slender buckwheat host plants have the potential to occur in the Project Area. The Nevada viceroy butterfly was previously identified near the proposed Crescent Valley Survey Area, along the Humboldt River near Beowawe, according to NDNH data.

There are 21 known records of Mattoni's blue butterfly, all from Elko County (Austin and Leary 2008; BLM 2020b). Although no records are known from the immediate Project vicinity, there have been few surveys conducted. This species is challenging to survey, in part because larvae may remain in diapause for several years (WildEarth Guardians 2010).

Field Survey Results

Pedestrian field surveys were conducted for butterflies within the Project Area as part of special status plant and butterfly host plant surveys, as shown on Figure 3.4.12-1 through Figure 3.4.12-5. Nevada viceroys were observed at three locations in the southern part of the Carlin Survey Area, as shown on Figure 3.4.12-3. All observations of this species were associated with willows, which were documented in the Goldstrike and Carlin survey areas, including Welches Creek and the Humboldt River, as described in Section 3.3.2, Butterfly Host Plants. Though few Nevada viceroy individuals were observed, suitable habitat is present in the Goldstrike and Carlin survey areas.

No monarch butterflies or caterpillars were observed during field surveys; however, two species of milkweed (narrow leaf milkweed [23 occurrences] and showy milkweed [6 occurrences]) were identified and mapped in the Project Area, as shown on Figure 3.4.12-1 through Figure 3.4.12-5. Narrow leaf milkweed was identified in all three survey areas, and showy milkweed was identified in the Carlin and Goldstrike survey areas. These milkweeds were identified ranging from isolated individuals to clusters of 30 to 50 plants.

No Mattoni's blue butterflies were observed during the field surveys; therefore, no specimens were collected for further analysis. The Mattoni's blue butterfly host plant, slender buckwheat, was identified in the Goldstrike Survey Area, as shown on Figure 3.4.12-1 and Figure 3.4.12-2. Slender buckwheat was observed within the Welches Creek summit borrow source area.

Table 3.4.12-2: Butterflies and Plant Host Species in each Project Area

Project Area	Landscape Position	Species Observed	Plant Host Species
Goldstrike Survey Area	Canyons, Canyon Meadow, Arid Valley Alkali Flats	Checkered white (*Pontia protodice),* Spring white (*Pontia sisymbrii),* Cabbage white (*Pieris rapae),* Northern blue (*Heliopetes ericetorum)*	Narrow Leaf Milkweed, Showy Milkweed, Slender Buckwheat
Carlin Survey Area	Arid Valley, Wet Meadows, Riparian	Great Basin wood nymph *(Cercyonis sthenele),* Orange sulfur (*Colias eurytheme),* Viceroy (*Limenitis archippus),* Ruddy copper *(Lycaena rubidus),* Purplish copper (*Lycaena helloides),* Western tiger swallowtail (*Papilio rutulus),* White-lined sphinx (*Hyles lineata),* Checkered white (*Pontia protodice),* Spring white (*Pontia sisymbrii)*	Narrow Leaf Milkweed, Showy milkweed
Crescent Valley Survey Area	Arid Valley, Akali Flats, Alluvial Slopes	Orange sulfur (*Colias eurytheme),* Checkered white (*Pontia protodice),* Cabbage white (*Pieris rapae),*	Narrow Leaf Milkweed

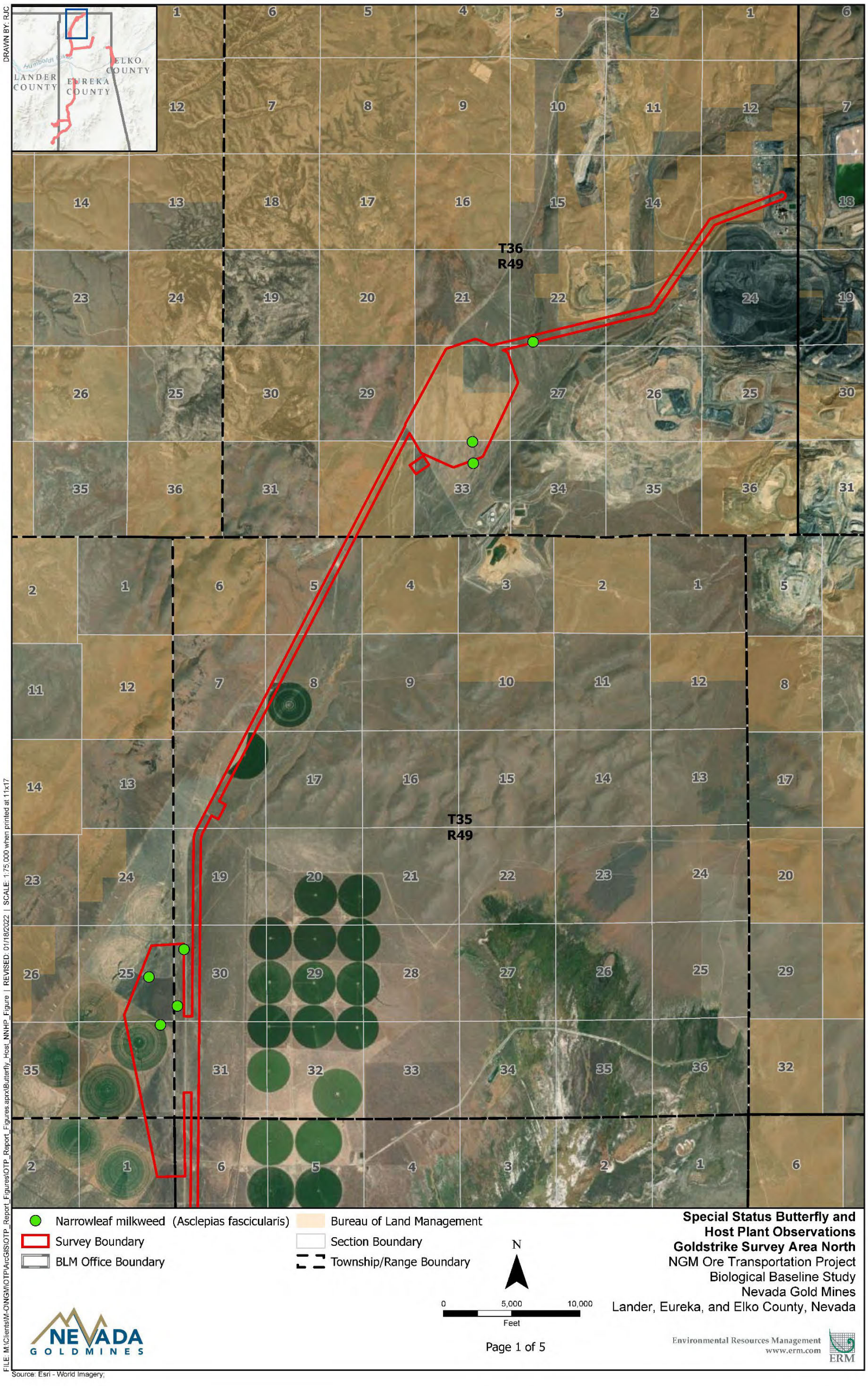


Figure 3.4.12-1. Special Status Butterflies and Host Plants Observations—Goldstrike Survey Area North

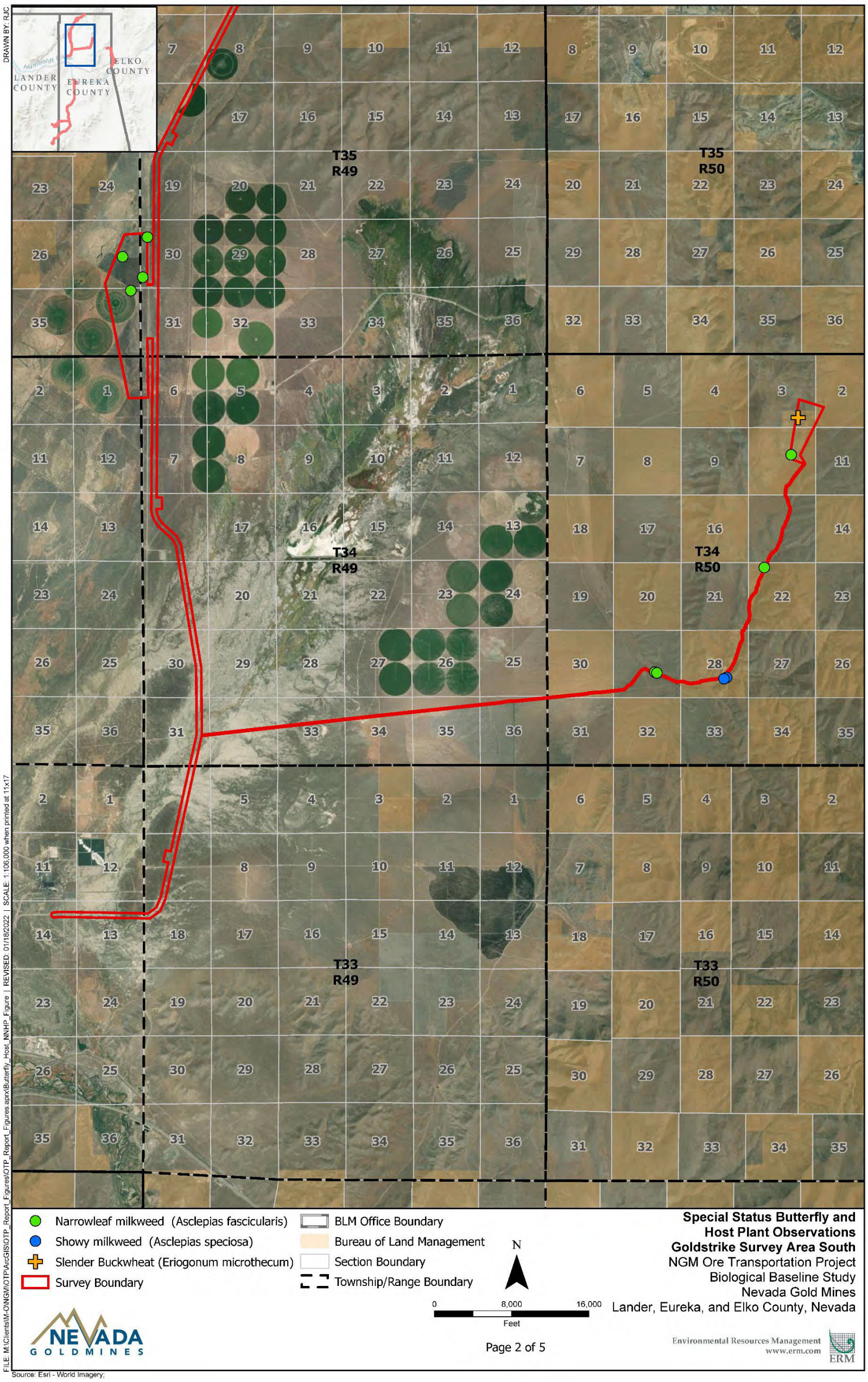


Figure 3.4.12-2: Special Status Butterflies and Host Plants Observations—Goldstrike Survey Area South

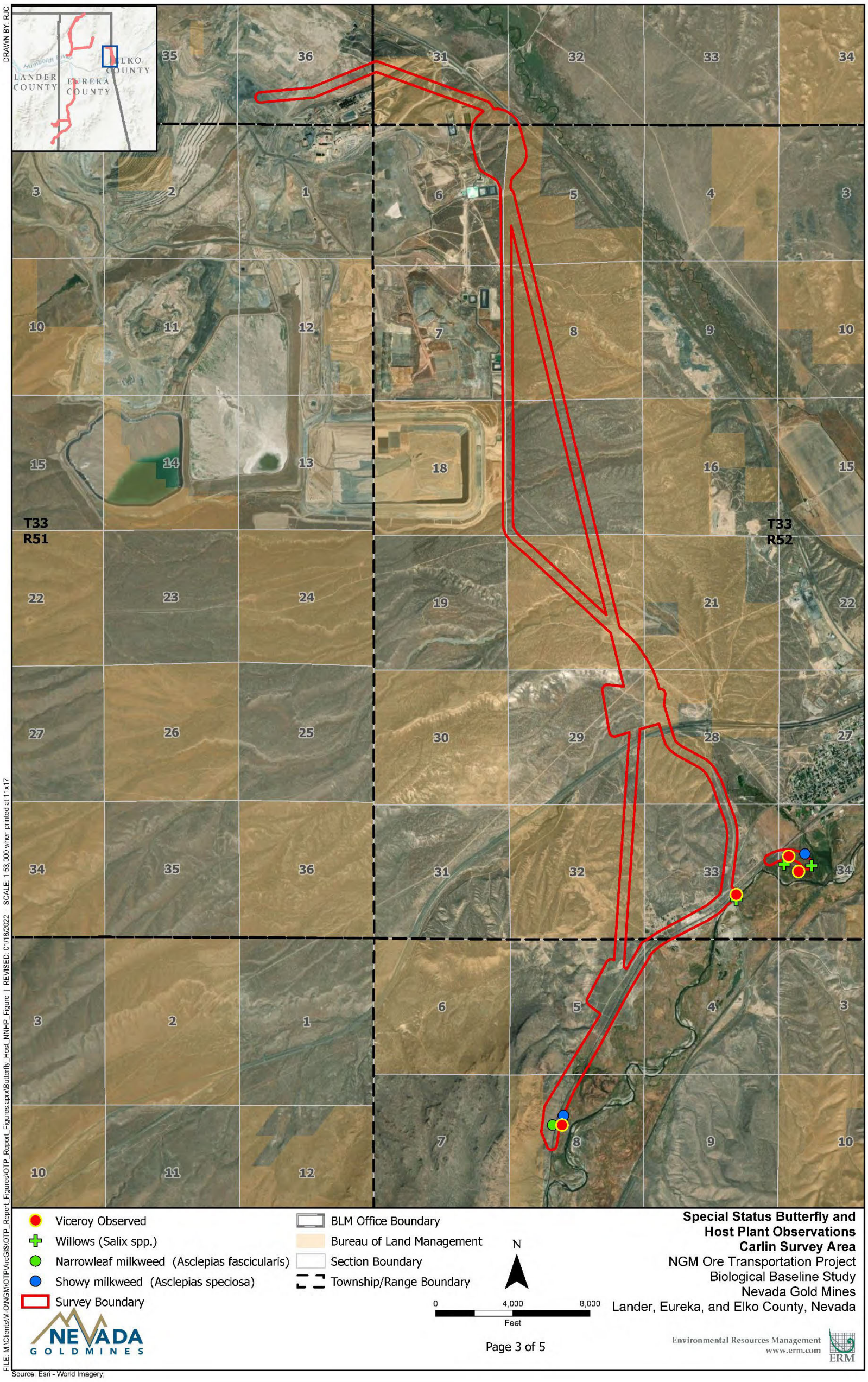


Figure 3.4.12-3: Special Status Butterflies and Host Plants Observations—Carlin Survey Area

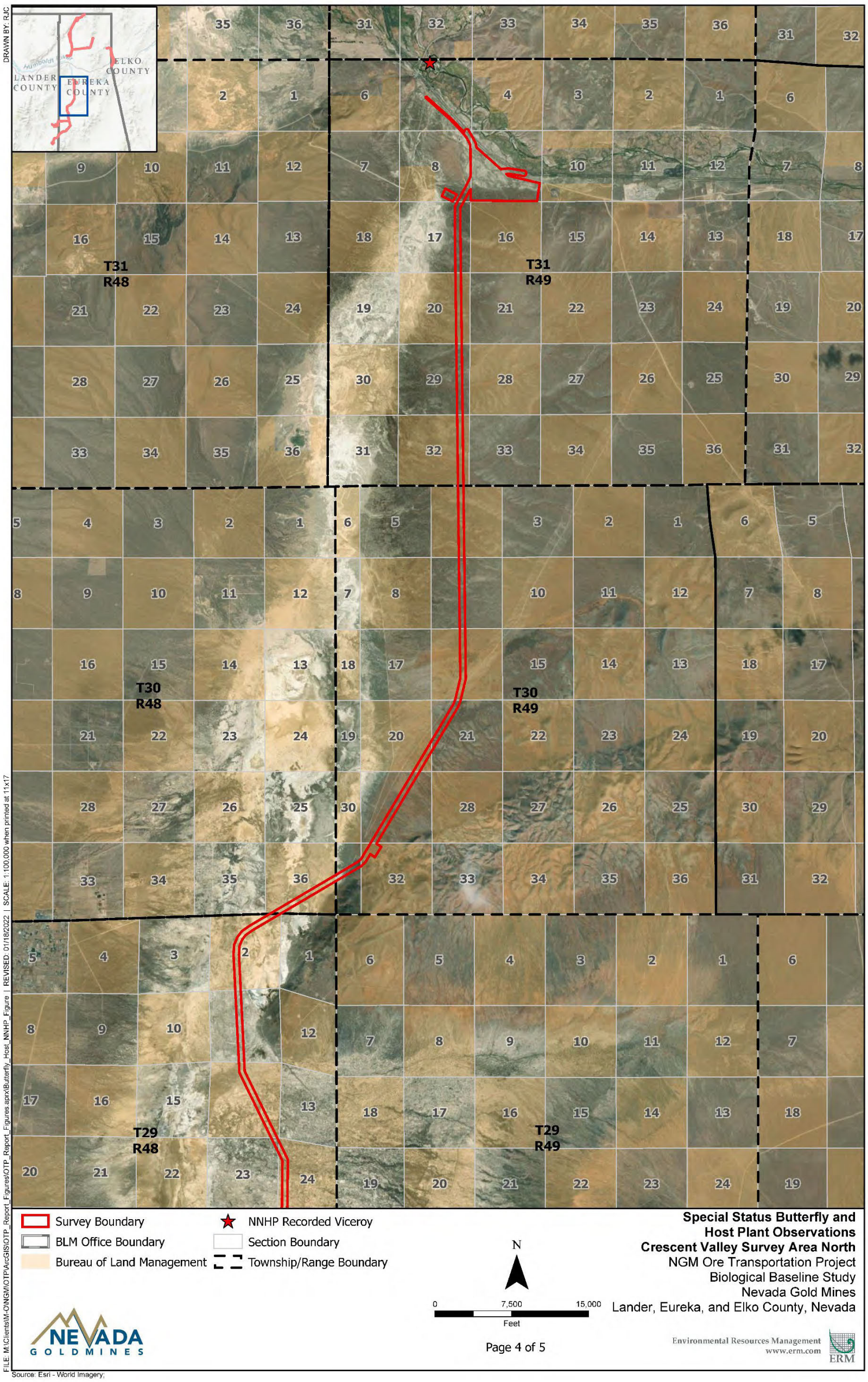


Figure 3.4.12-4: Special Status Butterflies and Host Plants Observations—Crescent Valley Survey Area North

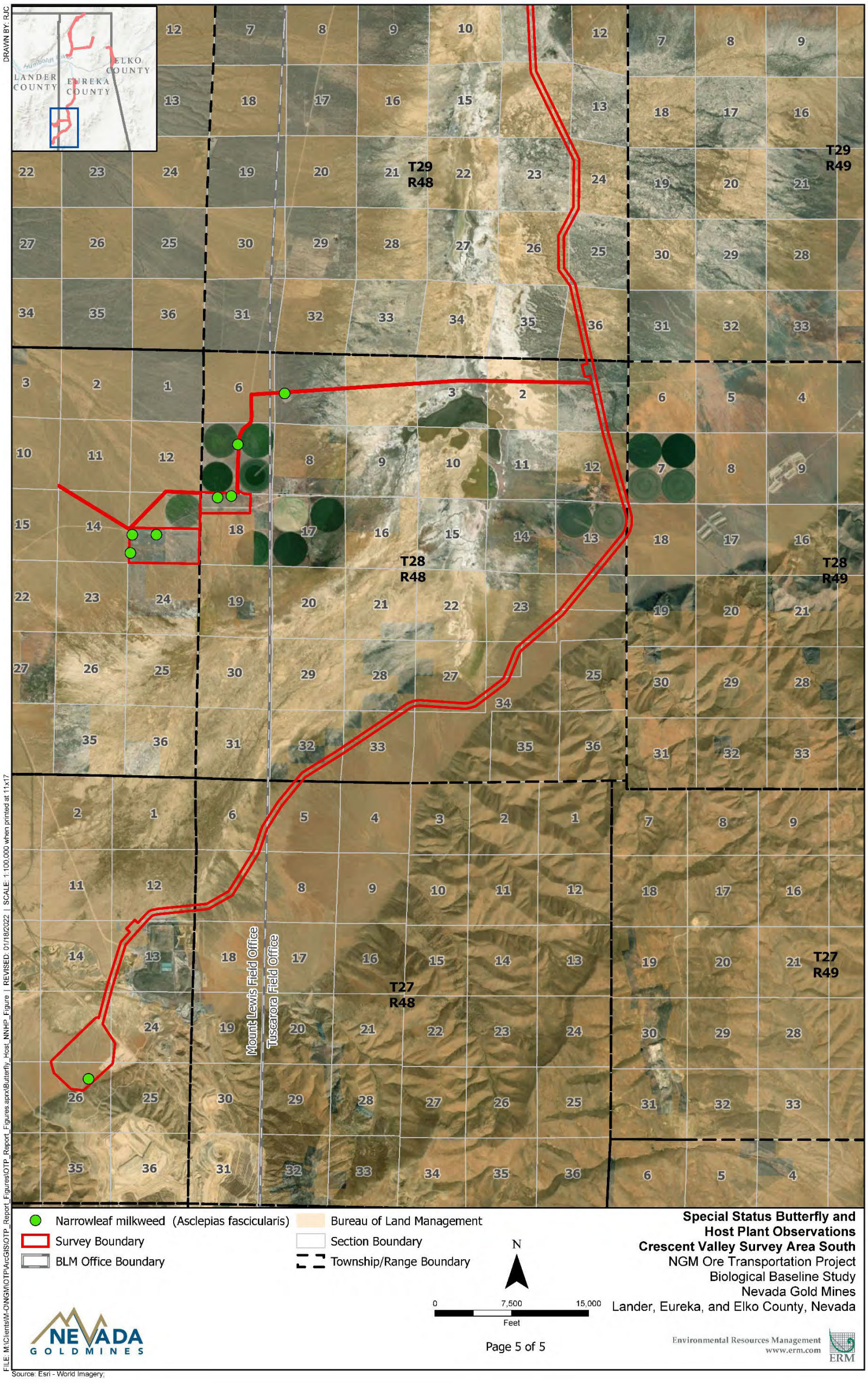


Figure 3.4.12-5: Special Status Butterflies and Host Plants Observations—Crescent Valley Survey Area South

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Several other butterfly species with no special status were observed across the Project Area. Butterfly observations were greatest in wetlands and wet meadows near the Humboldt River in the Carlin Survey Area. Checkered white *(Pontia protodice*), cabbage white *(Pieris rapae*), orange sulfurs *(Colias eurytheme*), Great Basin wood nymph *(Cercyonis sthenele*), ruddy copper (*Lycaena rubidus*), purplish copper (L*ycaena helloides)*, and western tiger swallowtail (*Papilio rutulus*) butterflies and white-lined sphinx (*Hyles lineata*) were observed in this survey area.

Checkered white and cabbage white butterflies were observed throughout the Goldstrike Survey Area in low numbers. Spring white butterflies (*Pontia sisymbrii*) and one northern blue butterfly (*Heliopetes ericetorum*) were observed in Welch Creek Canyon, just outside the Goldstrike Survey Area.

Checkered white, cabbage whites, and orange sulfur butterflies were observed near agricultural pivot fields in the Crescent Valley Survey Area; however, overall there were few butterfly observations in this Survey Area.

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Year 1 Biological Baseline Report

VOLUME II

Ore Transportation Project

May 2022

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APPENDIX A
ECOLOGICAL SITE DESCRIPTION

A.1. Ecological Site Descriptions

A.2. Integrated Indicators of Rangeland Health

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A.1. ECOLOGICAL SITE DESCRIPTIONS

Table A.1-1 contains the ecological site, soil map unit for each of the Southwest Regional GAP (SWreGAP) land cover types and ecological site identification (ID) (Ecological Site Descriptions [ESD] survey and soil pit location). Figure A.7-1 through Figure A.7-3 show the location of the Ecological Site ID, soil map unit symbol (MUSYM), and SWreGAP land cover type.

Table A.1-1: Ecological Site Descriptions and Soil Map Unit Acres in each Southwest Regional GAP Land Cover Type

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
R024XY035NV	BM	Invasive Annual Grassland	BM_3			0.7	0.7
R024XY002NV	1041	Inter-Mountain Basins Mixed Salt Desert Scrub	1041_1		0.7		0.7
	1160	Inter-Mountain Basins Greasewood Flat	1160_1		10.2		10.2
	1165	Inter-Mountain Basins Big Sagebrush Shrubland	1165_1		32.6		32.6
	1165	Invasive Annual and Biennial Forbland	1165_2		0.9		0.9
	1165	Inter-Mountain Basins Greasewood Flat	1165_3		6.1		6.1
	1165	Inter-Mountain Basins Mixed Salt Desert Scrub	1165_4		3.4		3.4
	1165	Recently Mined or Quarried	1165_5		13.9		13.9
	1169	Inter-Mountain Basins Mixed Salt Desert Scrub	1169_1		48.2		48.2
		Inter-Mountain Basins Greasewood Flat	1169_2		91.8		91.8
		Inter-Mountain Basins Big Sagebrush Shrubland	1169_3		0.5		0.5
		Great Basin Xeric Mixed Sagebrush Shrubland	1169_4		5.1		5.1
	1600	Recently Mined or Quarried	1600_1		4.4		4.4
	192	Invasive Annual and Biennial Forbland	192_1		18.2		18.2
		Invasive Annual Grassland	192_2	55.5			55.5
	2060	Inter-Mountain Basins Mixed Salt Desert Scrub	2060_1	32.3			32.3
		Inter-Mountain Basins Big Sagebrush Shrubland	2060_2	0.4			0.4
		Barren Lands, Non-specific	2060_3	1.0			1.0
		Inter-Mountain Basins Greasewood Flat	2060_4		158.3		158.3

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
	3661	Inter-Mountain Basins Big Sagebrush Shrubland	3661_1		135.2		135.2
		Inter-Mountain Basins Greasewood Flat	3661_2		16.7		16.7
		Recently Mined or Quarried	3661_4		2.7		2.7
		Inter-Mountain Basins Cliff and Canyon	3661_5		2.3		2.3
	525	Inter-Mountain Basins Big Sagebrush Shrubland	525_1		13.3	15.9	29.2
	671	Inter-Mountain Basins Big Sagebrush Shrubland	671_1		12.7	27.7	40.4
	741	Inter-Mountain Basins Big Sagebrush Shrubland	741_1		10.7	5.8	16.5
		Inter-Mountain Basins Mixed Salt Desert Scrub	741_2		1.9	1.3	3.1
		Invasive Annual and Biennial Forbland	741_3			1.2	1.2
		Invasive Annual Grassland	741_4		0.9		0.9
	855	Recently Mined or Quarried	855_2		2.2		2.2
	901	Inter-Mountain Basins Greasewood Flat	901_1		7.1		7.1
		Inter-Mountain Basins Mixed Salt Desert Scrub	901_2		1.0		1.0
	BB	Invasive Annual and Biennial Forbland	BB_1		14.6		14.6
		Invasive Annual Grassland	BB_2		15.6		15.6
	BC	Inter-Mountain Basins Big Sagebrush Shrubland	BC_1		22.6		22.6
		Inter-Mountain Basins Greasewood Flat	BC_2		3.6		3.6
		Inter-Mountain Basins Mixed Salt Desert Scrub	BC_3		16.0		16.0
		Invasive Annual Grassland	BC_5		2.5		2.5
	BpA	Invasive Annual and Biennial Forbland	BpA_1, BpA_1a		6.4		6.4
		Invasive Annual Grassland	BpA_2		22.9	4.0	26.9
		Inter-Mountain Basins Big Sagebrush Shrubland	BpA_3		0.7		0.7
		Inter-Mountain Basins Greasewood Flat	BpA_4			17.2	17.2
	RbB	Inter-Mountain Basins Mixed Salt Desert Scrub	RbB_1		319.8		319.8

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
		Inter-Mountain Basins Big Sagebrush Shrubland	RbB_10, RbB_5		92.4		92.4
		Inter-Mountain Basins Greasewood Flat	RbB_2, RbB_9		4.8		4.8
		Invasive Annual and Biennial Forbland	RbB_3, RbB_8		11.7		11.7
		Invasive Annual Grassland	RbB_4, RbB_7		3.6		3.6
		Barren Lands, Non-specific	RbB_6			11.4	11.4
R024XY003NV	167	Recently Mined or Quarried	167_4			29.7	29.7
	169	Inter-Mountain Basins Big Sagebrush Shrubland	169_1			18.0	18.0
		Inter-Mountain Basins Mixed Salt Desert Scrub	169_2			65.7	65.7
	192	Agriculture	192_3			36.5	36.5
		Barren Lands, Non-specific	192_4			567.2	567.2
		Inter-Mountain Basins Big Sagebrush Shrubland	192_5			58.1	58.1
		Inter-Mountain Basins Greasewood Flat	192_6			167.5	167.5
		Inter-Mountain Basins Mixed Salt Desert Scrub	192_7			6.9	6.9
	3742	Recently Mined or Quarried	3742_5			7.0	7.0
	822	Barren Lands, Non-specific	822_1			2.7	2.7
		Inter-Mountain Basins Greasewood Flat	822_3			16.9	16.9
	881	Invasive Annual Grassland	881_6			1.3	1.3
	Dp	Inter-Mountain Basins Big Sagebrush Shrubland	Dp_1			2.4	2.4
		Inter-Mountain Basins Greasewood Flat	Dp_2, Dp_2a	5.3		0.7	5.9
		Invasive Annual and Biennial Forbland	Dp_3			9.9	9.9
	Is	Inter-Mountain Basins Greasewood Flat	Is_1			0.7	0.7
R024XY003NV, R024XY007NV, R024XY011NV	881	Inter-Mountain Basins Greasewood Flat	881_2, 881_2a, 881_2b, 881_2c	6.6			6.6

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
R024XY005NV	861	Inter-Mountain Basins Big Sagebrush Shrubland	861_1			16.1	16.1
		Inter-Mountain Basins Greasewood Flat	861_2			5.5	5.5
		Inter-Mountain Basins Mixed Salt Desert Scrub	861_3			2.5	2.5
		Recently Mined or Quarried	861_4			15.5	15.5
	BM	Great Basin Xeric Mixed Sagebrush Shrubland	BM_1	19.7			19.7
	Mf	Inter-Mountain Basins Big Sagebrush Shrubland	Mf_1	24.3			24.3
		Inter-Mountain Basins Big Sagebrush Steppe	Mf_2			8.7	8.7
		Inter-Mountain Basins Greasewood Flat	Mf_3			2.8	2.8
		Inter-Mountain Basins Mixed Salt Desert Scrub	Mf_4			19.4	19.4
		Invasive Annual and Biennial Forbland	Mf_5			57.3	57.3
		Invasive Annual Grassland	Mf_6	5.3		2.7	8.0
		Agriculture	Mf_7	0.7			0.7
		Barren Lands, Non-specific	Mf_8			27.9	27.9
		Inter-Mountain Basins Cliff and Canyon	Mf_9			0.8	0.8
	Ms	Inter-Mountain Basins Mixed Salt Desert Scrub	Ms_1			54.2	54.2
		Invasive Annual and Biennial Forbland	Ms_2			0.8	0.8
		Invasive Annual Grassland	Ms_3			8.7	8.7
	OSB	Barren Lands, Non-specific	OSB_1			9.1	9.1
		Inter-Mountain Basins Big Sagebrush Shrubland	OSB_2		2.9		2.9
		Invasive Annual and Biennial Forbland	OSB_3		180.7		180.7
		Invasive Annual Grassland	OSB_4		154.5		154.5
	OtA	Inter-Mountain Basins Big Sagebrush Shrubland	OtA_1		84.1		84.1
	RaA	Inter-Mountain Basins Big Sagebrush Shrubland	RaA_1		52.8		52.8
		Inter-Mountain Basins Greasewood Flat	RaA_2		1.4		1.4
	RaB	Inter-Mountain Basins Greasewood Flat	RaB_1			40.3	40.3
		Invasive Annual and Biennial Forbland	RaB_2			112.9	112.9

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
	RE	Inter-Mountain Basins Big Sagebrush Shrubland	RE_1, RE_1a			2.1	2.1
R024XY005NV, R024XY020NV	RE	Invasive Annual Grassland	RE_3, RE_3a	7.6			7.6
R024XY006NV	660	Inter-Mountain Basins Big Sagebrush Shrubland	660_1	2.2			2.2
		Inter-Mountain Basins Greasewood Flat	660_2			16.5	16.5
		Inter-Mountain Basins Mixed Salt Desert Scrub	660_3			7.0	7.0
	Ge	Invasive Annual and Biennial Forbland	Ge_1	51.9		29.8	81.6
		Invasive Annual Grassland	Ge_2			5.5	5.5
	Pk	Inter-Mountain Basins Big Sagebrush Shrubland	Pk_1	3.4		1.2	4.6
		Inter-Mountain Basins Greasewood Flat	Pk_2	0.3			0.3
R024XY007NV	Cr	Inter-Mountain Basins Big Sagebrush Shrubland	Cr_1	4.8			4.8
		Inter-Mountain Basins Mixed Salt Desert Scrub	Cr_2	0.4			0.4
	Do	Inter-Mountain Basins Big Sagebrush Shrubland	Do_1	0.9			0.9
		Inter-Mountain Basins Big Sagebrush Steppe	Do_2	3.1			3.1
		Inter-Mountain Basins Greasewood Flat	Do_3			13.1	13.1
		Inter-Mountain Basins Semi-Desert Grassland	Do_4			40.5	40.5
		Invasive Annual and Biennial Forbland	Do_5			15.0	15.0
		Invasive Annual Grassland	Do_6			0.7	0.7
	Od	Inter-Mountain Basins Greasewood Flat	Od_1			8.7	8.7
	Ok	Inter-Mountain Basins Greasewood Flat	Ok_1			1.7	1.7
R024XY007NV, R024XY011NV	881	Inter-Mountain Basins Playa	881_4, 881_4a, 881_4b			14.6	14.6
R024XY011NV	3742	Inter-Mountain Basins Greasewood Flat	3742_1			0.3	0.3
		Inter-Mountain Basins Big Sagebrush Shrubland	3742_2			0.6	0.6
		Invasive Annual and Biennial Forbland	3742_3			0.7	0.7

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
		Inter-Mountain Basins Mixed Salt Desert Scrub	3742_4			5.1	5.1
	881	Inter-Mountain Basins Big Sagebrush Shrubland	881_1			5.4	5.4
		Inter-Mountain Basins Mixed Salt Desert Scrub	881_3	334.2			334.2
		Invasive Annual and Biennial Forbland	881_5	71.0			71.0
R024XY012NV	Ru	Inter-Mountain Basins Big Sagebrush Shrubland	Ru_1	4.3			4.3
		Inter-Mountain Basins Greasewood Flat	Ru_2, Ru_2a	6.3			6.3
		Invasive Annual and Biennial Forbland	Ru_3	4.1			4.1
R024XY014NV	855	Inter-Mountain Basins Greasewood Flat	855_1		6.2		6.2
R024XY020NV	RE	Inter-Mountain Basins Cliff and Canyon	RE_2		3.9		3.9
R024XY022NV	167	Great Basin Xeric Mixed Sagebrush Shrubland	167_1		16.4		16.4
		Inter-Mountain Basins Greasewood Flat	167_2		8.9		8.9
		Inter-Mountain Basins Mixed Salt Desert Scrub	167_3		23.9		23.9
R024XY030NV	3691	Inter-Mountain Basins Big Sagebrush Shrubland	3691_1_2_3		42.3		42.3
R025XY003NV	Bf	Inter-Mountain Basins Big Sagebrush Shrubland	Bf_1		2.4		2.4
	BM	Inter-Mountain Basins Big Sagebrush Shrubland	BM_2		2.1		2.1
	WE	Great Basin Xeric Mixed Sagebrush Shrubland	WE_1	5.6			5.6
		Inter-Mountain Basins Big Sagebrush Shrubland	WE_2, WE_5	5.5			5.5
		Inter-Mountain Basins Cliff and Canyon	WE_3	6.5			6.5
		Recently Mined or Quarried	WE_4	43.8			43.8
R025XY005NV	Bf	North American Arid West Emergent Marsh	Bf_2			40.0	40.0
	Wc	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	Wc_1			2.8	2.8

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
		Inter-Mountain Basins Big Sagebrush Shrubland	Wc_2			8.6	8.6
		Inter-Mountain Basins Semi-Desert Grassland	Wc_3			921.2	921.2
		North American Arid West Emergent Marsh	Wc_4			2.0	2.0
R025XY014NV	RF	Invasive Perennial Grassland	RF_3			23.5	23.5
		Invasive Annual Grassland	RF_4			20.3	20.3
		Inter-Mountain Basins Big Sagebrush Shrubland	RF_5			11.0	11.0
		Inter-Mountain Basins Big Sagebrush Steppe	RF_6	239.5			239.5
	SBB	Inter-Mountain Basins Big Sagebrush Shrubland	SBB_1	2.8			2.8
		Inter-Mountain Basins Semi-Desert Grassland	SBB_2	9.8			9.8
		Invasive Annual Grassland	SBB_3	3.1			3.1
		Inter-Mountain Basins Big Sagebrush Steppe	SBB_4	6.3			6.3
		Invasive Perennial Grassland	SBB_5			7.4	7.4
		Great Basin Xeric Mixed Sagebrush Shrubland	SBB_6			8.8	8.8
	SG	Inter-Mountain Basins Big Sagebrush Shrubland	SG_2			1.1	1.1
		Inter-Mountain Basins Semi-Desert Grassland	SG_4			2.7	2.7
R025XY015NV, R025XY019NV	CF	Inter-Mountain Basins Big Sagebrush Shrubland	CF_2, CF_2a, CF_2b, CF_2c, CF_2d, CF_2e, CF_6a			4.0	4.0
R025XY019NV	491	Inter-Mountain Basins Big Sagebrush Shrubland	491_1, 491_1b			0.2	0.2

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
		Inter-Mountain Basins Mixed Salt Desert Scrub	491_2			1.8	1.8
		Invasive Annual Grassland	491_3			0.9	0.9
		Recently Mined or Quarried	491_4			1.9	1.9
	525	Inter-Mountain Basins Mixed Salt Desert Scrub	525_2	6.9			6.9
	561	Inter-Mountain Basins Mixed Salt Desert Scrub	561_1	35.1		12.5	47.6
		Invasive Annual and Biennial Forbland	561_2	3.4			3.4
		Invasive Annual Grassland	561_3	3.5		0.5	4.0
	822	Inter-Mountain Basins Big Sagebrush Shrubland	822_2	8.8		0.7	9.5
		Inter-Mountain Basins Mixed Salt Desert Scrub	822_4	1.4			1.4
		Invasive Annual and Biennial Forbland	822_5	6.4			6.4
		Recently Mined or Quarried	822_6	2.0			2.0
	CF	Developed, Medium - High Intensity	CF_1			0.4	0.4
		Inter-Mountain Basins Mixed Salt Desert Scrub	CF_3			59.9	59.9
		Invasive Annual Grassland	CF_5	1,036.0	1720.6	2,762.3	5,518.9
		Recently Mined or Quarried	CF_6			0.7	0.7
	CG	Inter-Mountain Basins Semi-Desert Grassland	CG_1, CG_7		0.7		0.7
		Recently Mined or Quarried	CG_10		10.2		10.2
		Great Basin Xeric Mixed Sagebrush Shrubland	CG_2		32.6		32.6
		Inter-Mountain Basins Big Sagebrush Shrubland	CG_3, CG_3a, CG_3b, CG_3c		0.9		0.9
		Inter-Mountain Basins Big Sagebrush Steppe	CG_4		6.1		6.1
		Inter-Mountain Basins Greasewood Flat	CG_5		3.4		3.4
		Inter-Mountain Basins Mixed Salt Desert Scrub	CG_6		13.9		13.9
		Invasive Annual and Biennial Forbland	CG_8		48.2		48.2

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
	CH	Inter-Mountain Basins Big Sagebrush Shrubland	491_1a, CH_2, CH_2a		91.8		91.8
		Barren Lands, Non-specific	CH_1		0.5		0.5
		Inter-Mountain Basins Greasewood Flat	CH_3		5.1		5.1
		Inter-Mountain Basins Mixed Salt Desert Scrub	CH_4		4.4		4.4
		Recently Mined or Quarried	CH_5		18.2		18.2
	SD	Great Basin Xeric Mixed Sagebrush Shrubland	SD_1	55.5			55.5
		Inter-Mountain Basins Big Sagebrush Shrubland	SD_2	32.3			32.3
		Inter-Mountain Basins Big Sagebrush Steppe	SD_3	0.4			0.4
		Inter-Mountain Basins Semi-Desert Grassland	SD_4	1.0			1.0
		Invasive Annual Grassland	SD_5		158.3		158.3
	SG	Great Basin Xeric Mixed Sagebrush Shrubland	SG_1		135.2		135.2
		Inter-Mountain Basins Big Sagebrush Steppe	SG_3		16.7		16.7
		Invasive Annual Grassland	SG_5		2.7		2.7
	TN	Barren Lands, Non-specific	TN_1		2.3		2.3
		Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	TN_2		13.3	15.9	29.2
		Inter-Mountain Basins Big Sagebrush Shrubland	TN_3, TN_3a		12.7	27.7	40.4
		Inter-Mountain Basins Greasewood Flat	TN_4		10.7	5.8	16.5
		Inter-Mountain Basins Mixed Salt Desert Scrub	TN_5, TN_5a		1.9	1.3	3.1
		Inter-Mountain Basins Semi-Desert Grassland	TN_6, TN_6a			1.2	1.2
		Invasive Annual and Biennial Forbland	TN_7		0.9		0.9
		Invasive Annual Grassland	TN_8, TN_8a		2.2		2.2

Ecological Site Description	Soil Map Unit Symbol	Southwest Regional GAP Land Cover Type	Ecological Site ID	Project Area Acres			
				Carlin	Crescent Valley	Goldstrike	Total Acres
		North American Arid West Emergent Marsh	TN_9		7.1		7.1
R025XY022NV	RF	Great Basin Pinyon-Juniper Woodland	RF_1		1.0		1.0
		Great Basin Xeric Mixed Sagebrush Shrubland	RF_2		14.6		14.6

Table A.1-2: Tuscarora Field Office Goldstrike Survey Area Ecological Site Descriptions Ground Cover and Dominant Vegetation Species

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R024XY002NV Loamy 5-8 P.Z.	Rad silt loam, slightly alkali, 0 to 4 percent slopes	RbB_6	97	31	Few to none; scattered cheatgrass	Burning bush	Few scattered greasewood within survey area
		RbB_7	96	35	Cheatgrass	Clasping pepperweed, other mustards, burning bush	Greasewood
		RbB_8	95	51	Cheatgrass	Mustard, pepperweed	Greasewood
		RbB_9	93	42	Cheatgrass	Halogeton	Greasewood, shadscale
		RbB_10	96	53	Cheatgrass	Tansy mustard, pepperweed , bur buttercup	Greasewood
R024XY003NV Sodic Terrace 6-8 P.Z.	Iron Blosson silt loam, strongly saline	Is_1	90	42	NA	Mustard, broad-leaved pepperweed	Greasewood, shadscale
	Dunphy silt loam, drained, strongly saline	Dp_2a	86	48	Few to none – basin wildrye	Halogeton, Russian thistle	Greasewood, rubber rabbitbrush, four-wing saltbrush
R024XY005NV Loamy 8-10 P.Z.	McConnel gravelly fine sandy loam	Mf_1	98	26	Cheatgrass	Mustard, spiny sow-thistle	Greasewood, big sagebrush
		Mf_2	57	N/A	Few to none, cheatgrass	NA	NA

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		Mf_3	98	38	Cheatgrass; few sparse clumps of basin wildrye	Mustard	NA
		Mf_4	98	13	Cheatgrass	Mustard	NA
		Mf_5	94	43	Cheatgrass; evidence of some bluegrass within survey area but all of it has been grazed down	NA; few mustards scattered throughout	NA; rubber rabbitbrush lining streambed to the west but not present anywhere else
		Mf_6	91	31	Cheatgrass	Mustard	NA
		Mf_7	98	23	Cheatgrass, basin wildrye, cultivate hay	NA	NA
		Mf_8	79	21	Sandberg's bluegrass, cheatgrass; perennial grasses show evidence of heavy grazing	Wooly star, mustards	NA
		Mf_9	80	20	Sandberg's bluegrass, cheatgrass; perennial grasses show evidence of heavy grazing	Wooly star	NA
	Boulflat-Havingdon Association	BM_1	NA	NA	Cheatgrass, crested wheatgrass, Thurber's needlegrass, basin wildrye	Russian thistle, prickly lettuce, tansy mustard	Big sagebrush, yellow rabbitbrush
	Midas complex	Ms_1	97	21	Cheatgrass	Mustard, Russian thistle	NA
		Ms_2	91	18	Few to none, cheatgrass	Scattered tansy mustard	NA
		Ms_3	95	18	Few to none, cheatgrass	Tansy mustard, Russian thistle	NA

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
	Orovada gravelly fine sandy loam, 2 to 4 percent slope	OSB_1	84	7	Cheatgrass, crested wheatgrass	Russian thistle	NA
		OSB_2	85	4	Cheatgrass	Russian thistle, tansy mustard	NA
		OSB_3	90	6	Cheatgrass, desert saltgrass	Tansy mustard, Russian thistle	NA
		OSB_4	97	27	Crested wheatgrass, cheatgrass	Russian thistle, tansy mustard, prickly lettuce	NA
	Road silt loam, 0 to 2 percent slope	RaA_1	95	64	Few to none, cheatgrass	Burning bush, broad-leaved pepperweed	Big sagebrush, greasewood, rubber rabbit
		RaA_2	83	55	Cheatgrass	Mustard including broad-leaved pepperweed	Greasewood
	Road silt loam, 2 to 4 percent slope	RaB_1	91	65	Cheatgrass	Clasping pepperweed, mustards, prickly lettuce, Russian thistle	NA; remnants of burned big sagebrush make up some “dead” shrub cover
		RaB_2	95	51	Cheatgrass; some scattered crested wheatgrass	Prickly lettuce, tansy mustard, burning bush, Russian thistle	NA
R024XY006NV Dry Floodplain	Pocker silt loam	Pk_1	70	45	Cheatgrass	NA	Greasewood
		Pk_2	91	74	Desert saltgrass, basin wildrye	Mustard, broad-leaved pepperweed	Greasewood, rubber rabbitbrush, tamarisk, shadscale, four-wing saltbrush
	Geyser silt loam	Ge_1	98	47	Cheatgrass	Storksbill, mustards	NA
		Ge_2	98	48	Cheatgrass	Mustard	NA

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R024XY007NV Saline Bottom	Dunphy silt loam, drained, slightly saline	Do_1	93	39	Cheatgrass	Prostrate mustard	Greasewood, shadscale, big sagebrush, rubber rabbitbrush
		Do_2	61	3	Few to none, cheatgrass	Few to none, Russian thistle	NA
		Do_3	96	69	Cheatgrass, squirrel tail	Prostrate mustard, pepperweed	Greasewood, shadscale, big sagebrush
		Do_4	90	71	Cheatgrass	Mustard, poverty weed, burning bush	Few to none, greasewood
		Do_5	95	37	Cheatgrass	Mustard, prickly lettuce	Greasewood
		Do_6	65	12	Few to none, Cheatgrass	Few to none, Russian thistle, brown-eyed primrose	Few to none, greasewood
	Cluro silt loam, slightly saline	Cr_1	96	53	Cheatgrass	Burning bush, mustards, clasping pepperweed	Big sagebrush, greasewood, rubber rabbitbrush
R024XY012NV Saline Terrace 6-8 P.Z	Rosney silt loam	Ru_1	96	43	Few to none; cheatgrass	Few to none; clasping pepperweed and wolly star	Greasewood
		Ru_2	99	43	Few to none; cheatgrass, squirrel tail	NA	Greasewood
		Ru_2a	80	59	Few to none - cheatgrass	Halogeton	Greasewood, four-wing saltbush
		Ru_2b	76	55	Desert saltgrass	Halogeton, perennial pepperweed	Greasewood, winterfat
		Ru_2c	96	59	Cheatgrass	Halogeton, clasping pepperweed	Greasewood, four-wing saltbush, big sagebrush
		Ru_3	91	43	Few to none; sparse cheatgrass	Few to none; some areas contain patches of clasping pepperweed	Greasewood, big sagebrush

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R024XY035NV Shallow Loam 10-14 P.Z.	Boulflat-Havingdon Association	BM_3	75	13	Cheatgrass, Sandberg's bluegrass	Smooth stem blazing star, mustards, prickly lettuce	Rubber rabbitbrush, big sagebrush
R025XY003NV Loamy Bottom 8-14 P.Z.	Boulflat-Havingdon Association	BM_2	82	22	Cheatgrass, Thurber's needlegrass, crested wheatgrass	Tansy mustard	Rubber rabbitbrush, big sagebrush
	Welch-Bosco Association	WE_1	94	69	Desert saltgrass, crested wheatgrass, basin wildrye, cheatgrass	Mustard, prickly lettuce, western salsify	Yellow rabbitbrush, big sagebrush
		WE_2	65	43	Cheatgrass, bottlebrush squirrel tail, bain wildrye, crested wheatgrass	NA	Big sagebrush, yellow rabbitbrush, greasewood
		WE_3	96	75	Basin wildrye, crested wheatgrass, cheatgrass	Tansy mustard, prickly lettuce, hoary cress, fleabane, poverty-weed, rumex spp.	Big sagebrush, yellow rabbitbrush
		WE_4	96	61	Crested wheatgrass, cheatgrass	Prickly lettuce	Rubber rabbitbrush, yellow rabbitbrush, big sagebrush
R025XY014NV Loamy 10-12 P.Z.	Ramires-Chen-Bobs Association	RF_3	97	73	Thurber needlegrass, slender wheatgrass, basin wildrye, cheatgrass, Indian ricegrass	Daggerpod, arrowleaf balsamroot, fringed puccoon, hawksbeard, bull thistle	Few to none; some yellow rabbitbrush
		RF_4	NA	NA	NA	NA	NA
		RF_5	84	64	Blue bunch wheatgrass, basin wildrye	Western salsify, daggerpod	Big sagebrush

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		RF_6	98	55	Cheatgrass, bluebunch wheatgrass, basin wildrye, bottlebrush squirrel tail	Mustard, western salsify, prickly lettuce, bull thistle, western stoneseed, globemallow	Big sagebrush, rubber rabbitbrush
	Simon loam, 2 to 8 percent slopes	SBB_1	96	70	Cheatgrass, crested wheatgrass, basin wildrye, some Japanese brome	Prickly lettuce, western salsify, some knapweed	Green rabbitbrush, big sagebrush
		SBB_2	98	73	Cheatgrass, crested wheatgrass, basin wildrye, some Japanese Mustard.brome	Western salsify, lupine, globemallow	Green rabbitbrush, some sparse big sagebrush
		SBB_3	99	74	Cheatgrass, crested wheatgrass, basin wildrye, some Japanese brome	Mustard, poverty weed	Big sagebrush, green rabbitbrush
		SBB_4	95	71	Cheatgrass, basin wildrye	Arrowleaf balsamroot, mustards, western salsify	Sparse big sagebrush
		SBB_5	79	48	Tall wheatgrass, basin wildrye	Arrowleaf, balsamroot, buckwheat	Big sagebrush, Utah serviceberry
		SBB_6	95	72	Basin wildrye	Blue mustard, lupine, western salsify, arrowleaf balsamroot	Green rabbitbrush, dead remnant big sagebrush stumps
	Slaven-Toeja Association	SG_2	92	43	Cheatgrass, crested wheatgrass, basin wildrye, blue bunch wheatgrass	Few to none; some tansy mustard	Big sagebrush, yellow rabbitbrush
		SG_4	94	46	Cheatgrass, crested wheatgrass, basin wildrye, blue bunch wheatgrass	Mustard, western stoneseed	Yellow rabbitbrush, big sagebrush

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R025XY019NV Loamy 8-10 P.Z.	Cherry Spring-Cortez-Chiara Association	CG_1	82	16	Cheatgrass	Halogeton, mustards, prickly lettuce, alfalfa	NA
		CG_2	NA	NA	NA. No vegetative survey performed	NA. No vegetative survey performed	NA. No vegetative survey performed
		CG_3	92	51	Crested wheatgrass, cheatgrass, basin wildrye	Mustard, western salsify, sow-thistle	Big sagebrush
		CG_3a	97	49	Crested wheatgrass, cheatgrass	NA	Yellow rabbitbrush, rubber rabbitbrush, big sagebrush
		CG_3b	95	44	Crested wheatgrass, cheatgrass	Few to none; western salsify, bur buttercup	Few to none – big sagebrush
		CG_3c	96	29	Crested wheatgrass, cheatgrass	Western salsify	NA
		CG_4	90	14	Cheatgrass	Tumble mustard, tansy mustard, prickly lettuce, halogeton	Big sagebrush
		CG_5	84	15	Cheatgrass, basin wildrye	Mustard, western salsify, halogeton	NA
		CG_6	98	30	Few to none; cheatgrass	Tansy mustard	Big sagebrush, rubber rabbitbrush
		CG_7	96	20	Cheatgrass	Tumble mustard, mustard spp., western salsify	NA
		CG_8	97	30	Cheatgrass	Tansy mustard, western salsify, pepperweed, bur buttercup, halogeton	Big sagebrush
		CG_10	NA	NA	NA. No vegetative survey performed	NA. No vegetative survey performed	NA. No vegetative survey performed

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
	Slaven-Mascamp Association	SD_1	94	24	Cheatgrass, Thuber's needlegrass, basin wildrye	Tansy mustard, storksbill, prickly lettuce	Yellow rabbitbrush, rubber rabbitbrush
		SD_2	94	35	Cheatgrass, blue bunch wheatgrass, slender wheatgrass, Thurber's needlegrass, Sandberg's bluegrass, crested wheatgrass	Few to none; western salsify	Big sagebrush, yellow rabbitbrush
		SD_3	98	37	Cheatgrass, blue bunch wheatgrass, basin wildrye, Thurber's needlegrass	Tansy mustard, western stoneseed	Big sagebrush, yellow rabbitbrush
		SD_4	99	27	Cheatgrass, basin wildrye, Thurber's needlegrass	Tansy mustard, western salsify, bull thistle	Big sagebrush
		SD_5	98	19	Cheatgrass, basin wildrye, desert saltgrass	Tansy mustard, bull thistle	Few to none, big sagebrush, rubber rabbitbrush
	Slaven-Toeja Association	SG_1	98	27	Cheatgrass, basin wildrye, crested wheatgrass	Tansy mustard, western stoneseed	Big sagebrush, yellow rabbitbrush
		SG_3	98	19	Cheatgrass, basin wildrye, crested wheatgrass	Tansy mustard, silvery lupin, bull thistle, desert saltgrass	Big sagebrush, yellow rabbitbrush
		SG_5	97	38	Cheatgrass, basin wildrye, slender wheatgrass, Thurber's needlegrass, blue bunch wheatgrass	Few to none; mustards	Big sagebrush

Ecological Site ID	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
	Tomera-Cherry Spring Association	TN_1	87	9	Cheatgrass, basin wildrye	Russian thistle	NA
		TN_3	82	24	Cheatgrass	Globemallow, prickly lettuce, mustards	Big sagebrush, rubber rabbitbrush
		TN_5	85	31	Cheatgrass	Halogeton	Big sagebrush
		TN_6	93	30	Cheatgrass, basin wildrye, crested wheatgrass	Mustard, tansy mustard, Russian thistle	Big sagebrush, rubber rabbitbrush
R025XY022NV Cobbly Claypan 8-12 P.Z.	Ramires-Chen-Bobs Association	RF_1	87	35	Thurber's needlegrass, slender wheatgrass	Daggerpod, arrowleaf balsamroot	Bitterbrush, big sagebrush, Utah serviceberry
		RF_2	91	62	Thurber's needlegrass, slender wheatgrass, basin wildrye, Indian rice grass, cheatgrass	Daggerpod, arrowleaf balsamroot, western salsify, prickly lettuce, Lewis flax, bottlebrush squirrel tail	Low sagebrush, big sagebrush, yellow rabbitbrush, bitterbrush, Utah serviceberry

N/A = data not available; NA = not applicable

Table A.1-3: Tuscarora Field Office Carlin Survey Area Ecological Site Description Ground Cover and Dominant Vegetation Species

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R024XY002NV Loamy 5-8 P.Z.	Beowawe silty clay loam, heavy subsoil variant	BC_1	91	49	Few to none – basin wildrye, crested wheatgrass, desert saltgrass	Few to none – clasping pepperweed, halogeton, mustards	Greasewood, rubber rabbitbrush, big sagebrush

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		BC_2	61	46	Alkali sacaton, cheatgrass, basin wildrye	Entire leaf thelypody, clasping pepperweed, tumble mustard, prickly lettuce, halogeton	Greasewood
		BC_3	88	21	Few to none – cheatgrass	Desert globemallow, common purslane, Russian thistle, halogeton	Greasewood
		BC_5	99	35	Cheatgrass, crested wheatgrass	Clasping pepperweed, mustards, halogeton, winterfat	Greasewood
R024XY005NV Loamy 8-10 P.Z.	Orovada silt loam, 0 to 2 percent slope	OtA_1	85	52	Few to none; basin wildrye	Burning bush, clasping pepperweed	Rubber rabbitbrush, big sagebrush, greasewood
	Rad-Brock Association	RE_1	94	63	Cheatgrass, basin wildrye, blue-bunch wheatgrass	Scotch thistle, clasping pepper weed, Russian thistle	Big sagebrush, green rabbitbrush, greasewood, rubber rabbitbrush
		RE_1a	79	47	Cheatgrass, squirrel tail, Sandberg's bluegrass	Clasping pepperweed	Big sagebrush, rubber rabbitbrush
		RE_3	93	69	Cheatgrass, blue bunch wheatgrass, squirrel tail	Tansy mustard, scotch thistle	Big sagebrush, green rabbitbrush

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R024XY007NV Saline Bottom	Cluro silt loam, slightly saline	Cr_2	95	22	Cheatgrass	Common purslane, desert globemallow, tansy mustard, Russian thistle, Scotch thistle	Few to none - greasewood
R024XY020NV Droughty Loam 8-10 P.Z.	Rad-Brock Association	RE_2	98	48	Cheatgrass, basin wildrye, squirrel tail, slender wheatgrass, Sandberg's bluegrass, blue-bunch wheatgrass	Scotch thistle, tansy mustard	Green rabbitbrush, rubber rabbitbrush, greasewood
		RE_3a	97	20	Cheatgrass, Indian ricegrass	Tumble mustard spp., clasping pepperweed	Big sagebrush
R025XY003NV Loamy Bottom 8-14 P.Z.	Bicondoa silty clay loam, drained, slightly saline	Bf_1	98	86	Basin wildrye, western wheatgrass	Russian knapweed	Rubber rabbitbrush, big sagebrush
	Welch-Bosco Association	WE_5	65	40	Basin wildrye, crested wheatgrass	Halogeton	Big sagebrush, yellow rabbitbrush, rubber rabbitbrush
R025XY005NV Wet Meadow	Bicondoa silty clay loam, drained, slightly saline	Bf_2	80	77	Common cattail, Elemus spp., Hordium jubadum, meadow foxtail, Potentilla spp., saltgrass, Juncus spp.	Tall white top, knapweed, milkweed, dock	Woodrose

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
	Welch loam	Wc_1	100	95	Western wheatgrass, Sandberg's bluegrass, broad-leaf cattail, Timothy, alkali Sacaton	Broad-leaved pepperweed, Baltic rush, scotch thistle, musk thistle, Russian knapweed, mapleleaf goosefoot, prickly lettuce, Rocky Mountain iris, Oregon checker mallow	Rubber rabbitbrush, Russian olive, currant
		Wc_2	100	87	Alpine timothy, Sandberg's bluegrass, basin wildrye, Timothy, desert saltgrass	Scotch thistle, musk thistle, small tumble mustard, Russian knapweed, field pennycress, prickly lettuce, broad-leaved pepperweed, hoary cress, Baltic rush, smartweed, Fremont's goosefoot, mapleleaf goosefoot	Greasewood, rubber rabbitbrush, big sagebrush

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		Wc_3	NA	75	Sandberg's bluegrass, basin wildrye, timothy	Scotch thistle, musk thistle, small tumble mustard, tansy mustard, Russian knapweed, prickly lettuce, broad-leaved pepperweed, smartweed, Fremont's goosefoot	Rubber rabbitbrush, greasewood, big sagebrush
		Wc_4	99	90	Western wheatgrass, Sandberg's bluegrass, smooth brome, alkali sacaton	Broad-leaved pepperweed, small tumble mustard, Slender cinquefoil, musk thistle, scotch thistle	Rubber rabbitbrush, greasewood, big sagebrush, Russian olive
R025XY015NV South Slope 8-12 P.Z.	Cherry Spring-Berning Association	CF_2b	78	42	Few to none – cheatgrass	Clasping pepperweed, halogeton	Big sagebrush, rubber rabbitbrush, yellow rabbitbrush
R025XY019NV Loamy 8-10 P.Z.	Cherry Spring-Cortez-Tomera Association	CH_1	72	32	Crested wheatgrass, basin wildrye, Sandberg's bluegrass	NA	Greasewood, big sagebrush
		CH_2	97	43	Sandberg's bluegrass	Russian thistle, prickly lettuce	Big sagebrush
		CH_2a	89	38	NA	Clasping pepperweed	Big sagebrush, yellow rabbitbrush
		CH_3	80	29	NA	NA	Big sagebrush

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		CH_4	82	23	Basin wildrye	Russian thistle	Big sagebrush, greasewood
		CH_5	83	43	Cheatgrass	NA	Big sagebrush
R025XY019NV Loamy 8-10 P.Z.	Cherry Spring-Berning Association	CF_1	0	0	NA. No vegetative survey performed	NA. No vegetative survey performed	No. No vegetative survey performeed.
		CF_2	92	41	Cheatgrass, crested wheatgrass	Clasping pepperweed, Russian thistle, desert globemallow, tansy mustard	Big sagebrush, rubber rabbitbrush
		CF_2a	92	41	Cheatgrass, crested wheatgrass	Clasping pepperweed, Russian thistle, desert globemallow, tansy mustard	Big sagebrush, rubber rabbitbrush
		CF_2c	96	58	Squirrel tail, cheatgrass	Clasping pepperweed	Big sagebrush
		CF_2d	94	46	Cheatgrass	Clasping pepperweed	Big sagebrush
		CF_2e	95	52	NA	Prickly lettuce, tumble mustard	Big sagebrush
		CF_3	88	43	Cheatgrass	Halogeton, Russian thistle, clasping pepperweed, tansy mustard, bur buttercup	Big sagebrush, rubber rabbitbrush
	Cherry Spring-Berning Association	CF_5	87	45	Squirrel tail, crested wheatgrass	NA	Big sagebrush, yellow rabbitbrush
		CF_6	92	42	Cheatgrass	NA	Big sagebrush, yellow rabbitbrush

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		CF_6a	91	38	Sandberg's bluegrass, squirrel tail, cheatgrass	Clasping pepperweed, tansy mustard	Big sagebrush
	Orovado-Puett Association	491_1	76	30	Sandberg's bluegrass	Tansy mustard	Big sagebrush
		491_1a	89	49	Cheatgrass, squirrel tail	Clasping pepperweed	Big sagebrush
		491_1b	86	37	Few to none – cheatgrass	Clasping pepperweed, mustards	Rubber rabbitbrush, yellow rabbitbrush, big sagebrush
		491_2	89	43	Sandberg's bluegrass, squirrel tail	Halogeton	Big sagebrush
		491_3	81	31	Cheatgrass	Russian thistle, halogeton, forage kochia	NA
		491_4	63	32	Sandberg's bluegrass, cheatgrass, squirrel tail	Mustard, asters	Big sagebrush
	Tomera-Cherry Spring Association	TN_2	99	98	Western wheatgrass, meadow foxtail	Perennial pepperweed, scotch thistle, yarrow, silverscale saltbush	Russian olive, rubber rabbitbrush
		TN_3a	TN_3a	TN_3a	TN_3a	TN_3a	TN_3a
		82	82	82	82	82	82
		46	46	46	46	46	46
		Cheatgrass	Cheatgrass	Cheatgrass	Cheatgrass	Cheatgrass	Cheatgrass
		Clasping pepperweed	Clasping pepperweed	Clasping pepperweed	Clasping pepperweed	Clasping pepperweed	Clasping pepperweed
		Big sagebrush, greasewood	Big sagebrush, greasewood	Big sagebrush, greasewood	Big sagebrush, greasewood	Big sagebrush, greasewood	Big sagebrush, greasewood

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		TN_4	TN_4	TN_4	TN_4	TN_4	TN_4
		79	79	79	79	79	79

NA = not applicable

Table A.1-4: Tuscarora Field Office Crescent Valley Survey Area Ecological Site Description Ground Cover and Dominant Vegetation Species

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R024XY002NV Loamy 5-8 P.Z.	Beowawe-Broyles Association	BB_1	95	35	Cheatgrass	Tansy mustard, clasping pepperweed, Russian thistle	Shadscale
		BB_2	95	49	Cheatgrass, squirrel tail	Russian thistle, clasping pepperweed, blue mustard, tumble mustard, basin yellow cats eye, globemallow, pepperweed	Shadscale
	Broyles silt loam, 0 to 2 percent slopes	BpA_1	96	74	Cheatgrass	Russian thistle, lowland cudweed	NA
		BpA_1a	97	44	Few to none – cheatgrass	Russian thistle, mustards, bur buttercup, halogeton	Greasewood, shadscale
		BpA_2	95	51	Cheatgrass	Mustard, Russian thistle	Few to none; some sparse shadscale and dead shrubs
		BpA_3	95	55	Cheatgrass	Annual forbs; Russian thistle, some sporadic globemallow	Greasewood; few sporadic big sagebrush clumped together

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		BpA_4	97	40	Cheatgrass	Halogeton, mustards, annual forbs	Greasewood
	Broyles-Ricert Association	192_1	80	42	Few to none; cheatgrass	Annual forbs; mustards, brown-eyed primrose, Russian thistle	Shadscale
		192_2	93	46	Cheatgrass	Mustard, Russian thistle	Shadscale
	Creemon-Relley Association	741_1	96	82	Cheatgrass	Mustard, pepperweed	Shadscale, spiny horse brush
		741_2	81	54	Cheatgrass	Mustard, Russian thistle	Shadscale, spiny horse brush
		741_3	93	51	Basin wildrye, crested wheatgrass	Mustard, Russian thistle	NA
		741_4	96	44	Western wheatgrass, crested wheatgrass	Mustard	NA
	Crescent Valley Area	RbB_1	96	41	Few to none; some cheatgrass and some sparse bottlebrush squirrel tail	Few to none; some sparse annual forbs such as pepperweed, mustards, and wooly star	Greasewood
		RbB_2	87	39	Few to none; some scattered cheatgrass	Few to none; some annual forb presence; pepperweed and mustards	Greasewood
		RbB_3	98	36	Few to none; sporadic cheatgrass	Clasping pepperweed, mustards, Russian thistle	NA

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		RbB_4	97	42	Cheatgrass	Clasping pepperweed, cud weed	NA; few greasewood
		RbB_5	95	45	Cheatgrass	Halogeton, mustards	Greasewood, big sagebrush
	Soughe-Fortank-Kodra Variant Association	525_1	98	52	Few to none; some scattered squirrel tail and cheatgrass	Scattered wooly star	Budsage, shadscale
	Tenabo-Ricert Association	901_1	89	73	Bottlebrush squirrel tail, Indian ricegrass	NA	Greasewood, shadscale, little leaf horse brush, some big sagebrush present
		901_2	96	51	Cheatgrass, bottlebrush squirrel tail	Pepperweed	Budsage, shadscale
	Whirlo gravelly loam, 2 to 8 percent slopes	671_1	97	53	Cheatgrass	Desert prince's plume, redstem storksbill	Big sagebrush, budsage, rabbitbrush species

NA = not applicable

Table A.1-5: Mount Lewis Field Office Crescent Valley Survey Area Ecological Site Description Ground Cover and Dominant Vegetation Species

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
R024XY002NV Loamy 5-8 P.Z.	Dun Glen-Whirlo Association	3661_1	84	54	Cheatgrass, Sandberg's bluegrass, bottlebrush squirrel tail	Currantleaf desert mallow, mustard, pepperweed	Budsage, shadscale
		3661_2	89	76	Cheatgrass, crested wheatgrass, bottlebrush squirrel tail	Pepperweed, currentleaf desert mallow, blue mustard	Shadscale, budsage, rubber rabbitbrush

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
		3661_3	89	70	Cheatgrass, Sandberg's bluegrass, bottlebrush squirrel tail	Pepperweed, mustard, annual forbs	Rubber rabbitbrush, shadscale, budsage, big sagebrush
		3661_4	99	47	Cheatgrass, bottlebrush Squirrel tail	Pepperweed	Rubber rabbitbrush
		3661_5	99	59	Cheatgrass	Tansy mustard, storksbill, pepperweed	Rubber rabbitbrush, shadscale, budsage, big sagebrush
	Whirlo-Creemon Association	1165_1	90	74	Cheatgrass, bluegrass, bottlebrush squirrel tail	Pepperweed, mustard, currantleaf desert mallow	Shadscale, budsage, big sagebrush, Plains prickly pear
		1165_2	55	18	Annual false wheatgrass, cheatgrass	Pepperweed, annual forbs; few to no forbs	NA
		1165_3	92	78	Cheatgrass, bottlebrush squirrel tail, Indian ricegrass	Mustard, lambs quarter, pepperweed	Rubber rabbitbrush, big sagebrush
		1165_4	94	63	Few to none; cheatgrass, bottlebrush squirrel tail	Pepperweed, currantleaf desert mallow; few to no forbs	Shadscale, budsage, big sagebrush, plains prickly pear
		1165_5	99	63	Cheatgrass, bottlebrush squirrel tail	Tansy mustard, pepperweed, storksbill	Rubber rabbitbrush
	Dumps and pits, mine	1600_1	66	45	Annual false wheatgrass, cheatgrass	Mustard	Shadscale, horse brush
	Tenabo-Ricert Association	1041_1	91	51	Cheatgrass, bottlebrush squirrel tail, Indian ricegrass	Pepperweed, mustard	Shadscale, budsage
	Whirlo gravelly loam, 2 to 8 percent slopes	1160_1	83	41	Few to none; sparse cheatgrass	Few to none; some small annual forbs	Big sagebrush, greasewood

Ecological Site ID & ESD	Soil Component Name	Site ID	Ground Cover %	Canopy Cover %	Dominant Grasses	Dominant Forbs	Dominant Shrubs/Succulents/Trees
	Whirlo-Broyles Association	1169_1	66	34	Cheatgrass; some bottlebrush squirrel tail and Indian ricegrass present, but not as prevalent	Blue mustard, halogeton	Shadscale, budsage
		1169_2	72	25	Cheatgrass, bottlebrush squirrel tail	Tansy mustard	Big sagebrush, shadscale, budsage
		1169_3	97	25	Cheatgrass	Bur buttercup	Shadscale; some greasewood and big sagebrush
		1169_4	98	47	Cheatgrass, squirrel tail	Pepperweed	Shadscale, black sagebrush, saltbush

NA = not applicable

A.2. INTEGRATED INDICATORS OF RANGELAND HEALTH

Table A.2-1 is a summary of the 17 indicators of rangeland health departure ratings collected by ERM field crews in 2021. Data sheets and photos are in Appendix A.8.

Table A.2-1: Summary of the 17 Indicators of Rangeland Health in the Goldstrike, Carlin, and Crescent Valley Survey Areas

Indicator	Goldstrike		Carlin		Crescent Valley	
	Departure Rating	Number of Sites	Departure Rating	Number of Sites	Departure Rating	Number of Sites
1. Rills	None to Slight	29	None to Slight	10	None to Slight	49
	N/A	3			Slight to Moderate	2
2. Water Flow Patterns	None to Slight	28	None to Slight	10	None to Slight	51
	Moderate to Extreme	1				
	N/A	3				
3. Pedestals and/or Terracettes	None to Slight	28	None to Slight	10	None to Slight	50
	Moderate to Extreme	1				
	Extreme	1				
	N/A	3				
4. Bare Ground	None to Slight	16	None to Slight	5	None to Slight	12
	Slight to Moderate	7	Slight to Moderate	1	Slight to Moderate	5
	Moderate	3	Moderate		Moderate	9
	Moderate to Extreme	3	Moderate to Extreme	3	Moderate to Extreme	14
	Extreme		Extreme		Extreme	11
	N/A	3	N/A	1	N/A	
5. Gullies	None to Slight	28	None to Slight	10	None to Slight	51
	Moderate to Extreme	1				
	N/A	3				

Indicator	Goldstrike		Carlin		Crescent Valley	
	Departure Rating	Number of Sites	Departure Rating	Number of Sites	Departure Rating	Number of Sites
6. Wind-scoured and/or depositional areas	None to Slight	28	None to Slight	10	None to Slight	51
	Slight to Moderate	1				
	N/A	3				
7 Litter Movement (wind or water)	None to Slight	28	None to Slight	9	None to Slight	51
	Slight to Moderate	1	Slight to Moderate	1		
	N/A	3				
8. Soil Surface Resistance to erosion	None to Slight	28	None to Slight	10	None to Slight	51
	N/A	3				
9. Soil surface loss and degradation	None to Slight	20	None to Slight	10	None to Slight	49
	Slight to Moderate	3			Moderate	1
	Moderate	5			Extreme	1
	Extreme	1				
	N/A	3				
10. Effect of Plant Community Composition	None to Slight		None to Slight	1	None to Slight	1
	Slight to Moderate	4	Slight to Moderate	4	Slight to Moderate	13
	Moderate	2	Moderate	2	Moderate	18
	Moderate to Extreme	9	Moderate to Extreme	3	Moderate to Extreme	10
	Extreme	14			Extreme	9
	N/A	4				
11. Compaction Layer	None to Slight	31	None to Slight	7	None to Slight	48
	N/A	3	Moderate	3	Moderate	3
					Extreme	1

Indicator	Goldstrike		Carlin		Crescent Valley	
	Departure Rating	Number of Sites	Departure Rating	Number of Sites	Departure Rating	Number of Sites
12. Functional/Structural Groups	Moderate	5	Slight to Moderate	2	Moderate	7
	Moderate to Extreme	4	Moderate	2	Moderate to Extreme	24
	Extreme	20	Moderate to Extreme	4	Extreme	20
	N/A	4	Extreme	2		
13. Dead or dying plants or plant parts	None to Slight	8	None to Slight	9	None to Slight	16
	Slight to Moderate	2	Slight to Moderate	1	Slight to Moderate	9
	Moderate	1			Moderate	17
	Moderate to Extreme	6			Moderate to Extreme	4
	Extreme	13			Extreme	5
	N/A	4				
14. Litter Cover and Depth	None to Slight	7	None to Slight	5	None to Slight	32
	Slight to Moderate	5	Slight to Moderate	3	Slight to Moderate	5
	Moderate	8	Moderate	1	Moderate	6
	Moderate to Extreme	6	Moderate to Extreme	1	Moderate to Extreme	7
	Extreme	2			Extreme	1
	N/A	6				
15. Annual Production	None to Slight	29	None to Slight	10	None to Slight	51
	N/A	4				
16. Invasive Plants	None to Slight	1	None to Slight	3	None to Slight	3
	Slight to Moderate	10	Slight to Moderate	2	Slight to Moderate	4
	Moderate	4	Moderate	2	Moderate	14
	Moderate to Extreme	1	Moderate to Extreme	1	Moderate to Extreme	14
	Extreme	14	Extreme	2	Extreme	16
	N/A	3				

Indicator	Goldstrike		Carlin		Crescent Valley	
	Departure Rating	**Number of Sites**	**Departure Rating**	**Number of Sites**	**Departure Rating**	**Number of Sites**
17. Vigor with an emphasis on reproductive capability of perennial plants	Moderate	7	None to Slight	1	None to Slight	5
	Moderate to Extreme	7	Slight to Moderate	4	Slight to Moderate	3
	Extreme	16	Moderate	3	Moderate	20
	N/A	3	Moderate to Extreme	2	Moderate to Extreme	15
					Extreme	8

N/A = data not available

A.3. CANOPY COVER AND GROUND COVER

Table A.3-1 through Table A.3-8 contain the vegetation canopy cover and ground cover percentages for the ecological site ID (ESD and soil survey locations) in the Tuscarora and Mount Lewis Field Offices. Data sheets and photos are in Appendix A.8

Table A.3-1: Tuscarora Field Office Goldstrike Survey Area Vegetation Canopy Cover Percentages

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
Do_1	0	2	0	1	36	0	39
Do_3	3	3	0	28	35	0	69
RbB_6	0	2	0	28	1	0	31
Ru_3	0	1	0	4	38	0	43
RbB_7	0	1	0	2	32	0	35
Ru_1	0	1	0	2	40	0	43
Ru_2	2	1	0	0	40	0	43
RbB_8	0	3	0	20	28	0	51
RbB_9	0	2	0	15	25	0	42
RbB-10	0	3	0	20	30	0	53
Mf_1	0	1	0	5	20	0	26
Is_1	0	0	0	2	40	0	42
Pk_2	15	0	0	15	43	1	74
Pk_1	0	1	0	1	43	0	45
RaA_2	0	1	0	18	36	0	55
RaA_1	0	1	0	15	48	0	64
Cr_1	0	10	0	6	37	0	53
Mf_6	0	1	0	30	0	0	31
Mf_3	1	2	0	35	0	0	38
Mf_5	15	25	0	1	2	0	43
Mf_7	3	20	0	0	0	0	23
Mf_4	0	10	0	3	0	0	13
Ms_1	0	5	1	15	0	0	21
Ms_2	0	2	0	16	0	0	18
Ms_3	0	2	0	16	0	0	18
Do_5	0	5	0	4	28	0	37
Do_6	0	1	0	1	10	0	12
Mf_2	0	0	0	0	0	0	NA
Do_2	0	1	0	2	0	0	3

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
Mf_9	8	2	0	10	0	0	20
Mf_8	10	3	0	8	0	0	21
Ge_1	0	45	0	2	0	0	47
CG_6	0	2	0	3	25	0	30
CG_3	8	1	4	8	30	0	51
CG_8	0	2	2	20	6	0	30
CG_5	1	1	1	12	0	0	15
RaB_2	1	35	0	15	0	0	51
RaB_1	0	35	0	25	5	0	65
Do_4	0	40	0	30	1	0	71
CG_4	0	1	0	10	3	0	14
CG_1	0	1	0	15	0	0	16
RF_1	10	0	5	0	20	0	35
SBB_3	15	40	1	10	8	0	74
SBB_2	15	40	5	3	10	0	73
SBB_1	20	40	0	2	8	0	70
RF_2	25	1	12	2	22	0	62
RF_3	64	1	5	0	3	0	73
Ge_2	0	8	0	40	0	0	48
SBB_4	8	30	15	15	3	0	71
SBB_5	3	1	8	1	35	0	48
SBB_6	10	5	15	40	2	0	72
RF_5	32	0	7	0	25	0	64
RF_6	7	1	10	35	2	0	55
SG_4	11	1	0	5	29	0	46
SG_2	15	1	0	3	24	0	43
RF_4	NA	NA	NA	NA	NA	NA	NA
SD_1	12	1	3	6	2	0	24
SG_5	16	1	0	1	20	0	38
SG_1	8	1	3	11	4	0	27
SG_3	6	1	1	10	1	0	19
SD_2	15	1	1	0	18	0	35
SD_5	3	1	0	13	2	0	19
SD_4	9	1	1	6	10	0	27
SD_3	6	1	2	16	12	0	37
BM_3	1	1	3	0	8	0	13
TN_5	0	1	1	1	28	0	31

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
BM_2	5	1	0	1	15	0	22
WE_2	2	1	0	0	40	0	43
TN_3	0	1	1	2	20	0	24
WE_4	30	1	0	5	25	0	61
WE_3	30	1	1	15	28	0	75
WE_1	42	0	4	3	20	0	69
BM_1	NA	NA	NA	NA	NA	NA	NA
CG_10	NA	NA	NA	NA	NA	NA	NA
CG_2	NA	NA	NA	NA	NA	NA	NA
TN_6	2	1	0	1	26	0	30
TN_1	0	1	0	8	0	0	9
OSB_1	0	1	0	6	0	0	7
OSB_2	0	1	0	3	0	0	4
OSB_3	0	1	0	5	0	0	6
CG_3a	27	1	0	0	21	0	49
CG_3c	23	5	0	1	0	0	29
CG_7	0	10	0	10	0	0	20
CG_3b	35	1	3	1	4	0	44
OSB_4	0	1	0	26	0	0	27
Ru_2c	0	1	0	30	28	0	59
Ru_2a	0	1	0	16	42	0	59
Ru_2b	5	0	0	18	32	0	55
Dp_2a	2	0	0	12	34	0	48

NA = not applicable

Table A.3-2: Tuscarora Field Office Goldstrike Survey Area Ground Cover Percentages

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
Do_1	3	15	36	0	7	39	93
Do_3	2	5	20	0	4	69	96
RbB_6	1	40	25	0	3	31	97
Ru_3	5	20	23	0	9	43	91
RbB_7	1	40	20	0	4	35	96
Ru_1	2	18	33	0	4	43	96
Ru_2	1	10	45	0	1	43	99
RbB_8	22	12	10	0	5	51	95

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
RbB_9	8	7	35	1	7	42	93
RbB-10	30	8	5	0	4	53	96
Mf_1	27	40	1	4	2	26	98
Is_1	35	13	0	0	10	42	90
Pk_2	12	2	3	0	9	74	91
Pk_1	18	5	0	2	30	45	70
RaA_2	22	2	0	4	17	55	83
RaA_1	20	5	1	5	5	64	95
Cr_1	20	21	1	1	4	53	96
Mf_6	5	55	0	0	9	31	91
Mf_3	20	40	0	0	2	38	98
Mf_5	6	40	0	5	6	43	94
Mf_7	25	40	0	10	2	23	98
Mf_4	5	70	0	10	2	13	98
Ms_1	30	45	0	1	3	21	97
Ms_2	14	58	0	1	9	18	91
Ms_3	12	64	0	1	5	18	95
Do_5	15	42	1	0	5	37	95
Do_6	8	45	0	0	35	12	65
Mf_2	12	45	0	0	43	NA	57
Do_2	10	48	0	0	39	3	61
Mf_9	3	42	0	15	20	20	80
Mf_8	3	45	0	10	21	21	79
Ge_1	5	45	0	1	2	47	98
CG_6	28	35	0	5	2	30	98
CG_3	14	25	1	1	8	51	92
CG_8	34	32	0	1	3	30	97
CG_5	35	32	0	2	16	15	84
RaB_2	3	40	0	1	5	51	95
RaB_1	5	20	0	1	9	65	91
Do_4	1	18	0	0	10	71	90
CG_4	50	25	0	1	10	14	90
CG_1	50	15	0	1	18	16	82
RF_1	10	7	2	33	13	35	87
SBB_3	5	20	0	0	1	74	99
SBB_2	5	20	0	0	2	73	98
SBB_1	3	23	0	0	4	70	96

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
RF_2	8	3	1	17	9	62	91
RF_3	12	8	1	3	3	73	97
Ge_2	10	40	0	0	2	48	98
SBB_4	3	20	0	1	5	71	95
SBB_5	3	3	0	25	21	48	79
SBB_6	1	15	0	7	5	72	95
RF_5	10	2	1	7	16	64	84
RF_6	18	10	1	14	2	55	98
SG_4	25	21	1	1	6	46	94
SG_2	28	20	0	1	8	43	92
RF_4	NA	NA	NA	NA	NA	NA	NA
SD_1	32	12	1	25	6	24	94
SG_5	38	21	0	0	3	38	97
SG_1	50	20	0	1	2	27	98
SG_3	43	35	0	1	2	19	98
SD_2	45	10	0	4	6	35	94
SD_5	55	24	0	0	2	19	98
SD_4	48	24	0	0	1	27	99
SD_3	33	27	0	1	2	37	98
BM_3	12	20	0	30	25	13	75
TN_5	18	32	2	2	15	31	85
BM_2	39	18	0	3	18	22	82
WE_2	5	16	0	1	35	43	65
TN_3	15	40	2	1	18	24	82
WE_4	26	5	3	1	4	61	96
WE_3	12	5	2	2	4	75	96
WE_1	6	14	4	1	6	69	94
BM_1	NA	NA	NA	NA	NA	NA	NA
CG_10	NA	NA	NA	NA	NA	NA	NA
CG_2	NA	NA	NA	NA	NA	NA	NA
TN_6	20	37	5	1	7	30	93
TN_1	43	26	2	7	13	9	87
OSB_1	41	27	2	7	16	7	84
OSB_2	40	34	2	5	15	4	85
OSB_3	40	37	2	5	10	6	90
CG_3a	13	21	6	8	10	49	90
CG_3c	5	45	15	2	1	29	99

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
CG_7	5	60	10	1	0	20	100
CG_3b	14	30	2	5	21	44	79
OSB_4	46	22	0	2	15	27	85
Ru_2c	10	24	3	0	7	59	93
Ru_2a	10	6	5	0	12	59	88
Ru_2b	10	10	1	0	5	55	95
Dp_2a	18	5	3	12	8	48	92

NA = not applicable

Table A.3-3: Tuscarora Field Office Carlin Survey Area Vegetation Canopy Cover Percentages

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
Wc_4	43	0	2	42	2	1	90
Wc_1	48	0	1	43	2	1	95
Wc_3	55	0	0	18	2	0	75
OtA_1	1	0	0	13	38	0	52
Wc_2	41	0	0	41	5	0	87
RE_2	7	30	0	3	8	0	48
RE_3	7	25	0	2	35	0	69
RE_1	18	8	0	2	35	0	63
TN_2	75	0	0	16	7	0	98
TN_8	5	27	0	7	37	0	76
BC_1	1	0	0	3	45	0	49
BC_5	1	1	0	12	21	0	35
Bf_1	30	0	0	26	28	2	86
Bf_2	70	0	3	1	3	0	77
TN_9	40	0	2	1	15	0	58
TN_7	27	0	46	1	1	0	75
TN_3a	7	3	0	1	35	0	46
BC_2	18	3	1	2	22	0	46
BC_3	0	1	2	13	5	0	21
Cr_2	0	1	6	5	10	0	22
CF_2	4	1	1	3	32	0	41
CF_2a	4	1	1	3	32	0	41
CF_3	0	1	0	4	38	0	43
CF_2b	0	1	0	5	36	0	42

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
CF_1	0	0	0	NA	NA	NA	NA
TN_4	8	10	0	4	25	0	47
CF_5	10	0	0	0	35	0	45
TN_5a	5	8	0	2	35	0	50
CF_6a	3	1	0	1	33	0	38
TN_6a	0	19	0	2	3	0	24
TN_8a	1	8	0	8	10	0	27
RE_3a	2	6	1	1	10	0	20
RE_1a	11	2	0	1	33	0	47
CF_2c	10	3	0	10	35	0	58
CH_2	5	0	0	30	8	0	43
CF_2e	15	2	1	2	32	0	52
CH_4	1	0	0	5	17	0	23
491_3	0	4	2	20	5	0	31
491_2	8	0	0	0	35	0	43
CH_1	7	0	0	0	25	0	32
CH_3	2	0	0	0	27	0	29
491_1a	3	3	0	3	40	0	49
491_1	2	0	0	3	25	0	30
CF_2d	2	3	0	1	40	0	46
CF_6	2	2	0	0	38	0	42
491_4	2	1	0	4	25	0	32
CH_5	2	1	0	0	40	0	43
491_1b	0	1	0	1	35	0	37
CH_2a	0	0	0	1	37	0	38
WE_5	5	0	0	1	34	0	40

NA = not applicable

Table A.3-4: Tuscarora Field Office Carlin Survey Area Vegetation Ground Cover Percentages

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
Wc_4	5	4	0	0	1	90	99
Wc_1	1	4	0	0	0	95	100
Wc_3	1	3	NA	NA	NA	75	NA
OtA_1	1	14	12	6	15	52	85
Wc_2	2	11	0	0	0	87	100

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
RE_2	20	20	1	9	2	48	98
RE_3	6	3	5	10	7	69	93
RE_1	18	7	4	2	6	63	94
TN_2	1	0	0	0	1	98	99
TN_8	15	4	0	5	0	76	100
BC_1	3	18	20	1	9	49	91
BC_5	25	37	2	0	1	35	99
Bf_1	2	7	2	1	2	86	98
Bf_2	2	1	0	0	20	77	80
TN_9	2	2	0	0	38	58	62
TN_7	7	11	1	1	5	75	95
TN_3a	3	15	8	10	18	46	82
BC_2	4	10	1	0	39	46	61
BC_3	10	46	3	8	12	21	88
Cr_2	28	38	0	7	5	22	95
CF_2	24	20	1	6	8	41	92
CF_2a	24	20	1	6	8	41	92
CF_3	10	25	4	6	12	43	88
CF_2b	3	13	2	18	22	42	78
CF_1	NA	NA	NA	NA	100	NA	NA
TN_4	3	16	3	10	21	47	79
CF_5	3	13	22	4	13	45	87
TN_5a	7	9	2	12	20	50	80
CF_6a	7	18	8	20	9	38	91
TN_6a	10	12	0	52	2	24	98
TN_8a	4	12	1	55	1	27	99
RE_3a	5	7	0	65	3	20	97
RE_1a	7	11	12	2	21	47	79
CF_2c	4	18	15	1	4	58	96
CH_2	3	35	12	4	3	43	97
CF_2e	10	21	9	3	5	52	95
CH_4	4	20	30	5	18	23	82
491_3	2	18	10	20	19	31	81
491_2	6	10	15	15	11	43	89
CH_1	5	5	15	15	28	32	72
CH_3	4	5	19	23	20	29	80
491_1a	5	15	10	10	11	49	89

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
491_1	7	16	8	15	24	30	76
CF_2d	5	30	9	4	6	46	94
CF_6	7	22	15	6	8	42	92
491_4	7	4	12	8	37	32	63
CH_5	5	18	7	10	17	43	83
491_1b	13	26	0	10	14	37	86
CH_2a	8	21	12	10	11	38	89
WE_5	3	7	15	0	35	40	65

NA = not applicable

Table A.3-5: Tuscarora Field Office Crescent Valley Survey Area Vegetation Canopy Cover Percentages

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
901_1	8	2	1	2	60	0	73
901_2	2	20	1	8	20	0	51
881_4	33	0	0	0	20	0	53
881_1	0	15	0	0	45	0	60
881_3	0	15	0	1	45	0	61
881_2	0	0	0	15	50	0	65
741_2	1	7	1	7	38	0	54
741_1	1	7	1	43	30	0	82
822_5	0	40	1	10	40	0	91
822_4	0	30	1	5	40	0	76
822_2	0	38	1	10	38	0	87
192_4	1	15	1	25	10	0	52
192_3	1	40	1	25	7	0	74
192_6	1	8	1	14	30	0	54
822_1	0	30	1	2	30	0	63
822_3	0	28	1	2	32	0	63
192_5	1	20	0	10	38	0	69
192_7	1	20	0	12	42	0	75
861_2	0	15	2	8	40	0	65
861_1	1	12	2	8	35	0	58
822_6	0	6	1	6	70	0	83
861_4	1	6	0	5	68	0	80
861_3	1	10	0	8	50	0	69

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
671_1	2	14	5	12	20	0	53
169_1	0	3	1	3	30	0	37
Ok_1	2	0	0	0	40	0	42
Od_1	18	1	0	2	40	0	61
Dp_2	5	2	0	0	45	0	52
Dp_1	2	1	2	1	45	0	51
Dp_3	0	18	0	5	32	0	55
BpA_3	0	19	1	10	25	0	55
BpA_1	0	36	0	38	0	0	74
BpA_4	0	5	0	20	15	0	40
BpA_2	0	25	0	21	5	0	51
RbB_1	1	1	0	1	38	0	41
RbB_2	0	2	0	1	36	0	39
RbB_3	0	1	0	35	0	0	36
RbB_4	0	25	0	15	2	0	42
RbB_5	0	10	0	5	30	0	45
192_1	1	1	0	15	25	0	42
192_2	0	1	0	40	5	0	46
881_6	0	0	0	36	0	0	36
881_5	0	0	0	38	0	0	38
561_2	0	0	0	50	0	0	50
561_1	0	0	0	50	1	0	51
525_2	1	5	0	1	45	0	52
525_1	1	1	0	2	48	0	52
BB_2	2	5	2	35	5	0	49
BB_1	0	2	1	25	7	0	35
741_4	10	1	1	32	0	0	44
741_3	22	1	0	28	0	0	51
881_2a	48	0	0	2	28	0	78
881_2b	1	0	0	1	56	0	58
BpA_1a	0	0	0	10	34	0	44
881_4a	20	0	0	0	40	0	60
881_4b	25	0	0	0	25	0	50
561_3	0	40	0	5	0	0	45
881_2c	10	0	7	0	18	0	35

Table A.3-6: Tuscarora Field Office Crescent Valley Survey Area Ground Cover Percentages

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
901_1	5	2	8	1	11	73	89
901_2	20	5	5	15	4	51	96
881_4	5	5	16	5	16	53	84
881_1	7	2	30	0	1	60	99
881_3	6	2	30	0	1	61	99
881_2	2	2	15	1	15	65	85
741_2	10	17	0	0	19	54	81
741_1	2	12	0	0	4	82	96
822_5	1	3	0	1	4	91	96
822_4	5	10	0	1	8	76	92
822_2	2	5	0	1	5	87	95
192_4	15	1	0	2	30	52	70
192_3	5	6	0	1	14	74	86
192_6	8	8	0	1	29	54	71
822_1	5	11	0	0	21	63	79
822_3	5	11	0	0	21	63	79
192_5	5	3	0	0	23	69	77
192_7	5	4	0	0	16	75	84
861_2	5	7	4	4	15	65	85
861_1	5	7	4	10	16	58	84
822_6	1	7	0	1	8	83	92
861_4	4	7	1	1	7	80	93
861_3	4	10	1	10	6	69	94
671_1	5	18	1	20	3	53	97
169_1	5	12	15	8	23	37	77
Ok_1	3	2	30	0	23	42	77
Od_1	5	13	5	0	16	61	84
Dp_2	2	12	23	0	11	52	89
Dp_1	6	16	18	0	9	51	91
Dp_3	5	18	18	0	4	55	96
BpA_3	2	20	17	1	5	55	95
BpA_1	2	10	5	5	4	74	96
BpA_4	2	35	20	0	3	40	97
BpA_2	2	21	21	0	5	51	95
RbB_1	5	20	30	0	4	41	96

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
RbB_2	4	20	24	0	13	39	87
RbB_3	15	45	2	0	2	36	98
RbB_4	10	40	5	0	3	42	97
RbB_5	5	28	17	0	5	45	95
192_1	3	20	15	0	20	42	80
192_2	2	30	15	0	7	46	93
881_6	7	36	15	0	6	36	94
881_5	28	36	5	0	4	38	96
561_2	10	25	3	1	1	50	99
561_1	2	35	10	0	12	51	88
525_2	1	25	12	23	10	52	90
525_1	3	2	25	15	2	52	98
BB_2	10	3	10	1	5	49	95
BB_1	15	25	5	0	5	35	95
741_4	10	40	5	2	4	44	96
741_3	3	35	4	0	7	51	93
881_2a	2	35	8	1	10	78	90
881_2b	3	1	30	1	5	58	95
BpA_1a	10	3	28	3	3	44	97
881_4a	7	12	14	2	15	60	85
881_4b	3	2	35	0	12	50	88
561_3	10	0	3	1	1	45	99
881_2c	2	40	40	2	20	35	80

Table A.3-7: Mount Lewis Field Office Crescent Valley Survey Area Vegetation Canopy Cover Percentages

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
2060_1	5	22	1	10	35	0	73
2060_2	5	20	1	10	45	0	81
3661_2	3	20	1	45	7	0	76
3661_1	2	7	0	20	25	0	54
3661_3	5	20	0	15	30	0	70
1165_1	5	15	1	23	30	0	74
1165_2	5	10	0	3	0	0	18
1165_3	2	25	1	35	15	0	78
1165_4	2	28	1	2	30	0	63

Ecological Site ID	Perennial Grass %	Annual Grass %	Perennial Forb %	Annual Forb %	Shrub %	Tree %	Total Plant Cover %
1041_1	3	20	1	7	20	0	51
2060_3	8	6	50	5	0	0	69
3742_1	0	15	0	20	15	0	50
3742_2	0	15	1	15	25	0	56
3742_3	0	20	0	15	10	0	45
3742_4	0	10	0	40	10	0	60
660_1	1	18	2	20	20	0	61
660_2	1	25	2	27	10	0	65
660_3	1	45	2	22	5	0	75
855_2	0	8	0	1	40	0	49
1600_1	0	2	0	8	35	0	45
855_1	0	13	1	5	57	0	76
167_4	1	3	1	2	30	0	37
169_2	0	10	1	3	35	0	49
1160_1	1	6	0	2	32	0	41
167_1	0	0	0	0	68	0	68
167_3	20	0	0	3	48	0	71
167_2	1	1	0	0	38	0	40
3742_5	0	5	3	5	5	0	18
1165_5	1	6	0	6	50	0	63
3661_4	1	3	0	3	40	0	47
3661_5	0	6	0	25	28	0	59
2060_4	0	2	3	33	2	0	40
3691_1_2_3	0	15	0	2	25	0	42
1169_2	1	3	0	1	20	0	25
1169_3	0	15	0	0	10	0	25
1169_4	1	3	0	5	38	0	47
1169_1	1	3	0	0	30	0	34

Table A.3-8: Mount Lewis Field Office Crescent Valley Survey Area Ground Cover Percentages

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
2060_1	5	2	0	12	8	73	92
2060_2	3	2	1	10	3	81	97
3661_2	5	1	0	7	11	76	89
3661_1	2	10	10	8	16	54	84

Ecological Site ID	Residual Cover %	Litter %	Biological Crust %	Rock %	Bare Ground %	Total Plant Cover %	Total Ground Cover %
3661_3	10	2	2	5	11	70	89
1165_1	5	5	1	5	10	74	90
1165_2	2	30	0	5	45	18	55
1165_3	2	10	0	2	8	78	92
1165_4	6	10	15	0	6	63	94
1041_1	18	6	6	10	9	51	91
2060_3	2	21	0	6	2	69	98
3742_1	7	40	1	0	2	50	98
3742_2	5	30	4	0	5	56	95
3742_3	5	40	5	0	5	45	95
3742_4	6	30	1	0	3	60	97
660_1	5	25	2	0	7	61	93
660_2	5	18	5	0	7	65	93
660_3	5	8	2	2	8	75	92
855_2	10	5	26	0	10	49	90
1600_1	6	10	5	0	34	45	66
855_1	4	8	4	2	6	76	94
167_4	6	8	23	0	26	37	74
169_2	5	18	18	2	8	49	92
1160_1	4	8	22	8	17	41	83
167_1	8	5	15	0	4	68	96
167_3	5	8	8	0	8	71	92
167_2	5	2	17	2	34	40	66
3742_5	5	45	6	15	11	18	89
1165_5	8	8	0	20	1	63	99
3661_4	2	3	0	47	1	47	99
3661_5	3	2	0	35	1	59	99
2060_4	3	30	0	25	2	40	98
3691_1_2_3	5	25	0	25	3	42	97
1169_2	3	35	8	1	28	25	72
1169_3	15	45	2	10	3	25	97
1169_4	5	16	2	28	2	47	98
1169_1	7	14	10	1	34	34	66

A.4. PLANT SPECIES LIST

Table A.4-1 through Table A.4-4 list the plant species observed during the ecological site and integrated rangeland health field surveys. Data sheets and photos are in Appendix A.8.

Table A.4-1: Tuscarora Field Office Goldstrike Survey Area Ecological Site Survey Plant Species

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
• Cheatgrass (*Bromus tectorum*) • Japanese brome (*Bromus japonicus*)	• Basin wildrye (*Leymus cinereus*) • Bluegrass (*Poa* spp.) • Bluebunch wheatgrass (*Pseudoroegneria spicata*) • Bottlebrush squirreltail (*Elymus elymoides*) • Crested wheatgrass (*Agropyron cristatum*) • Cultivated hay • Desert saltgrass (*Distichlis spicata*) • Indian ricegrass (*Achnatherum hymenoides*) • Sandberg bluegrass (*Poa secunda*) • Slender wheatgrass (*Elymus trachycauls*) • Tall wheatgrass (*Thinopyrum ponticum*) • Thurber's neeedlegrass (*Stipa thureriana*)	• Blue mustard (*Chorispora tenella*) • Brown-eyed primrose (*Chylismia claviformis*) • Bull thistle (*Cirsium vulgare*) • Bur buttercup (*Ceratocephala testiculata*) • Burning bush (*Bassia scoparia*) • Clasping pepperweed (*Lepidium perfoliatum*) • Fleabane (*Erigeron* spp.) • Halogeton (*Halogeton glomeratus*) • Lewis flax (*Linum lewisii*) • Mustard(s) (*Brassica* spp.) • Pepperweed (*Lepidium* spp.) • Prickly lettuce (*Lactuca serriola*) • Prostrate mustard (*Hornungia procumbens*) • Russian thistle (*Salsola kali*) • Storksbill (*Erodium cicutarium*)	• Alfalfa (*Medicago sativa*) • Arrowleaf balsamroot (*Balsamorhiza sagittata*) • Broad-leaved pepperweed (Lepidium latifolium) • Daggerpod (*Anelsonia eurycarpa*) • Fringed puccoon (*Lithospermum incisum*) • Hawksbeard (*Crepis acuminata*) • Hoary cress (*Cardaria draba*) • Globemallow (*Sphaeralcea spp.*) • Knapweed (*Centaurea spp.*) • Lupine (*Lupinus spp.*) • Poverty weed (*Iva axillaris*) • Silvery lupine (*Lupinus argenteus*) • Western stoneseed (*Lithospermum ruderale*)	• Big sagebrush (*Artemisia tridentata*) • Bitterbrush (*Purshia tridentata*) • Dead shrubs • Four-wing saltbush (*Atriplex canescens*) • Greasewood (*Sarcobatus vermiculatus*) • Green rabbitbrush (*Ericameria teretifolia*) • Low sagebrush (*Artemisia arbuscula*) • Rubber rabbitbrush (*Ericameria nauseosa*) • Shadscale (*Atriplex confertifolia*) • Utah serviceberry (*Amelanchier utahensis*) • Winterfat (*Krascheninnikovia lanata*) • Yellow rabbitbrush (*Chrysothamnus viscidiflorus*)

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
		• Tansy mustard (*Descurainia pinnata*) • Tumble mustard (*Sisymbrium altissimum*) • Western salsify (*Tragopogon dubius*) • Wooly star (*Eriastrum densifolium*)		

Table A.4-2: Tuscarora Field Office Carlin Survey Area Ecological Site Survey Plant Species

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
• Cheatgrass (*Bromus tectorum*) • Japanese brome (*Bromus japonicus*)	• Basin wildrye (*Leymus cinereus*) • Bluegrass (*Poa* spp.) • Bluebunch wheatgrass (*Pseudoroegneria spicata*) • Bottlebrush squirreltail (*Elymus elymoides*) • Crested wheatgrass (*Agropyron cristatum*) • Cultivated hay • Desert saltgrass (*Distichlis spicata*) • Indian ricegrass (*Achnatherum hymenoides*) • Sandberg bluegrass (*Poa secunda*) • Slender wheatgrass (*Elymus trachycauls*) • Tall wheatgrass (*Thinopyrum ponticum*) • Thurber's neeedlegrass (*Stipa thureriana*)	• Blue mustard (*Chorispora tenella*) • Brown-eyed primrose (*Chylismia claviformis*) • Bull thistle (*Cirsium vulgare*) • Bur buttercup (*Ceratocephala testiculata*) • Burning bush (*Bassia scoparia*) • Clasping pepperweed (*Lepidium perfoliatum*) • Fleabane (*Erigeron* spp.) • Halogeton (*Halogeton glomeratus*) • Lewis flax (*Linum lewisii*) • Mustard(s) (*Brassica* spp.) • Pepperweed (*Lepidium* spp.) • Prickly lettuce (*Lactuca serriola*) • Prostrate mustard (*Hornungia procumbens*)	• Alfalfa (*Medicago sativa*) • Arrowleaf balsamroot (*Balsamorhiza sagittata*) • Broad-leaved pepperweed (*Lepidium latifolium*) • Daggerpod (*Anelsonia eurycarpa*) • Fringed puccoon (*Lithospermum incisum*) • Hawksbeard (*Crepis acuminata*) • Hoary cress (*Cardaria draba*) • Globemallow (*Sphaeralcea spp.*) • Knapweed (*Centaurea spp.*) • Lupine (*Lupinus spp.*) • Poverty weed (*Iva axillaris*) • Silvery lupine (*Lupinus argenteus*) • Western stoneseed (*Lithospermum ruderale*)	• Big sagebrush (*Artemisia tridentata*) • Bitterbrush (*Purshia tridentata*) • Dead shrubs • Four-wing saltbush (*Atriplex canescens*) • Greasewood (*Sarcobatus vermiculatus*) • Green rabbitbrush (*Ericameria teretifolia*) • Low sagebrush (*Artemisia arbuscula*) • Rubber rabbitbrush (*Ericameria nauseosa*) • Shadscale (*Atriplex confertifolia*) • Utah serviceberry (*Amelanchier utahensis*) • Winterfat (*Krascheninnikovia lanata*)

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
		• Russian thistle (*Salsola kali*) • Storksbill (*Erodium cicutarium*) • Tansy mustard (*Descurainia pinnata*) • Tumble mustard (*Sisymbrium altissimum*) • Western salsify (*Tragopogon dubius*) • Wooly star (*Eriastrum densifolium*)		• Yellow rabbitbrush (*Chrysothamnus viscidiflorus*)

Table A.4-3: Tuscarora Field Office Crescent Valley Survey Area Ecological Site Plant Species Survey

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
• Cheatgrass (*Bromus tectorum*) • wheatgrass (*Eremopyrum triticeum*)	• Alkali sacaton (*Sporobolus airoides*) • Basin wildrye (*Leymus cinereus*) • Bluegrass (*Poa* spp.) • Bluebunch wheatgrass (*Pseudoroegneria spicata*) • Bottlebrush squirreltail (*Elymus elymoides*) • Crested wheatgrass (*Agropyron cristatum*) • Saltgrass (*Distichlis spicata*) • Indian ricegrass (*Achnatherum hymenoides*) • Sandberg bluegrass (*Poa secunda*) • Western wheatgrass (*Pascopyrum smithii*)	• Blue mustard (*Chorispora tenella*) • Brown-eyed primrose (*Chylismia claviformis*) • Bull thistle (*Cirsium vulgare*) • Bur buttercup (*Ceratocephala testiculata*) • Burning bush (*Bassia scoparia*) • Clasping pepperweed (*Lepidium perfoliatum*) • Fleabane (*Erigeron* spp.) • Halogeton (*Halogeton glomeratus*) • lambsquarters (*Chenopodium album*) • Mustard(s) (*Brassica* spp.) • Pepperweed (*Lepidium* spp.)	• Alfalfa (*Medicago sativa*) • Arrowleaf balsamroot (*Balsamorhiza sagittata*) • Broad-leaved pepperweed (*Lepidium latifolium*) • Daggerpod (*Anelsonia eurycarpa*) • Fringed puccoon (*Lithospermum incisum*) • Hawksbeard (*Crepis acuminata*) • Whitetop (*Cardaria draba*) • Globemallow (*Sphaeralcea* spp.) • Knapweed (*Centaurea* spp.) • Lupine (*Lupinus* spp.) • Poverty weed (*Iva axillaris*)	• Big sagebrush (*Artemisia tridentate*) • Bitterbrush (*Purshia tridentate*) • Black sagebrush (*Artemisia nova*) • Budsage (*Artemisia frigida*) • Dead shrubs • Four-wing saltbush (*Atriplex canescens*) • Greasewood (*Sarcobatus vermiculatus*) • Green rabbitbrush (*Ericameria teretifolia*) • Littleleaf horsebrush (*Tetradymia glabrata*) • Low sagebrush (*Artemisia arbuscula*)

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
		• Prickly lettuce (*Lactuca serriola*) • Russian thistle (*Salsola kali*) • Storksbill (*Erodium cicutarium*) • Tansy mustard (*Descurainia pinnata*) • Tumble mustard (*Sisymbrium altissimum*) • Wooly star (*Eriastrum densifolium*)	• Mountain pepperweed (*Lepidium montanum*) • Western stoneseed (*Lithospermum ruderale*) • Yarrow (*Achillea millefolium*)	• Pickleweed (*Allenrolfea occidentalis*) • Rubber rabbitbrush (*Ericameria nauseosa*) • Shadscale (*Atriplex confertifolia*) • Shortspine horsebrush (*Tetradymia spinose*) • Spiny hopsage (*Grayia spinose*) • Utah serviceberry (*Amelanchier utahensis*) • Winterfat (*Krascheninnikovia lanata*) • Yellow rabbitbrush (*Chrysothamnus viscidiflorus*) • Broom snakeweed (*Gutierrezia sarothrae*) • Tamarisk (*Tamarix* ssp.)

Table A.4-4: Mount Lewis Field Office Crescent Valley Survey Area Ecological Site Survey Plant Species

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
• Cheatgrass (*Bromus tectorum*) • wheatgrass (*Eremopyrum triticeum*)	• Alkali sacaton (*Sporobolus airoides*) • Basin wildrye (*Leymus cinereus*) Bluegrass (*Poa* spp.) • Bluebunch wheatgrass (*Pseudoroegneria spicata*) • Bottlebrush squirreltail (*Elymus elymoides*)	• Blue mustard (*Chorispora tenella*) • Brown-eyed primrose (*Chylismia claviformis*) • Bull thistle (*Cirsium vulgare*) • Bur buttercup (*Ceratocephala testiculata*)	• Alfalfa (*Medicago sativa*) • Arrowleaf balsamroot (*Balsamorhiza sagittata*) • Broad-leaved pepperweed (*Lepidium latifolium*) • Daggerpod (*Anelsonia eurycarpa*) • Fringed puccoon (*Lithospermum incisum*)	• Big sagebrush (*Artemisia tridentate*) • Bitterbrush (*Purshia tridentate*) • Black sagebrush (*Artemisia nova*) • Budsage (*Artemisia frigida*) • Dead shrubs (species undetermined)

Annual Grasses	Perennial Grasses	Annual Forbs	Perennial Forbs	Shrubs
	• Crested wheatgrass (*Agropyron cristatum*) • Saltgrass (*Distichlis spicata*) • Indian ricegrass (*Achnatherum hymenoides*) • Sandberg bluegrass (*Poa secunda*) • Western wheatgrass (*Pascopyrum smithii*)	• Burning bush (*Bassia scoparia*) • Clasping pepperweed (*Lepidium perfoliatum*) • Fleabane (*Erigeron* spp.) • Halogeton (*Halogeton glomeratus*) • Lambsquarters (*Chenopodium album*) • Mustard(s) (*Brassica* spp.) • Pepperweed (*Lepidium* spp.) • Prickly lettuce (*Lactuca serriola*) • Russian thistle (*Salsola kali*) • Storksbill (*Erodium cicutarium*) • Tansy mustard (*Descurainia pinnata*) • Tumble mustard (*Sisymbrium altissimum*) • Wooly star (*Eriastrum densifolium*)	• Hawksbeard (*Crepis acuminata*) • Whitetop (*Cardaria draba*) • Globemallow (*Sphaeralcea* spp.) • Knapweed (*Centaurea* spp.) • Lupine (*Lupinus* spp.) • Poverty weed (*Iva axillaris*) • Mountain pepperweed (*Lepidium montanum*) • Western stoneseed (*Lithospermum ruderale*) • Yarrow (*Achillea millefolium*)	• Four-wing saltbush (*Atriplex canescens*) • Greasewood (*Sarcobatus vermiculatus*) • Green rabbitbrush (*Ericameria teretifolia*) • Littleleaf horsebrush (*Tetradymia glabrata*) • Low sagebrush (*Artemisia arbuscula*) • Pickleweed (*Allenrolfea occidentalis*) • Rubber rabbitbrush (*Ericameria nauseosa*) • Shadscale (*Atriplex confertifolia*) • Shortspine horsebrush (*Tetradymia spinose*) • Spiny hopsage (*Grayia spinose*) • Utah serviceberry (*Amelanchier utahensis*) • Winterfat (*Krascheninnikovia lanata*) • Yellow rabbitbrush (*Chrysothamnus viscidiflorus*) • Broom snakeweed (*Gutierrezia sarothrae*) • Tamarisk (*Tamarix* ssp.)

A.5. STATE AND TRANSITION

Table A.5-1 through Table A.5-4 list the state-and-transition community phase for each of the ecological site ID (ESD and soil survey location). Figure A.7-1 through Figure A.7-3 show the location of each of the ecological site IDs and the community phase. Data sheets and photos are in Appendix A.8.

Table A.5-1: Tuscarora Field Office Goldstrike Survey Area State and Transition

Ecological Site	Ecological Site Description	Community Phase	Ecological Site IDs
R024XY002NV	Loamy 5-8 P.Z.	3.2 Community Phase	RbB_10 RbB_7 RbB_8 RbB_9
		4.2 Community Phase	RbB_6
R024XY003NV	Sodic Terrace 6-8 P.Z.	3.1 Community Phase	Dp_2a Is_1
R024XY005NV	Loamy 8-10 P.Z.	2.3 Community Phase	RaA_1
		3.3 Community Phase	Mf_1
		4.1 Community Phase	Mf_2 Mf_3 Mf_4 Mf_5 Mf_6 Mf_7 Ms_1 Ms_2 Ms_3 Mf_8 Mf_9 RaB_1 RaB_2 OSB_1 OSB_2 OSB_3 OSB_4
		4.2 Community Phase	RaA_2 BM_1
R024XY006NV	Dry Floodplain	3.1 Community Phase	Pk_1 Pk_2
		4.1 Community Phase	Ge_1 Ge_2
R024XY007NV	Saline Bottom	2.3 Community Phase	Do_4 Do_6
		3.1 Community Phase	Cr_1 Do_1 Do_3 Do_5
		3.2 Community Phase	Do_2

Ecological Site	Ecological Site Description	Community Phase	Ecological Site IDs
R024XY012NV	Saline Terrace 6-8 P.Z.	3.1 Community Phase	Ru_1 Ru_2 Ru_2a Ru_2b Ru_3
		4.1 Community Phase	Ru_2c
R024XY035NV	Shallow Loam 10-14 P.Z.	State-and-Transition models not developed for this draft ecological site description	BM_3
R025XY003NV	Loamy Bottom 8-14 P.Z.	3.1 Community Phase	WE_1 WE_2 WE_3 WE_4
		5.2 Community Phase	BM_2
R025XY014NV	Loamy 10-12 P.Z.	2.1 Community Phase	RF_4
		3.1 Community Phase	RF_6 SG_2 SG_4
		3.2 Community Phase	RF_5 SBB_6
		4.1 Community Phase	SBB_4 SBB_5
		4.2 Community Phase	RF_3
		5.1 Community Phase	SBB_1 SBB_2 SBB_3
R025XY019NV	Loamy 8-10 P.Z.	3.2 Community Phase	SG_1 SG_3 SG_5 SD_2 SD_3 SD_4
		4.1 Community Phase	CG_3 CG_6 CG_8 TN_1
		4.2 Community Phase	CG_3a CG_3b CG_3c CG_7 SD_1 SD_5 TN_5 TN_6
		5.1 Community Phase	CG_1 CG_4 CG_5
		5.3 Community Phase	TN_3
R025XY022NV	Cobbly Claypan 8-12 P.Z.	3.1 Community Phase	RF_1 RF_2

Table A.5-2: Tuscarora Field Office Carlin Survey Area State and Transition

Ecological Site	Ecological Site Description	Community Phase	Ecological Site IDs
R024XY002NV	Loamy 5-8 P.Z.	3.2 Community Phase	BC_1 BC_2 BC_5
		4.2 Community Phase	BC_3
R024XY005NV	Loamy 8-10 P.Z.	3.2 Community Phase	OtA_1
		3.3 Community Phase	RE_1 RE_1a
		4.2 Community Phase	RE_3
R024XY007NV	Saline Bottom	3.2 Community Phase	Cr_2
R024XY020NV	Droughty Loam 8-10 P.Z.	4.1 Community Phase	RE_2
		4.2 Community Phase	RE_3a
R025XY003NV	Loamy Bottom 8-14 P.Z.	3.1 Community Phase	Bf_1
		5.1 Community Phase	WE_5
R025XY005NV	Wet Meadow	State-and-Transition models not developed for this draft ecological site description	Bf_2 Wc_1 Wc_2 Wc_3 Wc_4
R025XY015NV	South Slope 8-12 P.Z.	4.2 Community Phase	CF_2b
R025XY019NV	Loamy 8-10 P.Z.	3.2 Community Phase	CF_2c CF_5 CF_6a TN_3a TN_4 TN_5a
		4.1 Community Phase	TN_9
		4.2 Community Phase	CF_2 CF_2a CF_2d CF_2e CF_3 CF_6 CH_1 CH_2 CH_2a CH_3 CH_4 CH_5 TN_6a TN_7 TN_8 TN_8a 491_1 491_1a 491_1b 491_2 491_3 491_4
		5.1 Community Phase	TN_2

Ecological Site	Ecological Site Description	Community Phase	Ecological Site IDs
		State-and-Transition models not developed for this draft ecological site description	CF_1

Table A.5-3: Tuscarora Field Office Crescent Valley Survey Area State and Transition

Ecological Site	Ecological Site Description	Community Phase	Ecological Site IDs
R024XY002NV	Loamy 5-8 P.Z.	2.2 Community Phase	901_1
		3.1 Community Phase	RbB_1 RbB_2 RbB_5 192_1 525_1 901_2
		3.2 Community Phase	BpA_3 671_1 741_2
		4.1 Community Phase	BpA_1 741_3 741_4
		4.2 Community Phase	BB_1 BB_2 BpA_1a BpA_2 BpA_4 RbB_3 RbB_4 192_2
R024XY003NV	Sodic Terrace 6-8 P.Z.	3.1 Community Phase	Dp_2 169_1 192_3 192_4 192_5 192_6 192_7 881_2b 881_6
		4.2 Community Phase	Dp_1 Dp_3
R024XY005NV	Loamy 8-10 P.Z.	3.3 Community Phase	861_1 861_2 861_3 861_4
R024XY007NV	Saline Bottom	2.2 Community Phase	881_4b
		2.3 Community Phase	881_2a 881_4a
		3.1 Community Phase	Od_1 Ok_1
R024XY011NV	Sodic Flat 6-8 P.Z.	2.2 Community Phase	881_2c 881_4

Ecological Site	Ecological Site Description	Community Phase	Ecological Site IDs
		3.1 Community Phase	881_1 881_2 881_3
		5.1 Community Phase	881_5
R025XY019NV	Loamy 8-10 P.Z.	3.2 Community Phase	822_6
		4.1 Community Phase	561_2 822_1 822_2 822_3 822_4 822_5
		4.2 Community Phase	5252_2 561_1 561_3

Table A.5-4: Mount Lewis Field Office Crescent Valley Survey Area State and Transition

Ecological Site	Ecological Site Description	Community Phase	Ecological Site IDs
R024XY002NV	Loamy 5-8 P.Z.	2.1 Community Phase	1169_2
		3.1 Community Phase	855_2 1041_1 1165_1 1165_4 1169_1 1600_1
		3.2 Community Phase	1160_1 1165_5 1169_3 1169_4 3661_4 3661_5
		4.2 Community Phase	1165_3 2060_4 3661_2
		5.1 Community Phase	1165_2 2060_3
R024XY003NV	Sodic Terrace 6-8 P.Z.	3.1 Community Phase	167_4 169_2 3742_5
R024XY006NV	Dry Floodplain	3.1 Community Phase	660_1
		4.1 Community Phase	660_3
		4.2 Community Phase	660_2
R024XY011NV	Sodic Flat 6-8 P.Z.	4.1 Community Phase	3742_1 3742_2 3742_3 3742_4
R024XY014NV	Coarse Silty 4-8 P.Z.	4.1 Community Phase	855_1
R024XY022NV	Sodic Terrace 8-10 P.Z.	3.1 Community Phase	167_2
		3.2 Community Phase	167_1 167_3
R024XY030NV	Shallow Calcareous Loam 8-10 P.Z.	4.1 Community Phase	3691_1_2_3

A.6. SOIL DATA

Table A.6-1 and Table A.6-2 list the ecological site, soil component and the farmland classification for each of the soil types in the Tuscarora and Mount Lewis Field Offices respectively. Figure A.7-1 through Figure A.7-3 show the SSURGO MUSYM.

Table A.6-1: Tuscarora Field Office Soils and Farmland Classification

Ecological Site	Soil Component Name	SSURGO Map Unit Symbol	Farmland Classification	Survey Area Acres
024XY002NV_1 LOAMY 5-8 P.Z.	Creemon	741	Farmland of statewide importance	157.3
024XY002NV_1 LOAMY 5-8 P.Z.	Ricert	901	Not prime farmland	5.5
024XY002NV_1 LOAMY 5-8 P.Z.	Whirlo	671	Prime farmland if irrigated and reclaimed of excess salts and sodium	7.3
024XY014NV_1	Water	W	Not prime farmland	1.4
R024XY002NV LOAMY 5-8 P.Z.	Beowawe	BB	Not prime farmland	22.7
R024XY002NV LOAMY 5-8 P.Z.	Beowawe variant	BC	Not prime farmland	92.1
R024XY002NV LOAMY 5-8 P.Z.	Broyles	BpA	Prime farmland if irrigated and reclaimed of excess salts and sodium	312.9
R024XY002NV LOAMY 5-8 P.Z.	Rad	RbB	Prime farmland if irrigated and reclaimed of excess salts and sodium	92.8
R024XY003NV SODIC TERRACE 6-8 P.Z.	Batan	881	Farmland of statewide importance	615
R024XY003NV SODIC TERRACE 6-8 P.Z.	Batan	NV612	Not prime farmland	.02
R024XY003NV SODIC TERRACE 6-8 P.Z.	Broyles	NV776 192	Farmland of statewide importance	136.9
R024XY003NV SODIC TERRACE 6-8 P.Z.	Broyles	192	Not prime farmland	73.7
R024XY003NV SODIC TERRACE 6-8 P.Z.	Dunphy	Dp	Not prime farmland	42.8
R024XY003NV SODIC TERRACE 6-8 P.Z.	Iron Blossom	Is	Not prime farmland	34.4
R024XY005NV LOAMY 8-10 P.Z.	Boulflat	BM	Not prime farmland	17.3
R024XY005NV LOAMY 8-10 P.Z.	McConnel	Mf	Farmland of statewide importance	28.6
R024XY005NV LOAMY 8-10 P.Z.	Midas	Ms	Prime farmland if irrigated and reclaimed of excess salts and sodium	956.6

Ecological Site	Soil Component Name	SSURGO Map Unit Symbol	Farmland Classification	Survey Area Acres
R024XY005NV LOAMY 8-10 P.Z.	Orovada	OSB	Prime farmland if irrigated and reclaimed of excess salts and sodium	21.1
R024XY005NV LOAMY 8-10 P.Z.	Orovada	OtA	Prime farmland if irrigated and reclaimed of excess salts and sodium	19.1
R024XY005NV LOAMY 8-10 P.Z.	Rad	RaA	Prime farmland if irrigated and reclaimed of excess salts and sodium	7.7
R024XY005NV LOAMY 8-10 P.Z.	Rad	RaB	Prime farmland if irrigated and reclaimed of excess salts and sodium	21.6
R024XY005NV LOAMY 8-10 P.Z.	Zineb	861	Not prime farmland	18.4
R024XY006NV DRY FLOODPLAIN	Cluro	Co	Prime farmland if irrigated and reclaimed of excess salts and sodium	112.5
R024XY006NV DRY FLOODPLAIN	Geysen	Ge	Farmland of statewide importance	0.14
R024XY006NV DRY FLOODPLAIN	Pocker	Pk	Not prime farmland	12.6
R024XY007NV SALINE BOTTOM	Cluro	Cr	Not prime farmland	76.6
R024XY007NV SALINE BOTTOM	Dunphy	Do	Farmland of statewide importance	8.7
R024XY007NV SALINE BOTTOM	Ocala	OK	Not prime farmland	101.6
R024XY007NV SALINE BOTTOM	Ocala	Od	Not prime farmland	181.4
R024XY012NV SALINE TERRACE 6-8 P.Z.	Rosney	Ru	Not prime farmland	2.9
R024XY017NV SANDY 8-10 P.Z.	Davey	822	Farmland of statewide importance	155.7
R024XY020NV DROUGHTY LOAM 8-10 P.Z.	Brock	RE	Not prime farmland	90.2
R025XY001NV MOIST FLOODPLAIN	Coit	Ct	Not prime farmland	52.7
R025XY003NV LOAMY BOTTOM 8-14 P.Z.	Bicondoa	Bf	Prime farmland if irrigated and reclaimed of excess salts and sodium	0.8
R025XY003NV LOAMY BOTTOM 8-14 P.Z.	Bosco	BL	Farmland of statewide importance	4
R025XY003NV LOAMY BOTTOM 8-14 P.Z.	Bosco	WE	Not prime farmland	2
R025XY005NV WET MEADOW	Crooked Creek	Cx	Not prime farmland	101.8
R025XY005NV WET MEADOW	Welch	Wc	Farmland of statewide importance	0.6

Ecological Site	Soil Component Name	SSURGO Map Unit Symbol	Farmland Classification	Survey Area Acres
R025XY014NV LOAMY 10-12 P.Z.	Bobs	RF	Not prime farmland	9.3
R025XY014NV LOAMY 10-12 P.Z.	Simon	SBB	Prime farmland if irrigated	129.6
R025XY015NV SOUTH SLOPE 8-12 P.Z.	Berning	CF	Not prime farmland	26.6
R025XY019NV LOAMY 8-10 P.Z.	Bucan	BX	Not prime farmland	400
R025XY019NV LOAMY 8-10 P.Z.	Bucan	BZ	Not prime farmland	1.7
R025XY019NV LOAMY 8-10 P.Z.	Bucan	BZm	Not prime farmland	4.3
R025XY019NV LOAMY 8-10 P.Z.	Cherry Spring	CG	Farmland of statewide importance	0.1
R025XY019NV LOAMY 8-10 P.Z.	Cherry Spring	TN	Farmland of statewide importance	1,044.4
R025XY019NV LOAMY 8-10 P.Z.	Cherry Spring	CH	Not prime farmland	83.2
R025XY019NV LOAMY 8-10 P.Z.	Fortank	525	Not prime farmland	291.4
R025XY019NV LOAMY 8-10 P.Z.	Orovada	491	Not prime farmland	7.1
R025XY019NV LOAMY 8-10 P.Z.	Slaven	SG	Not prime farmland	86.5
R025XY021NV SHALLOW LOAM 8-12 P.Z.	Mascamp	SD	Not prime farmland	13.4

Table A.6-2: Mount Lewis Field Office Soils and Farmland Classification

Ecological Site	Soil Component Name	SSURGO Map Unit Symbol	Farmland Classification	Survey Area Acres
R024XY003NV SODIC TERRACE 6-8 P.Z.	Batan	NV775 167	Not prime farmland	136.9
R024XY003NV SODIC TERRACE 6-8 P.Z.	Batan	169	Not prime farmland	12.4
024XY002NV_1 LOAMY 5-8 P.Z.	Beoska	2060	Farmland of statewide importance	30.5
024XY014NV_1 COARSE SILTY 4-8 P.Z.	Broyles	855	Not prime farmland	81.9
024XY002NV_1 LOAMY 5-8 P.Z.	Broyles	1169	Not prime farmland	315.2
024XY002NV_1 LOAMY 5-8 P.Z.	Creemon	1165	Farmland of statewide importance	164
Null (No ecological site for this area)	Dumps [a]	1600	Not prime farmland	5.2
024XY002NV_1 LOAMY 5-8 P.Z.	Dun Glen	3661	Farmland of statewide importance	171.7

Ecological Site	Soil Component Name	SSURGO Map Unit Symbol	Farmland Classification	Survey Area Acres
R024XY030NV SHALLOW CALCAREOUS LOAM 8-10 P.Z.	Izod	3691	Not prime farmland	0.4
R024XY006NV DRY FLOODPLAIN	Kelk	3742	Farmland of statewide importance	114.9
R024XY006NV DRY FLOODPLAIN	Needle Peak	660	Prime farmland if irrigated and reclaimed of excess salts and sodium	5.2
024XY002NV_1 LOAMY 5-8 P.Z.	Whirlo	1160	Not prime farmland	3.5
*R024XY003NV SODIC TERRACE 6-8 P.Z.	Batan	169	Not prime farmland	12.4
* 024XY002NV_1 LOAMY 5-8 P.Z.	Ricert	1041	Not prime farmland	6.1

[a] Dumps are areas classified by NRCS as areas of smoothed or uneven accumulations or piles of waste rock and general refuse. “Dumps, mine” is an area of waste rock from mines, quarries, and smelters.

Table A.6-3 and Table A.6-4 list the ecological site, SSURGO MUSYM acres and the expected range production during low, average, and high production years in the Tuscarora and Mount Lewis Field Offices respectively. Figure A.7-1 through Figure A.7-3 show the SSURGO MUSYM.

Table A.6-3: Tuscarora Field Office Range Production

Ecological Site [a]	SSURGO Map Unit Symbol	Survey Area Acres	Range Production Pounds per Year		
			Low	Average	High
024XY002NV_1 LOAMY 5-8 P.Z.	1041	6.1	300	450	750
	671	7.3			
	741	157.3			
	901	5.5			
R024XY002NV LOAMY 5-8 P.Z.	BB	22.7	300	450	750
	BC	92.1			
	BpA	312.9			
	RbB	92.8			
R024XY003NV SODIC TERRACE 6-8 P.Z.	169	12.4	300	450	600
	192	116.5			
	881	615.0			
	Dp	34.4			
	Is	17.3			
R024XY005NV LOAMY 8-10 P.Z.	861	112.5	400	600	800
	BM	28.6			
	Mf	956.7			
	Ms	21.1			
	OSB	19.1			
	OtA	7.7			

Ecological Site [a]	SSURGO Map Unit Symbol	Survey Area Acres	Range Production Pounds per Year		
			Low	Average	High
	RaA	21.6			
	RaB	18.4			
R024XY006NV DRY FLOODPLAIN	Co	0.1	600	1,000	1,500
	Ge	12.6			
	Pk	76.7			
R024XY007NV SALINE BOTTOM	Cr	8.7	800	1,400	1,900
	Do	101.6			
	Od	2.9			
	Ok	181.4			
R024XY012NV SALINE TERRACE 6-8 P.Z.	Ru	155.7	200	400	700
R024XY017NV SANDY 8-10 P.Z.	822	90.2	500	700	900
R024XY020NV DROUGHTY LOAM 8-10 P.Z.	RE	52.7	400	600	800
R025XY001NV MOIST FLOODPLAIN	Ct	0.8	1,800	2,500	3,500
R025XY003NV LOAMY BOTTOM 8-14 P.Z.	Bf	4.0	2,000	3,500	4,500
	BL	2.0			
	WE	101.8			
R025XY005NV WET MEADOW	Cx	0.6	1,000	1,700	3,000
	Wc	9.3			
R025XY014NV LOAMY 10-12 P.Z.	RF	129.6	600	800	1,000
	SBB	26.6			
R025XY015NV SOUTH SLOPE 8-12 P.Z.	CF	400.0	500	700	1,000
R025XY019NV LOAMY 8-10 P.Z.	491	86.5	400	600	800
	525	7.1			
	561	29.5			
	BX	1.7			
	BZ	4.3			
	BZm	0.0			
	CG	1,044.5			
	CH	261.9			
R025XY019NV LOAMY 8-10 P.Z.	SG	13.4	400	600	800
	TN	83.2			
R025XY021NV SHALLOW LOAM 8-12 P.Z.	SD	24.0	250	400	600

Source: NRCS 2021 soil survey data

[a] Ecological sites were not identified for 1.4 acres in SSURGO map unit Water for the soil component name Dumps.

Table A.6-4: Mount Lewis Field Office Range Production

Ecological Site [a]	SSURGO Map Unit Symbol	Survey Area Acres	Range Production Pounds per Year		
			Low	Average	High
024XY002NV LOAMY 5-8 P.Z.	1041	6.1	300	450	750
	1160	3.5			
	1165	164.0			
	1169	315.2			
	2060	30.5			
	3661	171.7			
024XY014NV_1 COARSE SILTY 4-8 P.Z.	855	81.9	300	450	750
R024XY003NV SODIC TERRACE 6-8 P.Z.	167	136.9	300	450	750
	169	12.4			
R024XY006NV DRY FLOODPLAIN	3742	114.9	600	1,100	1,500
	660	5.2			
R024XY030NV SHALLOW CALCAREOUS LOAM 8-10 P.Z.	3691	0.4	250	350	500

Table Source: NRCS 2021 soil survey data

[a] Ecological sites were not identified for 5.2 acres in SSURGO map unit 1600 for the soil component name Dumps.

A.7. ECOLOGICAL SITE DESCRIPTION FIGURES

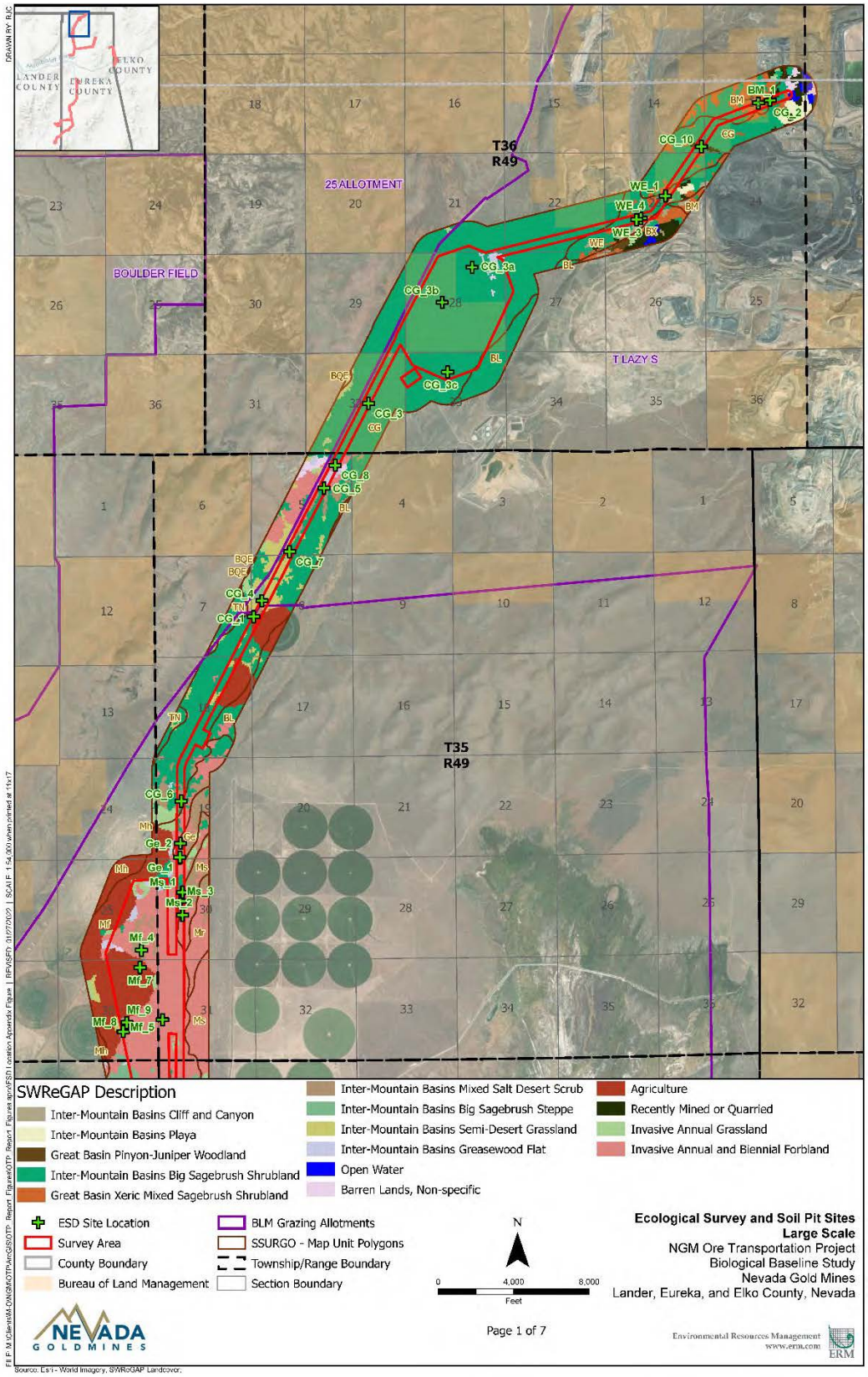


Figure A.7-1: Ecological Survey and Soil Pit Locations—Goldstrike Survey Area North

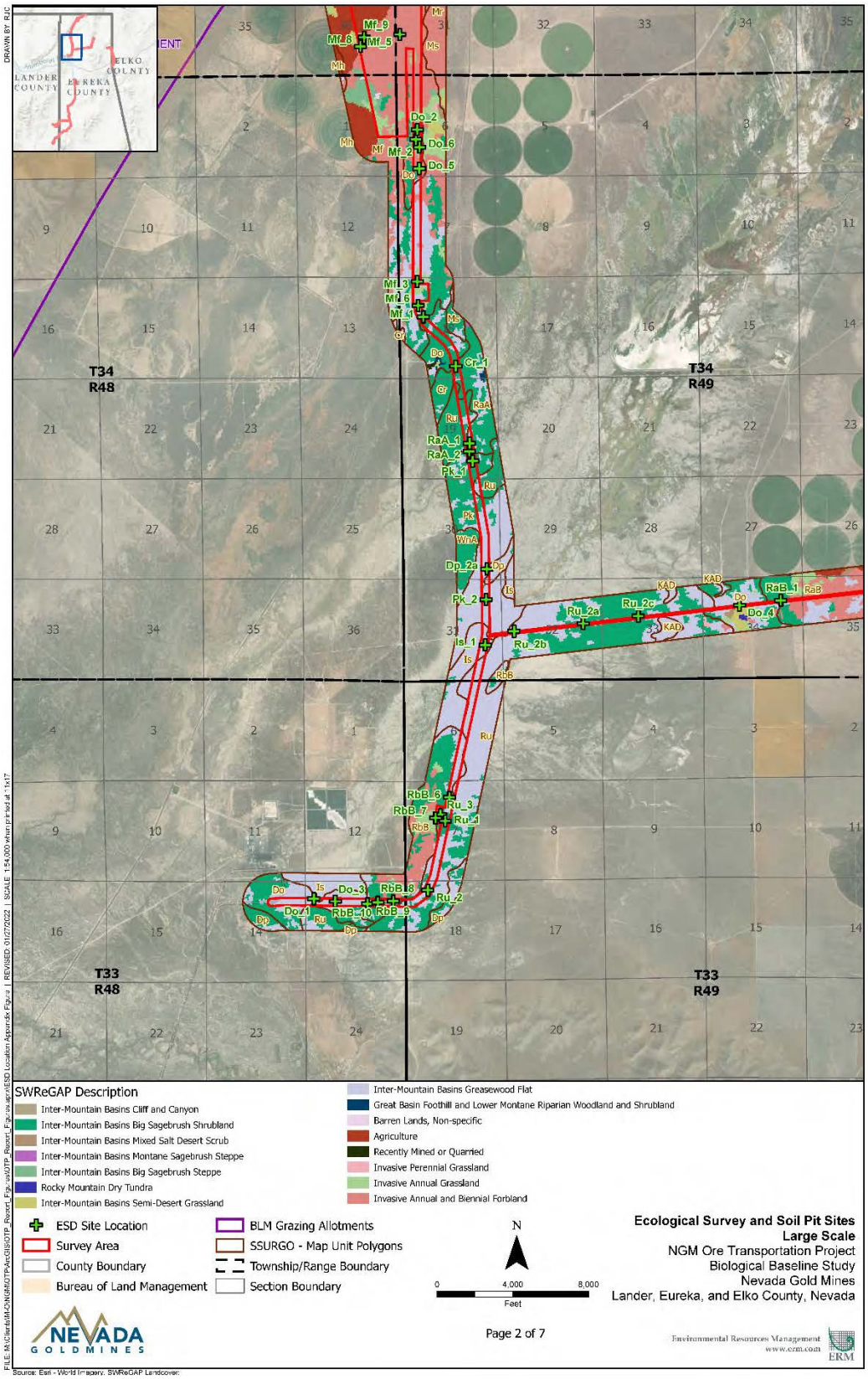


Figure A.7-2: Ecological Survey and Soil Pit Locations—Goldstrike Survey Area Southwest

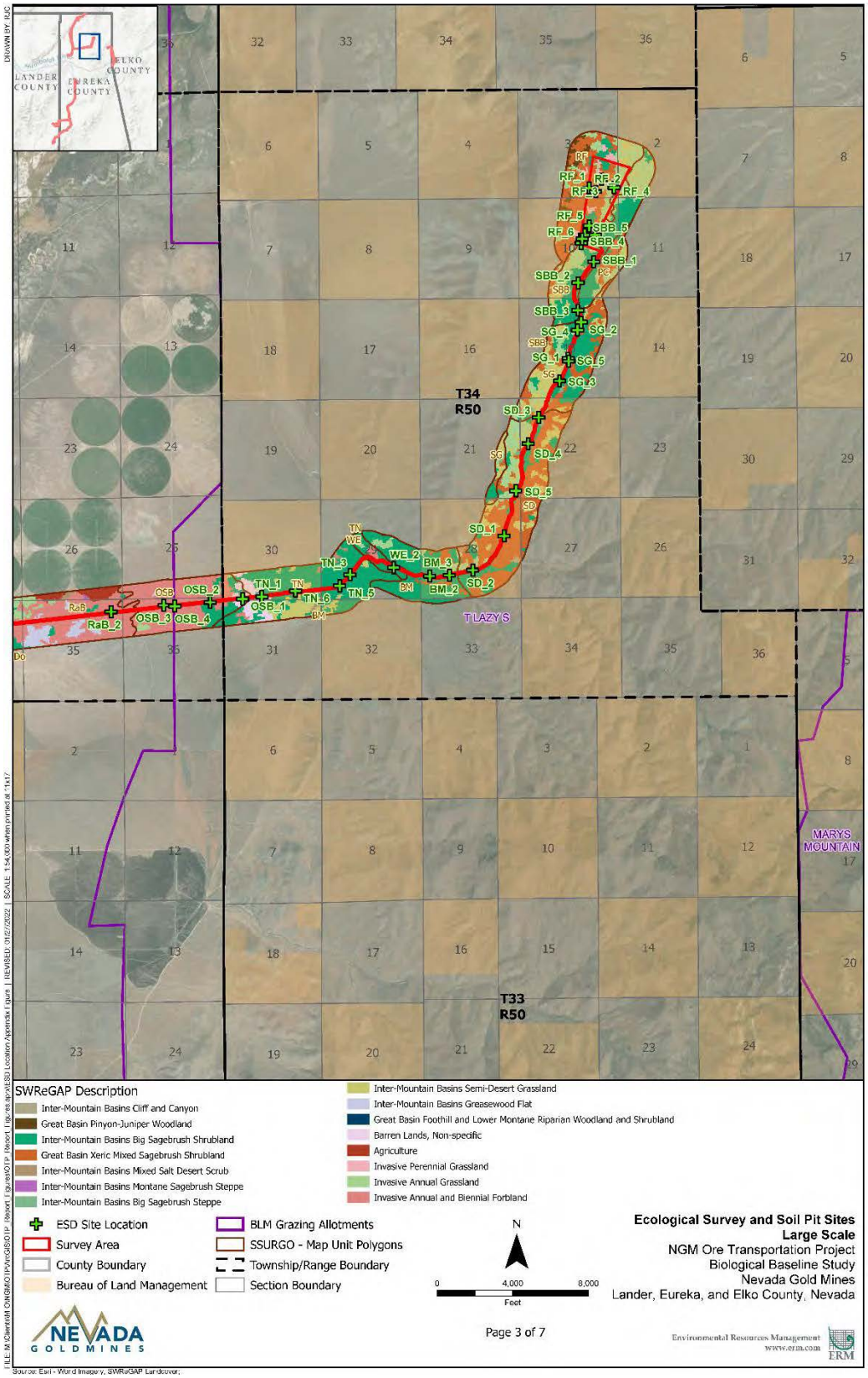


Figure A.7-3: Ecological Survey and Soil Pit Locations—Goldstrike Survey Area Southest

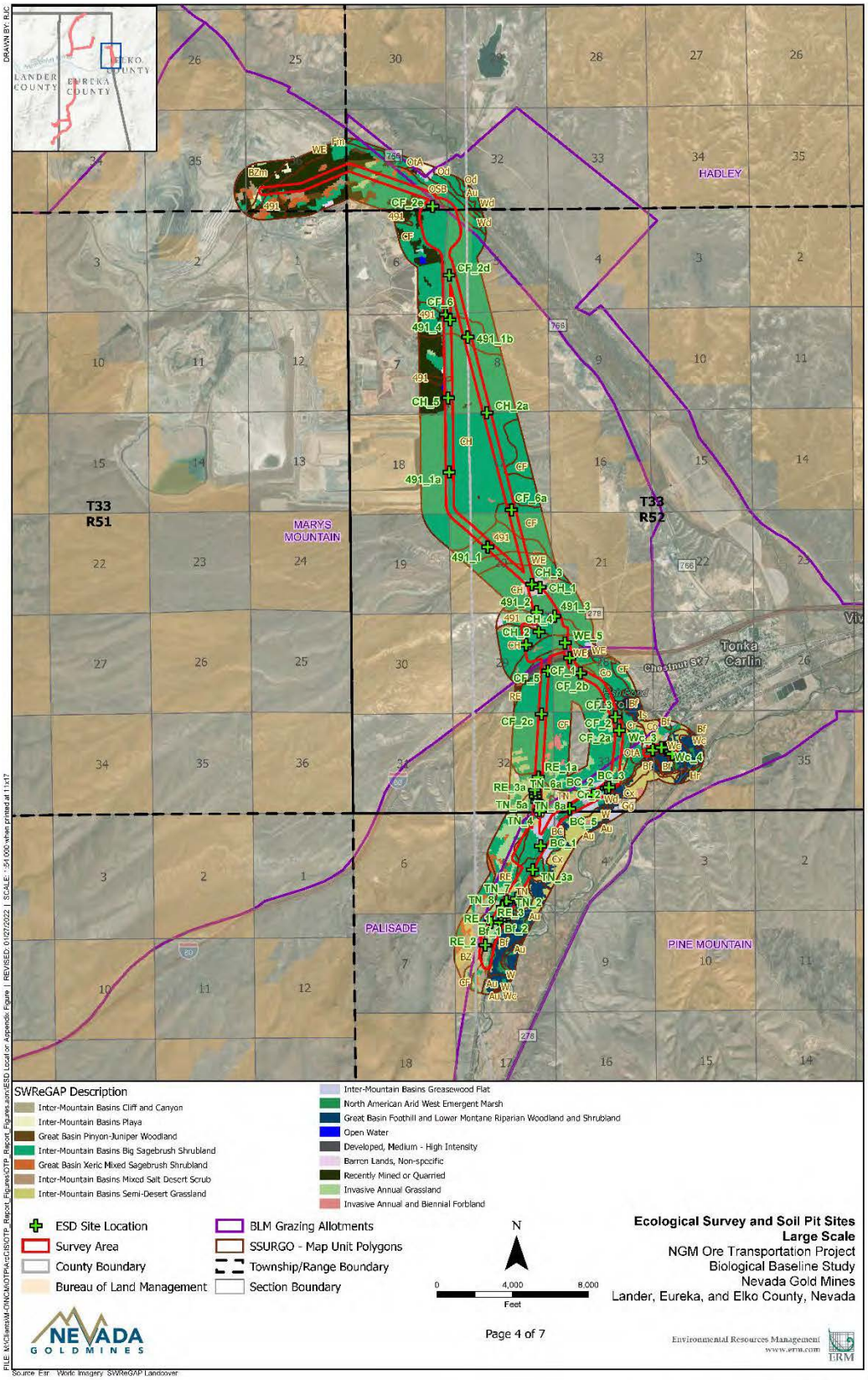


Figure A.7-4: Ecological Survey and Soil Pit Locations—Carlin Survey Area

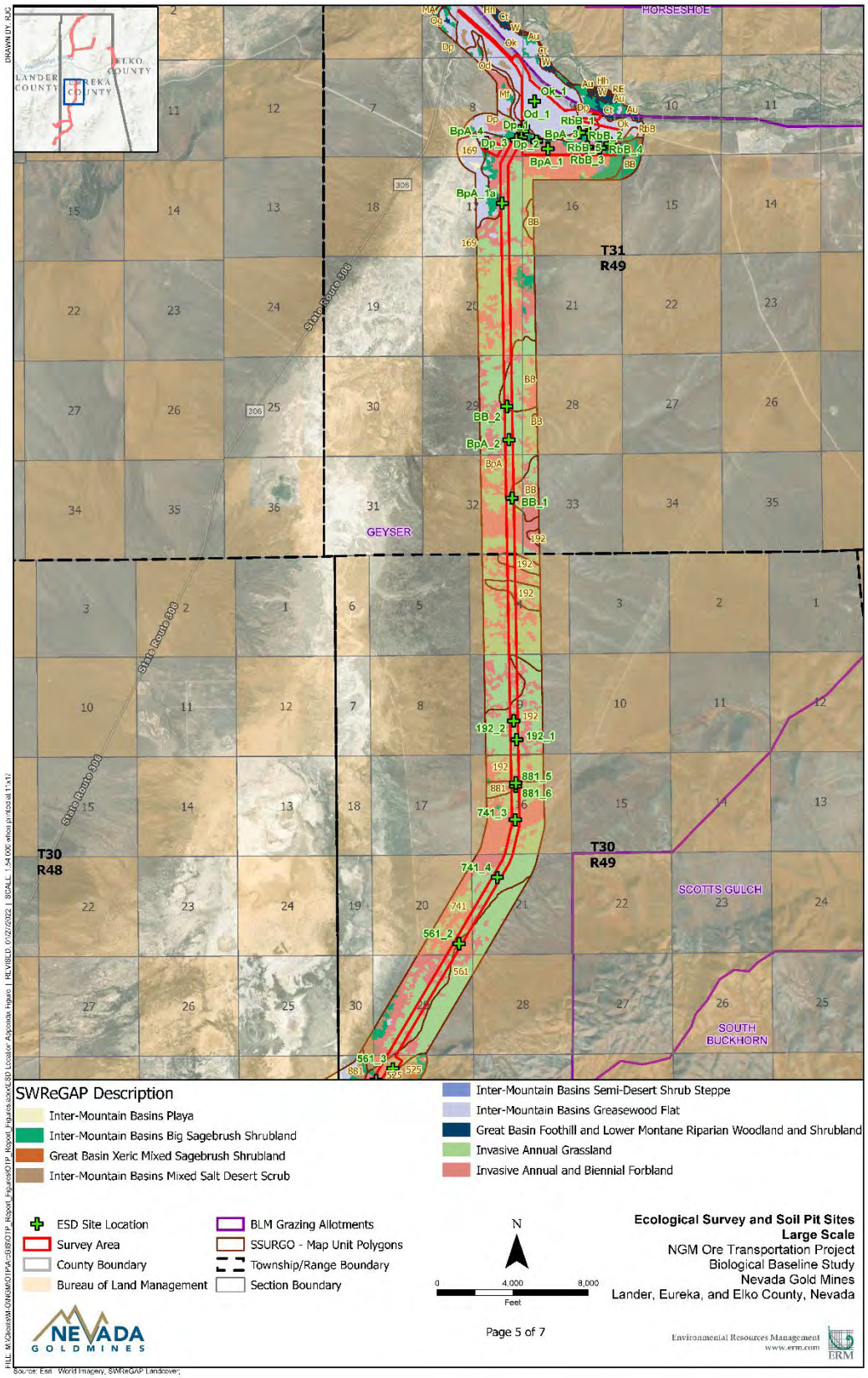


Figure A.7-5: Ecological Survey and Soil Pit Locations—Crescent Valley Survey Area North

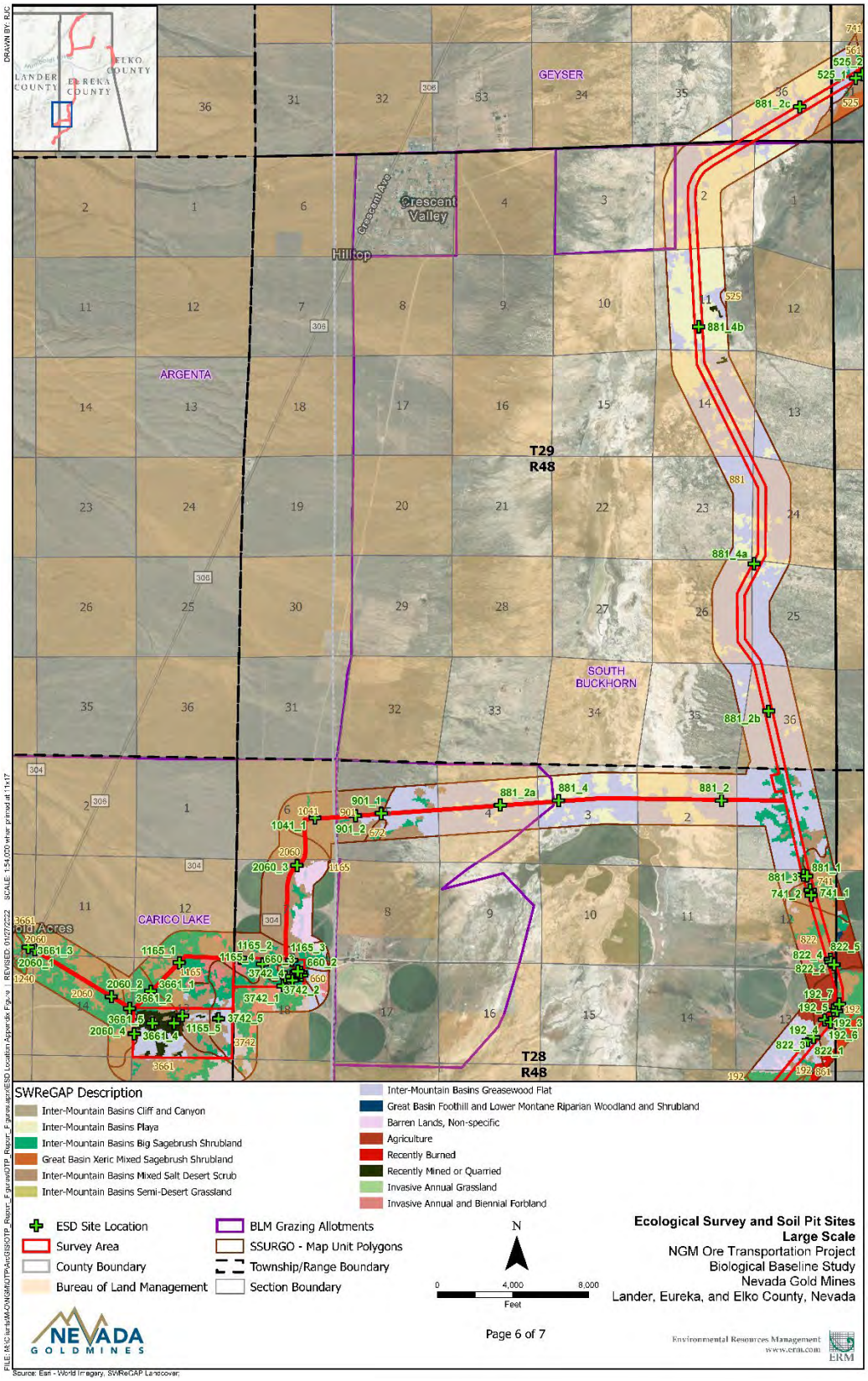


Figure A.7-6: Ecological Survey and Soil Pit Locations—Crescent Valley Survey Area Central

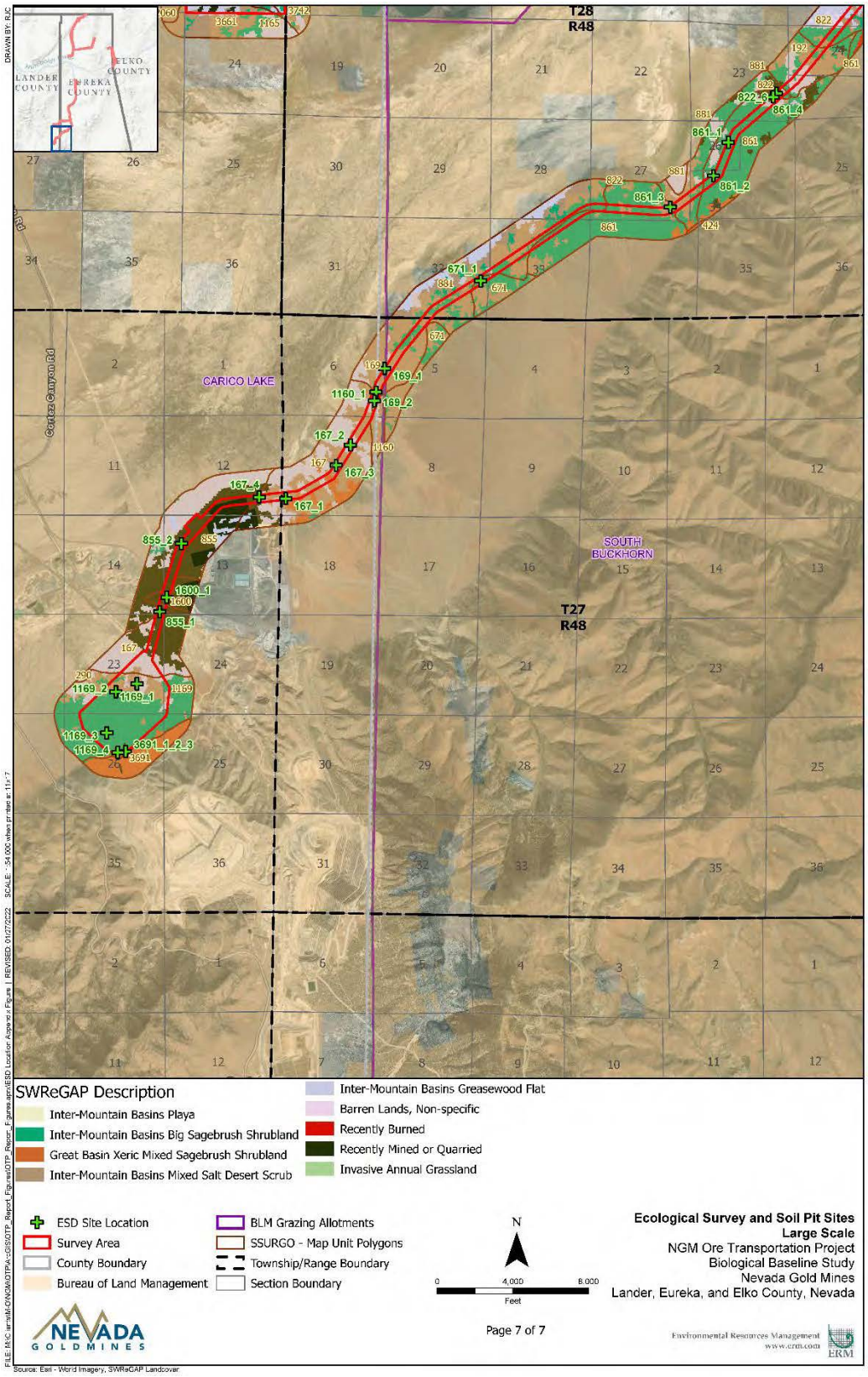


Figure A.7-7: Ecological Survey and Soil Pit Locations—Crescent Valley Survey Area South

A.8. ECOLOGICAL SITE SURVEY DATASHEETS AND PHOTOS

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: 1041_1		Date: *May 20, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *1041*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rocks, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1467.663* m	Aspect: *120°*
Topographic position: Alluvial fans		Topographic position: *Fan piedmont*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *48* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR42, 7% 1mm - 4cm pebbles present*
					2	*8 - 24 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR43, 35% 1mm - 4cm pebbles present*
					3	*24 - 48 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR43, 50% 1mm-4cm pebbles*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.96 miles southwest of the Cortez Mine, mile marker 4.6 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.324945 N. Latitude
Section 1/4 Section		m		-116.598285 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Roads, pivots, ranch residence near survey area. Mine site within general proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1041_1*		Date: *May 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(1) Assign 17 indicator ratings, record comments and any measurements. (2) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (3) Assign overall rating for each attribute based on preponderance of evidence. (4) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *9* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Infiltration potentially impacted by lack of perennial grasses*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *6*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *S-M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil functioning as expected in site						*Potential reduction in infiltration from lack of perennial grasses may affect hydrology*						*Lack of dominant functional structure groups and likely increasing invasive annual grass and forb presence*
0	1	0	0	9		0	1	0	1	8		0	2	0	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *1041_1* **Date:** *May 20, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.
2. Observe and list the F/S groups present in the evaluation area.
3. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in the evaluation area.
4. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the **Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.
5. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.
6. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Indian ricegrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*4*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



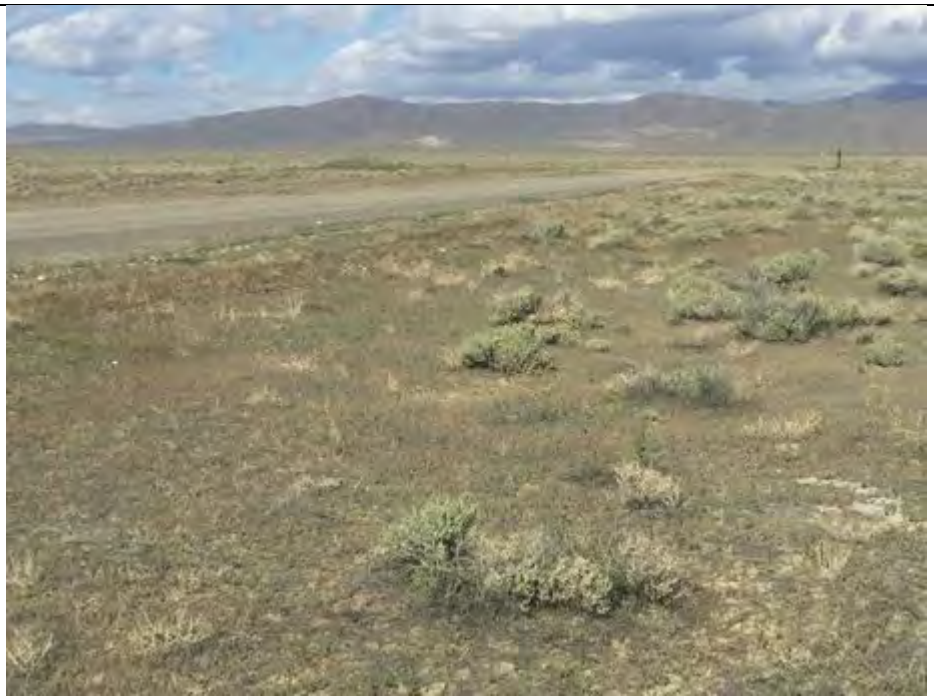
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photo_W-20210520-152846.jpg



photo_Soil-20210520-154127.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1160_1*		Date: *June 4, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *1160*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1460.786* m	Aspect: *294°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/4, extremely gravelly; fine gravel; fine sandy loam*
					2	*6 - 16 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/4, some blocky structure, extremely gravelly, medium roots throughout*
					3	*16 - 34 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR3/6, gravelly; fine gravel, medium roots throughout*
					4	*34 - 53 cm*	*Silty Clay Loam*		*Dry 10YR7/4; moist 10YR3/6, subangular blockiness, smooth appearance, some fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.4 miles south of the Cortez Mine, mile marker 3.8 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.233867 N. Latitude
Section 1/4 Section		m		-116.597538 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Mine site	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1160_1*		Date: *June 4, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(5) Assign 17 indicator ratings, record comments and any measurements. (6) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (7) Assign overall rating for each attribute based on preponderance of evidence. (8) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *17* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Reduced infiltration due to lack of perennial bunchgrasses.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *S-M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *8*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M*					Rationale:
					Soils functioning as intended for site.						*Reduced infiltration due to lack of perennial bunchgrasses.*						*Biotic community is missing dominant functional structure groups and invasive cheatgrass is commonly scattered throughout.*
0	0	0	1	9		0	1	0	1	8		0	0	3	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *1160_1* **Date:** *June 4, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

7. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.
8. Observe and list the F/S groups present in the evaluation area.
9. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in the evaluation area.
10. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the **Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.
11. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.
12. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Small annual forbs*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210604-181657.jpg



photo_S-20210604-181704.jpg



photo_W-20210604-181712.jpg



photo_Soil-20210604-181723.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1165_1*		Date: *May 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *1165*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess* Slope: *2°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1480.061* m Aspect: *163°*
Topographic position: Alluvial fans	Topographic position: *Fan remnant; inset fan; low lying valley bottom getting closer to lowest elevation in area of the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *38* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR62; moist 10YR34, 30% 2mm - 15mm pebbles present*
					2	*6 - 23 cm*	*Sandy Clay Loam*		*Dry 10 YR62; moist 10YR43, platy layer, 50% 1mm - 3cm pebbles.*
					3	*23 - 38 cm*	*Loamy Sand*		*Dry 10YR72 ; moist 10YR43. 80% compacted remnant mixed rock. Refusal at 38cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.35 miles south of the Cortez Mine, mile marker 1.9 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.304094 N. Latitude
Section 1/4 Section		m		-116.624085 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Road use, powerlines, irrigated field	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1165_1*		Date: *May 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(9) Assign 17 indicator ratings, record comments and any measurements. (10) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (11) Assign overall rating for each attribute based on preponderance of evidence. (12) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *10* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Annual forb cover protecting surface from runoff, however, lack of perennial grasses may lead to reduced infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *M*	B *E-T*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *11*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*S-M*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					Annual forb cover adding coverage to survey site and protecting soils from erosion.						*Infiltration potentially impacted by lack of perennial grasses*						*Biotic community now dominated by annual forbs and annual grasses and lacking perennial grasses.*
1	0	0	0	9		1	0	0	1	8		2	0	1	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_1165_1* **Date:** *May 19, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

13. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.
14. Observe and list the F/S groups present in the evaluation area.
15. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.
16. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.
17. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.
18. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Desert mallow*
Non-sprouting shrubs	*Big sagebrush, Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	*Plains prickly pear*
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*5*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210519-181904.jpg



photo_W-20210519-181912.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1165_2*		Date: *May 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *1165*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess* Slope: *1°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1468.766* m Aspect: *140°*
Topographic position: Alluvial fans	Topographic position: *Fan remnant; inset fan; low lying valley bottom, getting closer to lowest elevation in area of the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *56* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 3 cm*	*Loam*		*1% 2mm - 25mm pebbles. Dry 10YR62; moist 10YR43.*
					2	*3 - 33 cm*	*Silt Loam*		*Dry 10YR53; moist 10YR33, greasy texture when moist, mixed rock present; 15%*
					3	*33 - 56 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR33, larger rocks present, more pebbles; 25%*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.4 miles south of the Cortez Mine, mile marker 2.5 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.304714 N. Latitude
Section 1/4 Section		m		-116.612586 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Ranch, pivots, roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1165_2*		Date: *May 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(13) Assign 17 indicator ratings, record comments and any measurements. (14) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (15) Assign overall rating for each attribute based on preponderance of evidence. (16) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *45* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Lack of shrubs and perennial grasses may increase impact from rain event, decrease infiltration, and increase runoff.*
11. Compaction layer	S | H | B *M*	
12. Functional/structural groups	B *E-T*	
a. Relative dominance: *E-T*		
b. F/S groups not expected at the site: *E-T*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *30*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Litter presence helping cover soil surface and bare ground within expectation for site.						*Missing functional biotic community components which may lead to greater runoff and less infiltration at the survey site.*						*Missing dominant functional structure groups. Biotic community not representative of site description within survey site.*
0	0	1	0	9		0	1	1	0	8		1	1	2	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_1165_2* **Date:** *May 19, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

19. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

20. Observe and list the F/S groups present in the evaluation area.

21. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

22. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

23. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

24. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Annual false wheatgrass, Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210519-193331.jpg



photo_S-20210519-193342.jpg



photo_W-20210519-193352.jpg



photo_Soil-20210519-193256.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1165_3*		Date: *May 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *1165*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess* Slope: *1°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1462.266* m Aspect: *108°*
Topographic position: Alluvial fans	Topographic position: *Fan remnant; inset fan; low lying valley bottom, getting closer to lowest elevation in area of the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *40* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 10 cm*	*Sandy Loam*		*Dry 10YR53, moist 10YR32, 20% 1mm - 10mm pebbles present*
					2	*10 - 40 cm*	*Sandy Loam*		*Dry 10YR62; moist 10YR33, platy layers, less than 5% 1-10mm pebbles. Refusal at 40cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.67 miles southwest of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.304363 N. Latitude
Section 1/4 Section		m		-116.602777 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife

Offsite influences: Ranch, pivots, roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1165_3*		Date: *May 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(17) Assign 17 indicator ratings, record comments and any measurements. (18) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (19) Assign overall rating for each attribute based on preponderance of evidence. (20) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *8* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial functional structure groups.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *10*% Depth: *N/A*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>M-E</u>					Rationale:	Attribute Rating: <u>M-E</u>					Rationale:
					Soils functioning as expected for site						*Lack of perennial functional structure groups may contribute to moderate reduced infiltration capabilities within survey area.*						*Functional structure groups not expected at the site are now dominant throughout the survey area.*
0	0	1	0	9		0	0	2	0	8		2	1	1	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *1165_3* **Date:** *May 19, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

25. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

26. Observe and list the F/S groups present in the evaluation area.

27. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

28. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

29. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

30. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Indian ricegrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Lambs quarter, Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*4*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210519-203335.jpg



photo_W-20210519-203353.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1165_4*		Date: *May 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *1165*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess* Slope: *2°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1465.853* m Aspect: *138°*
Topographic position: Alluvial fans	Topographic position: *Fan remnant; inset fan; low lying valley bottom, getting closer to lowest elevation in area of the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *83* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Silt Loam*		*Dry 10YR53; moist 10YR33, no pebbles present*
					2	*9 - 49 cm*	*Silty Clay Loam*		*Dry 10YR52; moist 10YR32, platy structures, porous, roots present*
					3	*49 - 83 cm*	*Silt Loam*		*Dry 10YR72; moist 10YR43, looser texture than layer above*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.43 miles southwest of the Cortez Mine, mile marker 2.8 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.303813 N. Latitude
Section 1/4 Section		m		-116.608341 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Ranch, pivots, roads, diverted stream	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1165_4*		Date: *May 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(21) Assign 17 indicator ratings, record comments and any measurements. (22) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (23) Assign overall rating for each attribute based on preponderance of evidence. (24) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *6* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of infiltration capabilities due to lack of perennial bunchgrass presence. Shrubs aiding in infiltration and litter coverage aiding in protection from raindrop impact.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *S-M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *M*	B *M*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *10*% Depth: *N/A*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:	Attribute Rating: <u>M-E</u>					Rationale:
					Soils functioning as expected within the site.						*Potential reduction in infiltration capabilities due to reduced presence of perennial bunchgrasses and increased presence of annual grass.*						*Invasive annual grass is now sub-dominant throughout survey area.*
0	0	1	0	9		0	0	2	0	8		0	1	2	1	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_1165_4* **Date:** *May 19, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

31. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.
32. Observe and list the F/S groups present in the evaluation area.
33. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.
34. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.
35. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.
36. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Desert mallow*
Non-sprouting shrubs	*Big sagebrush, Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	*Plains prickly pear*
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*4*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1165_5*		Date: *June 15, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *1165*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-30%*	Parent material: *NA. No soil pit dug.* Slope: *2°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1470.595* m Aspect: *145°*
Topographic position: Alluvial fans	Topographic position: *Fan remnant; inset fan; low lying valley bottom, getting closer to lowest elevation in area of the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *1* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 1 cm*	*Sand*		*Refusal at surface; surface layer is coarse gravel and cobble*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 1.5 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.296383 N. Latitude
Section 1/4 Section		m		-116.623565 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife

Offsite influences: Mine site, access road, pivot, pipeline, powerlines

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 3.1 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1165_5*		Date: *June 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(25) Assign 17 indicator ratings, record comments and any measurements. (26) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (27) Assign overall rating for each attribute based on preponderance of evidence. (28) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *1* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *M*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Potential lack of infiltration due to lack of perennial bunchgrasses and heavy rock surface layer.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *8*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Some departure due to heavy disturbance from anthropogenic use. No soil pit dug.						*Lack of perennial bunchgrasses and heavy dominance of rock on surface layer may result in moderately reduced infiltration capabilities.*						*Biotic community is lacking dominant and sub-dominant functional structure groups.*
0	1	1	0	8		0	2	1	0	7		2	0	2	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *1165_5* **Date:** *June 15, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

37. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

38. Observe and list the F/S groups present in the evaluation area.

39. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

40. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

41. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

42. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed, Storksbill, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210615-170854.jpg



photo_S-20210615-170900.jpg



photo_W-20210615-170907.jpg



photo_Soil-20210615-170915.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1169_1*		Date: *June 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Kevin Cutrera / Other*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *1169*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1471.134* m	Aspect: *0°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt; terrace*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *64* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR 4/3, subangular blocky structures, slightly effervescent, friable, some fine roots*
					2	*5 - 21 cm*	*Clay Loam*		*Dry 10YR 6/2; moist N/A, subangular, blocky textures, hard, slightly sticky, fibrous roots present throughout*
					3	*21 - 48 cm*	*Sandy Loam*		*Dry 10YR 6/3; moist 10YR 3/3, granular in structure, some coarse sand, some roots present*
					4	*48 - 64 cm*	*Sandy Loam*		*Dry 10YR 7/2; moist 10YR 4/4, subangular, blocky structure, friable, absence of roots, dry; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Is within the Cortez Mine, mile marker 0.0 of the Segment #1 - Range Front to UP project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.192901 N. Latitude

Section 1/4 Section	OR	m	OR	-116.642813 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, mining	
Offsite influences: Site within an active mine	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1169_1*		Date: *June 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(29) Assign 17 indicator ratings, record comments and any measurements. (30) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (31) Assign overall rating for each attribute based on preponderance of evidence. (32) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *34* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of bunchgrasses may affect infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *14*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Other than cattle impacts on the surface, soil stability is intact.						*Lack of functional structure groups potentially reducing infiltration and increasing runoff.*						*Overall, the functional structure groups are present, however not in the ideal relationship. Lack of bunchgrasses and native forbs affecting overall health.*
0	0	0	0	10		0	0	1	0	9		0	1	2	1	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_1169_1* **Date:** *June 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Other*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

43. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

44. Observe and list the F/S groups present in the evaluation area.

45. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

46. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

47. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

48. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Indian ricegrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Blue mustard, Halogeton, Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

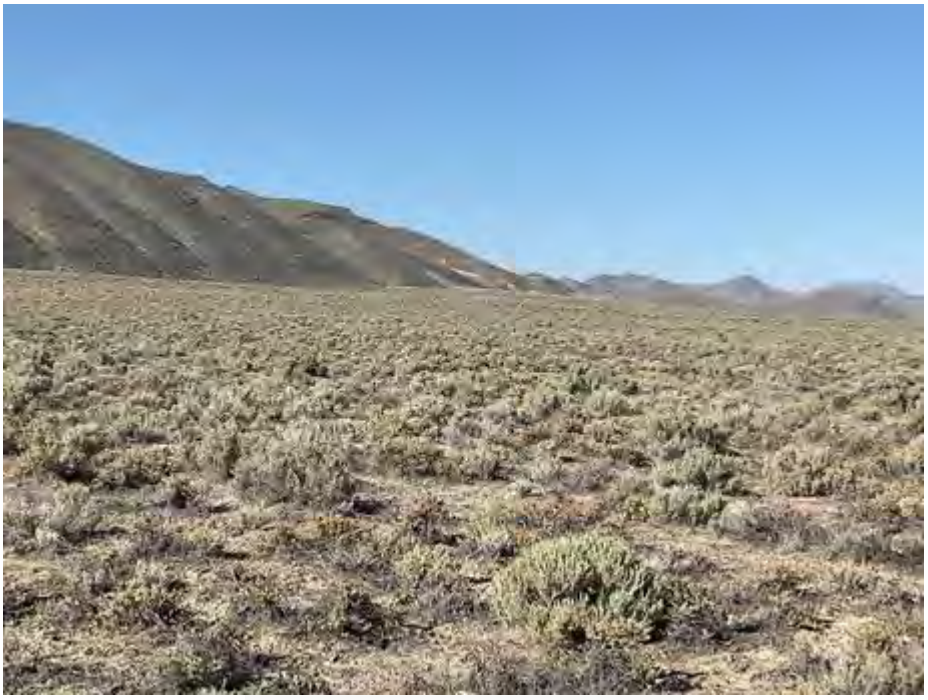
Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210619-150441.jpg



photo_W-20210619-150447.jpg



photo_Soil-20210619-150948.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1169_2*		Date: *June 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *1169*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1474.534* m	Aspect: *350°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *34* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Silty Clay*		*Dry 10YR6/2; moist 10YR4/3, subangular and blocky, friable, very sticky*
					2	*4 - 10 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR4/2, blocky, subangular, some fine roots*
					3	*10 - 34 cm*	*Clay Loam*		*Dry 10YR6/1; moist 10YR4/2, slightly effervescent, subangular, blocky, some fine roots*
					4	*34 - 16 cm*	*Sandy Loam*		*Dry 10YR6/2, moist 10YR4/2, subangular, blocky, slightly effervescent, some fine gravel; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 0.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.191734 N. Latitude
Section 1/4 Section		m		-116.6468 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, mining	
Offsite influences: Access roads, mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1169_2*		Date: *June 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(33) Assign 17 indicator ratings, record comments and any measurements. (34) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (35) Assign overall rating for each attribute based on preponderance of evidence. (36) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *28* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Greatly reduced perennial bunchgrasses decreases infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *N-S* d. Spp # in dom & subdom F/S groups: *N-S*	B *M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *35*% Depth: *1 cm*	H B *S-M*	
15. Annual production: Observed: _ ÷ Expected = %	B *N-S*	
16. Invasive plants	B *N-S*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:
					Soils functioning as expected for the site, despite some disturbance.						*Potential decreased infiltration and increased runoff due to reduction in bunchgrasses and perennial forbs*						*Missing subdominant functional structure groups.*
0	0	1	0	9		0	1	1	1	7		0	1	1	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *1169_2* **Date:** *June 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

49. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

50. Observe and list the F/S groups present in the evaluation area.

51. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

52. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

53. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

54. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *2.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*4*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210619-163857.jpg



photo_S-20210619-163910.jpg



photo_W-20210619-163921.jpg



photo_Soil-20210619-163810.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1169_3*		Date: *June 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *1169*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *4°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1501.263* m	Aspect: *335°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *38* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/3, platy, friable, fair amount of fine to medium-coarse gravel; coarse sandy clay loam*
					2	*8 - 21 cm*	*Sandy Clay*		*Dry 10YR6/2; moist 10YR4/2, subangular, blocky, gravelly; fine to coarse in size; coarse sandy clay*
					3	*21 - 38 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/2, extremely cobbley, gravely; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 0.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.185779 N. Latitude
Section 1/4 Section		m		-116.648558 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, mining	
Offsite influences: Access roads, mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 2.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1169_3*		Date: *June 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(37) Assign 17 indicator ratings, record comments and any measurements. (38) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (39) Assign overall rating for each attribute based on preponderance of evidence. (40) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *S-M*	*Increased erosional features due to disturbance*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Reduced perennial bunchgrasses reduces infiltration; however, increased litter from increased annual grasses reduces raindrop impact*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *S-M*	*M-E*	
b. F/S groups not expected at the site: *M-E*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *45*% Depth: *1 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Decreased infiltration due to increased annual grasses, however, increased litter which aids in soil surface protection from raindrops, may offset some of this impact.						*Reduced infiltration due to overall lack of perennial bunchgrasses and forbs*						*Lacking or missing perennial bunchgrasses and forbs; major functional structure groups.*
0	1	0	1	8		0	2	1	1	6		0	2	3	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *1169_3* **Date:** *June 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

55. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

56. Observe and list the F/S groups present in the evaluation area.

57. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

58. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

59. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

60. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Burr buttercup*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210619-181403.jpg



photo_W-20210619-181411.jpg



photo_Soil-20210619-181253.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1169_4*		Date: *June 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *1169*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess* Slope: *12°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1522.592* m Aspect: *345°*
Topographic position: Alluvial fans	Topographic position: *Fan skirt*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *2* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Sand*		*Refusal by gravel, cobble, and boulders from nearby disturbance; straight gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 0.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.182897 N. Latitude
Section 1/4 Section		m		-116.646473 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock, mining

Offsite influences: Access roads, mining activity, reclamation area

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes
Reference community phase/description[3]: 3.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1169_4*		Date: *June 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(41) Assign 17 indicator ratings, record comments and any measurements. (42) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (43) Assign overall rating for each attribute based on preponderance of evidence. (44) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *S-M*	*Remediation may have left artificially created rills*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial bunchgrasses may reduce infiltration and potentially increase runoff*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *16*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *N-S*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*M*</u>					Rationale:	Attribute Rating: <u>*S-M*</u>					Rationale:	Attribute Rating: <u>*S-M*</u>					Rationale:
					Soils disturbed from anthropogenic use.						*Lack of perennial grasses and increased gravel, cobble, and boulders from disturbance potentially reducing infiltration and increasing runoff*						*Lacking subdominant functional structure groups*
1	0	0	1	8		1	0	0	2	7		0	1	1	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *1169_4* **Date:** *June 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

61. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

62. Observe and list the F/S groups present in the evaluation area.

63. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

64. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

65. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

66. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Black sagebrush, Saltbush, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210619-193631.jpg



photo_W-20210619-193652.jpg



photo_Soil-20210619-193524.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *1600_1*		Date: *June 2, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *1600*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *NA. No soil description available.*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1460.034* m	Aspect: *112°*
Topographic position: Alluvial fans		Topographic position: *Flats before hill slopes*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silty Clay*		*Dry 2.5Y6/2; moist 10YR3/4, loose, but contains a crusty, platy structure, some effervescence*
					2	*5 - 24 cm*	*Silty Clay*		*Dry 10YR6/2; moist 10YR4/4, granular texture, fine roots*
					3	*24 - 39 cm*	*Silty Clay*		*Dry 10YR3/3; moist 10YR3/4, platy structure*
					4	*39 - 54 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR4/4, subangular blocky structure*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 0.7 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.205419 N. Latitude	
Section 1/4 Section		m		-116.637043 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, mining	
Offsite influences: Mine site	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Commmunity Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *1600_1*		Date: *June 2, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(45) Assign 17 indicator ratings, record comments and any measurements. (46) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (47) Assign overall rating for each attribute based on preponderance of evidence. (48) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *34* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potential reduction in infiltration due to lack of deep rooted vegetation.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *10*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *1600_1* **Date:** *June 2, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

67. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

68. Observe and list the F/S groups present in the evaluation area.

69. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

70. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

71. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

72. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Commmunity Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Annual false wheatgrass, Cheatgrass*

Perennial bunchgrass		
Cool-season perennial grasses		
Annual forbs	*Mustard*	
Sprouting succulent		
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*	
Number of expected F/S groups present[2] in evaluation area:		*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:		*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *167_1*		Date: *June 7, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 8-10 P.Z.*	Ecological site ID: *R024XY022NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *167*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1460.11* m	Aspect: *292°*
Topographic position: NA		Topographic position: *Alluvial flats; inset fan*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *56* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Silt Loam*		*Dry 10YR6/2; Moist 10YR3/4, loose with fine roots*
					2	*6 - 20 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR3/3, fine to medium roots throughout*
					3	*20 - 56 cm*	*Silty Clay Loam*		*Dry 10YR4/3; moist 10YR3/3, holding some moisture, subangular blocky structure, very few fine roots present*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 2.4 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.219708 N. Latitude
Section 1/4 Section		m		-116.614433 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine site in close proximity, powerlines with access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *167_1*		Date: *June 7, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(49) Assign 17 indicator ratings, record comments and any measurements. (50) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (51) Assign overall rating for each attribute based on preponderance of evidence. (52) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*High shrub cover protects surface from runoff, lacking perennial bunchgrasses though, which aid in infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_167_1* **Date:** *June 7, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

73. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

74. Observe and list the F/S groups present in the evaluation area.

75. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

76. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

77. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

78. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210607-141301.jpg



photo_E-20210607-141308.jpg



photo_S-20210607-141314.jpg



photo_W-20210607-141322.jpg



photo_Soil-20210607-141345.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *167_2*		Date: *June 7, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 8-10 P.Z.*	Ecological site ID: *R024XY022NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *167*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1460.941* m	Aspect: *290°*
Topographic position: NA		Topographic position: *Alluvial flats; inset fan*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR4/4, some effervescence*
					2	*6 - 27 cm*	*Silty Clay*		*Dry 10YR4/3, moist 10YR4/4, some moisture present, fine platy structure, fine roots*
					3	*27 - 52 cm*	*Silty Clay*		*Dry 10YR4/6; moist 2.5YR3/3, some moisture present, weak platy structure, no roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 3.3 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.22745 N. Latitude
Section 1/4 Section		m		-116.602153 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Mine site in close proximity, fence line with access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *167_2*		Date: *June 7, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(53) Assign 17 indicator ratings, record comments and any measurements. (54) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (55) Assign overall rating for each attribute based on preponderance of evidence. (56) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *34* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Evidence of low infiltration and higher runoff in soil surface characteristics.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_167_2* **Date:** *June 7, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

79. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

80. Observe and list the F/S groups present in the evaluation area.

81. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

82. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

83. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

84. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 8-10 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210607-160931.jpg



photo_S-20210607-160939.jpg



photo_W-20210607-160946.jpg



photo_Soil-20210607-161002.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *167_3*		Date: *June 7, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 8-10 P.Z.*	Ecological site ID: *R024XY022NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *167*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1460.703* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Alluvial flats; inset fan*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Silty Clay*		*Dry 10YR5/2; moist 10YR3/3, loose, granular texture*
					2	*4 - 32 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, subangular blocky structure; fine to coarse roots throughout*
					3	*32 - 54 cm*	*Silty Clay*		*Dry 10YR6/2; moist 10YR3/3, subangular blocky structure, no roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 3.1 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.224544 N. Latitude
Section 1/4 Section		m		-116.604838 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Mine site in close proximity, fence line with access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *167_3*		Date: *June 7, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(57) Assign 17 indicator ratings, record comments and any measurements. (58) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (59) Assign overall rating for each attribute based on preponderance of evidence. (60) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Fair to good infiltration with presence of some perennial bunchgrasses*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *8*% Depth: *2 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _*167_3*_____ **Date:** *June 7, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

85. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

86. Observe and list the F/S groups present in the evaluation area.

87. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

88. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

89. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

90. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Poverty weed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



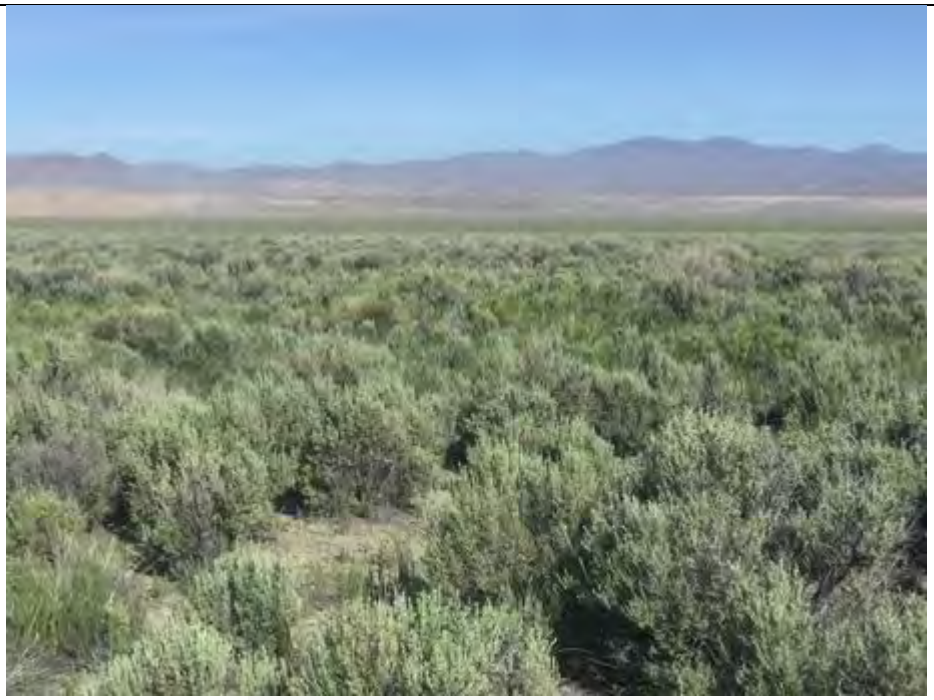
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photo_E-20210607-151614.jpg



photo_S-20210607-151619.jpg



photo_W-20210607-151625.jpg



photo_Soil-20210607-151645.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *167_4*		Date: *June 2, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Kevin Cutrera / Nicole St John*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *167*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1457.131* m	Aspect: *154°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR4/3, moderately effervescence, some platy structure*
					2	*5 - 32 cm*	*Silty Clay*		*Dry 10YR4/3; moist 10YR3/3, weak platy structure*
					3	*32 - 52 cm*	*Silty Clay*		*Dry 10YR6/1; moist 10YR3/3, weak platy structure*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 2.2 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.219954 N. Latitude
Section 1/4 Section		m		-116.619461 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Active mine site	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *167_4*		Date: *June 2, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(61) Assign 17 indicator ratings, record comments and any measurements. (62) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (63) Assign overall rating for each attribute based on preponderance of evidence. (64) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *26* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Runoff may be increased with increased amount of bare ground however shrubs may alleviate this. Low composition of bunchgrasses may be reducing infiltration capabilities.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *8*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _*167_4*_____ **Date:** *June 2, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Nicole St John*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

91. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

92. Observe and list the F/S groups present in the evaluation area.

93. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

94. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

95. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

96. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210602-211718.jpg



photo_S-20210602-211725.jpg



photo_W-20210602-211731.jpg



photo_Soil-20210602-211743.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *169_1*		Date: *June 4, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *169*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1460.772* m	Aspect: *296°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, loose, friable; fine sandy clay loam*
					2	*6 - 14 cm*	*Sandy Loam*		*Dry 10YR4/3; moist 10YR3/4, subangular blocky structure, very friable, fine roots throughout; fine sandy loam*
					3	*14 - 33 cm*	*Silty Clay*		*Dry 10YR4/3; moist 10YR3/3, some subangular blocky structure throughout, gravelly, fine roots throughout*
					4	*33 - 53 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, stronger platy structure, more compact*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.73 miles south of the Cortez Mine, mile marker 4.1 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.238584 N. Latitude
Section 1/4 Section		m		-116.595573 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Mine site	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *169_1*		Date: *June 4, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(65) Assign 17 indicator ratings, record comments and any measurements. (66) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (67) Assign overall rating for each attribute based on preponderance of evidence. (68) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *23* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*See dominant plants. Overall lack of perennial bunchgrasses.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *12*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_169_1* **Date:** *June 4, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

97. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

98. Observe and list the F/S groups present in the evaluation area.

99. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

100. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

101. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

102. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

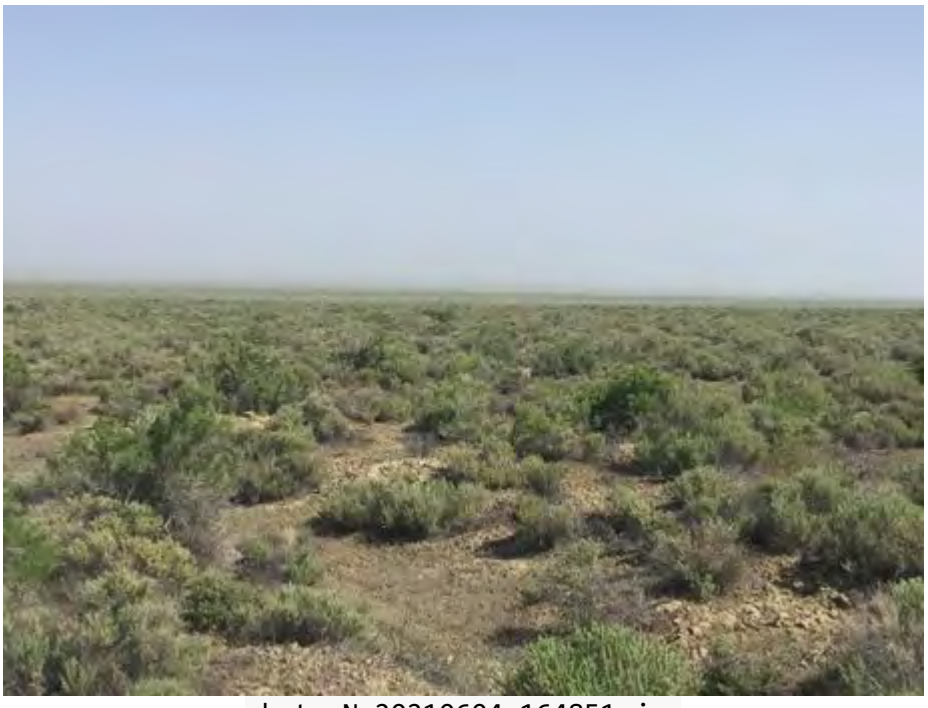
1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210604-164851.jpg



photo_E-20210604-164904.jpg



photo_S-20210604-164915.jpg



photo_W-20210604-164920.jpg



photo_Soil-20210604-164928.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *169_2*		Date: *June 4, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *169*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1460.783* m	Aspect: *266°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Silt Loam*		*Dry 10YR6/2; moist 10YR3/4, loose and friable*
					2	*6 - 15 cm*	*Silt Loam*		*Dry 10YR4/3; moist 3/3, some moisture present, platy structure, small roots*
					3	*15 - 27 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR3/4, some moisture present,, subangular blockiness, medium roots*
					4	*27 - 60 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR3/4, subangular, blockiness, smooth appearance*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.49 miles south of the Cortez Mine, mile marker 3.9 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.235167 N. Latitude
Section 1/4 Section		m		-116.597219 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Mine site	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *169_2*		Date: *June 4, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(69) Assign 17 indicator ratings, record comments and any measurements. (70) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (71) Assign overall rating for each attribute based on preponderance of evidence. (72) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*See dominant plants. Overall lack of perennial bunchgrasses.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *12*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *169_2* **Date:** *June 4, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

103. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

104. Observe and list the F/S groups present in the evaluation area.

105. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

106. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

107. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

108. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Flower baskets*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210604-174242.jpg



photo_W-20210604-174259.jpg



photo_Soil-20210604-174323.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *192_1*		Date: *June 11, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *192*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *3°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1454.949* m	Aspect: *256°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt, fan piedmont*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR5/3, subangular blockiness, crusty, some effervescence; fine sandy loam*
					2	*4 - 10 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/3, weak platy structure, porous; fine sandy loam*
					3	*10 - 19 cm*	*Sandy Loam*		*Dry 10YR7/1; moist 10YR5/4, weak, subangular blockiness, fine roots throughout; fine sandy loam*
					4	*19 - 33 cm*	*Sandy Clay*		*Dry 10YR3/4; 10YR4/4, duripan, subangular and hard texture, some coarse gravel*
					5	*33 - 43 cm*	*Sandy Loam*		*Dry 10YR4/6; moist 10YR3/6, medium roots throughout; coarse sandy loam*
					6	*43 - 53 cm*	*Silty Clay*		*Dry 10YR5/6; moist 10YR4/6, smooth, hard, no roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.87 miles north of the town of Beowawe, mile marker 25.5 of the Segment #1 - Range Front to UP project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.482792 N. Latitude
Section [1]/4 Section		m			-116.46527 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: NA					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *192_1*		Date: *June 11, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(73) Assign 17 indicator ratings, record comments and any measurements. (74) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (75) Assign overall rating for each attribute based on preponderance of evidence. (76) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *20* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial bunchgrasses that aid in infiltration, however increased sparse shrub canopy provides some protection from raindrops.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B *M-E*	
a. Relative dominance: *S-M*		
b. F/S groups not expected at the site: *M*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *20*% Depth: *0.5 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:	Attribute Rating: <u>*M-E*</u>					Rationale:
					Soils functioning as intended for site.						*Lack of perennial grasses may lead to decreased infiltration. Moderate bare ground may lead to increased runoff.*						*Invasive annual forbs appear to becoming more dominant throughout survey area.*
0	0	0	1	9		0	0	1	2	7		0	2	1	2	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_192_1* **Date:** *June 11, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

109. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

110. Observe and list the F/S groups present in the evaluation area.

111. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

112. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

113. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

114. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Brown-eyed primrose, Mustard, Mustards, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210611-155713.jpg



photo_S-20210611-155718.jpg



photo_W-20210611-155724.jpg



photo_Soil-20210611-155739.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *192_2*		Date: *June 11, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *192*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1453.563* m	Aspect: *312°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt; fan piedmont*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *66* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 12 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/4, loose, some subangular blocky structure, porous; fine sandy loam*
					2	*12 - 48 cm*	*Sandy Loam*		*Dry 10YR4/4; moist 10YR5/3, hard, subangular blockiness, fine to medium roots, porous; fine sandy loam.*
					3	*48 - 66 cm*	*Sandy Loam*		*Dry 7.5YR5/6; moist 7.5YR4/4, loose, subangular blocky structure; fine sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.68 miles north of the town of Beowawe, mile marker 25.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.485508 N. Latitude
Section 1/4 Section		m		-116.465833 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: NA	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *192_2*		Date: *June 11, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(77) Assign 17 indicator ratings, record comments and any measurements. (78) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (79) Assign overall rating for each attribute based on preponderance of evidence. (80) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *7* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Extreme lack of perennial vegetation, including shrubs, to aid in infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *30*% Depth: *0.75 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected for site.						*Lack of infiltration due to missing perennial functional structure groups.*						*Invasive annuals dominate and survey area lacks in overall diversity.*
0	1	0	0	9		1	1	1	0	7		1	2	2	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_192_2* **Date:** *June 11, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

115. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

116. Observe and list the F/S groups present in the evaluation area.

117. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

118. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

119. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

120. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210611-171141.jpg



photo_E-20210611-171150.jpg



photo_S-20210611-171155.jpg



photo_W-20210611-171200.jpg



photo_Soil-20210611-171212.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *192_3*		Date: *June 1, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *192*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1465.462* m	Aspect: *290°*
Topographic position: NA		Topographic position: *Fan skirt, fan piedmont*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 2.5Y5/3, moist 2.5Y3/3, loose, light granular texture, some effervescence, fine roots present; coarse sandy loam*
					2	*4 - 14 cm*	*Sandy Loam*		*Dry 2.5Y7/5; moist 2.5Y7/2, some subangular blockiness throughout. Coarse sandy loam.*
					3	*14 - 51 cm*	*Sandy Loam*		*Dry 10YR6/2, moist 10YR3/4. Extreme subangular blockiness texture. Coarse sandy loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.98 miles west of the Cortez Mine, mile marker 10.9 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.296737 N. Latitude
Section 1/4 Section		m		-116.500223 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, agriculture, livestock	
Offsite influences: Pivot field in close association within survey site. Pipeline running along pivot edge	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *192_3*		Date: *June 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(81) Assign 17 indicator ratings, record comments and any measurements. (82) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (83) Assign overall rating for each attribute based on preponderance of evidence. (84) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*None*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *14* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of bunchgrasses may lead to reduced infiltration and increased runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *6*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_192_3* **Date:** *June 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

121. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

122. Observe and list the F/S groups present in the evaluation area.

123. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

124. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

125. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

126. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210601-161030.jpg



photo_S-20210601-161038.jpg



photo_W-20210601-161045.jpg



photo_Soil-20210601-161107.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *192_4*		Date: *June 1, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *192*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1463.624* m	Aspect: *290°*
Topographic position: NA		Topographic position: *Fan skirt, fan piedmont*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 2.5Y5/4, moist 2.5Y3/3, loose, fine roots*
					2	*4 - 18 cm*	*Sandy Loam*		*Dry 10Y5/3; moist 10Y3/4, subangular blocky structure*
					3	*18 - 58 cm*	*Sandy Loam*		*Dry 2.5Y5/3; moist 10Y4/4, extremely subangular blocky structure, concretion-like texture, no roots; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.89 miles west of the Cortez Mine, mile marker 10.8 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.295342 N. Latitude
Section 1/4 Section		m		-116.501834 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, agriculture, livestock	
Offsite influences: Pivot field in close association within survey site. Pipeline running along pivot edge	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *192_4*		Date: *June 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(85) Assign 17 indicator ratings, record comments and any measurements. (86) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (87) Assign overall rating for each attribute based on preponderance of evidence. (88) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*None*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *30* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of bunchgrasses may lead to reduced infiltration and increased runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *1*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_192_4* **Date:** *June 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

127. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

128. Observe and list the F/S groups present in the evaluation area.

129. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

130. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

131. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

132. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210601-144540.jpg



photo_E-20210601-144547.jpg



photo_S-20210601-144552.jpg



photo_W-20210601-144558.jpg



photo_Soil-20210601-144608.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *192_5*		Date: *June 1, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *192*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *8°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1467.96* m	Aspect: *288°*
Topographic position: NA		Topographic position: *Fan skirt, fan piedmont*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 2 cm*	*Loamy Sand*		*Dry 10YR4/3; moist 10YR3/3; coarse loamy sand*
					2	*3 - 10 cm*	*Loamy Sand*		*Dry 10YR6/2, moist 10YR3/3, slightly platy, some effervescence*
					3	*10 - 43 cm*	*Loamy Sand*		*Dry 10YR6/2; moist 10YR3/4, thin platy structure; coarse loamy sand*
					4	*43 - 53 cm*	*Sandy Loam*		*Dry N/A; moist 10YR3/3, some moisture already present, fine subangular blocky texture; very coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.01 miles west of the Cortez Mine, mile marker 10.9 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.296654 N. Latitude
Section 1/4 Section		m		-116.499513 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Pivot field in close association within survey site. Pipeline running along pivot edge	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *192_5*		Date: *June 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(89) Assign 17 indicator ratings, record comments and any measurements. (90) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (91) Assign overall rating for each attribute based on preponderance of evidence. (92) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*None*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *30* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of bunchgrasses may lead to reduced infiltration and increased runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *1*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_192_5* **Date:** *June 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

133. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

134. Observe and list the F/S groups present in the evaluation area.

135. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

136. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

137. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

138. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Hopsage*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210601-201548.jpg



photo_E-20210601-201555.jpg



photo_S-20210601-201601.jpg



photo_W-20210601-201608.jpg



photo_Soil-20210601-201624.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *192_6*		Date: *June 1, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *192*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1466.214* m	Aspect: *292°*
Topographic position: NA		Topographic position: *Fan skirt, fan piedmont*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR5/3, moist 10YR3/3, granular blockiness, some effervescence, fine roots present; coarse sandy loam*
					2	*5 - 30 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, subangular blocky structure*
					3	*30 - 53 cm*	*Loamy Sand*		*Dry 10YR5/3; moist 7.5YR3/5, fine subangular blockiness*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.95 miles west of the Cortez Mine, mile marker 10.8 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.29499 N. Latitude
Section 1/4 Section		m		-116.500696 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, agriculture, livestock	
Offsite influences: Pivot field in close association within survey site. Pipeline running along pivot edge	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *192_6*		Date: *June 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(93) Assign 17 indicator ratings, record comments and any measurements. (94) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (95) Assign overall rating for each attribute based on preponderance of evidence. (96) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*None*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *29* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of bunchgrasses may lead to reduced infiltration and increased runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *8*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_192_6* **Date:** *June 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

139. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

140. Observe and list the F/S groups present in the evaluation area.

141. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

142. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

143. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

144. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210601-165438.jpg



photo_S-20210601-165448.jpg



photo_W-20210601-165455.jpg



photo_Soil-20210601-165519.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *192_7*		Date: *June 1, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *192*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *7°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1468.252* m	Aspect: *291°*
Topographic position: NA		Topographic position: *Fan skirt, fan piedmont*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *56* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR5/4; moist 10YR3/4; coarse sandy loam*
					2	*5 - 34 cm*	*Sandy Clay Loam*		*Dry 10YR4/4; moist 10YR3/4; thin platy structure; coarse sandy clay loam*
					3	*34 - 56 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/4, subangular blocky structure, coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.04 miles west of the Cortez Mine, mile marker 11.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.297601 N. Latitude
Section 1/4 Section		m		-116.49902 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Pivot field in close association within survey site. Pipeline running along pivot edge	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *192_7*		Date: *June 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(97) Assign 17 indicator ratings, record comments and any measurements. (98) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (99) Assign overall rating for each attribute based on preponderance of evidence. (100) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*None*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *14* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of bunchgrasses may lead to reduced infiltration and increased runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *6*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_192_7* **Date:** *June 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

145. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

146. Observe and list the F/S groups present in the evaluation area.

147. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

148. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

149. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

150. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Hopsage*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210601-212438.jpg



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photo_Soil-20210601-212419.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *2060_1*		Date: *May 18, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *2060*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1499.78* m	Aspect: *170°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; flats on a valley bottom; one third of the way between the playa and the foothills.*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *22* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Silty Clay Loam*		*N/A, friable, pebble to rock size gravel present*
					2	*6 - 13 cm*	*Clay Loam*		*N/A, friable, few pebbles*
					3	*13 - 22 cm*	*Clay Loam*		*N/A, friable, no pebbles*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.52 miles south of the Cortez Mine, mile marker 0.1 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.306018 N. Latitude	
Section 1/4 Section		m		-116.651466 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife

Offsite influences: Mine proximity, access roads

Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *2060_1*		Date: *May 18, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(101) Assign 17 indicator ratings, record comments and any measurements. (102) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (103) Assign overall rating for each attribute based on preponderance of evidence. (104) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *8* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *N-S*	*M*	
b. F/S groups not expected at the site: *S-M*		
c. Number of F/S groups: *M*		
d. Spp # in dom & subdom F/S groups: *M*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *2*% Depth: *0.5 cm*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Despite invasive presence and lack of functional groups, site stability is still as described in the reference sheet.						*Despite invasive presence and lack of functional groups, hydrology is still as described in the reference sheet.*						*Missing perennial grass and perennial forb components.*
0	*1*	*0*	*0*	*9*		0	*1*	*1*	*0*	*8*		0	*2*	*1*	*0*	*6*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_2060_1* **Date:** *May 18, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

151. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

152. Observe and list the F/S groups present in the evaluation area.

153. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

154. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

155. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

156. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Desert mallow*
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Annual false wheatgrass, Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210518-160510.jpg



photo_E-20210518-160524.jpg



photo_S-20210518-160535.jpg



photo_W-20210518-160550.jpg



photo_Soil-20210518-160413.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *2060_2*		Date: *May 18, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *2060*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1481.633* m	Aspect: *140°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; inset fan; flats in the low lying valley bottom before the playa*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *22* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Silt Loam*		*Dry 10YR71; moist 10YR42. 10-20% 5-10 mm pebbles.*
					2	*4 - 13 cm*	*Clay*		*Dry 10YR43; moist 10YR43, naturally chunky block-like structures, porous while dry; like modeling clay when moist, layer contains most roots, no gravel*
					3	*13 - 22 cm*	*Silty Clay*		*Dry 10YR44; moist 10YR44, stickier and more tacky than previous layer; more dense, no pebbles*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.03 miles south of the Cortez Mine, mile marker 1.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.299169 N. Latitude
Section 1/4 Section		m		-116.636983 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock use, potential wildlife habitat	
Offsite influences: Mine proximity, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *2060_2*		Date: *May 18, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(105) Assign 17 indicator ratings, record comments and any measurements. (106) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (107) Assign overall rating for each attribute based on preponderance of evidence. (108) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *N-S*	*Potential slight reduction in infiltration due to missing perennial bunchgrasses*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *2*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					Coverage by annual grasses and forbs keeps overall stability						*Coverage by annual grasses and forbs provides some hydrologic stability.*						*Overall lack of perennial bunch grasses*
0	*1*	*0*	*0*	*9*		0	*1*	*0*	*0*	*9*		0	*2*	*1*	*0*	*6*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_2060_2* **Date:** *May 18, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

157. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

158. Observe and list the F/S groups present in the evaluation area.

159. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

160. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

161. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

162. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Desert mallow*
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Annual false wheatgrass, Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

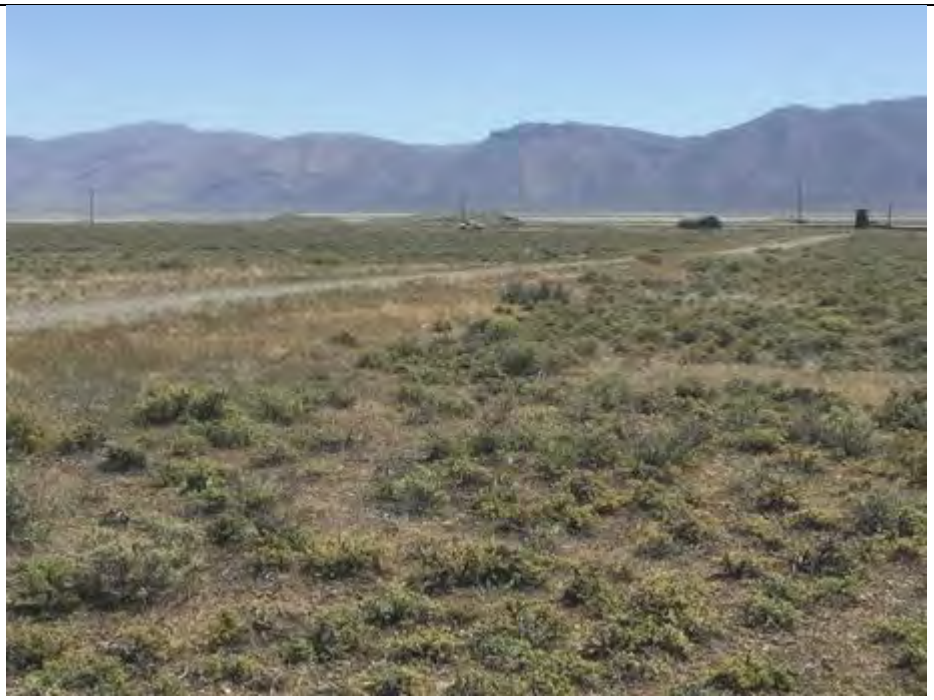
[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



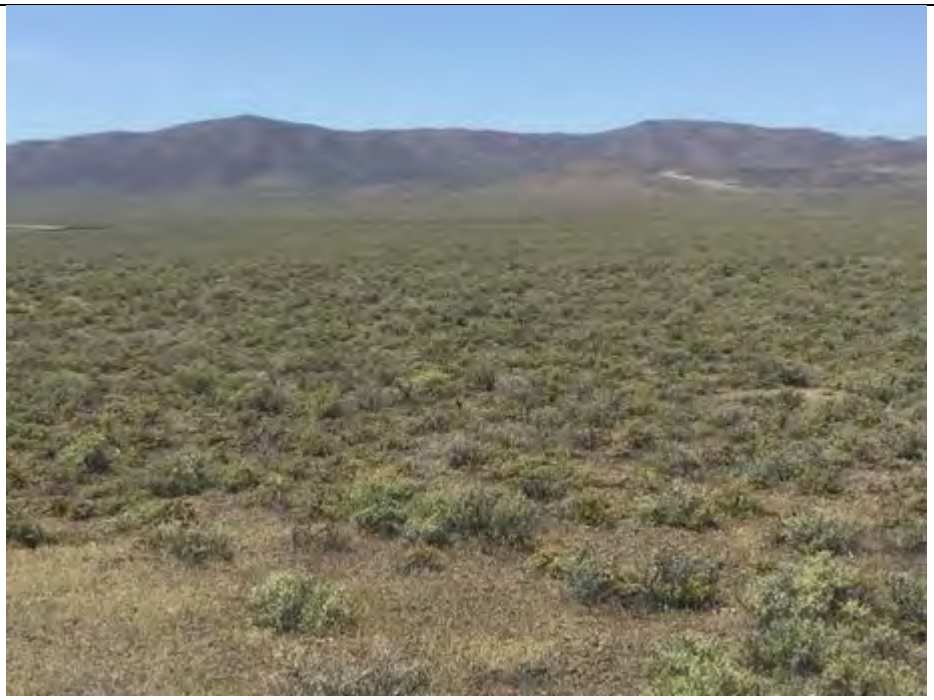
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photo_Soil-20210518-194735.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *2060_3*		Date: *May 20, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *2060*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess* Slope: *1°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1467.371* m Aspect: *44°*
Topographic position: Alluvial fans	Topographic position: *Remnant fan; low lying valley bottom edging closer to the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *51* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Silt Loam*		*Dry 10YR62; moist 10YR33, 20% 1-15mm pebbles present*
					2	*4 - 30 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR33, 20% 1mm -3cm*
					3	*30 - 51 cm*	*Silty Clay*		*Dry 10YR43; moist 10YR34, few to no rocks and pebbles present*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.47 miles southwest of the Cortez Mine, mile marker 4.1 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.318063 N. Latitude
Section 1/4 Section		m		-116.601688 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, agriculture

Offsite influences: Pivot field of alfalfa, road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *2060_3*		Date: *May 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(109) Assign 17 indicator ratings, record comments and any measurements. (110) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (111) Assign overall rating for each attribute based on preponderance of evidence. (112) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Changes to the plant community extreme. Potential extreme effect on infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *21*% Depth: *0.5 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *N-S*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Despite manipulation of biotic community, soil is functioning as described in the site.						*Hydrology heavily influenced by new biotic community within survey area.*						*Biotic community completely disturbed. No dominant and little to no co-dominant structural functional groups present.*
1	0	0	0	9		2	0	0	1	7		2	0	1	1	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_2060_3* **Date:** *May 20, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

163. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

164. Observe and list the F/S groups present in the evaluation area.

165. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

166. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

167. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

168. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Cultivated wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Alfalfa*
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Annual false wheatgrass, Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210520-165013.jpg



photo_E-20210520-165019.jpg



photo_S-20210520-165030.jpg



photo_W-20210520-165038.jpg



photo_Soil-20210520-165052.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *2060_4*		Date: *June 15, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *2060*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, loess, and mixed rock*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1472.674* m	Aspect: *120°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; flats*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/3, fine dry soil; coarse gravel, litter, shallow roots*
					2	*4 - 36 cm*	*Clay Loam*		*Dry 10YR8/1; moist 10YR4/3, sticky, fine roots, some gravel*
					3	*36 - 51 cm*	*Sandy Loam*		*Dry 10YR8/1; moist 10YR3/4, weak subangular structures, some gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 1.2 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.293794 N. Latitude
Section 1/4 Section		m		-116.632677 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, mine, pivot, pipeline, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *2060_4*		Date: *June 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(113) Assign 17 indicator ratings, record comments and any measurements. (114) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (115) Assign overall rating for each attribute based on preponderance of evidence. (116) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Reduced infiltration due to lack of perennial bunchgrasses*
11. Compaction layer	S | H | B *M*	
12. Functional/structural groups	B	
a. Relative dominance: *M-E*	*M-E*	
b. F/S groups not expected at the site: *M-E*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *30*% Depth: *0.5 cm*	H B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Functioning as expected for site						*Significant changes in hydrology due to changes in biotic community.*						*Lack of dominant and subdominant functional structure groups. Invasives are now common throughout the survey area.*
0	0	1	1	8		0	1	2	1	6		1	3	2	0	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_2060_4* **Date:** *June 15, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

169. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

170. Observe and list the F/S groups present in the evaluation area.

171. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

172. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

173. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

174. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Poverty weed, Whitetop*
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed, Storksbill*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3661_1*		Date: *May 18, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3661*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1478.886* m	Aspect: *118°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *40* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR42; horizon faint but, texture change more obvious; tacky texture when moist, 10% 1-10mm gravel in layer in addition to pebbles on top of the surface layer*
					2	*2 - 16 cm*	*Silty Clay Loam*		*Dry 10YR72; moist 10YR42, compaction characteristics different than top layer, larger rocks; 2.5-7.5 cm at 20% and 15% 1-10mm pebbles*
					3	*16 - 40 cm*	*N/A*		*N/A. Refusal at 40cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.09 miles south of the Cortez Mine, mile marker 1.5 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.29994 N. Latitude
Section 1/4 Section		m		-116.629535 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Mine site proximity, pipeline proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3661_1*		Date: *May 18, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(117) Assign 17 indicator ratings, record comments and any measurements. (118) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (119) Assign overall rating for each attribute based on preponderance of evidence. (120) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *16* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial grasses may influence infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *M*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *10*% Depth: *0.5 cm*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:
					More coverage provided by annual forbs than there is bare ground						*Hydrology still functioning as expected but some impact from lack of infiltration.*						*Lacking dominant functional groups and overall change in dominant species on the present landscape.*
0	0	1	0	9		0	0	2	0	8		0	1	2	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *3661_1* **Date:** *May 18, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

175. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

176. Observe and list the F/S groups present in the evaluation area.

177. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

178. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

179. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

180. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Desert mallow*
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

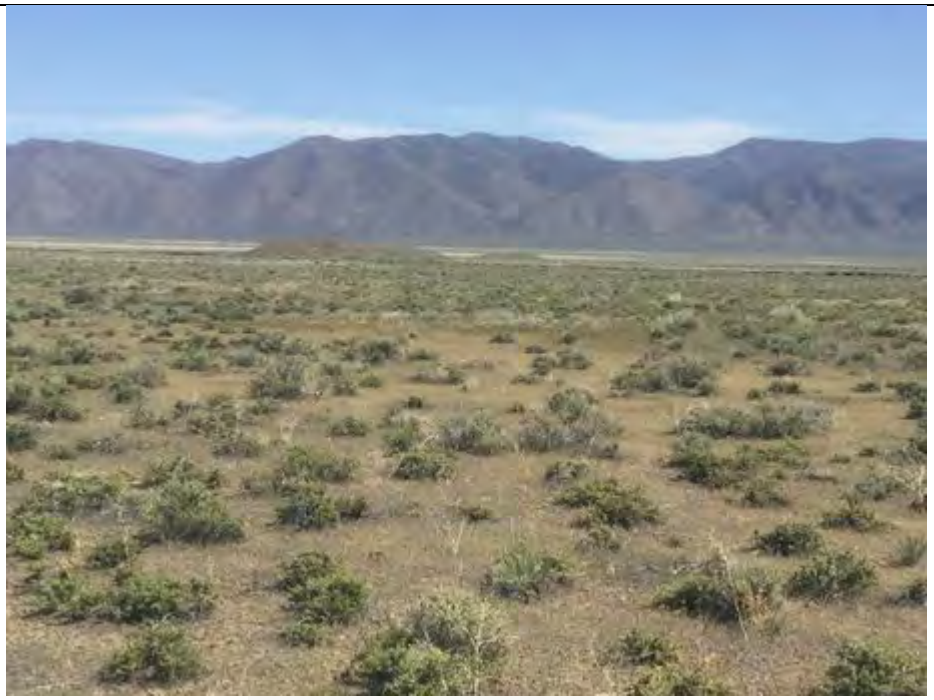
[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210518-213626.jpg



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photo_Soil-20210518-213858.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3661_2*		Date: *May 18, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *3661*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-8%*	Parent material: *Alluvium, mixed rocks, and loess* Slope: *2°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1476.346* m Aspect: *137°*
Topographic position: Alluvial fans	Topographic position: *Fan skirt*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *25* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Silty Clay Loam*		*Dry 10RY52; moist 10YR33 with 50% 1mm - 2cm pebbles.*
					2	*3 - 10 cm*	*Silty Clay Loam*		*Dry 10YR62, moist 10YR43 with 1mm - 2cm pebbles.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 1.2 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.29749 N. Latitude
Section 1/4 Section		m		-116.633529 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): Evidence of tilling, reclamation, and re-seeding

Wildlife, livestock, recreation, or other uses: Livestock, wildlife, and anthropogenic use

Offsite influences: Mine site proximity, pipeline proximity

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes
Reference community phase/description[3]: 3.1 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3661_2*		Date: *May 18, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(121) Assign 17 indicator ratings, record comments and any measurements. (122) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (123) Assign overall rating for each attribute based on preponderance of evidence. (124) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *11* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Reduced infiltration and increased runoff due to biotic community*
11. Compaction layer	S | H | B *M-E*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *1*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *M*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Lack of dominant functional structural groups has reduced soil stability within survey site.						*Lack of dominant functional structure groups has greatly modified hydrological function within survey site.*						*Natural biotic community has been highly affected by anthropogenic disturbance. Some reclamation efforts present.*
1	1	0	0	8		2	1	0	0	7		2	2	0	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *3661_2* **Date:** *May 18, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

181. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

182. Observe and list the F/S groups present in the evaluation area.

183. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

184. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

185. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

186. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Crested wheatgrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Desert mallow*
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Blue mustard, Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3661_3*		Date: *May 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3661*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1500.636* m	Aspect: *220°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					2	*0 - 8 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR33; 2 mm - 1.5cm pebbles make up more than 50% of the layer*
					3	*8 - 25 cm*	*Silty Clay*		*Dry 75YR44 ; moist 10YR36, fine roots throughout, absence of pebbles*
					3	*25 - 50 cm*	*Sandy Loam*		*Dry 10YR63; moist 10YR53, 15% 2mm -10cm pebbles*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.54 miles south of the Cortez Mine, mile marker 0.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.306417 N. Latitude
Section 1/4 Section		m		-116.652693 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife, and anthropogenic use	
Offsite influences: Mine site proximity, highway proximity, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3661_3*		Date: *May 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(125) Assign 17 indicator ratings, record comments and any measurements. (126) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (127) Assign overall rating for each attribute based on preponderance of evidence. (128) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *11* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lacking perennial grasses. Higher presence of annual grasses and annual forbs which may provide some protection form rain drop impact and reduce some runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *2*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *N-S*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					Vegetative cover greater and bare ground percentage less than expected.						*Vegetative cover higher than expected and helping with hydrological function.*						*Annual grasses and annual forbs outcompeting perennial grasses and are the dominant species.*
0	*1*	*0*	*0*	*9*		0	*1*	*0*	*1*	*8*		0	*2*	*1*	*0*	*6*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *3661_3* **Date:** *May 19, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

187. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

188. Observe and list the F/S groups present in the evaluation area.

189. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

190. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

191. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

192. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Budsage, Shadscale*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*5*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*6*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

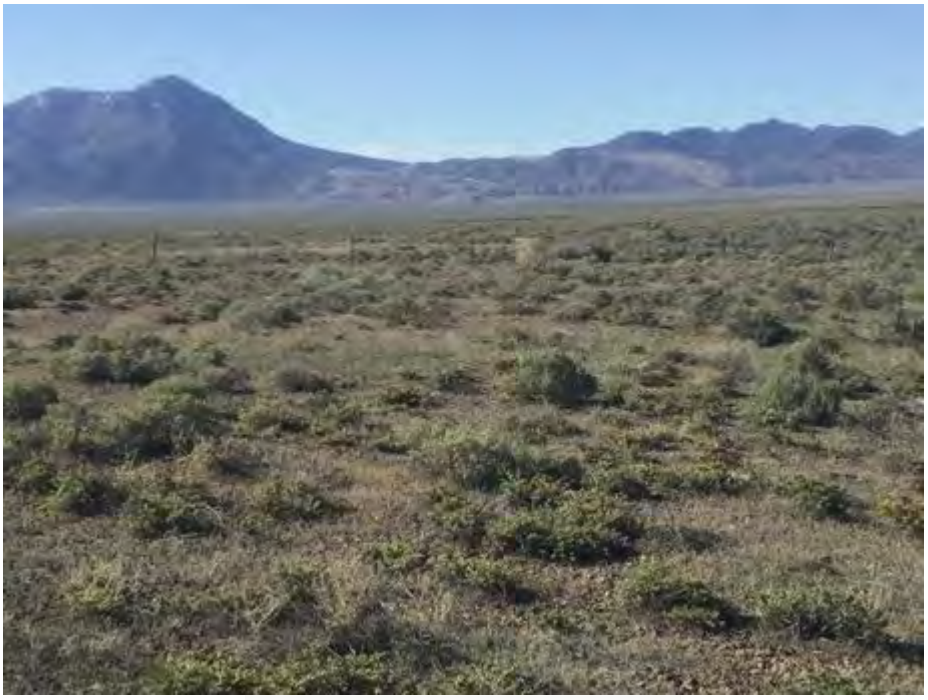
Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210519-153708.jpg



photo_W-20210519-153717.jpg



photo_Soil-20210519-153526.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3661_4*		Date: *June 15, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3661*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1470.905* m	Aspect: *120°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR7/2; Sticky; moist 10YR4/4, blocky structure, effervescent, gravely*
					2	*5 - 52 cm*	*Loamy Sand*		*Dry 10YR5/3; moist 10YR4/4, extremely gravely; coarse gravel and cobbles, fine roots throughout; coarse loamy sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 1.4 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.295316 N. Latitude
Section 1/4 Section		m		-116.62519 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Access roads, pipeline, pivot, Mine site proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3661_4*		Date: *June 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(129) Assign 17 indicator ratings, record comments and any measurements. (130) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (131) Assign overall rating for each attribute based on preponderance of evidence. (132) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *1* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial bunchgrasses may reduce infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M-E*	B *E-T*	
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *3*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils are functioning as expected for the site						*Lack of perennial bunchgrasses may lead to reduced infiltration within the survey area.*						*Major departures from expected biotic community within survey area.*
0	0	0	0	10		0	0	0	1	9		2	2	0	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_3661_4* **Date:** *June 15, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

193. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

194. Observe and list the F/S groups present in the evaluation area.

195. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

196. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

197. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

198. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210615-174351.jpg



photo_W-20210615-174359.jpg



photo_Soil-20210615-174455.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3661_5*		Date: *June 15, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3661*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1472.548* m	Aspect: *143°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *34* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loamy Sand*		*Dry 50/50 10YR7/3 and 10YR5/3; moist 10YR4/3, coarse gravel; very coarse loamy sand*
					2	*4 - 34 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 10YR4/4, extremely coarse gravel, fine roots throughout; coarse sandy clay loam. Refusal at 34 cm*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 1.3 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.295328 N. Latitude
Section 1/4 Section		m		-116.629215 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Access roads, pipeline, pivot, Mine site proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3661_5*		Date: *June 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(133) Assign 17 indicator ratings, record comments and any measurements. (134) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (135) Assign overall rating for each attribute based on preponderance of evidence. (136) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *1* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial bunchgrasses may reduce infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *2*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils function as expected for the site						*Lack of perennial bunchgrasses may lead to reduced infiltration within the survey area.*						*Overall lack of dominant and sub dominate functional structure groups within the survey area.*
0	0	0	1	9		0	0	1	1	8		4	0	0	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *3661_5* **Date:** *June 15, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

199. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

200. Observe and list the F/S groups present in the evaluation area.

201. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

202. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

203. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

204. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Budsage, Shadscale*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed, Storksbill, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*4*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210615-192030.jpg



photo_S-20210615-192041.jpg



photo_W-20210615-192053.jpg



photo_Soil-20210615-191945.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3691_1_2_3*		Date: *June 19, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Kevin Cutrera / Other*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Shallow Calcareous Loam 8-10 P.Z.*	Ecological site ID: *R024XY030NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3691*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Residuum and colluvium derived from limestone and dolomite*	Slope: *30°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1526.622* m	Aspect: *320°*
Topographic position: NA		Topographic position: *Hill; backslope*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *2* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Sandy Loam*		*Dry N/A, moist 10YR 3/4, gravel with loamy sand. Refusal at 2cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 0.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.183025 N. Latitude
Section 1/4 Section		m		-116.645023 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife, mining

Offsite influences: Active mine operations

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 4.1 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3691_1_2_3*		Date: *June 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(137) Assign 17 indicator ratings, record comments and any measurements. (138) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (139) Assign overall rating for each attribute based on preponderance of evidence. (140) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *3* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Shrubs and annual grasses, lack of bunchgrasses grasses. Runoff potentially high, infiltration potentially low*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *25*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_3691_1_2_3* **Date:** *June 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Other*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

205. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

206. Observe and list the F/S groups present in the evaluation area.

207. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

208. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

209. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

210. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Shallow Calcareous Loam 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210619-194521.jpg



photo_W-20210619-194540.jpg



photo_Soil-20210619-193806.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3742_1*		Date: *May 20, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3742*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1461.832* m	Aspect: *140°*
Topographic position: NA		Topographic position: *Alluvial flats; low lying valley bottom*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Loam*		*Dry 10YR53; moist 10YR33, few to no pebbles; ranging from 1mm-9cm*
					2	*8 - 34 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR43, no pebbles present*
					3	*34 - 52 cm*	*Silty Clay Loam*		*Dry 10YR53; moist 10YR33, no pebbles present*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.48 miles west of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.300636 N. Latitude
Section 1/4 Section		m		-116.604484 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife

Offsite influences: Pipeline in immediate area, mine proximity, pivot fields, roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3742_1*		Date: *May 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(141) Assign 17 indicator ratings, record comments and any measurements. (142) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (143) Assign overall rating for each attribute based on preponderance of evidence. (144) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Likely moderate to extreme reduction in infiltration due to lack of perennial functional structure groups within the survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *40*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *3742_1* **Date:** *May 20, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

211. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

212. Observe and list the F/S groups present in the evaluation area.

213. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

214. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

215. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

216. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Budsage*
Sprouting shrubs	*Spiny horsebrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210520-183202.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3742_2*		Date: *May 20, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *3742*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *NA*	Parent material: *Alluvium and loess*
Slope range: *NA*	Slope: *1°*
Elevation range: *NA* m	Elevation: *1462.115* m
Aspect NA (if specified):	Aspect: *140°*
Topographic position: NA	Topographic position: *Alluvial flats; low lying valley bottom*
Precipitation range: NA cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: NA	Seasonal precipitation distribution:
Soil depth[1]: NA	Pit depth: *52* cm

Type and depth of diagnostic horizons: in / cm

Soil horizon	Depth	Texture	Eff [2]	Other

Type and depth of diagnostic horizons: in / cm

Soil horizon	Depth	Texture	Eff [2]	Other
1	*0 - 13 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR43, N/A*
2	*13 - 34 cm*	*Silty Clay Loam*		*Dry 10YR53; moist 10YR33, roots present throughout*
3	*34 - 52 cm*	*Silt Loam*		*Dry 10YR62; moist 10YR34, N/A*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.53 miles southwest of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.301949 N. Latitude
Section 1/4 Section		m		-116.604017 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, anthropogenic uses (pipeline)

Offsite influences: Mine proximity, pipeline, pivots, roads

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes
Reference community phase/description[3]: 4.1 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3742_2*		Date: *May 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(145) Assign 17 indicator ratings, record comments and any measurements. (146) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (147) Assign overall rating for each attribute based on preponderance of evidence. (148) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Moderate lack of infiltration due to lack of perennial bunchgrasses*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *30*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _3742_2 **Date:** May 20, 2021 1:00 PM **Evaluator(s):** Nicole St John / Kevin Cutrera

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

217. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

218. Observe and list the F/S groups present in the evaluation area.

219. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

220. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

221. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

222. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Indian ricegrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Budsage*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Flower baskets*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210520-192738.jpg



photo_S-20210520-192744.jpg



photo_W-20210520-192751.jpg



photo_Soil-20210520-192810.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3742_3*		Date: *May 20, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *3742*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *NA*	Parent material: *Alluvium and loess*
Slope range: *NA*	Slope: *1°*
Elevation range: *NA* m	Elevation: *1461.303* m
Aspect NA (if specified):	Aspect: *128°*
Topographic position: NA	Topographic position: *Alluvial flats; low lying valley bottom*
Precipitation range: NA cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: NA	Seasonal precipitation distribution:
Soil depth[1]: NA	Pit depth: *71* cm

Type and depth of diagnostic horizons: in / cm

Soil horizon	Depth	Texture	Eff [2]	Other

Type and depth of diagnostic horizons: in / cm

Soil horizon	Depth	Texture	Eff [2]	Other
1	*0 - 10 cm*	*Silty Clay Loam*		*Dry 10YR53; moist 10YR33, N/A*
2	*10 - 26 cm*	*Silty Clay Loam*		*Dry 10YR62; moist 10YR43, more structure than layer above*
3	*26 - 71 cm*	*Silty Clay Loam*		*Dry 10YR53; moist 10YR33*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.59 miles west of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.302016 N. Latitude
Section 1/4 Section		m		-116.602855 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, anthropogenic use (pipeline)

Offsite influences: Pipeline in immediate area, mine proximity, pivot fields, roads

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes
Reference community phase/description[3]: 4.1 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3742_3*		Date: *May 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(149) Assign 17 indicator ratings, record comments and any measurements. (150) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (151) Assign overall rating for each attribute based on preponderance of evidence. (152) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): 5 %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Likely moderate to extreme reduction in infiltration due to the overall lack of perennial functional structure groups, especially grasses, within the survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: 40% Depth: N/A	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _3742_3 **Date:** May 20, 2021 1:00 PM **Evaluator(s):** Nicole St John / Kevin Cutrera

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

223. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

224. Observe and list the F/S groups present in the evaluation area.

225. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

226. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

227. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

228. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210520-203031.jpg



photo_Soil-20210520-203044.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3742_4*		Date: *May 20, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3742*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1461.223* m	Aspect: *108°*
Topographic position: NA		Topographic position: *Alluvial flats; low lying valley bottom*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *61* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silty Clay Loam*		*Dry 10YR53; moist 10YR33*
					2	*5 - 31 cm*	*Sandy Clay Loam*		*Dry 10YR53; moist 10YR34, some blockiness to layer, roots present*
					3	*31 - 61 cm*	*Silty Clay*		*Dry 10YR53; moist 10YR33, more blocky chunks than previous layer, but breaks into fine texture*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.59 miles west of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.301456 N. Latitude
Section 1/4 Section		m		-116.602672 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, anthropogenic use (pipeline)

Offsite influences: Pipeline in immediate area, mine proximity, pivot fields, roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3742_4*		Date: *May 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(153) Assign 17 indicator ratings, record comments and any measurements. (154) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (155) Assign overall rating for each attribute based on preponderance of evidence. (156) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *3* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Extreme lack of infiltration capabilities due to lack of perennial functional structure groups within the survey area*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *30*% Depth: *N/A*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _3742_4 **Date:** May 20, 2021 1:00 PM **Evaluator(s):** Nicole St John / Kevin Cutrera

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

229. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

230. Observe and list the F/S groups present in the evaluation area.

231. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

232. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

233. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

234. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Whitetop*
Non-sprouting shrubs	*Dead shrubs*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210520-211135.jpg



photo_S-20210520-211141.jpg



photo_W-20210520-211149.jpg



photo_Soil-20210520-211202.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *3742_5*		Date: *June 15, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *3742*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium and loess*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1464.682* m	Aspect: *140°*
Topographic position: NA		Topographic position: *Alluvial flats; low lying valley bottom*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Loam*		*Dry 10YR6/2; moist 10YR4/3, loose, subangular blockiness, gravelly; coarse in size*
					2	*5 - 28 cm*	*Sandy Clay*		*Dry 10YR4/4; moist 10YR3/4, subangular blockiness, very gravelly; coarse to cobble, fine roots throughout; coarse sandy clay*
					3	*28 - 53 cm*	*Loamy Sand*		*Dry 10YR6/3; 10YR4/3, extremely gravely; cobble sized; coarse loamy sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 2.3 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.295949	N. Latitude
Section 1/4 Section		m		-116.616721	W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): Evidence of tilling lines	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Pivot field, pipeline, access road, powerlines, and mine site all within close proximity.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *3742_5*		Date: *June 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(157) Assign 17 indicator ratings, record comments and any measurements. (158) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (159) Assign overall rating for each attribute based on preponderance of evidence. (160) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *11* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potentially reduced infiltration and increased runoff due to lack of perennial bunchgrasses and shrub cover.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *45*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *3742_5* **Date:** *June 15, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

235. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

236. Observe and list the F/S groups present in the evaluation area.

237. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

238. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

239. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

240. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Annual false wheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210615-154454.jpg



photo_W-20210615-154500.jpg



photo_Soil-20210615-154430.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *491_1*		Date: *July 22, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *491*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks, or in residuum and colluvium derived from tuff and tuffaceous sedimentary rocks.*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1544.522* m	Aspect: *118°*
Topographic position: NA		Topographic position: *Fan apron*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/6, loose and platy subangular structures, slightly sticky, porous; fine sandy loam.*
					2	*5 - 18 cm*	*Silty Clay Loam*		*Dry 7.5YR6/4; moist 7.5YR4/4, granular to blocky, dry, friable , slightly sticky, some fine roots throughout*
					3	*18 - 31 cm*	*Clay Loam*		*Dry 7.5YR5/4; moist 7.5YR4/4, subangular structure, hard, slightly sticky, slightly plastic, some fine roots*
					4	*31 - 54 cm*	*Sandy Loam*		*Dry 7.5YR6/4; moist 5YR4/4, granular, very hard, duripan, tubular pores; concreted sandy loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 1.69 miles southeast of the town of Carlin, mile marker 3.0 of the Carlin to GQ Private Bush Street project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.73416 N. Latitude
Section 1/4 Section			m		-116.15465 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *491_1*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(161) Assign 17 indicator ratings, record comments and any measurements. (162) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (163) Assign overall rating for each attribute based on preponderance of evidence. (164) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *24* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced bunchgrasses, forbs, and other shrubs may moderately reduce infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *16*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_491_1* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

241. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

242. Observe and list the F/S groups present in the evaluation area.

243. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

244. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

245. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

246. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210722-184439.jpg



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photo_S-20210722-184451.jpg



photo_W-20210722-184500.jpg



photo_Soil-20210722-184424.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *491_1a*		Date: *July 22, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *491*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks, or in residuum and colluvium derived from tuff and tuffaceous sedimentary rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1553.631* m	Aspect: *114°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *0* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 0 cm*	*Clay*		*N/A. No soil pit data.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.43 miles southeast of the town of Carlin, mile marker 3.9 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.745062 N. Latitude
Section 1/4 Section		m		-116.161842 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Access roads, mine

Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	

Reference community phase/description[3]: 4.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *491_1a*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(165) Assign 17 indicator ratings, record comments and any measurements. (166) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (167) Assign overall rating for each attribute based on preponderance of evidence. (168) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *11* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decreased bunchgrasses and native forbs slightly decrease infiltration, increases runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *15*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_491_1a* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

247. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

248. Observe and list the F/S groups present in the evaluation area.

249. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

250. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

251. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

252. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210722-201038.jpg



photo_S-20210722-201045.jpg



photo_W-20210722-201053.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *491_1b*		Date: *July 23, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *491*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks, or in residuum and colluvium derived from tuff and tuffaceous sedimentary rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1544.867* m	Aspect: *153°*
Topographic position: NA		Topographic position: *Fan apron*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 10 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, weak granular, litter, dry, some fine roots, some gravel throughout; fine to medium in size, slightly porous.*
					2	*10 - 26 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, subangular blocky, fibrous roots, gravely from fine to coarse, tubular pores.*
					3	*26 - 51 cm*	*Sandy Clay Loam*		*Dry 10YR7/3; moist 10YR3/4, subangular gradual, slightly moist, some fine roots, very gravely from fine to medium, slightly porous; coarse sandy clay loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 3.36 miles southeast of the town of Carlin, mile marker 5.2 of the Carlin to GQ Private Bush Street project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range	OR	m	OR	40.7646 N. Latitude	
Section 1/4 Section		m		-116.158058 W. Longitude	
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Mining activity, power lines, access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *491_1b*		Date: *July 23, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(169) Assign 17 indicator ratings, record comments and any measurements. (170) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (171) Assign overall rating for each attribute based on preponderance of evidence. (172) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *14* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Missing perennial bunchgrasses and forbs, likely slightly reducing infiltration and increasing runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *26*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_491_1b* **Date:** *July 23, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

253. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

254. Observe and list the F/S groups present in the evaluation area.

255. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

256. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

257. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

258. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210723-210510.jpg



photo_E-20210723-210521.jpg



photo_S-20210723-210530.jpg



photo_W-20210723-210622.jpg



photo_Soil-20210723-210443.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *491_2*		Date: *July 22, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *491*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks, or in residuum and colluvium derived from tuff and tuffaceous sedimentary rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1544.114* m	Aspect: *18°*
Topographic position: NA		Topographic position: *Fan apron*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *61* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/3, biocrust built on subangular structures, platy, gravelly, fine to coarse gravel, effervescent*
					2	*7 - 18 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR3/6, granular subangular structure, friable, slightly sticky, gravelly, fine to coarse gravel, some quite coarse and fine roots*
					3	*18 - 39 cm*	*Sandy Clay*		*Dry 5YR5/6; moist 5YR5/6, granular to coarse granular to blocky to subangular structure, hard, sticky, duranoids, some fine gravel, coarse roots*
					4	*39 - 61 cm*	*Sandy Clay Loam*		*Dry 5YR8/3; moist 7.5YR6/6, some weak small subangular structure, loose, friable, some medium gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type

indicated by the SWreGAP.					
Location description/directions: Approximately 1.01 miles east of the town of Carlin, mile marker 2.1 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR		40.724663 N. Latitude
Section 1/4 Section		m			-116.145478 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *491_2*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(173) Assign 17 indicator ratings, record comments and any measurements. (174) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (175) Assign overall rating for each attribute based on preponderance of evidence. (176) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *11* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absence of bunchgrasses slightly reduces infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *10*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *491_2* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

259. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

260. Observe and list the F/S groups present in the evaluation area.

261. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

262. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

263. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

264. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210722-154019.jpg



photo_W-20210722-154028.jpg



photo_Soil-20210722-153954.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *491_3*		Date: *July 22, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *491*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks, or in residuum and colluvium derived from tuff and tuffaceous sedimentary rocks.*	Slope: *15°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1539.294* m	Aspect: *170°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 9 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 7.5YR4/4, mostly loose, few weak subangular structures, gravelly, fine to medium gravel, roots*
					2	*9 - 33 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/6, some weak subangular structures, friable, gravelly, fine to coarse gravel, fine roots; coarse sandy loam.*
					3	*33 - 58 cm*	*Sandy Loam*		*Dry 7.5YR7/3; moist 7.5YR5/6, some weak subangular structure, very friable, gravelly, fine to coarse gravel, some fine roots; coarse sandy loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 0.83 miles east of the town of Carlin, mile marker 2.0 of the Carlin to GQ Private Bush Street project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.724023 N. Latitude
Section 1/4 Section			m		-116.142055 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *491_3*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(177) Assign 17 indicator ratings, record comments and any measurements. (178) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (179) Assign overall rating for each attribute based on preponderance of evidence. (180) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *19* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decreased presence of shrubs and bunchgrasses, with increased presence of annual forbs and grasses may result in greatly reduced infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *18*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *491_3* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

265. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

266. Observe and list the F/S groups present in the evaluation area.

267. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

268. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

269. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

270. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210722-144053.jpg



photo_W-20210722-144104.jpg



photo_Soil-20210722-144026.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *491_4*		Date: *July 23, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *491*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks, or in residuum and colluvium derived from tuff and tuffaceous sedimentary rocks.*	Slope: *4°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1555.235* m	Aspect: *177°*
Topographic position: NA		Topographic position: *Fan apron*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Loamy Sand*		*Dry 10YR7/2; moist 10YR4/4, mostly loose, some subangular structure, very dry, fine gravelly*
					2	*7 - 21 cm*	*Loamy Sand*		*Dry 10YR7/2; moist 10YR4/4, platy, subangular, fine granular structure; fine gravel throughout*
					3	*21 - 54 cm*	*Sandy Loam*		*Dry 10YR5/4; moist 7.5YR4/4, thin subangular platy structure, very hard, some very fine gravel, some coarse roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.6 miles southeast of the town of Carlin, mile marker 5.4 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.767134 N. Latitude
Section 1/4 Section		m		-116.161445 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *491_4*		Date: *July 23, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(181) Assign 17 indicator ratings, record comments and any measurements. (182) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (183) Assign overall rating for each attribute based on preponderance of evidence. (184) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *37* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Bunchgrasses absent and shrub cover reduced. Likely greatly reduced infiltration within the survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *4*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *491_4* **Date:** *July 23, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

271. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

272. Observe and list the F/S groups present in the evaluation area.

273. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

274. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

275. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

276. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210723-171229.jpg



photo_E-20210723-171236.jpg



photo_S-20210723-171245.jpg



photo_W-20210723-171254.jpg



photo_Soil-20210723-171221.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *525_1*		Date: *June 17, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *525*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, loess, and volcanic ash* Slope: *3°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1446.626* m Aspect: *300°*
Topographic position: Alluvial fans	Topographic position: *Backslope; hill*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *55* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, slightly effervescent, fine texture*
					2	*8 - 29 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular blocky structure, fibrous roots throughout*
					3	*29 - 55 cm*	*Sandy Clay Loam*		*Dry 10YR6/4; moist 10YR4/4, slightly sticky, gravelly; fine to coarse in size; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.95 miles west of the town of Crescent Valley, mile marker 21.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.431722 N. Latitude
Section 1/4 Section		m		-116.494927 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Two track approximately 100 meters to the northwest and dirt road approximately 200 meters to the west	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *525_1*		Date: *June 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(185) Assign 17 indicator ratings, record comments and any measurements. (186) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (187) Assign overall rating for each attribute based on preponderance of evidence. (188) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial bunchgrasses may contribute to a reduction in infiltration within survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *S-M* b. F/S groups not expected at the site: *N-S* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *3*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *N-S*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Soils functioning as expected for site.						*Some reduced infiltration due to lack of bunchgrasses.*						*Lacking some subdominant functional structure groups.*
0	0	1	0	9		0	0	2	0	8		0	1	2	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *525_1* **Date:** *June 17, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

277. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

278. Observe and list the F/S groups present in the evaluation area.

279. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

280. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

281. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

282. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Wooly star*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

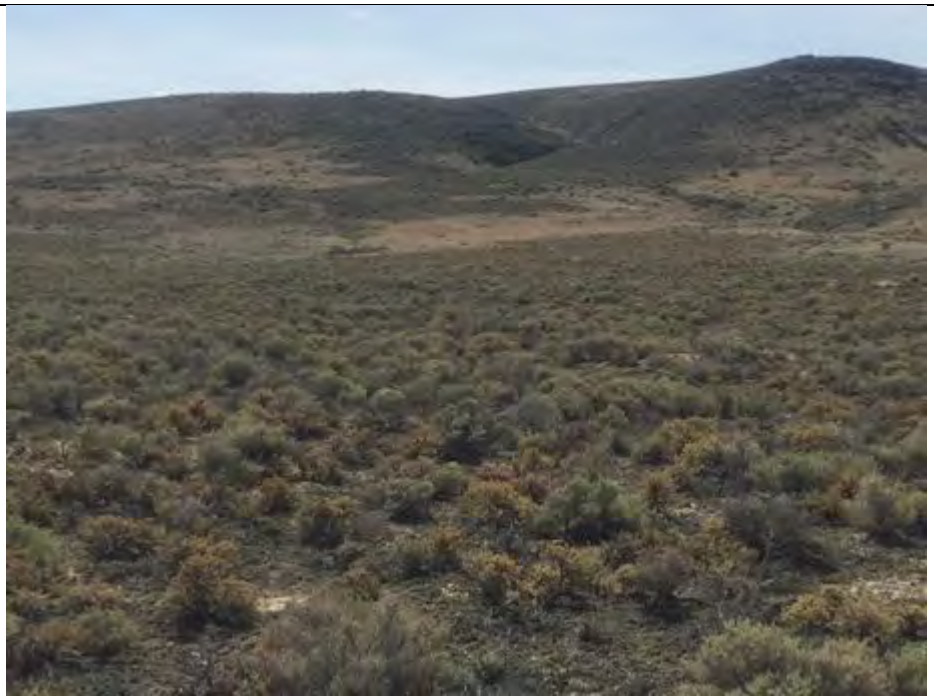
[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210617-180032.jpg



photo_E-20210617-180037.jpg



photo_S-20210617-180044.jpg



photo_W-20210617-180101.jpg



photo_Soil-20210617-180111.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *525_2*		Date: *June 17, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *525*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Residuum derived from andesite, rhyolite, and quartzite*	Slope: *4°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1450.09* m	Aspect: *290°*
Topographic position: NA		Topographic position: *Backslope; hill*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *48* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, very gravely; fine to coarse in size; coarse sandy clay loam*
					2	*5 - 17 cm*	*Sandy Clay*		*Dry 10YR6/3; moist 10YR4/3, sticky, very gravely; fine to coarse in size; more coarse; coarse sandy clay*
					3	*17 - 28 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR4/3, very gravelly; fine and medium in size; coarse sandy clay loam*
					4	*28 - 48 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, very gravelly; fine to coarse in size; lack of fibrous roots.; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.03 miles west of the town of Crescent Valley, mile marker 21.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.432246 N. Latitude
Section 1/4 Section		m		-116.493623 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Two track approximately 100 meters west of survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *525_2*		Date: *June 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(189) Assign 17 indicator ratings, record comments and any measurements. (190) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (191) Assign overall rating for each attribute based on preponderance of evidence. (192) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *10* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial bunchgrasses within survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *2*% Depth: *0.5 cm*	H B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil functioning as expected for site.						*Some lack of infiltration due to lack of perennial bunchgrasses.*						*Mismatch in dominant shrub community within survey site.*
0	0	0	0	10		0	0	1	1	8		0	3	0	2	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *525_2* **Date:** *June 17, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

283. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

284. Observe and list the F/S groups present in the evaluation area.

285. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

286. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

287. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

288. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210617-164602.jpg



photo_S-20210617-164607.jpg



photo_W-20210617-164611.jpg



photo_Soil-20210617-164622.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *561_1*		Date: *June 17, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *561*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium derived from mixed rock; loess and volcanic ash*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1448.427* m	Aspect: *260°*
Topographic position: NA		Topographic position: *Fan remnant; base of rolling hills*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Silt Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular blockiness, slightly effervescent, some fibrous roots*
					2	*7 - 16 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR4/3, granular, some subangular blockiness, slightly sticky, some fine gravel*
					3	*16 - 28 cm*	*Loam*		*Dry 10YR5/4; moist 10YR4/3, subangular blocky structure*
					4	*28 - 53 cm*	*Silt Loam*		*Dry 10YR6/2; moist 10YR5/3, granular, light, airy texture*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.11 miles west of the town of Crescent Valley, mile marker 21.7 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.433453 N. Latitude
Section 1/4 Section		m		-116.492404 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife livestock	
Offsite influences: NA	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *561_1*		Date: *June 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(193) Assign 17 indicator ratings, record comments and any measurements. (194) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (195) Assign overall rating for each attribute based on preponderance of evidence. (196) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *12* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Extreme reduction in infiltration and potential increase in runoff due to lack of shrub cover and missing perennial bunchgrasses*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *25*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *561_1* **Date:** *June 17, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

289. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

290. Observe and list the F/S groups present in the evaluation area.

291. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

292. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

293. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

294. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Burning bush*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Halogeton, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



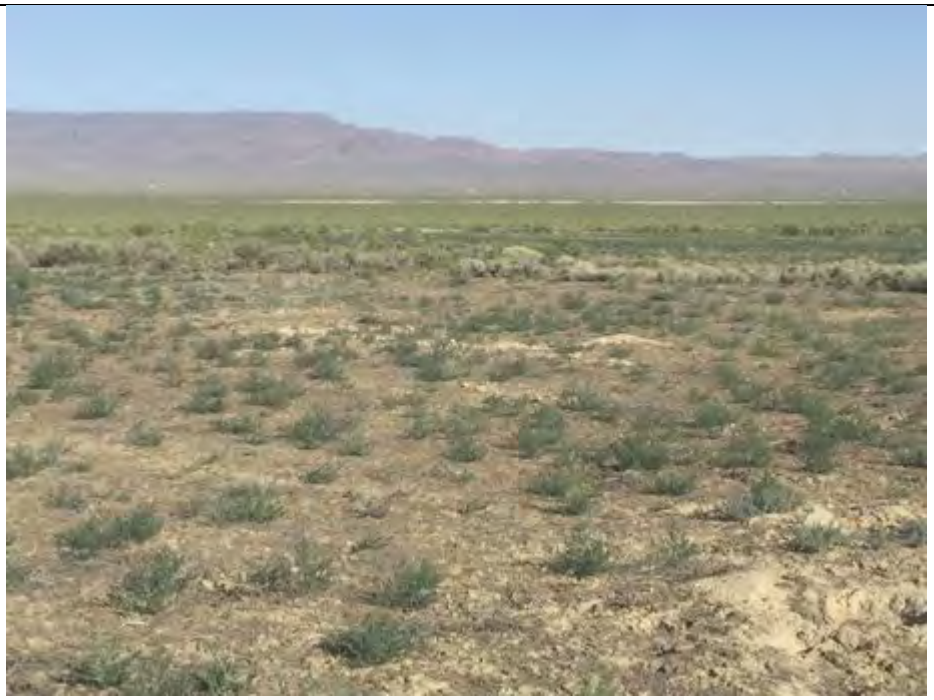
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photo_W-20210617-150358.jpg



photo_Soil-20210617-150333.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *561_2*		Date: *June 16, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *561*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium derived from mixed rock; loess and volcanic ash*	Slope: *4°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1454.116* m	Aspect: *340°*
Topographic position: NA		Topographic position: *Fan remnant; fan piedmont*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular blockiness, some light gravel*
					2	*20 - 31 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 10YR3/4, subangular blockiness to a granular texture, little gravel*
					3	*8 - 20 cm*	*Clay Loam*		*Dry 10YR7/1; moist 10YR4/3, subangular blockiness, slightly effervescent, slightly sticky and plastic, gravelly*
					4	*31 - 50 cm*	*Sandy Loam*		*Dry 10YR 6/3; moist 10YR4/4, medium-sized blocky structures, some gravel; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.34 miles southwest of the town of Crescent Valley, mile marker 23.3 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.453223 N. Latitude
Section 1/4 Section		m		-116.476491 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Residence within close proximity to the south	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *561_2*		Date: *June 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(197) Assign 17 indicator ratings, record comments and any measurements. (198) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (199) Assign overall rating for each attribute based on preponderance of evidence. (200) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses and sagebrush may severely reduce infiltration and increase runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *35*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *561_2* **Date:** *June 16, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

295. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

296. Observe and list the F/S groups present in the evaluation area.

297. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

298. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

299. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

300. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210616-195230.jpg



photo_S-20210616-195236.jpg



photo_W-20210616-195242.jpg



photo_Soil-20210616-195252.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *561_3*		Date: *July 24, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *561*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium derived from mixed rock; loess and volcanic ash*	Slope: *8°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1456.342* m	Aspect: *280°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *31* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/3, loose material, fine to medium extremely gravelly, litter*
					2	*8 - 31 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular, some coarse granular structure, sticky, fine to coarse gravel, very gravelly, fine roots throughout; coarse sand clay loam. Refusal (gravel) at 31cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.3 miles west of the town of Crescent Valley, mile marker 21.9 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.435135 N. Latitude	
Section 1/4 Section		m		-116.48922 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 2.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *561_3*		Date: *July 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(201) Assign 17 indicator ratings, record comments and any measurements. (202) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (203) Assign overall rating for each attribute based on preponderance of evidence. (204) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absence of important functional structure groups and cheatgrass dominance likely severely reduces infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *40*% Depth: *3 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *561_3* **Date:** *July 24, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

301. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

302. Observe and list the F/S groups present in the evaluation area.

303. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

304. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

305. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

306. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210724-210410.jpg



photo_W-20210724-210415.jpg



photo_Soil-20210724-210307.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *660_1*		Date: *May 24, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Dry Floodplain*	Ecological site ID: *R024XY006NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/17/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *660*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash*	Slope range: *0-2%*	Parent material: *Alluvium, mixed rocks, and loess*	Slope: *2°*
Elevation range: *1189 - 1524* m	Aspect NA (if specified):	Elevation: *1460.862* m	Aspect: *110°*
Topographic position: Valley bottoms, fan skirts, intermittent drainageways		Topographic position: *Fan skirt; moving closer to playa. Low lying valley bottom.*	
Precipitation range: 0.15 - 0.25 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution:		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Silt Loam*		*Dry N/A; moist 10YR33, fine to medium root presence in layer, no rocks present*
					2	*10 - 47 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10Y3/3, compacted platy structure, fine to medium root presence, no rock presence*
					3	*47 - 55 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, semi-gravelly, 10% at 1mm - 10mm in size*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.69 miles west of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.30216 N. Latitude
Section 1/4 Section		m		-116.600945 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, anthropogenic use	
Offsite influences: Pivot field, roads, mine site proximity, pipelines running through survey area.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *660_1*		Date: *May 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(205) Assign 17 indicator ratings, record comments and any measurements. (206) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (207) Assign overall rating for each attribute based on preponderance of evidence. (208) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *7* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of deep rooted perennial grasses may reduce infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *25*% Depth: *0.5 cm*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *N-S*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil stability appears to resemble the Dry Floodplain ESD reference sheet						*NA*						*NA*
0	0	1	0	9		0	0	2	0	8		2	0	0	0	7	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *660_1* **Date:** *May 24, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

307. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

308. Observe and list the F/S groups present in the evaluation area.

309. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

310. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

311. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

312. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Dry Floodplain*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Spiny horsebrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210524-142850.jpg



photo_S-20210524-142900.jpg



photo_W-20210524-142907.jpg



photo_Soil-20210524-142929.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *660_2*		Date: *May 24, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Dry Floodplain*	Ecological site ID: *R024XY006NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/17/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *660*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash* Slope range: *0-2%*	Parent material: *Alluvium, mixed rocks, and loess* Slope: *2°*
Elevation range: *1189 - 1524* m Aspect NA (if specified):	Elevation: *1461.122* m Aspect: *120°*
Topographic position: Valley bottoms, fan skirts, intermittent drainageways	Topographic position: *Fan skirt; moving closer to playa. Low lying valley bottom.*
Precipitation range: 0.15 - 0.25 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution:	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *60* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Clay Loam*		*Dry N/A; moist 2.5YR4/3, some moisture already present, loose, fine roots present, no rock presence*
					2	*10 - 36 cm*	*Silty Clay*		*Dry 10YR6/2; moist 10YR3/4, platy, blocky structure*
					3	*36 - 60 cm*	*Clay Loam*		*Dry 10YR6/2; moist 10YR3/4, somewhat blocky structure, less than 10% coarse gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.69 miles west of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.302593 N. Latitude
Section 1/4 Section		m		-116.60108 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, anthropogenic use	
Offsite influences: Pivot field, roads, mine site proximity, pipelines running through survey area.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *660_2*		Date: *May 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(209) Assign 17 indicator ratings, record comments and any measurements. (210) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (211) Assign overall rating for each attribute based on preponderance of evidence. (212) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *7* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of deep rooted perennial grasses may reduce infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *M-E*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *18*% Depth: *0.6 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *N-S*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil properties appear to be functioning as expected						*Potential slight impacts to hydrological functioning due to loss of important functional structure groups.*						*This site is dominated by invasive annuals and shows a complete loss of the expected dominant functional groups; expected subdominant species also appear to be decreasing.*
0	0	0	0	10		0	0	1	0	9		2	0	0	0	7	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *660_2* **Date:** *May 24, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

313. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

314. Observe and list the F/S groups present in the evaluation area.

315. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

316. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

317. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

318. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Dry Floodplain*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Indian ricegrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210524-153601.jpg



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photo_Soil-20210524-153619.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *660_3*		Date: *May 24, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Dry Floodplain*	Ecological site ID: *R024XY006NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/17/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *660*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash* Slope range: *0-2%*	Parent material: *Alluvium, mixed rocks, and loess* Slope: *2°*
Elevation range: *1189 - 1524* m Aspect NA (if specified):	Elevation: *1461.498* m Aspect: *200°*
Topographic position: Valley bottoms, fan skirts, intermittent drainageways	Topographic position: *Fan skirt; moving closer to playa. Low lying valley bottom.*
Precipitation range: 0.15 - 0.25 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution:	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *58* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 9 cm*	*Silty Clay Loam*		*Dry N/A; moist 10YR3/3, no rocks present*
					2	*9 - 18 cm*	*Sandy Clay Loam*		*Dry 2.5YR5/3; moist 10YR3/4, compacted, blocky, and gravely, medium gravel size*
					3	*18 - 38 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, platy structure*
					4	*38 - 58 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist10YR4/4, blocky structure*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.67 miles southwest of the Cortez Mine, mile marker 3.0 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*	UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range		m	OR	40.302772 N. Latitude
Section 1/4 Section	OR	m		-116.601644 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, anthropogenic use	
Offsite influences: Pivot field, roads, mine site proximity, pipelines running through survey area.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *660_3*		Date: *May 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(213) Assign 17 indicator ratings, record comments and any measurements. (214) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (215) Assign overall rating for each attribute based on preponderance of evidence. (216) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *8* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial bunchgrasses as a dominant functional structure group may reduce infiltration and increase runoff. Additional shrub components may mediate that effect.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *N/A*% Depth: *1.3 cm*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil stability appears to resemble the Dry Floodplain ESD reference sheet						*Lack of perennial bunchgrasses may have a slight to moderate effect on hydrological function within the survey area.*						*Lack of the dominant functional structure groups and increasing presence of invasives has altered the biotic community.*
0	0	0	1	9		0	0	1	1	8		0	2	1	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *660_3* **Date:** *May 24, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

319. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

320. Observe and list the F/S groups present in the evaluation area.

321. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

322. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

323. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

324. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Dry Floodplain*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210524-163519.jpg



photo_S-20210524-163525.jpg



photo_W-20210524-163531.jpg



photo_Soil-20210524-163548.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *671_1*		Date: *June 4, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *671*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *5°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1460.64* m	Aspect: *308°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, extremely gravelly, fine roots; fine sandy loam*
					2	*4 - 13 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, extremely gravelly; fine to some coarse gravel in size, fine sandy loam*
					3	*13 - 39 cm*	*Sandy Clay*		*Dry 2.5Y5/4, moist 10YR3/4, some subangular blockiness, extremely gravelly*
					4	*39 - 53 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, extremely gravelly; fine to coarse*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.87 miles southwest of the Cortez Mine, mile marker 5.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.251252 N. Latitude
Section 1/4 Section		m		-116.577259 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Mine site	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *671_1*		Date: *June 4, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(217) Assign 17 indicator ratings, record comments and any measurements. (218) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (219) Assign overall rating for each attribute based on preponderance of evidence. (220) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Reduced infiltration due to lack of perennial bunchgrasses.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *E-T*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *18*% Depth: *1 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Less bare ground than expected, however soils functioning as intended for site.						*Reduced infiltration due to lack of perennial bunchgrasses and heavy presence of annual grasses and forbs.*						*Biotic community heavily dominated by annual grasses.*
1	0	0	0	9		1	1	1	0	7		2	1	1	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *671_1* **Date:** *June 4, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

325. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

326. Observe and list the F/S groups present in the evaluation area.

327. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

328. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

329. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

330. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Desert prince's plume*
Non-sprouting shrubs	*Big sagebrush, Budsage*
Sprouting shrubs	*Rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Redstem storksbill, Storksbill*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *741_1*		Date: *May 27, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *741*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, volcanic ash, and loess* Slope: *1°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1454.482* m Aspect: *286°*
Topographic position: Alluvial fans	Topographic position: *Fan skirt; flat terrace adjacent to the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *57* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3*
					2	*7 - 40 cm*	*Sandy Clay Loam*		*Dry 10YR4/3, moist 10YR3/3, coarse, prismatic texture, fine to medium roots*
					3	*40 - 57 cm*	*Sandy Clay Loam*		*Dry N/A, no fry color taken; moist 10YR3/4, some moisture already present, fine, gravelly texture*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.85 miles west of the Cortez Mine, mile marker 12.1 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.313406 N. Latitude
Section 1/4 Section		m		-116.504257 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Pivots, road proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *741_1*		Date: *May 27, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(221) Assign 17 indicator ratings, record comments and any measurements. (222) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (223) Assign overall rating for each attribute based on preponderance of evidence. (224) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *4* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Extremely high dominance of annual forbs and the absence of perennial grasses may reduce infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *M*	B *E-T*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *17*% Depth: *1 cm*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Annual forb cover and litter presence helping to hold soil in place.						*N/A*						*N/A*
1	0	0	0	9		1	0	1	0	8		1	1	1	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *741_1* **Date:** *May 27, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

331. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

332. Observe and list the F/S groups present in the evaluation area.

333. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

334. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

335. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

336. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Spiny horsebrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210527-190101.jpg



photo_S-20210527-190108.jpg



photo_W-20210527-190117.jpg



photo_Soil-20210527-190129.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *741_2*		Date: *May 27, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *741*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, volcanic ash, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1453.561* m	Aspect: *292°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt; flat terrace adjacent to the playa*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 1 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 10YR3/3, fine, loose, plentiful debris*
					2	*1 - 43 cm*	*Sandy Clay Loam*		*Dry N/A; moist 10YR4/3, some moisture already present, granular structure*
					3	*43 - 53 cm*	*Sandy Clay Loam*		*Dry N/A; moist 10YR3/4, granular texture*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.84 miles west of the Cortez Mine, mile marker 12.2 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.314159 N. Latitude
Section 1/4 Section		m		-116.504494 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Pivots, road proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *741_2*		Date: *May 27, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(225) Assign 17 indicator ratings, record comments and any measurements. (226) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (227) Assign overall rating for each attribute based on preponderance of evidence. (228) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *19* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Higher dominance of annual grasses and annual forbs and the absence of perennial grasses may reduce infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B *M-E*	
a. Relative dominance: *S-M*		
b. F/S groups not expected at the site: *M-E*		
c. Number of F/S groups: *S-M*		
d. Spp # in dom & subdom F/S groups: *M*		
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *17*% Depth: *1.5 cm*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Annual forb cover and litter presence helping to hold soil in place.						*N/A*						*N/A*
0	0	1	0	9		0	0	2	0	8		0	1	2	1	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *741_2* **Date:** *May 27, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

337. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

338. Observe and list the F/S groups present in the evaluation area.

339. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

340. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

341. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

342. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Spiny horsebrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210527-173414.jpg



photo_W-20210527-173422.jpg



photo_Soil-20210527-173447.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *741_3*		Date: *June 16, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *741*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, volcanic ash, and loess* Slope: *1°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1452.921* m Aspect: *288°*
Topographic position: Alluvial fans	Topographic position: *Fan skirt; flat terrace adjacent to the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *54* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Silt Loam*		*Dry 10YR6/2; moist 10YR3/4, slightly blocky, slightly effervescent, some gravel*
					2	*6 - 19 cm*	*Loam*		*Dry 10YR6/3; moist 10YR3/4; subangular, granular*
					3	*19 - 54 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular, blocky, minimal gravel, some fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.43 miles southwest of the town of Crescent Valley, mile marker 24.7 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.47115 N. Latitude
Section 1/4 Section		m		-116.46565 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): Evidence of remediation efforts; some re-seeding and tilling

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: NA	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *741_3*		Date: *June 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(229) Assign 17 indicator ratings, record comments and any measurements. (230) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (231) Assign overall rating for each attribute based on preponderance of evidence. (232) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *7* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *E-T*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Potential reduced infiltration due to the lack of shrubs.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *E-T*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *35*% Depth: *1 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *M*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Slight departure due to evidence of tilling						*Lack of perennial shrubs may reduce infiltration in the survey area*						*Lacking dominant functional structure groups*
1	1	0	0	8		1	2	1	0	6		3	2	1	0	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *741_3* **Date:** *June 16, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

343. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

344. Observe and list the F/S groups present in the evaluation area.

345. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

346. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

347. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

348. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210616-174416.jpg



photo_S-20210616-174421.jpg



photo_W-20210616-174431.jpg



photo_Soil-20210616-174444.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *741_4*		Date: *June 16, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *741*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, volcanic ash, and loess* Slope: *8°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1451.785* m Aspect: *310°*
Topographic position: Alluvial fans	Topographic position: *Fan skirt; flat terrace adjacent to the playa*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *58* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, loose with blocky soil structure features, slightly sticky, slightly plastic, some gravel, litter, and roots present*
					2	*5 - 18 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular, friable, some fine roots throughout, slightly sticky, slightly plastic; fine sandy loam*
					3	*18 - 46 cm*	*Sandy Loam*		*Dry 10YR6/4; moist 10YR4/4, subangular, hard, dry, slightly sticky, slightly plastic, , some gravel, some fine roots*
					4	*46 - 58 cm*	*Loamy Sand*		*Dry 10YR6/3; moist 10YR4/4; subangular structures, very friable, soft, weak, some duranoids, slightly sticky, slightly plastic; fine loamy sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.98 miles southwest of the town of Crescent Valley, mile marker 24.0 of the Segment #1 - Range Front to UP project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.462812 N. Latitude
Section 1/4 Section		m			-116.469132 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): Evidence of remediation efforts; some re-seeding and tilling					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: NA					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *741_4*		Date: *June 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(233) Assign 17 indicator ratings, record comments and any measurements. (234) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (235) Assign overall rating for each attribute based on preponderance of evidence. (236) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *4* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Potentially reduced infiltration due to the lack of two dominant functional structure groups. May lead to increased runoff, but could be offset by litter and forbs.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B *M-E*	
a. Relative dominance: *M-E*		
b. F/S groups not expected at the site: *M-E*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *35*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:
					N/A						*N/A*						*N/A*
0	0	0	0	10		0	0	1	0	9		0	4	0	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _*741_4*_____ **Date:** *June 16, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

349. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

350. Observe and list the F/S groups present in the evaluation area.

351. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

352. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

353. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

354. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass, Western wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210616-192919.jpg



photo_S-20210616-192929.jpg



photo_W-20210616-193142.jpg



photo_Soil-20210616-192853.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *822_1*		Date: *June 1, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *822*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1465.054* m	Aspect: *293°*
Topographic position: NA		Topographic position: *Inset fan; fan skirt; flat terrace above the playa*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, fine roots throughout*
					2	*5 - 11 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 10YR/ 3/3, weak subangular blocky structure, gravelly; fine sandy clay loam*
					3	*11 - 39 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 3/4, weak subangular block structure; more blockiness than previous layer*
					4	*39 - 55 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, some blockiness, gravelly; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.73 miles west of the Cortez Mine, mile marker 10.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.292368 N. Latitude
Section 1/4 Section		m		-116.504984 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Proximity to pivot field	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *822_1*		Date: *June 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(237) Assign 17 indicator ratings, record comments and any measurements. (238) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (239) Assign overall rating for each attribute based on preponderance of evidence. (240) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *21* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses may moderately reduce infiltration capabilities, however big sagebrush is functioning as needed*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *11*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_822_1* **Date:** *June 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

355. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

356. Observe and list the F/S groups present in the evaluation area.

357. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

358. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

359. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

360. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210601-181704.jpg



photo_S-20210601-181710.jpg



photo_W-20210601-181716.jpg



photo_Soil-20210601-181728.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *822_2*		Date: *May 28, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *822*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1463.849* m	Aspect: *306°*
Topographic position: NA		Topographic position: *Inset fan; fan skirt; flat terrace above the playa*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *64* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 7.5YR2.5/3, fine roots, fine sandy clay loam*
					2	*6 - 12 cm*	*Sandy Clay Loam*		*Dry 10YR4/3, moist 7.5YR2.5/3, platy structure, fine sandy clay loam*
					3	*12 - 54 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 7.5YR2.5/3, subangular blocky structure, fine to medium roots; coarse sandy clay loam*
					4	*54 - 64 cm*	*Loamy Sand*		*Dry 10YR4/3; moist 7.5YR2.5/3, extremely gravelly; coarse loamy sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.99 miles west of the Cortez Mine, mile marker 11.4 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.303318 N. Latitude
Section 1/4 Section		m		-116.500009 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, cropland if irrigated	
Offsite influences: Pivot field, pipelines, and roads in close proximity to the survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *822_2*		Date: *May 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(241) Assign 17 indicator ratings, record comments and any measurements. (242) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (243) Assign overall rating for each attribute based on preponderance of evidence. (244) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses may moderately reduce infiltration capabilities, however big sagebrush is functioning as needed*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *3*% Depth: *1.25 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *822_2* **Date:** *May 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

361. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

362. Observe and list the F/S groups present in the evaluation area.

363. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

364. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

365. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

366. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210528-172825.jpg



photo_S-20210528-172832.jpg



photo_W-20210528-172839.jpg



photo_Soil-20210528-172848.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *822_3*		Date: *June 1, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *822*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1465.099* m	Aspect: *295°*
Topographic position: NA		Topographic position: *Inset fan; fan skirt; flat terrace above the playa*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3; fine sandy loam*
					2	*3 - 11 cm*	*Sandy Clay Loam*		*Dry 10YR4/3, moist 10YR3/3, moderate subangular blocky texture, fine roots throughout, fine sandy clay loam*
					3	*11 - 25 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 10YR3/3, weak platy structure, fine roots throughout*
					4	*25 - 55 cm*	*Clay Loam*		*Dry 10YR4/4, moist 10YR3/4, subangular blocky texture*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.79 miles west of the Cortez Mine, mile marker 10.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.292766 N. Latitude
Section 1/4 Section		m		-116.503924 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Proximity to pivot field	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *822_3*		Date: *June 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(245) Assign 17 indicator ratings, record comments and any measurements. (246) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (247) Assign overall rating for each attribute based on preponderance of evidence. (248) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *21* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses may moderately reduce infiltration capabilities, however big sagebrush is functioning as needed*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *11*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *822_3* **Date:** *June 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

367. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

368. Observe and list the F/S groups present in the evaluation area.

369. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

370. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

371. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

372. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210601-193534.jpg



photo_S-20210601-193541.jpg



photo_W-20210601-193549.jpg



photo_Soil-20210601-193559.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *822_4*		Date: *May 28, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *822*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1462.94* m	Aspect: *306°*
Topographic position: NA		Topographic position: *Inset fan; fan skirt; flat terrace above the playa*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *57* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 7.5YR2.5/3; fine sandy loam*
					2	*5 - 25 cm*	*Sandy Loam*		*Dry 10YR3/4; moist 7.5YR2/3, blocky structure, fine roots, fine to coarse gravel present; less than 10%*
					3	*25 - 41 cm*	*Sandy Loam*		*Dry10YR4/3; Moist 7.5YR2.5/3, extremely gravelly; coarse gravel, coarse sandy loam*
					4	*41 - 57 cm*	*Sandy Loam*		*Dry10YR4/3; moist 7.5YR2.5/3, less coarse gravel and more fine gravel present; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.96 miles west of the Cortez Mine, mile marker 11.4 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.303678 N. Latitude
Section 1/4 Section		m		-116.500607 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, cropland if irrigated	
Offsite influences: Pivot field, pipelines, and roads in close proximity to the survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *822_4*		Date: *May 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(249) Assign 17 indicator ratings, record comments and any measurements. (250) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (251) Assign overall rating for each attribute based on preponderance of evidence. (252) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses may moderately reduce infiltration capabilities, however big sagebrush is functioning as needed*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *3*% Depth: *1.25 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *822_4* **Date:** *May 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

373. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

374. Observe and list the F/S groups present in the evaluation area.

375. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

376. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

377. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

378. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Thistles*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210528-162640.jpg



photo_W-20210528-162659.jpg



photo_Soil-20210528-162719.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *822_5*		Date: *May 28, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *822*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1462.78* m	Aspect: *288°*
Topographic position: NA		Topographic position: *Inset fan; fan skirt; flat terrace above the playa*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *64* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, fine annual grass roots heavy throughout, fine gravel present*
					2	*8 - 30 cm*	*Sandy Loam*		*Dry 10YR5/3, moist 10YR3/3, granular, gravelly; coarse sandy loam*
					3	*30 - 64 cm*	*Loamy Sand*		*Dry 10YR5/3; moist 10YR3/3. Extremely gravelly; coarse sized gravel, difficult to color due to gravel content*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.96 miles west of the Cortez Mine, mile marker 11.4 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.30409 N. Latitude
Section 1/4 Section		m		-116.50069 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, cropland if irrigated	
Offsite influences: Pivot field, pipelines, and roads in close proximity to the survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *822_5*		Date: *May 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(253) Assign 17 indicator ratings, record comments and any measurements. (254) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (255) Assign overall rating for each attribute based on preponderance of evidence. (256) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses may moderately reduce infiltration capabilities, however big sagebrush is functioning as needed*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *3*% Depth: *1.25 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *822_5* **Date:** *May 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

379. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

380. Observe and list the F/S groups present in the evaluation area.

381. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

382. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

383. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

384. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210528-150012.jpg



photo_S-20210528-150019.jpg



photo_W-20210528-150026.jpg



photo_Soil-20210528-150040.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *822_6*		Date: *June 3, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *822*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *NA* / Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess* / Slope: *4°*
Elevation range: *NA* m / Aspect NA (if specified):	Elevation: *1457.994* m / Aspect: *307°*
Topographic position: NA	Topographic position: *Inset fan; fan skirt; flat terrace above the playa*
Precipitation range: NA cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: NA	Seasonal precipitation distribution:
Soil depth[1]: NA	Pit depth: *53* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, N/A*
					2	*6 - 18 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 10YR3/3, some moisture already present, platy structure, medium roots throughout*
					3	*18 - 53 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR3/4, subangular blockiness*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.9 miles west of the Cortez Mine, mile marker 9.2 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.278295 N. Latitude
Section 1/4 Section		m		-116.520962 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Mine site proximity, pivot field	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *822_6*		Date: *June 3, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(257) Assign 17 indicator ratings, record comments and any measurements. (258) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (259) Assign overall rating for each attribute based on preponderance of evidence. (260) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses may moderately reduce infiltration capabilities, however big sagebrush is functioning as needed*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *7*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *822_6* **Date:** *June 3, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

385. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

386. Observe and list the F/S groups present in the evaluation area.

387. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

388. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

389. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

390. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210603-184946.jpg



photo_S-20210603-184953.jpg



photo_W-20210603-184959.jpg



photo_Soil-20210603-185018.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *855_1*		Date: *June 2, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Coarse Silty 4-8 P.Z.*	Ecological site ID: *R024XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *855*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1460.435* m	Aspect: *146°*
Topographic position: NA		Topographic position: *Fan skirt*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR6/3, dry and crusty, platy effervescence*
					2	*5 - 29 cm*	*Silt Loam*		*Dry 10YR5/5; moist 10YR3/4, platy structure*
					3	*29 - 53 cm*	*Silt Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular structure*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 0.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.203346 N. Latitude
Section 1/4 Section		m		-116.638429 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Livestock, wildlife, mining

Offsite influences: Mine site

Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Commmunity Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *855_1*		Date: *June 2, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(261) Assign 17 indicator ratings, record comments and any measurements. (262) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (263) Assign overall rating for each attribute based on preponderance of evidence. (264) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potentially some lack of infiltration due to the lack of perennial bunchgrasses, but shrub cover may help offset this.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *8*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *855_1* **Date:** *June 2, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

391. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

392. Observe and list the F/S groups present in the evaluation area.

393. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

394. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

395. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

396. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Coarse Silty 4-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood, Rabbitbrush, Spiny horsebrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Mustard, Mustards*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210602-172434.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *855_2*		Date: *June 2, 2021 1:00 PM*
Management unit: *CARICO LAKE*	State: *NV*	Office: *Mount Lewis Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *855*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1459.037* m	Aspect: *138°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *61* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silty Clay Loam*		*Dry 2.5Y7/2; moist 10YR5/3, very loose and powdery texture with some slight clumping*
					2	*5 - 15 cm*	*Silty Clay*		*Dry 10YR8/1; moist 10YR5/3, weak platy structure*
					3	*15 - 39 cm*	*Silty Clay*		*Dry 10YR6/3, moist 10YR4/4, weak platy structure*
					4	*39 - 61 cm*	*Silty Clay*		*Dry 10YR7/1; moist 10YR5/3, weak platy structure, fine effervescence*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Cortez Mine, mile marker 1.2 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.213239 N. Latitude	
Section 1/4 Section		m		-116.63429 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, mining	
Offsite influences: Mine site proximity. Pipeline in close proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *855_2*		Date: *June 2, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(265) Assign 17 indicator ratings, record comments and any measurements. (266) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (267) Assign overall rating for each attribute based on preponderance of evidence. (268) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*None*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *29* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of bunchgrasses may lead to reduced infiltration and increased runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *8*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *855_2* **Date:** *June 2, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

397. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

398. Observe and list the F/S groups present in the evaluation area.

399. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

400. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

401. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

402. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Commmunity Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Spiny horsebrush*
Evergreen trees	
Annual grasses	*Annual false wheatgrass, Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210602-144556.jpg



photo_W-20210602-144604.jpg



photo_Soil-20210602-144619.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *861_1*		Date: *June 3, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *861*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *10°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1464.432* m	Aspect: *270°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; just before base of western facing slopes*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *45* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR5/4; moist 10YR3/3, moderately gravelly; fine gravel, fine roots*
					2	*4 - 8 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, weakly granular, some subsurface structure; not as loose, gravelly*
					3	*8 - 45 cm*	*Sandy Loam*		*Dry 10YR5/5; moist 3/3, subangular blockiness, fine to medium roots, moderately cobbley and gravelly; fine gravel, coarse sandy loam. Refusal at 45cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.43 miles west of the Cortez Mine, mile marker 8.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.271216 N. Latitude
Section 1/4 Section		m		-116.530178 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine site, pivot fields	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *861_1*		Date: *June 3, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(269) Assign 17 indicator ratings, record comments and any measurements. (270) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (271) Assign overall rating for each attribute based on preponderance of evidence. (272) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *16* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial grasses may have an impact on infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *7*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil functioning as expected.						*Reduction in infiltration capabilities, however, overall hydrology is functioning as expected still.*						*Vegetative community not as expected at site. Higher shrub cover and lack of perennial grasses.*
0	0	0	0	10		0	0	0	1	9		0	2	2	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *861_1* **Date:** *June 3, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

403. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

404. Observe and list the F/S groups present in the evaluation area.

405. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

406. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

407. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

408. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *861_2*		Date: *June 3, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *861*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *8°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1458.225* m	Aspect: *256°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; just before base of western facing slopes*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *48* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, gravelly, fine roots present*
					2	*3 - 11 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/3, little to no gravel, weak subangular blockiness*
					3	*11 - 25 cm*	*Sandy Loam*		*Dry 10YR5/4; moist 10YR3/3, fine gravel present; coarse sandy loam*
					4	*25 - 45 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/4, fine to coarse gravel present*
					5	*45 - 48 cm*	*Sandy Clay*		*Dry 10YR5/4; moist 10YR3/4, moderately gravelly; fine to coarse gravel. Refusal at 48cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.23 miles southwest of the Cortez Mine, mile marker 8.1 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.266369 N. Latitude
Section 1/4 Section		m		-116.532988 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine site, pivot fields	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *861_2*		Date: *June 3, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(273) Assign 17 indicator ratings, record comments and any measurements. (274) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (275) Assign overall rating for each attribute based on preponderance of evidence. (276) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *15* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial grasses may have an impact on infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *7*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil functioning as expected.						*Reduction in infiltration capabilities, however, overall hydrology is functioning as expected still.*						*Vegetative community not as expected at site. Higher shrub cover and lack of perennial grasses.*
0	0	0	0	10		0	0	0	1	9		0	2	2	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *861_2* **Date:** *June 3, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

409. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

410. Observe and list the F/S groups present in the evaluation area.

411. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

412. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

413. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

414. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210603-155547.jpg



photo_W-20210603-155552.jpg



photo_Soil-20210603-155604.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *861_3*		Date: *June 3, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *861*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *10°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1457.46* m	Aspect: *13°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; just before base of western facing slopes*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *45* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Loamy Sand*		*Dry 10YR5/3; moist 10YR3/3, loose, extremely gravelly*
					2	*4 - 12 cm*	*Sandy Loam*		*Dry 10YR5/3, moist 10YR3/4, granular with some subangular blockiness throughout, moderately gravelly*
					3	*12 - 45 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 10YR3/4, some platy structure, extremely gravelly; coarse to cobble in size, medium roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.7 miles southwest of the Cortez Mine, mile marker 7.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.261844 N. Latitude
Section 1/4 Section		m		-116.541219 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine site, pivot fields	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *861_3*		Date: *June 3, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(277) Assign 17 indicator ratings, record comments and any measurements. (278) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (279) Assign overall rating for each attribute based on preponderance of evidence. (280) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *6* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial grasses may have an impact on infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *6*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil functioning as expected.						*Reduction in infiltration capabilities, however, overall hydrology is functioning as expected still.*						*Vegetative community not as expected at site. Higher shrub cover and lack of perennial grasses.*
0	0	0	0	10		0	0	0	1	9		0	1	3	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *861_3* **Date:** *June 3, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

415. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

416. Observe and list the F/S groups present in the evaluation area.

417. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

418. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

419. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

420. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Hopsage*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *861_4*		Date: *June 3, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *861*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *5°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1458.562* m	Aspect: *273°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; just before base of western facing slopes*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Silt Loam*		*Dry 10YR5/2; moist 10YR3/3, loose, subangular blockiness*
					2	*6 - 16 cm*	*Sandy Loam*		*Dry 10YR4/3; moist 10YR3/3, chunky blockiness, fine roots, gravelly; coarse sandy loam*
					3	*16 - 31 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 10YR3/3, granular with some concretions throughout.*
					4	*31 - 52 cm*	*Sandy Clay Loam*		*Dry 2.5Y5/3; moist 2.5Y3/3, extremely subangular with some fine gravel; fine sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.87 miles west of the Cortez Mine, mile marker 9.2 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.277775 N. Latitude
Section 1/4 Section		m		-116.521636 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine site, pivot fields	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *861_4*		Date: *June 3, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(281) Assign 17 indicator ratings, record comments and any measurements. (282) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (283) Assign overall rating for each attribute based on preponderance of evidence. (284) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *7* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial grasses may have an impact on infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *7*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soil functioning as expected.						*Reduction in infiltration capabilities, however, overall hydrology is functioning as expected still.*						*Vegetative community not as expected at site. Higher shrub cover and lack of perennial grasses.*
0	0	0	0	10		0	0	0	1	9		0	1	3	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *861_4* **Date:** *June 3, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

421. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

422. Observe and list the F/S groups present in the evaluation area.

423. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

424. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

425. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

426. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_1*		Date: *May 25, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *881*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**

Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1451.153* m	Aspect: *268°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *62* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Silty Clay Loam*		*Dry N/A; moist 10YR3/3, N/A*
					2	*6 - 27 cm*	*Silty Clay*		*Dry N/A; moist 50/50 mix 10YR4/2 and10YR4/3, fine to medium roots present*
					3	*27 - 62 cm*	*Silty Clay*		*Dry N/A; moist 10YR4/4, redox concentration of 10YR5/6; redox depletion of 10YR52, 5%; Layer separation due to saturation*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.81 miles west of the Cortez Mine, mile marker 12.3 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.316349 N. Latitude
Section 1/4 Section		m		-116.50571 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Road presence influencing hydrology.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 2.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_1*		Date: *May 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(285) Assign 17 indicator ratings, record comments and any measurements. (286) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (287) Assign overall rating for each attribute based on preponderance of evidence. (288) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Can infer heavy salt crust may reduce infiltration and may promote more runoff. Shrub presence, however, aids in infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *2*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_1* **Date:** *May 25, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

427. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

428. Observe and list the F/S groups present in the evaluation area.

429. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

430. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

431. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

432. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood, Spiny horsebrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210525-164543.jpg



photo_E-20210525-164551.jpg



photo_S-20210525-164559.jpg



photo_W-20210525-164605.jpg



photo_Soil-20210525-164615.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_2*		Date: *May 25, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1444.328* m	Aspect: *122°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Silty Clay*		*Dry 10YR5/3; moist 2.5YR4/3, platy structure, very porous*
					2	*4 - 8 cm*	*Silty Clay*		*Dry N/A; moist 2.5YR5/3, tighter platy structure and much smaller pores*
					3	*8 - 33 cm*	*Silty Clay*		*Dry N/A, no dry color taken; moist 10YR4/4, platy structure, medium roots present*
					4	*33 - 52 cm*	*Sandy Clay*		*Dry 10YR4/3; moist 10YR3/3, chunky, granular texture, compact, very small gravel present*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.24 miles west of the Cortez Mine, mile marker 8.7 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.3272 N. Latitude
Section 1/4 Section		m		-116.521138 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Elevated road running through survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_2*		Date: *May 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(289) Assign 17 indicator ratings, record comments and any measurements. (290) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (291) Assign overall rating for each attribute based on preponderance of evidence. (292) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *15* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Can infer that site is lacking basin wildrye, which may influence infiltration within the survey site.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *2*% Depth: *0.2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_2* **Date:** *May 25, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

433. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

434. Observe and list the F/S groups present in the evaluation area.

435. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

436. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

437. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

438. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210525-182323.jpg



photo_E-20210525-182330.jpg



photo_S-20210525-182336.jpg



photo_W-20210525-182345.jpg



photo_Soil-20210525-182356.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_2a*		Date: *July 24, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from mixed rocks loess, and volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1444.326* m	Aspect: *110°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silty Clay*		*Dry 10YR7/2; moist 10YR5/4, fine platy, dry, friable, very sticky, some medium roots, effervescent*
					2	*5 - 24 cm*	*Clay*		*Dry 10YR6/3; moist 10YR5/4, subangular blocky, slightly moist, slightly sticky, some fine roots*
					3	*24 - 51 cm*	*Clay Loam*		*Dry N/A; moist 10YR3/4, angular blocky, plastic, some fine roots throughout, some redox around root poor linings, some salt-lined roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.27 miles southwest of the Cortez Mine, mile marker 6.5 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.326684 N. Latitude
Section 1/4 Section		m		-116.563125 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, pivots nearby	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_2a*		Date: *July 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(293) Assign 17 indicator ratings, record comments and any measurements. (294) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (295) Assign overall rating for each attribute based on preponderance of evidence. (296) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present.*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *10* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Dominant perennial bunchgrasses and subdominant shrubs encourage and maintain infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *1*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_881_2a* **Date:** *July 24, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

439. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

440. Observe and list the F/S groups present in the evaluation area.

441. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

442. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

443. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

444. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *2.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	*Alkali sacaton*
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Four-wing saltbush, Pickleweed, Saltbush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_Soil-20210724-193415.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_2b*		Date: *July 24, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from mixed rocks loess, and volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1446.528* m	Aspect: *292°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Sandy Clay*		*Dry 10YR7/2; moist 10YR5/3, weak subangular granular, dry, dense, friable, violently effervescent, very small amount of fine gravel; coarse sandy clay.*
					2	*6 - 15 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, weak subangular granular, plastic, slightly moist, effervescent,, a lot of fibrous roots some salt-lines, tubular pores*
					3	*15 - 51 cm*	*Sandy Clay Loam*		*Dry 10YR7/2; moist - 10YR3/4, subangular blocky, moist, plastic, some fine roots with salt in pore linings, small amount of fine to medium gravel, some interstitial and tubular pores; dry, coarse sandy clay loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.39 miles northwest of the town of Crescent Valley, mile marker 14.0 of the Segment #1 - Range Front to UP project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.340107 N. Latitude
Section 1/4 Section		m			-116.512111 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 2.3 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_2b*		Date: *July 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(297) Assign 17 indicator ratings, record comments and any measurements. (298) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (299) Assign overall rating for each attribute based on preponderance of evidence. (300) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Few to no perennial bunchgrasses and absent perennial forbs likely to decrease infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *3*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_2b* **Date:** *July 24, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

445. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

446. Observe and list the F/S groups present in the evaluation area.

447. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

448. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

449. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

450. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Four-wing saltbush, Saltbush, Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210724-210037.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_2c*		Date: *July 24, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from mixed rocks, loess, and volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1439.202* m	Aspect: *290°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *56* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Silty Clay Loam*		*Dry 10YR7/2; moist 10YR5/3, salt crust, biocrust, large massive subangular platy structure, hard, dry, sticky, slightly plastic, porous*
					2	*7 - 36 cm*	*Clay Loam*		*Dry 10YR5/4; moist 7.5YR4/4, loose to massive subangular structures, friable, fine to very coarse roots, tubular pores*
					3	*36 - 56 cm*	*Loamy Sand*		*Dry 7.5YR4/4; moist 7.5YR3/4, loose material, lots of weak small blocky durinoids, very hard; coarse sandy loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.35 miles west of the town of Crescent Valley, mile marker 20.9 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.427624 N. Latitude
Section 1/4 Section		m		-116.505605 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_2c*		Date: *July 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(301) Assign 17 indicator ratings, record comments and any measurements. (302) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (303) Assign overall rating for each attribute based on preponderance of evidence. (304) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *20* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Salt crust, dry soils*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *1*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_881_2c* **Date:** *July 24, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

451. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

452. Observe and list the F/S groups present in the evaluation area.

453. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

454. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

455. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

456. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *2.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210724-215749.jpg



photo_S-20210724-215756.jpg



photo_W-20210724-215806.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_3*		Date: *May 25, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *881*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**

Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1451.753* m	Aspect: *126°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Silty Clay Loam*		*Dry N/A; moist 10YR3/3, loose, some fine root presence*
					2	*4 - 34 cm*	*Sandy Loam*		*Dry N/A; moist 10YR4/3, fine to medium roots present*
					3	*34 - 52 cm*	*Sandy Clay*		*Dry N/A; moist 10YR4/4*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.84 miles west of the Cortez Mine, mile marker 12.3 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.316191 N. Latitude
Section 1/4 Section		m		-116.505048 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Road influencing hydrology in the survey area

Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_3*		Date: *May 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(305) Assign 17 indicator ratings, record comments and any measurements. (306) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (307) Assign overall rating for each attribute based on preponderance of evidence. (308) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Heavy salt crust may reduce infiltration and promote more runoff. Shrub presence, however, aids in infiltration*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *2*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_3* **Date:** *May 25, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

457. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

458. Observe and list the F/S groups present in the evaluation area.

459. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

460. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

461. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

462. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood, Spiny horsebrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_4*		Date: *May 25, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *881*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *NA*	Parent material: *Alluvium, mixed rock, and loess*
Slope range: *NA*	Slope: *1°*
Elevation range: *NA* m	Elevation: *1442.829* m
Aspect NA (if specified):	Aspect: *56°*
Topographic position: NA	Topographic position: *Alluvial flats*
Precipitation range: NA cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: NA	Seasonal precipitation distribution:
Soil depth[1]: NA	Pit depth: *52* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Silty Clay*		*Dry N/A; moist 10YR4/2, matrix 10YR5/2, depletion, 2% ;10YR5/6 concentration, 5%; 10YR6/2 depletion, 5%*
					2	*10 - 30 cm*	*Silty Clay*		*Dry N/A; moist 10YR4/4, redox features; 10YR5/6 concentrations, 5%; 10YR4/2 depletions, 2%*
					3	*30 - 52 cm*	*Silty Clay*		*10YR4/2 matrix with 12% concentrations;10YR5/6, 5% depletions at 10YR5/2*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.78 miles southwest of the Cortez Mine, mile marker 7.1 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.327311 N. Latitude
Section 1/4 Section		m		-116.552065 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: NA	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_4*		Date: *May 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(309) Assign 17 indicator ratings, record comments and any measurements. (310) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (311) Assign overall rating for each attribute based on preponderance of evidence. (312) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *16* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced infiltration due to poor and declining condition of perennial grasses*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *0.2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_4* **Date:** *May 25, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

463. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

464. Observe and list the F/S groups present in the evaluation area.

465. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

466. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

467. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

468. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *2.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Inland saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Pickleweed*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210525-144919.jpg



photo_E-20210525-144929.jpg



photo_S-20210525-144945.jpg



photo_W-20210525-144952.jpg



photo_Soil-20210525-145003.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_4a*		Date: *July 24, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from mixed rocks, loess, and volcanic ash.*	Slope: *0°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1445.061* m	Aspect: *290°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR4/4, dusty effervescent salt crust, loose with some subangular structure*
					2	*4 - 19 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR4/4, loose, some subangular structure, some fine roots*
					3	*19 - 53 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, loose and subangular, hard, some fine roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.15 miles northwest of the town of Crescent Valley, mile marker 15.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.361445 N. Latitude	
Section 1/4 Section		m		-116.514754 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_4a*		Date: *July 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(313) Assign 17 indicator ratings, record comments and any measurements. (314) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (315) Assign overall rating for each attribute based on preponderance of evidence. (316) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *15* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Bunchgrasses and shrubs increases infiltration, bare ground increases potential for runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *2*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_4a* **Date:** *July 24, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

469. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

470. Observe and list the F/S groups present in the evaluation area.

471. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

472. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

473. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

474. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *2.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Pickleweed, Saltbush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210724-180204.jpg



photo_E-20210724-180301.jpg



photo_S-20210724-180308.jpg



photo_W-20210724-180314.jpg



photo_Soil-20210724-180155.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_4b*		Date: *July 24, 2021 1:00 PM*
Management unit: *SOUTH BUCKHORN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from mixed rocks, loess and volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1441.54* m	Aspect: *280°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 10YR4/4, very thin hard salt crust, loose to blocky structure underneath, sticky*
					2	*4 - 33 cm*	*Silty Clay Loam*		*Dry 7.5YR5/3; moist 7.5YR5/3, loose to subangular structures, slightly platy, slightly sticky, slightly plastic, heavy, lots of fine and coarse roots*
					3	*33 - 53 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR5/4, loose, some blocky subangular structure, sticky, plastic, some roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.4 miles west of the town of Crescent Valley, mile marker 18.1 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.395845 N. Latitude
Section 1/4 Section		m		-116.525033 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife	
Offsite influences: Access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 2.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_4b*		Date: *July 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(317) Assign 17 indicator ratings, record comments and any measurements. (318) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (319) Assign overall rating for each attribute based on preponderance of evidence. (320) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *12* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lots of bare ground. Some signs of high evaporation: salt crust, soils slightly moist*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *0*% Depth: *NA*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_881_4b* **Date:** *July 24, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

475. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

476. Observe and list the F/S groups present in the evaluation area.

477. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

478. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

479. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

480. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *2.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210724-195823.jpg



photo_S-20210724-195830.jpg



photo_W-20210724-195837.jpg



photo_Soil-20210724-195803.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_5*		Date: *June 16, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Flat 6-8 P.Z.*	Ecological site ID: *R024XY011NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, loess, and volcanic ash*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1453.737* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *68* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, loose, weak subangular blocky structures, fine roots throughout*
					2	*8 - 28 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR4/3, weak, subangular blockiness, friable, fine roots throughout*
					3	*28 - 57 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 10 YR4/4, weak subangular blockiness, fine roots throughout; fine sandy clay loam*
					4	*57 - 68 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4; fine sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.62 miles southwest of the town of Crescent Valley, mile marker 25.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.476011 N. Latitude
Section 1/4 Section		m		-116.465541 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: None	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_5*		Date: *June 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(321) Assign 17 indicator ratings, record comments and any measurements. (322) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (323) Assign overall rating for each attribute based on preponderance of evidence. (324) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potential lack of overall infiltration due to heavy presence of annual forbs and lack of perennial forbs*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *25*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_5* **Date:** *June 16, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

481. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

482. Observe and list the F/S groups present in the evaluation area.

483. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

484. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

485. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

486. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Flat 6-8 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210616-163952.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *881_6*		Date: *June 16, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Nicole St John*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *881*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, loess, volcanic ash*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1453.49* m	Aspect: *240°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Silt Loam*		*Dry 10YR5/3; moist 10YR3/4, loose, subangular blocky structure, fine roots throughout*
					2	*5 - 21 cm*	*Silt Loam*		*Dry 10YR7/2; moist 10YR4/4, weak subangular blocky structure*
					3	*21 - 39 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, hard, subangular structure, porous, few fine roots and fine pieces of gravel*
					4	*39 - 58 cm*	*Sandy Loam*		*Dry 10YR 5/4; moist N/A, very hard, some durinodes, subangular blockiness with some porous structures, no roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.64 miles southwest of the town of Crescent Valley, mile marker 25.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.476494 N. Latitude
Section 1/4 Section		m		-116.465513 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: None	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *881_6*		Date: *June 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(325) Assign 17 indicator ratings, record comments and any measurements. (326) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (327) Assign overall rating for each attribute based on preponderance of evidence. (328) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potential lack of infiltration due to heavy presence of annual forbs*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *36*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *881_6* **Date:** *June 16, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Nicole St John*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

487. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

488. Observe and list the F/S groups present in the evaluation area.

489. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

490. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

491. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

492. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



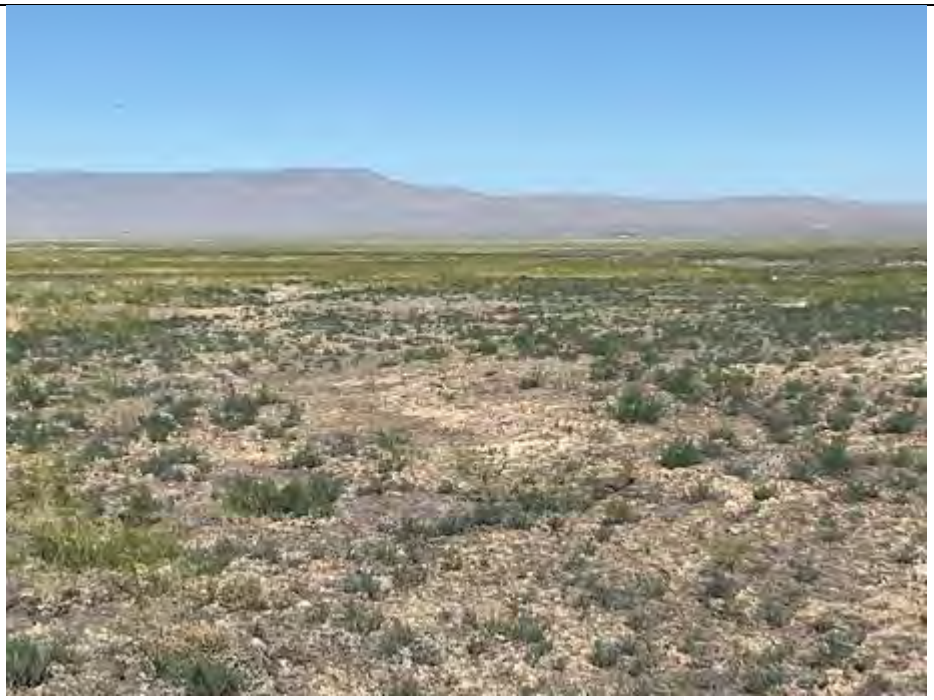
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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *901_1*		Date: *May 24, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *901*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rocks, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1454.746* m	Aspect: *65°*
Topographic position: Alluvial fans		Topographic position: *Fan piedmont; flats immediately next to the playa*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *62* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Silty Clay Loam*		*Dry N/A; moist 2.5YR3/4, some moisture already present, platy structure, friable, very fine to fine roots*
					2	*10 - 38 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR43, good amount of fine to medium roots present*
					3	*38 - 62 cm*	*Sandy Loam*		*Dry 10YR7/3; moist 10YR54, thinner platy structure, some chunky cementations*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.34 miles southwest of the Cortez Mine, mile marker 5.3 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.325558 N. Latitude
Section 1/4 Section		m		-116.585689 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Road running through survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *901_1*		Date: *May 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(329) Assign 17 indicator ratings, record comments and any measurements. (330) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (331) Assign overall rating for each attribute based on preponderance of evidence. (332) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *11* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Perennial grasses are lacking, therefore infiltration may be reduced. However, added shrub cover may be making up for where the perennial grass infiltration properties are lacking*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *N-S*		
b. F/S groups not expected at the site: *S-M*	*M*	
c. Number of F/S groups: *M*		
d. Spp # in dom & subdom F/S groups: *M*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *2*% Depth: *0.5 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *S-M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Soil functioning as expected for the site.						*Potential lack of infiltration due to lack of perennial bunch grasses*						*Missing dominant functional structural groups and presence of invasives*
0	*1*	*0*	*0*	*9*		0	*1*	*0*	*1*	*8*		0	*0*	*2*	*1*	*6*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *901_1* **Date:** *May 24, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

493. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

494. Observe and list the F/S groups present in the evaluation area.

495. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

496. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

497. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

498. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *2.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Indian ricegrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210524-195106.jpg



photo_S-20210524-195115.jpg



photo_W-20210524-195122.jpg



photo_Soil-20210524-195136.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *901_2*		Date: *May 24, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *901*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, and loess*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1459.2* m	Aspect: *74°*
Topographic position: Alluvial fans		Topographic position: *Fan piedmont; flats immediately next to the playa*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 9 cm*	*Sandy Clay Loam*		*Dry N/A; moist 10YR33, some moisture present, loose, some stones present and gravelly, 15% medium gravel*
					2	*9 - 21 cm*	*Sandy Clay Loam*		*Dry N/A; moist 10YR4/3, some moisture present, blocky structure, gravelly; medium sized gravel*
					3	*21 - 51 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, very gravelly; coarse-sized gravel and few cobbles*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.17 miles southwest of the Cortez Mine, mile marker 5.1 of the Dean Ranch Agg Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.325241 N. Latitude
Section 1/4 Section		m		-116.590553 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 2.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *901_2*		Date: *May 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(333) Assign 17 indicator ratings, record comments and any measurements. (334) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (335) Assign overall rating for each attribute based on preponderance of evidence. (336) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *M-E*	
4. Bare ground (observed): *4* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Infiltration potentially impacted by lack of perennial grasses*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *5*% Depth: *0.5 cm*	H B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *S-M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Soil functioning as expected for the site.						*Infiltration may be impacted by lack of perennial grasses and presence of annual forbs and grasses*						*Missing dominant functional structure group and presence of invasives*
0	2	0	0	8		0	2	0	1	7		0	2	0	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *901_2* **Date:** *May 24, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

499. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

500. Observe and list the F/S groups present in the evaluation area.

501. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

502. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

503. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

504. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Budsage, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210524-210602.jpg



photo_W-20210524-210608.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BB_1*		Date: *June 17, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, volcanic ash, loess, volcanic rock*	Slope: *5°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1456.868* m	Aspect: *324°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; fan skirts*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/3, subangular blocky structure, loose, slightly sticky, dry litter and some fine roots; fine sandy loam*
					2	*3 - 17 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/3, subangular, friable, slightly sticky, fine roots; fine sandy loam*
					3	*17 - 40 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular, friable, slightly sticky, dry, some fine roots; fine sandy loam*
					4	*40 - 58 cm*	*Loamy Sand*		*Dry 10YR4/4; moist 10YR3/4, hard, potentially duripan, granular, subangular; coarse loamy sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 4.45 miles north of the town of Beowawe, mile marker 27.9 of the Segment #1 - Range Front to UP project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.517859 N. Latitude

Section 1/4 Section	OR	m	OR	-116.465872 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power line, access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BB_1*		Date: *June 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(337) Assign 17 indicator ratings, record comments and any measurements. (338) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (339) Assign overall rating for each attribute based on preponderance of evidence. (340) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Lack of perennial shrubs and bunchgrasses could increase erosion and decrease infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *E-T*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *40*% Depth: *1 cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					N/A						*N/A*						*Missing dominant and subdominant functional structure groups*
0	0	0	0	10		0	2	0	0	8		2	1	2	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *BB_1* **Date:** *June 17, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

505. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

506. Observe and list the F/S groups present in the evaluation area.

507. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

508. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

509. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

510. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Pepperweed, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210617-163612.jpg



photo_E-20210617-163622.jpg



photo_S-20210617-163640.jpg



photo_W-20210617-163648.jpg



photo_Soil-20210617-163602.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *BB_2*		Date: *June 17, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *BB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, volcanic ash, loess, volcanic rock*	Slope: *12°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1456.056* m	Aspect: *194°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant; fan skirts*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *65* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/3, mostly loose with some blocky structure, fine, dry, slightly sticky, some roots; fine sandy loam*
					2	*7 - 21 cm*	*Loamy Sand*		*Dry 10YR6/2; moist 10YR4/3, weak subangular structure, friable, some very fine roots*
					3	*21 - 52 cm*	*Loamy Sand*		*Dry 10YR6/2; moist 10YR4/3, subangular structure, friable, loose, dry; coarse loamy sand*
					4	*52 - 65 cm*	*Loamy Sand*		*Dry 10YR7/2 ; moist 10YR5/3, lacking structure, loose, some granular structure, slightly sticky*

Evaluation Area Location			
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.			
Location description/directions: Approximately 3.53 miles north of the town of Beowawe, mile marker 28.8 of the Segment #1 - Range Front to UP project segment.			
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	m		40.531186 N. Latitude

Section	1/4 Section	OR	m	OR	-116.466768 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power line, access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BB_2*		Date: *June 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(341) Assign 17 indicator ratings, record comments and any measurements. (342) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (343) Assign overall rating for each attribute based on preponderance of evidence. (344) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Potentially reduced infiltration and increased runoff due to lack of perennial bunch grasses and shrub cover.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *E-T*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *25*% Depth: *1 cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					N/A						*Reduced infiltration due to lack of perennial bunchgrasses*						*Missing dominant and subdominant functional structure groups*
0	0	1	0	9		0	2	1	0	7		2	1	1	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *BB_2* **Date:** *June 17, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

511. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

512. Observe and list the F/S groups present in the evaluation area.

513. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

514. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

515. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

516. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Blue mustard, Clasping pepperweed, Mustard, Pepperweed, Russian thistle, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*4*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210617-152621.jpg



photo_S-20210617-152635.jpg



photo_W-20210617-152642.jpg



photo_Soil-20210617-152552.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.									
Evaluation area name or ID: *BC_1*								Date: *July 17, 2021 1:00 PM*	
Management unit: *NA*				State: *NV*				Office: *Tuscarora Field Office*	
Evaluator(s): *Kristyn Klecko / Henson DeBruler*									
Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***									
Ecological site name: *Loamy 5-8 P.Z.*				Ecological site ID: *R024XY002NV*					
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*								Date: *12/2/2009*	
Soil component: *GIS CALCS*	Composition based on : Annual Production								
Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***									
Soil Survey: *NA*				Soil Map Unit: *BC*					
Soil and site reference description Description Source: Ecological Site Description				**Evaluation area soil and site characterization**					
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*			Parent material: *Formed in alluvium derived from volcanic rocks with surficial mantles of loess and volcanic ash.*				Slope: *1°*	
Elevation range: *1097 - 1981* m	Aspect NA (if specified):			Elevation: *1487.039* m				Aspect: *185°*	
Topographic position: Alluvial fans				Topographic position: *Fan remnant*					
Precipitation range: 0.13 - 0.20 cm				Average annual precipitation: *12.98032197 in*					
Seasonal precipitation distribution: 70% occurs November- May				Seasonal precipitation distribution:					
Soil depth[1]: Very Deep				Pit depth: *54* cm					
Type and depth of diagnostic horizons: in / cm				**Type and depth of diagnostic horizons:** in / cm					
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Clay*		*Dry 10YR6/2; moist 10YR3/4, subangular, granular, and platy; dry, friable, loose, violently effervescent, slightly plastic, some fine roots throughout*
					2	*10 - 19 cm*	*Clay*		*Dry 10YR6/2; moist 10YR4/2, medium sized plates, dry, friable, effervescent, slightly sticky, plastic, some fine roots, fine tubular pores*
					3	*19 - 33 cm*	*Silty Clay*		*Dry 10YR7/2; moist 10YR4/4, subangular blocky, moist, hard, sticky, slightly plastic, some fibrous roots, tubular pores, many duranoids throughout*
					4	*33 - 54 cm*	*Clay*		*Dry 10YR7/2; moist 10YR5/3, subangular blocky, moist, very hard, smooth, very sticky, very plastic, some fine roots, some pores, cracking along root pores, many duranoids throughout; clay with a small*

									amount of sand.

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.72 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.690788 N. Latitude
Section 1/4 Section		m		-116.145119 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife habitat

Offsite influences: Railroad tracks, access roads, power lines, residual mining infrastructure

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 4.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BC_1*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(345) Assign 17 indicator ratings, record comments and any measurements. (346) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (347) Assign overall rating for each attribute based on preponderance of evidence. (348) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *9* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Reduced shrub diversity, few to no perennial bunchgrasses, and absent perennial forbs likely greatly reducing infiltration and increasing runoff.*
11. Compaction layer	S | H | B *M*	
12. Functional/structural groups	B	
a. Relative dominance: *M-E*	*M-E*	
b. F/S groups not expected at the site: *N-S*		
c. Number of F/S groups: *S-M*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *18*% Depth: *1 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *N-S*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Compaction layer beginning at 31cm						*Infiltration likely significantly reduced due to few to no perennial bunchgrasses and perennial forbs*						*Lacking diversity in shrubs, few to no perennial bunchgrasses, perennial forbs absent*
0	*1*	*1*	*0*	*8*		0	*2*	*1*	*1*	*6*		0	*3*	*1*	*1*	*4*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BC_1* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

517. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

518. Observe and list the F/S groups present in the evaluation area.

519. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

520. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

521. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

522. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Halogeton, Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210717-143914.jpg



photo_W-20210717-144001.jpg



photo_Soil-20210717-143823.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BC_2*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BC*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Formed in alluvium derived from volcanic rocks with surficial mantles of loess and volcanic ash.*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1488.843* m	Aspect: *175°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Clay Loam*		*Dry 10YR8/1; moist 10YR6/2, fine platy, subangular, slightly sticky, plastic, dry, friable, some fibrous roots, violently effervescent, porous*
					2	*9 - 14 cm*	*Sandy Clay*		*Dry 10YR8/1; moist 10YR5/3; weak subangular granular, dry, slightly plastic, some fibrous roots*
					3	*14 - 21 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR5/4, granular - no structure, loose, medium-fine platy structures throughout; very sandy loam.*
					4	*21 - 50 cm*	*Sandy Clay Loam*		*Dry 10YR8/1; moist 10YR6/3, subangular blocky, extremely hard, extremely compacted, slightly moist, small salt deposits throughout, some salt-lined pores*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.99 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.698067 N. Latitude
Section 1/4 Section		m			-116.134959 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife habitat					
Offsite influences: Access roads, power lines, railroad tracks,					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BC_2*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(349) Assign 17 indicator ratings, record comments and any measurements. (350) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (351) Assign overall rating for each attribute based on preponderance of evidence. (352) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *39* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Reduced shrubs and few to no perennial forbs may greatly decrease infiltration and increase runoff.*
11. Compaction layer	S | H | B *M*	
12. Functional/structural groups	B	
a. Relative dominance: *M*	*M*	
b. F/S groups not expected at the site: *S-M*		
c. Number of F/S groups: *S-M*		
d. Spp # in dom & subdom F/S groups: *M*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *10*% Depth: *N/A cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: S-M					Rationale:	Attribute Rating: S-M					Rationale:	Attribute Rating: M					Rationale:
					Compaction at 21cm to bottom (50cm)						*Potentially decreased infiltration and increased runoff likely due to reduced shrubs and few to no perennial forbs.*						*Reduced shrubs, few to perennial forbs, increasing invasive annual grass.*
0	0	1	0	9		0	0	1	1	8		0	0	3	1	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *BC_2* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

523. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

524. Observe and list the F/S groups present in the evaluation area.

525. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

526. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

527. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

528. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	*Alkali sacaton*
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Entire leaf thelypody*
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Halogeton, Mustard, Pepperweed, Prickly lettuce, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BC_3*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BC*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Formed in alluvium derived from volcanic rocks with surficial mantles of loess and volcanic ash.*	Slope: *3°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1492.071* m	Aspect: *200°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR4/3; moist 10YR2/2, fine, platy, friable, dry, some litter, gravely from fine to medium*
					2	*4 - 18 cm*	*Sandy Clay Loam*		*Dry 10YR5/2 ; moist 10YR3/3, weak subangular blocky structure, slightly moist, some fine roots, some gravel; fine to medium*
					3	*18 - 51 cm*	*Sandy Clay*		*Dry 10YR6/2; moist 10YR4/4, subangular blocky, moist, slightly sticky, plastic, gravely; fine to medium, , some fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.84 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.699025 N. Latitude
Section 1/4 Section		m		-116.132513 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife habitat	
Offsite influences: Access roads, railroad tracks, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BC_3*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(353) Assign 17 indicator ratings, record comments and any measurements. (354) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (355) Assign overall rating for each attribute based on preponderance of evidence. (356) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *12* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *S-M*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Reduced shrubs and perennial forbs likely to greatly decrease infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *N-S* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *46*% Depth: *N/A cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Increased litter likely due to increase annual forbs						*Decreased shrubs and perennial forbs likely reducing infiltration and increasing runoff.*						*Reduced shrub numbers and diversity, reduced perennial grass diversity, reduced perennial forbs, increasing invasive annual grass and annual forbs.*
0	1	0	1	8		0	1	0	1	8		0	1	1	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BC_3* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

529. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

530. Observe and list the F/S groups present in the evaluation area.

531. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

532. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

533. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

534. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Common purslane, Halogeton, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210717-190646.jpg



photo_S-20210717-190657.jpg



photo_W-20210717-190709.jpg



photo_Soil-20210717-190621.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BC_5*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BC*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium derived from volcanic rocks with surficial mantles of loess and volcanic ash.*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1488.39* m	Aspect: *203°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/3, subangular blocky, dry, loose, fine, dense when moist, some litter, slightly effervescent, some fine roots, some fine gravel; Fine sandy clay loam;*
					2	*8 - 24 cm*	*Sandy Clay*		*Dry 10YR6/4; moist 10YR3/4, subangular blocky, slightly moist, very sticky, plastic, some fibrous roots, some fine gravel, duranoids throughout, some fine tubular pores*
					3	*24 - 50 cm*	*Silty Clay*		*Dry 10YR6/4; moist 10YR4/4, subangular blocky, fine slightly moist, soft, sticky, plastic, few fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.			
Location description/directions: Approximately 1.26 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.			
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	m		40.69613 N. Latitude

Section 1/4 Section	OR	m	OR	-116.139517 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife habitat	
Offsite influences: Residential properties, access roads, railroad tracks, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BC_5*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(357) Assign 17 indicator ratings, record comments and any measurements. (358) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (359) Assign overall rating for each attribute based on preponderance of evidence. (360) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *1* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Few to no perennial bunchgrasses and absent perennial forbs likely greatly reducing infiltration and increase infiltration runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *M-E*	B *E-T*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *37*% Depth: *2 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Increased bare ground due to increasing invasive annual grass and annual forbs.						*Infiltration limited by increasing invasive annual grass and annual forbs, and reduced perennial bunchgrasses and forbs.*						*Lacking shrub diversity, few to no perennial bunchgrasses, absent perennial forbs, significantly increasing invasive annual grass and annual forbs.*
0	1	1	0	8		0	2	0	0	8		2	1	1	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *BC_5* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

535. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

536. Observe and list the F/S groups present in the evaluation area.

537. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

538. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

539. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

540. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Halogeton, Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210717-160756.jpg



photo_W-20210717-160815.jpg



photo_Soil-20210717-160653.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Bf_1*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy Bottom 8-14 P.Z.*	Ecological site ID: *R025XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Bf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in clayey alluvium from tuff and basalt*	Slope: *No Slope°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1486.012* m	Aspect: *70°*
Topographic position: NA		Topographic position: *Flood plain*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, small blocky structures, loose, dry, some fine gravel, lots of perennial sod grass roots and litter*
					2	*5 - 16 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/4, some subangular structure, loose, powdery, some fine gravel, lots of perennial grass roots throughout*
					3	*16 - 39 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 10YR3/6, weak subangular structure, some duranoids, loose, friable, slightly sticky, some fine to coarse gravel, many fine and some coarse roots*
					4	*39 - 53 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/4; hard, duripan, slightly sticky, requires pulverization for texturing, no roots; coarse sand clay loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.48 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.680241 N. Latitude
Section 1/4 Section		m			-116.152116 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Train track, power line					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Bf_1*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(361) Assign 17 indicator ratings, record comments and any measurements. (362) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (363) Assign overall rating for each attribute based on preponderance of evidence. (364) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Below track: Infiltration very high. Dense veg and low slope result in very little runoff. Above track: as expected*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *7*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Bf_1* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

541. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

542. Observe and list the F/S groups present in the evaluation area.

543. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

544. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

545. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

546. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy Bottom 8-14 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Western wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Knapweed, Russian knapweed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210717-144247.jpg



photo_S-20210717-144253.jpg



photo_W-20210717-144301.jpg



photo_Soil-20210717-144230.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Bf_2*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Wet Meadow*	Ecological site ID: *R025XY005NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Bf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in clayey alluvium from tuff and basalt or alluvium derived from volcanic rocks and vitric pyroclastic materials.*	Slope: *No Slope°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1486.863* m	Aspect: *280°*
Topographic position: NA		Topographic position: *Flood plain*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *30* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 30 cm*	*Sand*		*Dry NA; moist - black; mucky gravel, completely saturated with high water table to surface, gravel may be from railbed*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.46 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.680711 N. Latitude	
Section 1/4 Section		m		-116.152126 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock, rail corridor

Offsite influences: Train track, power line

Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Bf_2*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(365) Assign 17 indicator ratings, record comments and any measurements. (366) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (367) Assign overall rating for each attribute based on preponderance of evidence. (368) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *20* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Dense wetland. No runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *1*% Depth: *NA*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Bf_2* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

547. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

548. Observe and list the F/S groups present in the evaluation area.

549. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

550. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

551. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

552. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Wet Meadow*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	*Common cattail*
Shallow-rooted, warm-season, perennial grasses	*Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Dock, Knapweed, Milkweed, Whitetop*
Non-sprouting shrubs	
Sprouting shrubs	*Woods' rose*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210717-155556.jpg



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photo_Soil-20210717-155533.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BM_1*		Date: *July 13, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BM*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *NA. No soil pit dug. No access.*	Slope: *N/A°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1676.307* m	Aspect: *N/A°*
Topographic position: Alluvial fans		Topographic position: *N/A*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *0* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 0 cm*	*N/A*		*NA. No soil pit dug. No access.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.				
Location description/directions: Is within the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.				
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.997123 N. Latitude
Section 1/4 Section		m		-116.385388 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): N/A	
Land treatment type(s) and date(s): N/A	
Wildlife, livestock, recreation, or other uses:	
Offsite influences: Active mining activity, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BM_1*		Date: *July 13, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(369) Assign 17 indicator ratings, record comments and any measurements. (370) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (371) Assign overall rating for each attribute based on preponderance of evidence. (372) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: *N/A* Plant canopy: *N/A*	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *N/A*% Depth: *N/A N/A*	H B *N/A*	
15. Annual production: *N/A* Observed: *N/A* ÷ Expected *N/A*= *N/A* %	B *N/A*	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:
					N/A						*N/A*						*N/A*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BM_1* **Date:** *July 13, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

553. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

554. Observe and list the F/S groups present in the evaluation area.

555. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

556. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

557. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

558. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*5*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BM_2*		Date: *July 12, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy Bottom 8-14 P.Z.*	Ecological site ID: *R025XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BM*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum, alluvium, and colluvium derived from chert, shale, quartzite, andesite and mixed rocks with a component of loess high in volcanic ash.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1542.728* m	Aspect: *273°*
Topographic position: NA		Topographic position: *Hill*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Silty Clay Loam*		*Dry 10YR4/2; moist 10YR2/2, loose, some weak subangular structure, slightly sticky, plastic, some fine gravel, cheatgrass roots*
					2	*3 - 23 cm*	*Clay Loam*		*Dry 10YR4/3; moist 10YR3/2; blocky subangular structure, slightly sticky, plastic, some coarse gravel, fine roots*
					3	*23 - 43 cm*	*Clay Loam*		*Dry 10YR4/2; moist 10YR2/2; blocky angular structure, slightly sticky, no gravel, fine roots*
					4	*43 - 58 cm*	*Clay Loam*		*Dry 10YR4/3; moist 10YR3/2, some blocky subangular structure, slightly sticky, no gravel, some fine roots, salt in pore lining*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.07 miles west of the TS Power Plant, mile marker 7.4 of the Welches Creek Road project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.788658 N. Latitude
Section 1/4 Section		m			-116.346686 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access road					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BM_2*		Date: *July 12, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(373) Assign 17 indicator ratings, record comments and any measurements. (374) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (375) Assign overall rating for each attribute based on preponderance of evidence. (376) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *18* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Reduced perennial bunch grasses and shrubs and increased annual grass likely reducing infiltration and increasing runoff*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *18*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils functioning as expected for site						*Reduced perennial functional structure groups and increased invasive annual grass likely reduce infiltration and increase runoff*						*Greatly reduced dominant and subdominant perennial functional structure groups; invasive annual grass is now dominant when live*
0	0	0	0	10		0	1	0	0	9		2	1	0	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BM_2* **Date:** *July 12, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

559. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

560. Observe and list the F/S groups present in the evaluation area.

561. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

562. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

563. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

564. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy Bottom 8-14 P.Z.*	**Reference phase for evaluation area:** *5.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210712-143158.jpg



photo_Soil-20210712-143117.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BM_3*		Date: *July 9, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Shallow Loam 10-14 P.Z.*	Ecological site ID: *R024XY035NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BM*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from mixed rocks, chert, shake, quartzite, and andesite with a component of loess high in volcanic ash.*	Slope: *45°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1546.302* m	Aspect: *140°*
Topographic position: NA		Topographic position: *Hill; backslope*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *19* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 12 cm*	*Sandy Loam*		*Dry 10YR5/2; moist 7.5YR2.5/3, mostly loose with some blocky structure, dry, some annual grass debris and roots, extremely gravely; fine to coarse in size; very coarse sandy loam*
					2	*12 - 19 cm*	*Sandy Clay*		*Dry 7.5YR4/3; moist - 7.5YR3/3, some subangular structure mostly loose, very sticky, extremely gravely; fine to coarse in size; coarse sandy clay*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.27 miles west of the TS Power Plant, mile marker 7.7 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.788762 N. Latitude	
Section 1/4 Section		m		-116.342928 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BM_3*		Date: *July 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(377) Assign 17 indicator ratings, record comments and any measurements. (378) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (379) Assign overall rating for each attribute based on preponderance of evidence. (380) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *25* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth:	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BM_3* **Date:** *July 9, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

565. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

566. Observe and list the F/S groups present in the evaluation area.

567. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

568. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

569. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

570. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Shallow Loam 10-14 P.Z.*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Prickly lettuce*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210709-184706.jpg



photo_E-20210709-184730.jpg



photo_S-20210709-184811.jpg



photo_W-20210709-184837.jpg



photo_Soil-20210709-184612.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BpA_1*		Date: *June 9, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BpA*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, loess, and volcanic ash*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1444.371* m	Aspect: *240°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/4, loose, weak subangular blocky structure, fine roots present throughout*
					2	*5 - 13 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, holding some moisture, subangular blockiness, fine roots throughout*
					3	*13 - 54 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/4, slight subangular blockiness, heavier texture, some gravel, some fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.0 miles north of the town of Beowawe, mile marker 32.0 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.568549 N. Latitude
Section 1/4 Section		m		-116.458651 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Railroad in close proximity. Access road to the south	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BpA_1*		Date: *June 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(381) Assign 17 indicator ratings, record comments and any measurements. (382) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (383) Assign overall rating for each attribute based on preponderance of evidence. (384) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *4* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Completely lacking any perennial species to aid in infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *10*% Depth: *N/A cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected for site.						*Lack of infiltration due to heavy presence of annuals.*						*Biotic community no longer native. Completely dominated by invasive annual grasses and forbs.*
1	0	0	0	9		2	1	0	0	7		4	1	0	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BpA_1* **Date:** *June 9, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

571. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

572. Observe and list the F/S groups present in the evaluation area.

573. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

574. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

575. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

576. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Lowland cudweed, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



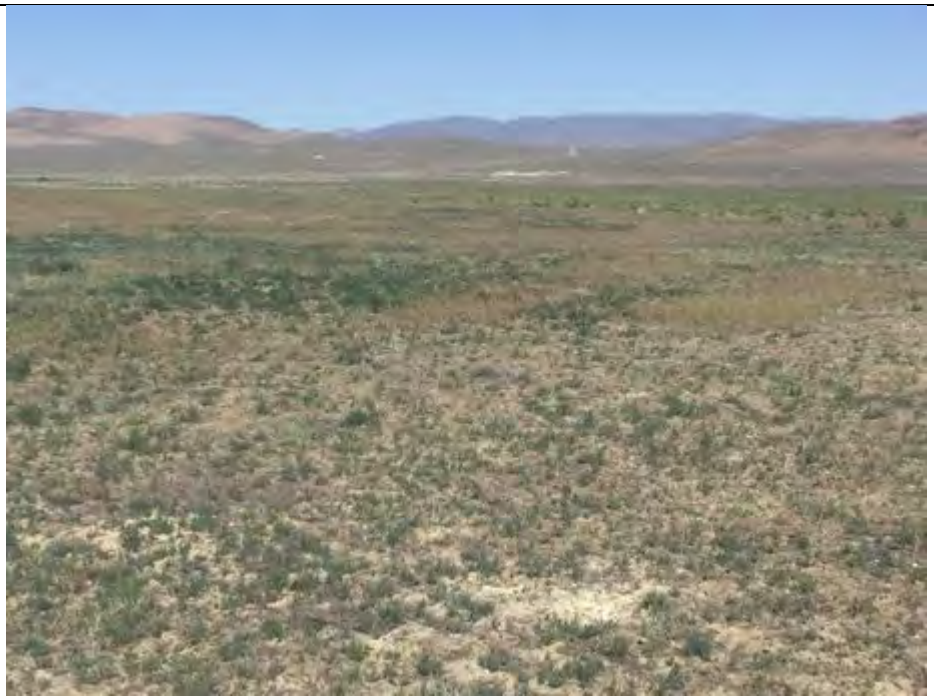
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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *BpA_1a*		Date: *July 24, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *BpA*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-8%*	Parent material: *Alluvium, mixed rock, loess, and volcanic ash*	Slope: *4°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1443.898* m	Aspect: *310°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Sandy Clay Loam*		*Dry 10YR7/2; moist 10YR3/3, fine platy structure, dry, friable, very dense, violently effervescent, some tubular pores, some fine gravel*
					2	*10 - 28 cm*	*Silt Loam*		*Dry 10YR7/3; moist 10YR3/3, subangular blocky, dry, slightly hard, slightly plastic, some fine roots, effervescent*
					3	*28 - 60 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR5/4, subangular blocky, slightly moist, some fine gravel, some fine tubular pores; fine sandy loam.*

Evaluation Area Location				
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.				
Location description/directions: Approximately 1.5 miles north of the town of Beowawe, mile marker 30.8 of the Segment #1 - Range Front to UP project segment.				
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.560685 N. Latitude
Section 1/4 Section		m		-116.467431 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BpA_1a*		Date: *July 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(385) Assign 17 indicator ratings, record comments and any measurements. (386) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (387) Assign overall rating for each attribute based on preponderance of evidence. (388) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present.*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Few to no perennial bunchgrasses and absent perennial forbs likely to slightly decrease infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *N-S* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *12*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *N-S*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					Soil is functioning as expected for site.						*Infiltration likely reduced due to missing perennial bunchgrasses and perennial forbs.*						*Missing potentially codominant or subdominant perennial bunchgrasses, missing subdominant perennial forbs.*
0	0	0	0	10		0	0	0	1	9		1	0	1	0	7	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BpA_1a* **Date:** *July 24, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

577. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

578. Observe and list the F/S groups present in the evaluation area.

579. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

580. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

581. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

582. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Mustard, Mustards, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210724-225750.jpg



photo_E-20210724-225758.jpg



photo_S-20210724-225814.jpg



photo_W-20210724-225825.jpg



photo_Soil-20210724-225712.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *BpA_2*		Date: *June 9, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *BpA*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, loess, and volcanic ash*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1456.339* m	Aspect: *16°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt; valley bottom; terrace above the playa*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *63* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/4, loose, some subangular blockiness, fine roots and litter; fine sandy loam*
					2	*8 - 27 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/4, subangular blockiness, fine roots throughout; fine sandy loam*
					3	*27 - 35 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/4, hard, concreted layer; subangular blockiness; fine sandy loam*
					4	*35 - 63 cm*	*Sandy Loam*		*Dry 10YR5/4; moist 10YR3/6, loose, some subangular blockiness*

Evaluation Area Location				
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.				
Location description/directions: Approximately 3.87 miles north of the town of Beowawe, mile marker 28.5 of the Segment #1 - Range Front to UP project segment.				
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.526336 N. Latitude
Section 1/4 Section		m		-116.466422 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: NA	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BpA_2*		Date: *June 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(389) Assign 17 indicator ratings, record comments and any measurements. (390) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (391) Assign overall rating for each attribute based on preponderance of evidence. (392) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Severe lack of infiltration and likely an increase in runoff due to lack of perennial vegetation.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *22*% Depth: *1 cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected within site.						*Overall lack of infiltration and increased runoff due to lack of perennial vegetation.*						*Invasive annual grasses and annual forbs are the complete dominant species within the survey area.*
1	0	0	0	9		2	1	0	0	7		3	2	0	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BpA_2* **Date:** *June 9, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

583. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

584. Observe and list the F/S groups present in the evaluation area.

585. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

586. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

587. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

588. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

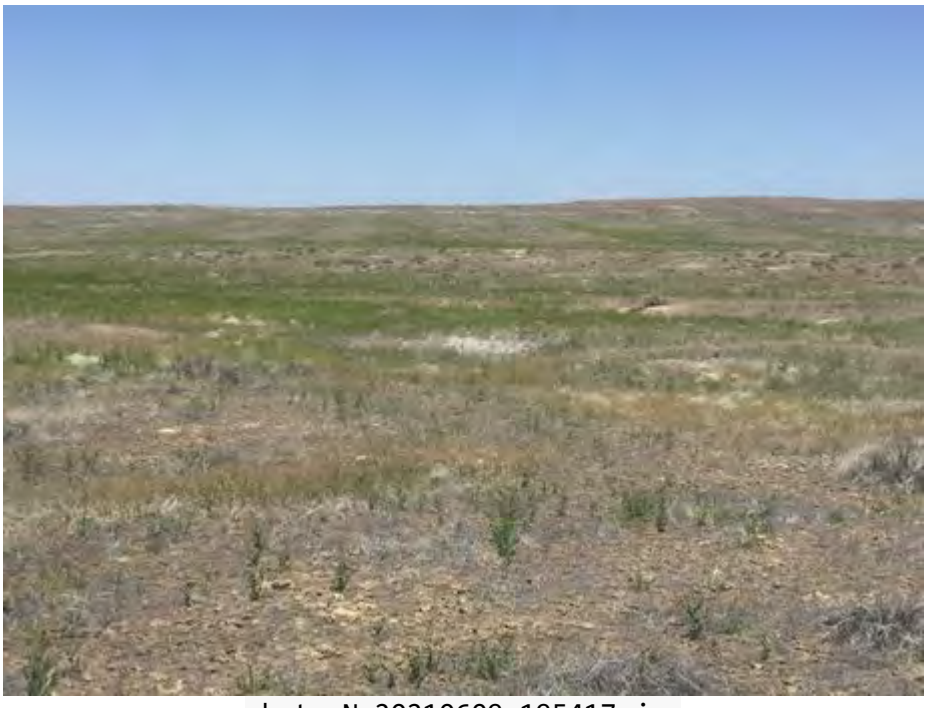
1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Dead shrubs, Shadscale*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

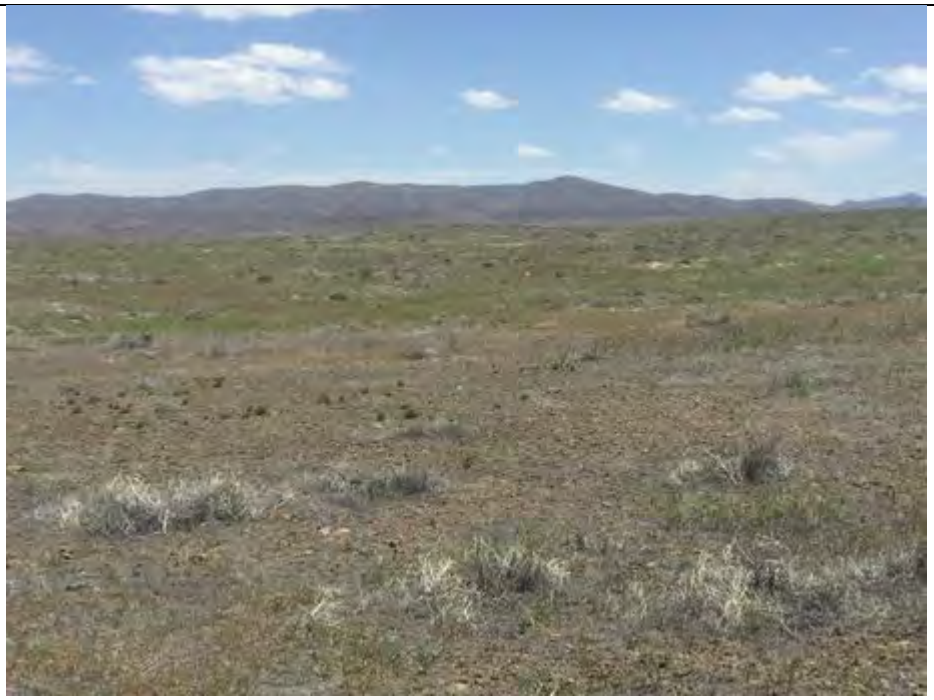
[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



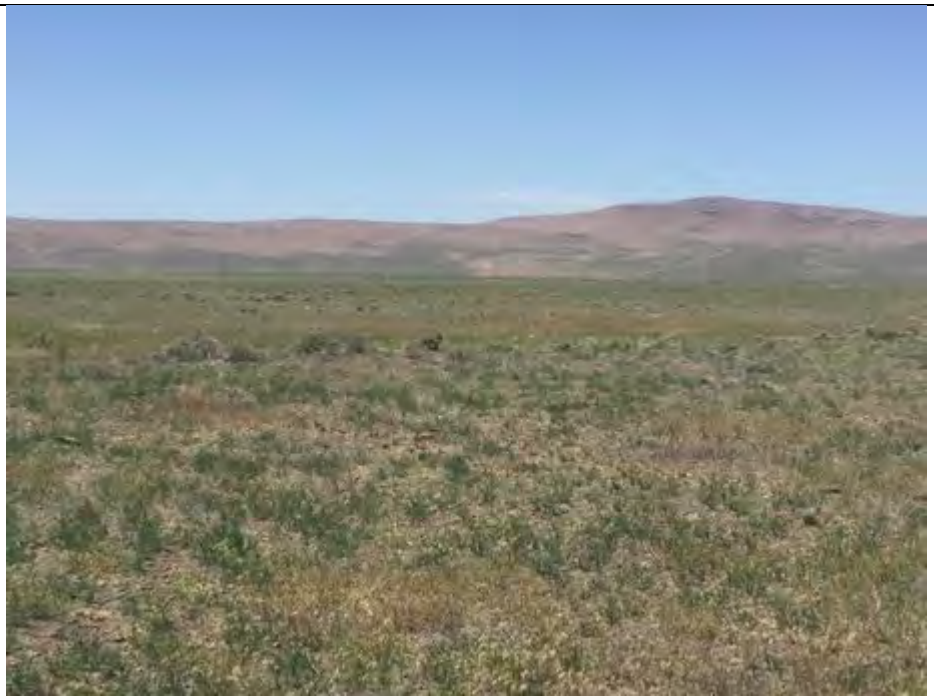
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photo_E-20210609-195423.jpg



photo_S-20210609-195432.jpg



photo_W-20210609-195449.jpg



photo_Soil-20210609-195500.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BpA_3*		Date: *June 9, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *BpA*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, loess, and volcanic ash*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1440.378* m	Aspect: *18°*
Topographic position: Alluvial fans		Topographic position: *Fan skirt*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *27* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR4/4, weak platy structure, some effervescence, plentiful fine roots throughout; fine sandy loam*
					2	*3 - 10 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/6, weak subangular blocky texture, fine roots throughout*
					3	*10 - 27 cm*	*Sandy Clay Loam*		*Dry 10YR7/1; moist 10YR4/4, very hard, subangular blocky texture, some fine roots. Refusal at 27 cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.91 miles north of the town of Beowawe, mile marker 31.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.569679 N. Latitude
Section 1/4 Section		m		-116.460819 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Highway, access road, and railroad all within close proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BpA_3*		Date: *June 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(393) Assign 17 indicator ratings, record comments and any measurements. (394) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (395) Assign overall rating for each attribute based on preponderance of evidence. (396) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Lack of bunchgrasses and increased annual grasses leads to reduced infiltration. Some protection from raindrops.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *20*% Depth: *N/A cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected.						*Lack of infiltration and increased runoff within survey area.*						*Loss of dominant functional structure groups and dominance of annuals.*
1	0	0	0	9		2	1	0	0	7		2	2	1	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BpA_3* **Date:** *June 9, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

589. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

590. Observe and list the F/S groups present in the evaluation area.

591. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

592. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

593. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

594. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210609-150808.jpg



photo_S-20210609-150815.jpg



photo_W-20210609-150821.jpg



photo_Soil-20210609-150836.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *BpA_4*		Date: *June 9, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Nicole St John*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *BpA*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-30%*	Parent material: *Alluvium, mixed rock, loess, and volcanic ash* Slope: *1°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1441.397* m Aspect: *260°*
Topographic position: Alluvial fans	Topographic position: *Fan skirt; terrace above the playa area*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *72* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/4, loose with some subangular blockiness present; fine sandy loam*
					2	*5 - 20 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/4, firm, subangular blockiness, fine roots throughout; fine sandy loam*
					3	*20 - 25 cm*	*Sandy Loam*		*Dry 10YR4/4; moist 10YR3/4, concreted, hard layer, subangular blockiness; coarse sandy loam*
					4	*25 - 72 cm*	*Loamy Sand*		*Dry 10YR5/4; moist 10YR4/6, subangular blockiness, looser texture*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.89 miles north of the town of Beowawe, mile marker 31.3 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.56945 N. Latitude
Section 1/4 Section		m		-116.470287 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road running through survey area. Close proximity to highway and railroad	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *BpA_4*		Date: *June 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(397) Assign 17 indicator ratings, record comments and any measurements. (398) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (399) Assign overall rating for each attribute based on preponderance of evidence. (400) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Little infiltration due to major loss of perennial plants within the survey area*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *35*% Depth: *0.5 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils functioning as expected.						*Overall lack of infiltration capabilities from missing perennial bunchgrasses and lack of shrubs.*						*Lack of dominant functional structure groups and dominance of annuals.*
1	0	0	0	9		2	0	0	1	7		0	3	1	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_BpA_4* **Date:** *June 9, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Nicole St John*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

595. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

596. Observe and list the F/S groups present in the evaluation area.

597. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

598. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

599. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

600. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Halogeton, Mustard, Mustards*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210609-181227.jpg



photo_W-20210609-181235.jpg



photo_Soil-20210609-182740.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_1*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *NA. No soil pit dug. Freeway.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1512.674* m	Aspect: *87°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 0 cm*	*Clay*		*NA. No soil pit dug. Freeway.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.				
Location description/directions: Approximately 0.73 miles east of the town of Carlin, mile marker 1.5 of the Carlin to GQ Private Bush Street project segment.				
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.71797 N. Latitude
Section 1/4 Section		m		-116.13923 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): Developed - Freeway	
Wildlife, livestock, recreation, or other uses: Developed - Freeway	
Offsite influences: NA	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_1*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(401) Assign 17 indicator ratings, record comments and any measurements. (402) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (403) Assign overall rating for each attribute based on preponderance of evidence. (404) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*NA*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *100* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*NA*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *0*% Depth:	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_1* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

601. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

602. Observe and list the F/S groups present in the evaluation area.

603. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

604. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

605. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

606. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210719-205124.jpg



photo_W-20210719-205144.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_2*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *6°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1508.942* m	Aspect: *165°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, fine platy, dry, friable, some litter, some fine to medium gravel, slightly porous.*
					2	*5 - 12 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, angular blocky structure, slightly moist, slightly sticky, plastic, some fine to medium gravel*
					3	*12 - 25 cm*	*Sandy Clay*		*Dry 10YR6/4; moist 10YR3/3, moderate subangular blocky structure, moist, sticky, fibrous roots throughout, some fine gravel*
					4	*25 - 50 cm*	*Sandy Clay*		*Dry 10YR6/4; moist 10YR3/4, subangular blocky structure, slightly moist, plastic, some fine to medium gravel, salt-coated fibrous roots, slightly porous*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.49 miles east of the town of Carlin, mile marker 0.6 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.707379 N. Latitude
Section 1/4 Section		m			-116.129919 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife habitat					
Offsite influences: Access road, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_2*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(405) Assign 17 indicator ratings, record comments and any measurements. (406) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (407) Assign overall rating for each attribute based on preponderance of evidence. (408) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced perennial bunchgrasses and perennial forbs likely to moderately decrease infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_2* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

607. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

608. Observe and list the F/S groups present in the evaluation area.

609. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

610. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

611. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

612. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Pepperweed, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210719-150207.jpg



photo_E-20210719-150217.jpg



photo_S-20210719-150226.jpg



photo_W-20210719-150236.jpg



photo_Soil-20210719-150136.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_2a*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *6°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1508.942* m	Aspect: *165°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, fine platy, dry, friable, some litter, some fine to medium gravel, slightly porous.*
					2	*5 - 12 cm*	*Clay Loam*		*Dry 10YR6/3; moist - 10YR3/3, angular blocky structure, slightly moist, slightly sticky, plastic, some fine to medium gravel*
					3	*12 - 25 cm*	*Sandy Clay*		*Dry 10YR6/4; moist 10YR3/3, moderately subangular blocky structure, moist, sticky, fibrous roots throughout, some fine gravel*
					4	*25 - 50 cm*	*Sandy Clay*		*Dry 10YR6/4; moist 10YR3/4, subangular blocky structure, slightly moist, plastic, some fine to medium gravel, salt-coated fibrous roots, slightly porous*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.49 miles east of the town of Carlin, mile marker 0.6 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.707379 N. Latitude
Section 1/4 Section		m			-116.129919 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife habitat					
Offsite influences: Access road, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_2a*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(409) Assign 17 indicator ratings, record comments and any measurements. (410) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (411) Assign overall rating for each attribute based on preponderance of evidence. (412) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced perennial bunchgrasses and perennial forbs likely to moderately decrease infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_2a* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

613. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

614. Observe and list the F/S groups present in the evaluation area.

615. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

616. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

617. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

618. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Pepperweed, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210719-150207.jpg



photo_E-20210719-150217.jpg



photo_S-20210719-150226.jpg



photo_W-20210719-150236.jpg



photo_Soil-20210719-150136.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_2b*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *South Slope 8-12 P.Z.*	Ecological site ID: *R025XY015NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium derived from mixed rocks.*	Slope: *4°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1521.809* m	Aspect: *120°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 11 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist-10YR3/3, weakly subangular, granular, dry, friable, plastic, some fine to medium gravel, fibrous roots throughout*
					2	*11 - 26 cm*	*Clay*		*Dry 10YR4/4; moist 10YR3/4 ; subangular blocky, dry, fine to medium roots, some tubular pores; clay with some sand.*
					3	*26 - 52 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular blocky, slightly hard, plastic,, some fine roots, gravely from fine to medium.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.68 miles east of the town of Carlin, mile marker 1.4 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR		40.715736 N. Latitude
Section 1/4 Section		m			-116.137246 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife habitat, livestock grazing	
Offsite influences: Access roads, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_2b*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(413) Assign 17 indicator ratings, record comments and any measurements. (414) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (415) Assign overall rating for each attribute based on preponderance of evidence. (416) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *22* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Missing perennial bunchgrasses and perennial forb sand increasing invasive annual grass and annual forbs likely to greatly reduce infiltration capabilities within he survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *13*% Depth: *1.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_2b* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

619. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

620. Observe and list the F/S groups present in the evaluation area.

621. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

622. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

623. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

624. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *South Slope 8-12 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Halogeton, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210719-194917.jpg



photo_W-20210719-194930.jpg



photo_Soil-20210719-194828.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_2c*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks*	Slope: *6°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1537.221* m	Aspect: *40°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/4, loose with some subangular structure, very friable, sticky, some gravel; fine sandy loam.*
					2	*5 - 20 cm*	*Sandy Clay Loam*		*Dry 10YR7/2; moist 10YR4/4, loose to granular with some subangular structure, some platiness, sticky, slightly plastic, effervescent, porous; fine sand clay loam.*
					3	*20 - 32 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 10YR3/4, granular to blocky structure, sticky, some fine roots*
					4	*32 - 53 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR4/4, some granular structure, hard, sticky, some fine gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.17 miles east of the town of Carlin, mile marker 1.4 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.709857 N. Latitude
Section 1/4 Section			m		-116.144696 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife habitat, livestock grazing					
Offsite influences: Access road					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.3 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_2c*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(417) Assign 17 indicator ratings, record comments and any measurements. (418) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (419) Assign overall rating for each attribute based on preponderance of evidence. (420) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Bunchgrasses, shrubs, and native, perennial forbs absent; increased cheatgrass. Changes in vegetative community may result in slightly reduced infiltration and increased runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *18*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					Reduced bare ground due to biocrust and litter.						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_2c* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

625. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

626. Observe and list the F/S groups present in the evaluation area.

627. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

628. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

629. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

630. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_Soil-20210719-183425.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_2d*		Date: *July 23, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1561.427* m	Aspect: *342°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/6, loose material with subangular and blocky structure, fine roots throughout, some litter; fine sandy loam.*
					2	*7 - 19 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR3/6, large blocky structure, slightly sticky, coarse and fine roots; fine sandy clay loam.*
					3	*19 - 35 cm*	*Clay Loam*		*Dry 10YR5/3; moist 10YR3/6, subangular to granular structure, slightly sticky, very coarse to fine roots throughout*
					4	*35 - 54 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/6, subangular to fine and coarse granular structure, very hard, some coarse roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.99 miles southeast of the town of Carlin, mile marker 5.8 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*			UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range		OR	m	OR	40.773587 N. Latitude
Section 1/4 Section			m		-116.161522 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife habitat, livestock grazing					
Offsite influences: Mine					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_2d*		Date: *July 23, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(421) Assign 17 indicator ratings, record comments and any measurements. (422) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (423) Assign overall rating for each attribute based on preponderance of evidence. (424) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decrease in functional structure groups and increases in annual grasses and forbs may moderately decrease infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *30*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_2d* **Date:** *July 23, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

631. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

632. Observe and list the F/S groups present in the evaluation area.

633. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

634. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

635. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

636. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210723-145602.jpg



photo_W-20210723-145612.jpg



photo_Soil-20210723-145535.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_2e*		Date: *July 21, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *NA. No soil pit dug.*	Slope: *N/A°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1558.789* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 0 cm*	*Clay*		*NA. No soil pit dug.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.67 miles southeast of the town of Carlin, mile marker 6.8 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.783581 N. Latitude
Section 1/4 Section		m		-116.164566 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife habitat, livestock grazing

Offsite influences: Highway, mine, power lines

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 4.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_2e*		Date: *July 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(425) Assign 17 indicator ratings, record comments and any measurements. (426) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (427) Assign overall rating for each attribute based on preponderance of evidence. (428) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): 5 %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: 21% Depth:	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_2e* **Date:** *July 21, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

637. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

638. Observe and list the F/S groups present in the evaluation area.

639. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

640. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

641. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

642. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210721-173936.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_3*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks*	Slope: *6°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1510.007* m	Aspect: *132°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/3, subangular blocky, loose, dry, some litter, a lot of fine roots throughout, some tubular pores*
					2	*8 - 27 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR4/4, subangular blocky structure, dry, plastic, fibrous roots, some fine gravel, tubular pores*
					3	*27 - 55 cm*	*Clay Loam*		*Dry 10YR6/4; moist 10YR3/4, weak subangular blocky structure, dry, slightly sticky and plastic, some fibrous roots, some fine gravel, a few tubular pores*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.48 miles east of the town of Carlin, mile marker 0.8 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.709336 N. Latitude	
Section 1/4 Section		m		-116.130641 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife habitat, livestock access	
Offsite influences: Access road, power line	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_3*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(429) Assign 17 indicator ratings, record comments and any measurements. (430) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (431) Assign overall rating for each attribute based on preponderance of evidence. (432) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *12* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absent perennial bunchgrasses and perennial forbs likely to moderately reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *25*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_3* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

643. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

644. Observe and list the F/S groups present in the evaluation area.

645. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

646. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

647. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

648. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Halogeton, Mustard, Pepperweed, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210719-160918.jpg



photo_W-20210719-160931.jpg



photo_Soil-20210719-160847.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.									
Evaluation area name or ID: *CF_5*								Date: *July 19, 2021 1:00 PM*	
Management unit: *PALISADE*				State: *NV*				Office: *Tuscarora Field Office*	
Evaluator(s): *Kevin Cutrera / Chris Hensley*									
Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***									
Ecological site name: *Loamy 8-10 P.Z.*				Ecological site ID: *R025XY019NV*					
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*								Date: *NA*	
Soil component: *GIS CALCS*		Composition based on : NA							
Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***									
Soil Survey: *NA*					Soil Map Unit: *CF*				
Soil and site reference description Description Source: Ecological Site Description					**Evaluation area soil and site characterization**				
Parent material: *NA*		Slope range: *NA*			Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks*			Slope: *5°*	
Elevation range: *NA* m		Aspect NA (if specified):			Elevation: *1530.283* m			Aspect: *310°*	
Topographic position: NA					Topographic position: *Fan remnant*				
Precipitation range: NA cm					Average annual precipitation: *12.98032197 in*				
Seasonal precipitation distribution: NA					Seasonal precipitation distribution:				
Soil depth[1]: NA					Pit depth: *57* cm				
Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/4, mostly loose, some subangular blocky structure, very dry, slightly sticky, slightly plastic, debris, some fine to medium gravel, fine roots, organic matter; Fine sand clay loam.*
					2	*7 - 19 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, loose, some platy subangular structure, slightly sticky, some fine to coarse gravel, some coarse and fine roots throughout; fine sand clay loam.*
					3	*19 - 36 cm*	*Silty Clay*		*Dry 7.5YR4/4; moist 7.5YR4/4, granular to blocky structure, hard, slightly sticky, plastic, some fine to coarse gravel, some fine and coarse roots throughout*
					4	*36 - 57 cm*	*Silty Clay*		*Dry 7.5YR5/4; moist 7.5YR4/4, some subangular structure, fine to coarse granular structure, some silica*

									concretions, hard, plastic

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.98 miles east of the town of Carlin, mile marker 1.5 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.716109 N. Latitude
Section 1/4 Section		m		-116.143434 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife habitat

Offsite influences: Highway

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 3.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_5*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(433) Assign 17 indicator ratings, record comments and any measurements. (434) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (435) Assign overall rating for each attribute based on preponderance of evidence. (436) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *13* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Missing bunchgrasses may result in slightly reduced infiltration, increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *13*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CF_5* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

649. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

650. Observe and list the F/S groups present in the evaluation area.

651. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

652. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

653. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

654. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210719-194224.jpg



photo_W-20210719-194243.jpg



photo_Soil-20210719-194131.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CF_6*		Date: *July 23, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *CF*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *NA* Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.* Slope: *5°*
Elevation range: *NA* m Aspect NA (if specified):	Elevation: *1556.828* m Aspect: *30°*
Topographic position: NA	Topographic position: *Fan remnant*
Precipitation range: NA cm	Average annual precipitation: *12.98032197 in*
Seasonal precipitation distribution: NA	Seasonal precipitation distribution:
Soil depth[1]: NA	Pit depth: *51* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 11 cm*	*Sandy Clay Loam*		*Dry 7.5YR8/1; moist 7.5YR4/3, platy, loose, friable, slightly effervescent, some coarse gravel; fine sand clay loam*
					2	*11 - 51 cm*	*Clay Loam*		*Dry 10YR7/3; moist 7.5YR4/4, subangular, hard, very fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.66 miles southeast of the town of Carlin, mile marker 5.4 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.767863 N. Latitude
Section 1/4 Section		m		-116.162272 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife habitat, livestock grazing

Offsite influences: Mine, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_6*		Date: *July 23, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(437) Assign 17 indicator ratings, record comments and any measurements. (438) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (439) Assign overall rating for each attribute based on preponderance of evidence. (440) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Bunchgrasses absent, perennial forbs absent, and annual grass is now dominant. Changes in vegetative community may result in moderately reduced infiltration and increased runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *22*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_6* **Date:** *July 23, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

655. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

656. Observe and list the F/S groups present in the evaluation area.

657. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

658. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

659. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

660. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210723-161149.jpg



photo_S-20210723-161159.jpg



photo_W-20210723-161207.jpg



photo_Soil-20210723-161132.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.									
Evaluation area name or ID: *CF_6a*								Date: *July 19, 2021 1:00 PM*	
Management unit: *MARYS MOUNTAIN*				State: *NV*				Office: *Tuscarora Field Office*	
Evaluator(s): *Kevin Cutrera / Chris Hensley*									
Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***									
Ecological site name: *Loamy 8-10 P.Z.*				Ecological site ID: *R025XY019NV*					
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*								Date: *NA*	
Soil component: *GIS CALCS*		Composition based on : NA							
Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***									
Soil Survey: *NA*				Soil Map Unit: *CF*					
Soil and site reference description Description Source: Ecological Site Description				**Evaluation area soil and site characterization**					
Parent material: *NA*		Slope range: *NA*		Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks*				Slope: *5°*	
Elevation range: *NA* m		Aspect NA (if specified):		Elevation: *1540.709* m				Aspect: *40°*	
Topographic position: NA				Topographic position: *Fan remnant*					
Precipitation range: NA cm				Average annual precipitation: *12.98032197 in*					
Seasonal precipitation distribution: NA				Seasonal precipitation distribution:					
Soil depth[1]: NA				Pit depth: *57* cm					
Type and depth of diagnostic horizons: in / cm				**Type and depth of diagnostic horizons:** in / cm					
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/3, loose, some very weak subangular structure, slightly sticky, some fine gravel, full of annual roots*
					2	*5 - 15 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR4/4; loose with some subangular structure, slightly sticky, some coarse gravel, lots of fine to coarse roots*
					3	*15 - 30 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, granular to blocky subangular structure, slightly sticky, slightly plastic, gravelly, fine to medium gravel, fine and coarse roots throughout*
					4	*30 - 44 cm*	*Clay Loam*		*Dry 10YR7/2; moist 10YR4/4, subangular structure, hard, slightly sticky, gravelly, fine to medium gravel, some very fine roots throughout*
					5	*44 - 57 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/4, loose to no structure, very gravelly,*

									skeletal, fine to coarse gravel; coarse sandy loam

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.72 miles southeast of the town of Carlin, mile marker 3.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.739496 N. Latitude
Section 1/4 Section		m		-116.15005 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife habitat, livestock grazing

Offsite influences: Access roads

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 3.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CF_6a*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(441) Assign 17 indicator ratings, record comments and any measurements. (442) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (443) Assign overall rating for each attribute based on preponderance of evidence. (444) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *9* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of bunchgrasses and forbs within survey area may slightly reduce infiltration and increases runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *18*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CF_6a* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

661. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

662. Observe and list the F/S groups present in the evaluation area.

663. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

664. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

665. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

666. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Pepperweed, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210719-211218.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_1*		Date: *June 29, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *NA. No soil pit dug. No Access.*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1500.023* m	Aspect: *65°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *0* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 0 cm*	*Silty Clay Loam*		*NA. No soil pit dug. No access.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.				
Location description/directions: Approximately 3.52 miles northeast of the Goldstrike Mine, mile marker 14.6 of the Segment #2 TS Power Plant Loop to GS project segment.				
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.922965 N. Latitude
Section 1/4 Section		m		-116.482867 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): Evidence of some tilling	
Wildlife, livestock, recreation, or other uses: Wildlife, agriculture	
Offsite influences: Access roads, power lines, mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_1*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(445) Assign 17 indicator ratings, record comments and any measurements. (446) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (447) Assign overall rating for each attribute based on preponderance of evidence. (448) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *18* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of dominant and subdominant perennial functional structure groups and the increased presence of annual grasses and forbs is potentially reducing infiltration and increasing runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *15*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CG_1* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

667. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

668. Observe and list the F/S groups present in the evaluation area.

669. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

670. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

671. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

672. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Alfalfa*
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Mustard, Mustards, Prickly lettuce*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210629-203921.jpg



photo_W-20210629-203940.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_10*		Date: *July 13, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *NA. No soil pit dug. Parking area.*	Slope: *N/A°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1606.905* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *N/A*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *0* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 0 cm*	*N/A*		*NA. No soil pit dug. Parking area.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.990802 N. Latitude
Section 1/4 Section		m		-116.396369 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): N/A

Land treatment type(s) and date(s): N/A

Wildlife, livestock, recreation, or other uses: N/A

Offsite influences: N/A

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 4.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_10*		Date: *July 13, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(449) Assign 17 indicator ratings, record comments and any measurements. (450) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (451) Assign overall rating for each attribute based on preponderance of evidence. (452) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: *N/A* Plant canopy: *N/A*	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *N/A*% Depth: *N/A N/A*	H B *N/A*	
15. Annual production: *N/A* Observed: *N/A* ÷ Expected *N/A*= *N/A* %	B *N/A*	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: -					Rationale:
					N/A						*N/A*						
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CG_10* **Date:** *July 13, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

673. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

674. Observe and list the F/S groups present in the evaluation area.

675. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

676. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

677. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

678. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210713-145125.jpg



photo_W-20210713-145104.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_2*		Date: *July 13, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *NA. No soil pit dug. Parking area.*	Slope: *N/A°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1637.351* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *N/A*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *0* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 0 cm*	*N/A*		*NA. No soil pit dug. Parking area.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.997475	N. Latitude
Section 1/4 Section		m		-116.383127	W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): N/A

Land treatment type(s) and date(s): N/A

Wildlife, livestock, recreation, or other uses: N/A

Offsite influences: N/A

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_2*		Date: *July 13, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(453) Assign 17 indicator ratings, record comments and any measurements. (454) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (455) Assign overall rating for each attribute based on preponderance of evidence. (456) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: *N/A* Plant canopy: *N/A*	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *N/A*% Depth: *N/A N/A*	H B *N/A*	
15. Annual production: *N/A* Observed: *N/A* ÷ Expected *N/A*= *N/A* %	B *N/A*	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: -					Rationale:
					N/A						*N/A*						
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CG_2* **Date:** *July 13, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

679. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

680. Observe and list the F/S groups present in the evaluation area.

681. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

682. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

683. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

684. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass		
Cool-season perennial grasses		
Annual forbs		
Sprouting succulent		
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*	
Number of expected F/S groups present[2] in evaluation area:		*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:		*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210713-145808.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_3*		Date: *June 29, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *CG*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *NA* Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock* Slope: *2°*
Elevation range: *NA* m Aspect NA (if specified):	Elevation: *1533.354* m Aspect: *202°*
Topographic position: NA	Topographic position: *Fan remnant*
Precipitation range: NA cm	Average annual precipitation: *8.96850878 in*
Seasonal precipitation distribution: NA	Seasonal precipitation distribution:
Soil depth[1]: NA	Pit depth: *54* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR3/4, loose and subangular structure, fine roots throughout*
					2	*7 - 25 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR3/6, subangular to granular structure, very sticky, fine roots throughout*
					3	*25 - 54 cm*	*Clay*		*Dry 7.5YR4/4; moist 7.5YR3/4, blocky, subangular, chunky, slightly moist, hard*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.34 miles northeast of the Goldstrike Mine, mile marker 17.0 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.953843 N. Latitude
Section 1/4 Section		m		-116.460565 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, power plan, mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_3*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(457) Assign 17 indicator ratings, record comments and any measurements. (458) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (459) Assign overall rating for each attribute based on preponderance of evidence. (460) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced perennial bunchgrasses and forbs and increased annual grasses may slightly reduce infiltration and increase runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *25*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CG_3* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

685. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

686. Observe and list the F/S groups present in the evaluation area.

687. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

688. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

689. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

690. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210629-155742.jpg



photo_Soil-20210629-155655.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_3a*		Date: *July 20, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess and volcanic ash over alluvium derived from mixed volcanic and sedimentary rock*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1567.218* m	Aspect: *58°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *30* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR3/4, fine platy, dry, friable, some fibrous roots, some fine to coarse gravel, some tubular and interstitial pores*
					2	*6 - 20 cm*	*Clay*		*Dry 10YR6/2; moist 10YR3/4, slightly moist, weak subangular blocky, hard, very dense when moist, some fibrous roots, some fine gravel*
					3	*20 - 30 cm*	*Clay Loam*		*Dry 10YR6/2; moist 10YR3/6, weak angular blocky, slightly sticky, dense, moist, some fine and some salt-encrusted roots, some fine gravel, some salt deposits*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.973498 N. Latitude	
Section 1/4 Section		m		-116.44053 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): Evidence of remediation efforts	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_3a*		Date: *July 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(461) Assign 17 indicator ratings, record comments and any measurements. (462) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (463) Assign overall rating for each attribute based on preponderance of evidence. (464) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *3* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced shrubs, absent perennial and annual forbs, increased invasive annual grass, all potentially reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *21*% Depth:	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CG_3a* **Date:** *July 20, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

691. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

692. Observe and list the F/S groups present in the evaluation area.

693. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

694. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

695. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

696. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_3b*		Date: *July 20, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess and volcanic ash over alluvium derived from mixed volcanic and sedimentary rock*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1562.567* m	Aspect: *155°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *36* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Silty Clay Loam*		*Dry 10YR5/2; moist 10YR2/2, super fine platy structure, loose, dry, litter, some fine roots, some fine gravel, some tubular pores*
					2	*8 - 21 cm*	*Silty Clay Loam*		*Dry 10YR7/2; moist - 10YR4/4, loose platy structure, dry, hard, plastic, some fibrous roots, fine to medium gravel*
					3	*21 - 36 cm*	*Silt*		*Dry 10YR6/3; moist 10YR3/4, subangular blocky, dry, hard, sticky, plastic, some fibrous roots, fine to medium gravel, porous*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.14 miles east of the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.968435 N. Latitude
Section 1/4 Section		m		-116.446323 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): Evidence of remediation efforts	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_3b*		Date: *July 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(465) Assign 17 indicator ratings, record comments and any measurements. (466) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (467) Assign overall rating for each attribute based on preponderance of evidence. (468) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): 5 %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Significantly reduced shrubs and perennial forbs likely to reduce infiltration and increase runoff; may be partially offset by increased non-native perennial bunchgrass.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: 30% Depth:	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CG_3b* **Date:** *July 20, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

697. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

698. Observe and list the F/S groups present in the evaluation area.

699. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

700. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

701. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

702. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210720-203050.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_3c*		Date: *July 20, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess and volcanic ash over alluvium derived from mixed volcanic and sedimentary rock*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1545.494* m	Aspect: *280°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *45* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR3/4; mostly loose with some platy subangular structures, sticky, some fine roots*
					2	*9 - 32 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 10YR3/4, loose with fine granular to rough subangular structures, sticky, thick coarse roots, some fine roots*
					3	*32 - 41 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 10YR3/6, finely granular, sticky, some fine roots*
					4	*41 - 45 cm*	*Sand*		*Dry N/A; moist N/A, angular structure, extremely hard concretions of silica, rocklike. Refusal at 45cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 0.7 miles north of the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.958326 N. Latitude

Section	1/4 Section	OR	m	OR	-116.445332 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine, power lines, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_3c*		Date: *July 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(469) Assign 17 indicator ratings, record comments and any measurements. (470) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (471) Assign overall rating for each attribute based on preponderance of evidence. (472) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Fire burned away almost all vegetation. Cheatgrass now dominant and widespread. Lack of shrubs and bunchgrasses may severely reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *45*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CG_3c* **Date:** *July 20, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

703. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

704. Observe and list the F/S groups present in the evaluation area.

705. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

706. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

707. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

708. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210720-194203.jpg



photo_S-20210720-194211.jpg



photo_W-20210720-194217.jpg



photo_Soil-20210720-194142.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_4*		Date: *June 29, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *NA. No soil pit dug. No Access.*	Slope: *6°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1500.798* m	Aspect: *50°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *0* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 0 cm*	*Silty Clay Loam*		*NA. No soil pit dug. No access.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.				
Location description/directions: Approximately 3.36 miles northeast of the Goldstrike Mine, mile marker 14.8 of the Segment #2 TS Power Plant Loop to GS project segment.				
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.925264 N. Latitude
Section 1/4 Section		m		-116.481271 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, agriculture, livestock	
Offsite influences: Access roads, power lines, mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 2.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_4*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(473) Assign 17 indicator ratings, record comments and any measurements. (474) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (475) Assign overall rating for each attribute based on preponderance of evidence. (476) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *10* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of dominant perennial bunchgrasses, reduced dominant shrubs, and increased annual grasses and forbs may reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *25*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CG_4* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

709. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

710. Observe and list the F/S groups present in the evaluation area.

711. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

712. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

713. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

714. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Mustard, Prickly lettuce, Tansy mustard, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



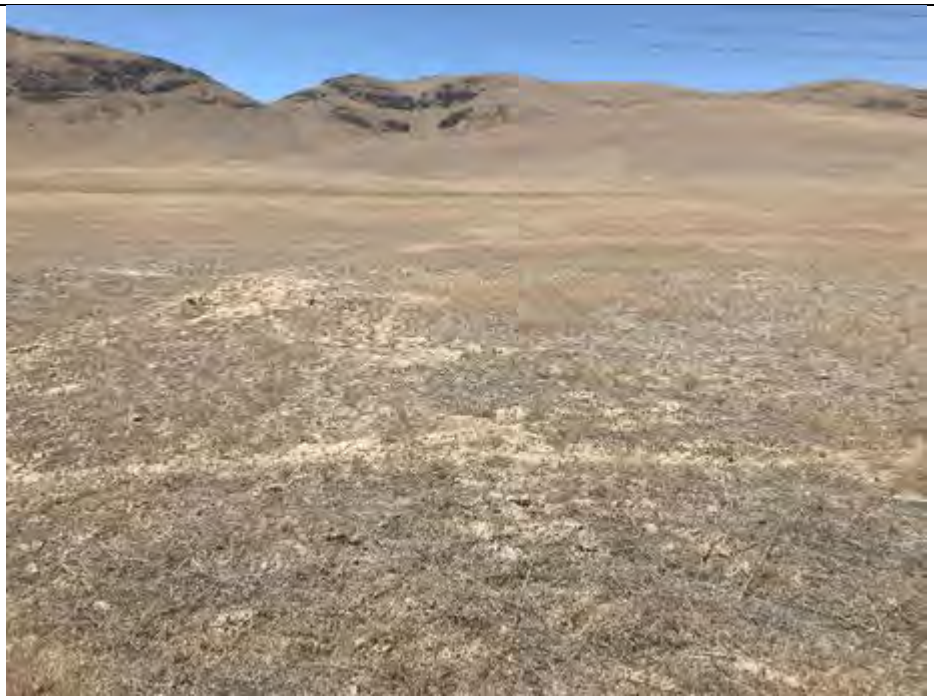
photo_N-20210629-201713.jpg



photo_E-20210629-201735.jpg



photo_S-20210629-201744.jpg



photo_W-20210629-201802.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_5*		Date: *June 29, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1517.152* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *56* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Silt Loam*		*Dry 10YR5/3; moist 10YR3/3, very dry, loose with some litter, some fine gravel, some fine dead roots*
					2	*2 - 13 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 10YR3/4, subangular structures with some fine roots, a little moist, sticky, plasticky, heavy, some fine to coarse gravel*
					3	*13 - 39 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/4, soft, friable, sticky, some gravel, roots throughout*
					4	*39 - 56 cm*	*Silty Clay*		*Dry 10YR4/4; moist 7.5YR3/4, sticky, subangular structure, some gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 2.25 miles northeast of the Goldstrike Mine, mile marker 16.1 of the Segment #2 TS Power Plant Loop to GS project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.94158 N. Latitude

Section	1/4 Section	OR	m	OR	-116.469212 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road, power lines, power plant, underground mining hydrological infrastructure, retention pond	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_5*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(477) Assign 17 indicator ratings, record comments and any measurements. (478) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (479) Assign overall rating for each attribute based on preponderance of evidence. (480) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *16* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of most functional structure groups, reduced annual and perennial forbs, and increased annual grasses may reduce infiltration and increase runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *32*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CG_5* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

715. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

716. Observe and list the F/S groups present in the evaluation area.

717. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

718. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

719. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

720. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Mustard, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210629-183713.jpg



photo_E-20210629-183725.jpg



photo_S-20210629-183740.jpg



photo_W-20210629-183752.jpg



photo_Soil-20210629-183702.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_6*		Date: *June 29, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1469.284* m	Aspect: *140°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *45* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Loam*		*Dry 10YR6/2; moist 10YR3/3; predominantly loose with some subangular structure; 25-50% fine to coarse gravel, some litter, some fine roots*
					3	*2 - 15 cm*	*Silt Loam*		*Dry 10YR5/3; moist 10YR3/4, subangular structure, slightly sticky, loose, extremely gravely; fine to coarse gravel, some fine to coarse roots throughout; lots of root pores*
					4	*15 - 45 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, loose, slightly sticky, moderate amount of fine to coarse gravel, some fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.32 miles northeast of the Goldstrike Mine, mile marker 12.6 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.896205 N. Latitude	
Section 1/4 Section		m		-116.496946 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines,	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_6*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(481) Assign 17 indicator ratings, record comments and any measurements. (482) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (483) Assign overall rating for each attribute based on preponderance of evidence. (484) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Missing perennial bunchgrasses decreases infiltration and reduces runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *35*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CG_6* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

721. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

722. Observe and list the F/S groups present in the evaluation area.

723. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

724. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

725. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

726. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210629-135035.jpg



photo_W-20210629-135045.jpg



photo_Soil-20210629-134958.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_7*		Date: *July 20, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess and volcanic ash over alluvium derived from mixed volcanic and sedimentary rock*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1510.138* m	Aspect: *140°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *56* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/3, mostly loose, some subangular granular and blocky structures.*
					2	*4 - 19 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 5YR4/3, weak subangular structures, heavy, sticky, some fine roots throughout, coarse gravel <15%*
					3	*19 - 56 cm*	*Silt Loam*		*Dry 10YR4/4; moist 10YR3/4, loose material, large blocky to subangular structure, friable, heavy, sticky, fine gravel to cobble present, tubular pores*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.85 miles northeast of the Goldstrike Mine, mile marker 15.4 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.932358 N. Latitude
Section 1/4 Section		m		-116.475897 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road, power line	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_7*		Date: *July 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(485) Assign 17 indicator ratings, record comments and any measurements. (486) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (487) Assign overall rating for each attribute based on preponderance of evidence. (488) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absence of shrubs and bunchgrasses and cheatgrass dominance likely results in severely decreased infiltration and increased runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *60*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CG_7* **Date:** *July 20, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

727. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

728. Observe and list the F/S groups present in the evaluation area.

729. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

730. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

731. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

732. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Tumble mustard, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210720-210410.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CG_8*		Date: *June 29, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1522.024* m	Aspect: *184°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silt Loam*		*Dry 10YR5/4; moist 10YR4/3, loose with some subangular structure, some coarse gravel*
					2	*5 - 42 cm*	*Silty Clay Loam*		*Dry 7.5YR5/3; moist 7.5YR3/4, subangular, friable, sticky, plastic, many fine roots, some coarse gravel*
					3	*42 - 54 cm*	*Silty Clay*		*Dry 7.5YR5/4; moist 7.5YR4/4, hard, granular, sticky, plastic, gravely; fine in size*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.03 miles northeast of the Goldstrike Mine, mile marker 16.3 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.944906 N. Latitude
Section 1/4 Section		m		-116.467079 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road, power lines, power plant, underground mining hydrological infrastructure, retention pond	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CG_8*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(489) Assign 17 indicator ratings, record comments and any measurements. (490) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (491) Assign overall rating for each attribute based on preponderance of evidence. (492) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *3* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Heavily reduced shrub cover, absence of perennial bunchgrasses, reduced perennial forbs, and increased annual grasses may all contribute to reduced infiltration and increased runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *32*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CG_8* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

733. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

734. Observe and list the F/S groups present in the evaluation area.

735. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

736. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

737. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

738. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Mustard, Pepperweed, Tansy mustard, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210629-173041.jpg



photo_W-20210629-173053.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CH_1*		Date: *July 22, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *CH*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *NA* Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.* Slope: *1°*
Elevation range: *NA* m Aspect NA (if specified):	Elevation: *1532.763* m Aspect: *270°*
Topographic position: NA	Topographic position: *Fan remnant*
Precipitation range: NA cm	Average annual precipitation: *12.98032197 in*
Seasonal precipitation distribution: NA	Seasonal precipitation distribution:
Soil depth[1]: NA	Pit depth: *54* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 7.5YR7/3; moist 7.5YR4/6, some loose material, some subangular structure, slightly sticky, gravelly, fine to coarse gravel.*
					2	*4 - 41 cm*	*Sandy Loam*		*Dry 7.5YR7/2; moist 7.5YR5/4, mostly loose, some very weak subangular structures, some durinoids, very gravelly, skeletal, fine to coarse gravel, some rock, coarse to fine roots throughout; coarse sandy loam.*
					3	*41 - 54 cm*	*Sand*		*Dry N/A; moist N/A, coarse gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.05 miles east of the town of Carlin, mile marker 2.3 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.728213 N. Latitude
Section 1/4 Section		m		-116.144743 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CH_1*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(493) Assign 17 indicator ratings, record comments and any measurements. (494) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (495) Assign overall rating for each attribute based on preponderance of evidence. (496) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *28* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absence of perennial grasses and forbs may moderately decreases infiltration within the survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CH_1* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

739. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

740. Observe and list the F/S groups present in the evaluation area.

741. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

742. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

743. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

744. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CH_2*		Date: *July 21, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CH*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *4°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1528.146* m	Aspect: *74°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/4, loose with some very weak subangular structure, fairly platy, some rock, some loose vegetative material; fine sandy loam.*
					2	*5 - 10 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/4, blocky to subangular structure, slightly sticky; fine sandy loam.*
					3	*10 - 38 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/6, subangular structure, slightly sticky, fine roots throughout , tubular pores; fine sandy loam.*
					4	*38 - 53 cm*	*Loam*		*Dry 10YR7/2; moist 10YR3/6, fine to coarse granular structure, some subangular structure, slightly sticky, hard, crusty, some roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.12 miles east of the town of Carlin, mile marker 1.8 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.719904 N. Latitude
Section 1/4 Section		m			-116.147501 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Recreation: shooting range, wildlife, livestock					
Offsite influences: Shooting range, highway, access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CH_2*		Date: *July 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(497) Assign 17 indicator ratings, record comments and any measurements. (498) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (499) Assign overall rating for each attribute based on preponderance of evidence. (500) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *3* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced shrubs, missing bunchgrasses, and increased forbs may greatly reduce infiltration within the survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *35*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CH_2* **Date:** *July 21, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

745. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

746. Observe and list the F/S groups present in the evaluation area.

747. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

748. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

749. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

750. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Prickly lettuce, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210721-190656.jpg



photo_W-20210721-190704.jpg



photo_Soil-20210721-190623.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CH_2a*		Date: *July 23, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CH*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1540.294* m	Aspect: *72°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *57* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Loam*		*Dry 10YR6/3; moist 10YR4/3, loose, dry, dense, gravely; fine to very coarse in size.*
					2	*6 - 18 cm*	*Clay*		*Dry 10YR6/3; moist 10YR3/3; weak granular structure, slightly moist, loose, plastic, very gravely - fine to medium; clay with some sand.*
					3	*18 - 29 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR3/4, strong subangular blocky, gravely, duranoids, tubular pores - some salt-lined; coarse sandy loam.*
					4	*29 - 57 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, weak subangular blocky, platy, loose, some small cobbles, some duranoids*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.62 miles southeast of the town of Carlin, mile marker 4.5 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.753594 N. Latitude
Section 1/4 Section		m		-116.154543 W. Longitude
Supplemental Information & Reference Community Phase				
Recent weather (last 2 years): Drought				
Natural disturbance type(s) and date(s): NA				
Land treatment type(s) and date(s): NA				
Wildlife, livestock, recreation, or other uses: Wildlife, livestock				
Offsite influences: Residual mining activity, power lines				
Photos taken? Yes	Quantitative data collected: No			
F/S groups worksheet completed? Yes				
Reference community phase/description[3]: 4.2 Community Phase				

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CH_2a*		Date: *July 23, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(501) Assign 17 indicator ratings, record comments and any measurements. (502) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (503) Assign overall rating for each attribute based on preponderance of evidence. (504) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *11* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Missing perennial bunchgrasses and forbs, likely slightly reducing infiltration and increasing runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *21*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_CH_2a* **Date:** *July 23, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

751. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

752. Observe and list the F/S groups present in the evaluation area.

753. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

754. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

755. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

756. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210723-195745.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CH_3*		Date: *July 22, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CH*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1533.461* m	Aspect: *56°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *22* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Silty Clay Loam*		*Dry 10YR7/2; moist 10YR4/2, platy, friable, slightly sticky, effervescent*
					2	*8 - 22 cm*	*Sandy Clay Loam*		*Dry 10YR7/2; moist 10YR3/6, platy, subangular, blocky structures, gravelly, fine to coarse gravel. Refusal at 22cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.13 miles east of the town of Carlin, mile marker 2.4 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.728646 N. Latitude
Section 1/4 Section		m		-116.146335 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CH_3*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(505) Assign 17 indicator ratings, record comments and any measurements. (506) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (507) Assign overall rating for each attribute based on preponderance of evidence. (508) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *20* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Greatly reduced bunchgrasses and forbs may slightly decrease infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CH_3* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

757. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

758. Observe and list the F/S groups present in the evaluation area.

759. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

760. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

761. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

762. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass		
Cool-season perennial grasses		
Annual forbs		
Sprouting succulent		
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*	
Number of expected F/S groups present[2] in evaluation area:		*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:		*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CH_4*		Date: *July 22, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CH*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *N/A°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1516.736* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, loose, large subangular structure, slightly sticky, some fine gravel, fine roots throughout, litter mixed in*
					2	*9 - 21 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, some weak subangular structure, very friable, slightly sticky, some gravel, roots throughout*
					3	*21 - 58 cm*	*Loamy Sand*		*Dry 10YR5/3; moist 10YR3/3, weak subangular structure, firm in profile, very friable, gravelly (~20%), fine to coarse gravel, coarse roots, tubular pores*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.98 miles east of the town of Carlin, mile marker 1.9 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.721779 N. Latitude

Section 1/4 Section	OR	m	OR	-116.145051 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Recreation: shooting range, wildlife, livestock	
Offsite influences: Access roads, shooting range, highway	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CH_4*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(509) Assign 17 indicator ratings, record comments and any measurements. (510) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (511) Assign overall rating for each attribute based on preponderance of evidence. (512) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *18* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Severely reduced shrubs and grasses, with increased annual forbs and bare ground may greatly reduce infiltration within the survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CH_4* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

763. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

764. Observe and list the F/S groups present in the evaluation area.

765. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

766. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

767. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

768. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210722-134125.jpg



photo_S-20210722-134132.jpg



photo_W-20210722-134144.jpg



photo_Soil-20210722-134048.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *CH_5*		Date: *July 23, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *CH*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1556.909* m	Aspect: *8°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Silt Loam*		*Dry 10YR6/2; moist 10YR3/4, some very weak large subangular structures, platy, slightly sticky, fine to coarse gravelly, lots of fine roots*
					2	*7 - 17 cm*	*Silty Clay Loam*		*Dry 7.5YR6/3; moist 7.5YR3/4, weak blocky structure, slightly sticky, slightly plastic, gravelly fine to medium, fine roots throughout*
					3	*17 - 55 cm*	*Sandy Clay Loam*		*Dry 7.5YR6/3; moist 7.5YR4/3, fine to coarse granular structure, some subangular structures, gravelly fine to coarse, fine and coarse roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.			
Location description/directions: Approximately 2.97 miles southeast of the town of Carlin, mile marker 4.6 of the Carlin to GQ Private Bush Street project segment.			
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range		m	40.755824 N. Latitude

Section	1/4 Section	OR	m	OR	-116.161937 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Mine	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *CH_5*		Date: *July 23, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(513) Assign 17 indicator ratings, record comments and any measurements. (514) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (515) Assign overall rating for each attribute based on preponderance of evidence. (516) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *17* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decreases in bunchgrasses and forbs may slightly decrease infiltration within the survey area. .*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *18*% Depth: *2 cm*	H B	
15. Annual production: Observed: ÷ Expected = %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *CH_5* **Date:** *July 23, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

769. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

770. Observe and list the F/S groups present in the evaluation area.

771. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

772. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

773. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

774. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210723-192726.jpg



photo_S-20210723-192732.jpg



photo_W-20210723-192741.jpg



photo_Soil-20210723-192709.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Cr_1*		Date: *June 25, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Cr*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess over alluvium derived from mixed rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1421.721* m	Aspect: *316°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Silty Clay*		*Dry 10YR6/2; moist 10YR3/3, slightly effervescent, some litter and fine gravel throughout, fibrous roots*
					2	*8 - 31 cm*	*Clay*		*Dry N/A; moist 10YR3/3, moist, subangular blocky, fine to medium gravel, fibrous roots throughout; clay with small amount of sand*
					3	*31 - 53 cm*	*Clay Loam*		*Dry N/A; moist - 10YR3/4, moist, subangular, blocky, fine gravel throughout, lots of fibrous roots with salt coating*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.2 miles south of the TS Power Plant, mile marker 7.0 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.816377 N. Latitude
Section 1/4 Section		m		-116.490424 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, substation	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 2.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Cr_1*		Date: *June 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(517) Assign 17 indicator ratings, record comments and any measurements. (518) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (519) Assign overall rating for each attribute based on preponderance of evidence. (520) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Missing perennial bunchgrasses and forbs, which may reduce infiltration and increase runoff.*
11. Compaction layer	S H B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *21*% Depth: *2 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Cr_1* **Date:** *June 25, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

775. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

776. Observe and list the F/S groups present in the evaluation area.

777. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

778. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

779. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

780. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Burning bush*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210625-191037.jpg



photo_E-20210625-191023.jpg



photo_S-20210625-191048.jpg



photo_W-20210625-191100.jpg



photo_Soil-20210625-190951.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Cr_2*		Date: *July 19, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Cr*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess over alluvium derived from mixed rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1492.023* m	Aspect: *185°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, subangular blocky, slightly effervescent, friable, dry, litter, some fine roots, gravely from fine to medium*
					2	*10 - 34 cm*	*Sandy Clay*		*Dry 19YR5/4; moist 10YR3/4, subangular blocky, slightly sticky, very plastic, some fibrous roots, some fine to medium gravel throughout, some tubular pores*
					3	*34 - 51 cm*	*Clay Loam*		*Dry 10YR6/4; moist 10YR3/4, weak subangular blocky, slightly moist, plastic, some fine to medium gravel, slightly porous*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.82 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR		40.69918 N. Latitude
Section 1/4 Section		m			-116.132014 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, anthropogenic use - access roads	
Offsite influences: Access roads, underground pipeline, railroad tracks, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Cr_2*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(521) Assign 17 indicator ratings, record comments and any measurements. (522) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (523) Assign overall rating for each attribute based on preponderance of evidence. (524) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced shrubs and perennial bunchgrasses likely result in a slight decrease in infiltration and increase in runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *38*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Cr_2* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

781. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

782. Observe and list the F/S groups present in the evaluation area.

783. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

784. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

785. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

786. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Common purslane, Mustard, Russian thistle, Scotch thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210719-132415.jpg



photo_E-20210719-132424.jpg



photo_S-20210719-132434.jpg



photo_W-20210719-132442.jpg



photo_Soil-20210719-132357.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *Do_1*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *Do*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Volcanic ash and alluvium derived from volcanic rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1410.778* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Floodplain; flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Sandy Loam*		*Dry 10YR7/1; moist 10YR4/4, some subangular and effervescent structure, loose, dry, slightly sticky, slightly plastic, some fine roots; fine sandy loam*
					2	*7 - 21 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 10YR4/4, some subangular structure, loose, friable and dry, slightly sticky, slightly plastic, some fine to slightly more coarse roots throughout; fine sandy clay loam*
					3	*21 - 42 cm*	*Loamy Sand*		*Dry 10YR6/3; moist 10YR4/4, weak subangular structure, loose, friable, heavy, some coarse roots*
					4	*42 - 60 cm*	*Loamy Sand*		*Dry 10YR6/3; moist 10YR4/3, friable, loose, granular structure, slightly sticky*

Evaluation Area Location
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the TS Power Plant, mile marker 0.4 of the Segment #2 TS Power Plant Loop to GS project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.739248 N. Latitude
Section 1/4 Section		m			-116.518127 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Power plant, access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Do_1*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(525) Assign 17 indicator ratings, record comments and any measurements. (526) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (527) Assign overall rating for each attribute based on preponderance of evidence. (528) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *7* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial bunchgrasses my reduce infiltration; potentially offset by increased shrubs*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *15*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Do_1* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

787. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

788. Observe and list the F/S groups present in the evaluation area.

789. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

790. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

791. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

792. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Shadscale*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prostrate mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-142718.jpg



photo_S-20210621-142727.jpg



photo_W-20210621-142757.jpg



photo_Soil-20210621-142656.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Do_2*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Do*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in volcanic ash and alluvium derived from volcanic rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1436.354* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Floodplain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 10YR6/2; moist 10YR3/4, some weak subangular structure, blocky, micropores, slightly sticky*
					2	*4 - 27 cm*	*Silty Clay*		*Dry 10YR4/3 ; moist 10YR3/4, massive subangular weak structuring, granular*
					3	*27 - 52 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/4, subangular with some weak textures, sticky, friable, some coarse gravel; fine sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.5 miles south of the TS Power Plant, mile marker 9.5 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.850696 N. Latitude
Section 1/4 Section		m		-116.497526 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, heavy livestock use	
Offsite influences: Access roads, power plant, residual mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Do_2*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(529) Assign 17 indicator ratings, record comments and any measurements. (530) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (531) Assign overall rating for each attribute based on preponderance of evidence. (532) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *39* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*All functional structure groups greatly reduced or missing*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *48*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Do_2* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

793. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

794. Observe and list the F/S groups present in the evaluation area.

795. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

796. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

797. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

798. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210628-175813.jpg



photo_S-20210628-175824.jpg



photo_W-20210628-175835.jpg



photo_Soil-20210628-175747.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Do_3*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Do*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Volcanic ash and alluvium derived from volcanic rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1411.268* m	Aspect: *320°*
Topographic position: NA		Topographic position: *Floodplain; flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR4/3, top 0.5 cm consists of salt crust, effervescent throughout, platy structures, prismatic, very sticky, plastic*
					2	*5 - 10 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR4/4, subangular structure, dry, sticky*
					3	*10 - 30 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR4/3, subangular structure, heavy, some weak duranoids, sticky, no roots*
					4	*30 - 53 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR4/4, loose, friable, dry, heavy, slightly sticky, few roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the TS Power Plant, mile marker 0.6 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.738884 N. Latitude
Section 1/4 Section		m		-116.514053 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Do_3*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(533) Assign 17 indicator ratings, record comments and any measurements. (534) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (535) Assign overall rating for each attribute based on preponderance of evidence. (536) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lacking dominant perennial bunchgrasses.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Do_3* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

799. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

800. Observe and list the F/S groups present in the evaluation area.

801. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

802. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

803. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

804. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed, Prostrate mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-153306.jpg



photo_S-20210621-153323.jpg



photo_W-20210621-153334.jpg



photo_Soil-20210621-153244.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Do_4*		Date: *June 30, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Do*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Volcanic ash and alluvium derived from volcanic rocks*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1426.633* m	Aspect: *152°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *65* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Loam*		*Dry 10YR6/2; moist 10YR3/6, loose, some platy structure*
					2	*5 - 14 cm*	*Clay Loam*		*Dry 10YR5/3; moist 10YR3/4, platy structure, dry; fine roots throughout*
					3	*14 - 32 cm*	*Silty Clay*		*Dry 10YR5/4; moist 10YR3/6, subangular blocky structure, friable, sticky, plentiful fine roots*
					4	*32 - 65 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR5/6, weak subangular structure, friable; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.36 miles west of the TS Power Plant, mile marker 2.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.781442 N. Latitude
Section 1/4 Section		m		-116.43653 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Stock pond, pivot fields, power plant, two track running through survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Do_4*		Date: *June 30, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(537) Assign 17 indicator ratings, record comments and any measurements. (538) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (539) Assign overall rating for each attribute based on preponderance of evidence. (540) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *10* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Likely extreme lack of infiltration due to overall lack of perennial plants within the survey area*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *18*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Do_4* **Date:** *June 30, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

805. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

806. Observe and list the F/S groups present in the evaluation area.

807. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

808. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

809. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

810. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *2.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Burning bush, Poverty weed*
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210630-164048.jpg



photo_W-20210630-164111.jpg



photo_Soil-20210630-164104.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *Do_5*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *Do*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in volcanic ash and alluvium derived from volcanic rock*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1432.993* m	Aspect: *284°*
Topographic position: NA		Topographic position: *Floodplain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *37* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Silt Loam*		*Dry 10YR5/2; moist 10YR3/3; loose with some subangular structure, dry, roots, debris*
					2	*6 - 22 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/4; weak subangular texture, loose, slightly sticky, some fine roots*
					3	*22 - 37 cm*	*Silt Loam*		*Dry 10YR6/3; moist 10YR4/4, weak subangular structure, some fine gravel, sticky, some fine roots*
					4	*37 - 24 cm*	*Silt Loam*		*Dry 10YR6/2; moist 10YR4/4, some dry hardened subangular structures, fine, friable, some fine roots*

Evaluation Area Location				
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.				
Location description/directions: Approximately 4.11 miles south of the TS Power Plant, mile marker 9.1 of the Segment #2 TS Power Plant Loop to GS project segment.				
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.845043 N. Latitude
Section 1/4 Section		m		-116.497189 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power plant, substation	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Do_5*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(541) Assign 17 indicator ratings, record comments and any measurements. (542) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (543) Assign overall rating for each attribute based on preponderance of evidence. (544) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack in shrub diversity, missing perennial bunchgrasses and forbs, and increased annual grasses and forbs*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *42*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Do_5* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

811. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

812. Observe and list the F/S groups present in the evaluation area.

813. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

814. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

815. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

816. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210628-142146.jpg



photo_S-20210628-142157.jpg



photo_W-20210628-142209.jpg



photo_Soil-20210628-142125.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Do_6*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Do*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in volcanic ash and alluvium derived from volcanic rock*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1434.518* m	Aspect: *90°*
Topographic position: NA		Topographic position: *Floodplain; alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Silty Clay Loam*		*Dry 10YR4/3; moist 7.5YR2.5/3, loose with some subangular structure, many fine dead roots*
					2	*6 - 34 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 10YR3/4, subangular blocky structure, heavy, sticky, friable, loose, fine root materials*
					3	*34 - 58 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/4, subangular, granular, blocky, hard, friable, slightly sticky, more defined duripan or silica layer*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 4.33 miles south of the TS Power Plant, mile marker 9.3 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.848139 N. Latitude
Section 1/4 Section		m		-116.49715 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, some mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Do_6*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(545) Assign 17 indicator ratings, record comments and any measurements. (546) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (547) Assign overall rating for each attribute based on preponderance of evidence. (548) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *35* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Heavy reduction in shrubs, nearly total reduction in perennial grasses and forbs, reduced annual forbs and grasses*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *45*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Do_6* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

817. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

818. Observe and list the F/S groups present in the evaluation area.

819. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

820. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

821. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

822. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *2.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Brown-eyed primrose, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210628-151754.jpg



photo_W-20210628-151808.jpg



photo_Soil-20210628-151723.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Dp_1*		Date: *June 8, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Dp*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Volcanic ash and alluvium derived from volcanic rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1436.518* m	Aspect: *12°*
Topographic position: NA		Topographic position: *Floodplain; flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *64* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/4, loose, granular, weak platy structure; fine sandy loam*
					2	*3 - 16 cm*	*Loamy Sand*		*Dry 10YR5/3; moist 10YR4/3, weak platy structure, relatively loose*
					3	*16 - 44 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/4, subangular blocky structure, tubular pores, fine roots; fine sandy clay loam*
					4	*44 - 64 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR 3/4, subangular blockiness, fine roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.86 miles north of the town of Beowawe, mile marker 31.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.570209 N. Latitude
Section 1/4 Section		m		-116.463713 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Highway, access road, and railroad within close proximity.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Dp_1*		Date: *June 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(549) Assign 17 indicator ratings, record comments and any measurements. (550) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (551) Assign overall rating for each attribute based on preponderance of evidence. (552) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *9* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial grasses may contribute to less infiltration, some increased runoff through bare ground exposure.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *18*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Dp_1* **Date:** *June 8, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

823. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

824. Observe and list the F/S groups present in the evaluation area.

825. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

826. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

827. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

828. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210608-193114.jpg



photo_S-20210608-193121.jpg



photo_W-20210608-193128.jpg



photo_Soil-20210608-193141.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Dp_2*		Date: *June 8, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Dp*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Volcanic ash and alluvium derived from volcanic rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1436.174* m	Aspect: *12°*
Topographic position: NA		Topographic position: *Floodplain; flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR4/4, effervescent, platy structure; fine sandy loam*
					2	*6 - 12 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR3/4, N/A*
					3	*12 - 23 cm*	*Sandy Clay Loam*		*Dry 10YR5/3, moist N/A some fine gravel throughout. Fine sandy clay loam.*
					4	*23 - 54 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR5/3, heavy texture; fine sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.8 miles north of the town of Beowawe, mile marker 31.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.571116 N. Latitude
Section 1/4 Section		m		-116.463411 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Highway, access road, and railroad within close proximity.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Dp_2*		Date: *June 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(553) Assign 17 indicator ratings, record comments and any measurements. (554) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (555) Assign overall rating for each attribute based on preponderance of evidence. (556) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *11* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lacking presence of perennial grasses within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *N/A*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Dp_2* **Date:** *June 8, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

829. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

830. Observe and list the F/S groups present in the evaluation area.

831. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

832. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

833. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

834. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Dp_2a*		Date: *July 22, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Dp*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in volcanic ash and alluvium derived from volcanic rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1416.846* m	Aspect: *297°*
Topographic position: NA		Topographic position: *Flood plains*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular blocky, slightly effervescent, some litter, loose, dry, very sticky, plastic, some fibrous roots, fine gravel throughout*
					2	*8 - 51 cm*	*Sandy Clay Loam*		*Dry N/A; moist 10YR3/6, subangular blocky, moist, some fine roots, fine gravel throughout; coarse sandy clay loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.84 miles west of the TS Power Plant, mile marker 4.9 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.786906 N. Latitude
Section 1/4 Section		m		-116.484725 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, coal processing plant, substation	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Dp_2a*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(557) Assign 17 indicator ratings, record comments and any measurements. (558) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (559) Assign overall rating for each attribute based on preponderance of evidence. (560) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *14* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration likely slightly reduced due to decreased perennial bunchgrasses and absent perennial forbs*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *2*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Dp_2a* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

835. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

836. Observe and list the F/S groups present in the evaluation area.

837. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

838. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

839. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

840. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Four-wing saltbush, Saltbush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Dp_3*		Date: *June 9, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Dp*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Volcanic ash and alluvium derived from volcanic rocks*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1438.483* m	Aspect: *16°*
Topographic position: NA		Topographic position: *Floodplain; flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *46* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/3, loose, weak platy structure, tubular pores, fine roots present throughout; fine sandy loam*
					2	*5 - 14 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, fine roots throughout; fine sandy clay loam*
					3	*14 - 38 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/4, granular with some subangular blockiness, hard texture; fine sandy clay loam*
					4	*38 - 46 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/4, very hard surface present; coarse sandy clay loam. Refusal at 46cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.88 miles north of the town of Beowawe, mile marker 31.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.569872 N. Latitude	
Section 1/4 Section		m		-116.464671 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Highway, access roads, and railroad all within close proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Dp_3*		Date: *June 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(561) Assign 17 indicator ratings, record comments and any measurements. (562) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (563) Assign overall rating for each attribute based on preponderance of evidence. (564) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lack of perennial grasses within survey site and increase presence of annual forbs and grasses may contribute to overall lack of infiltration*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *17*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Dp_3* **Date:** *June 9, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

841. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

842. Observe and list the F/S groups present in the evaluation area.

843. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

844. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

845. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

846. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



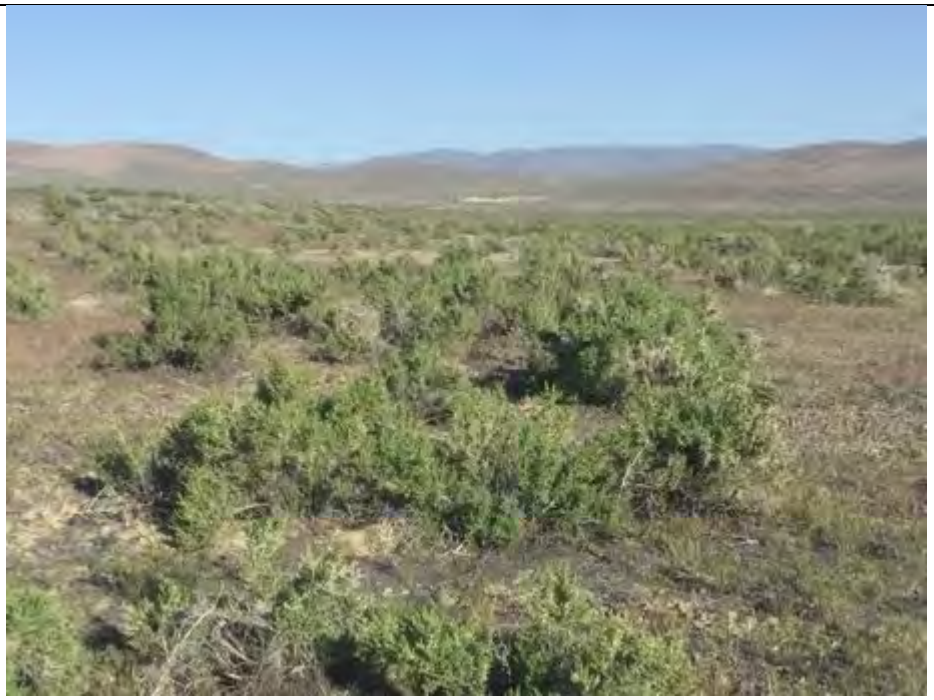
photo_N-20210609-141005.jpg



photo_E-20210609-141010.jpg



photo_S-20210609-141016.jpg



photo_W-20210609-141021.jpg



photo_Soil-20210609-141046.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ge_1*		Date: *June 29, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Dry Floodplain*	Ecological site ID: *R024XY006NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/17/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ge*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash*	Slope range: *0-2%*	Parent material: *Loess high in volcanic ash over alluvium derived from mixed rocks*	Slope: *1°*
Elevation range: *1189 - 1524* m	Aspect NA (if specified):	Elevation: *1463.2* m	Aspect: *320°*
Topographic position: Valley bottoms, fan skirts, intermittent drainageways		Topographic position: *Fan remnant*	
Precipitation range: 0.15 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution:		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 10 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, granular, some fine litter present, gravely; fine to coarse in size*
					2	*10 - 50 cm*	*Sandy Clay*		*Dry 10YR6/3, moist 10YR3/3, subangular blocky structure, hard, gravelly; coarse sandy clay*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.76 miles northeast of the Goldstrike Mine, mile marker 12.0 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.888083 N. Latitude
Section 1/4 Section		m		-116.497254 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Rangeland, wildlife	
Offsite influences: Access road, pivot fields, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ge_1*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(565) Assign 17 indicator ratings, record comments and any measurements. (566) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (567) Assign overall rating for each attribute based on preponderance of evidence. (568) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *M*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Lack of perennial bunchgrasses to aid in infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *45*% Depth: *2 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected for site						*Lack of infiltration due to lack of perennial grasses.*						*Invasive annuals are now dominant at the survey site.*
0	0	1	0	9		1	0	1	1	7		4	0	1	1	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Ge_1* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

847. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

848. Observe and list the F/S groups present in the evaluation area.

849. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

850. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

851. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

852. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Dry Floodplain*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Storksbill*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210629-170445.jpg



photo_E-20210629-170451.jpg



photo_S-20210629-170456.jpg



photo_W-20210629-170501.jpg



photo_Soil-20210629-170514.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ge_2*		Date: *June 29, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Dry Floodplain*	Ecological site ID: *R024XY006NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/17/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ge*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash*	Slope range: *0-2%*	Parent material: *Loess high in volcanic ash over alluvium derived from mixed rocks*	Slope: *1°*
Elevation range: *1189 - 1524* m	Aspect NA (if specified):	Elevation: *1464.443* m	Aspect: *345°*
Topographic position: Valley bottoms, fan skirts, intermittent drainageways		Topographic position: *Fan remnant*	
Precipitation range: 0.15 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution:		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *47* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 10 cm*	*Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, dry, gravelly, fine litter throughout*
					2	*10 - 34 cm*	*Sandy Clay*		*Dry 10YR6/3; moist 10YR3/3, subangular blocky texture, slightly sticky, slightly moist, some gravel*
					3	*34 - 47 cm*	*Sandy Clay*		*Dry 10YR6/3; moist 10YR3/3, subangular blocky texture, hard, small cobbles present*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.65 miles northeast of the Goldstrike Mine, mile marker 12.2 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.890109 N. Latitude	
Section 1/4 Section		m		-116.497132 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Rangeland, wildlife	
Offsite influences: Access road, pivot fields, power plant, ranch	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ge_2*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(569) Assign 17 indicator ratings, record comments and any measurements. (570) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (571) Assign overall rating for each attribute based on preponderance of evidence. (572) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Total lack of perennial plants that aid in infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *40*% Depth: *2 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected						*Increased runoff and decreased infiltration due to the lack of perennial functional structure groups*						*Annual mustards and cheatgrass are dominant*
0	0	0	1	9		1	0	0	2	7		3	1	0	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Ge_2* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

853. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

854. Observe and list the F/S groups present in the evaluation area.

855. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

856. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

857. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

858. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Dry Floodplain*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210629-175223.jpg



photo_S-20210629-175229.jpg



photo_W-20210629-175235.jpg



photo_Soil-20210629-175246.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Is_1*		Date: *June 24, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Sodic Terrace 6-8 P.Z.*	Ecological site ID: *R024XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Is*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium, derived of mixed rock*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1415.316* m	Aspect: *225°*
Topographic position: NA		Topographic position: *Alluvial fan; playa*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *63* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR4/4, subangular, blocky, effervescent, moist, sticky*
					2	*7 - 38 cm*	*Clay*		*Dry 10YR5/3; moist 10YR4/4, subangular blocky, slightly porous, fibrous and medium roots*
					3	*38 - 63 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR4/4, subangular, slightly blocky, slightly porous, moist, fibrous and medium roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.81 miles west of the TS Power Plant, mile marker 4.1 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.775891 N. Latitude
Section 1/4 Section		m		-116.485134 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, Livestock	
Offsite influences: Access roads, power lines, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *ls_1*		Date: *June 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(573) Assign 17 indicator ratings, record comments and any measurements. (574) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (575) Assign overall rating for each attribute based on preponderance of evidence. (576) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *10* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration likely appropriate for site.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *13*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_ls_1* **Date:** *June 24, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

859. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

860. Observe and list the F/S groups present in the evaluation area.

861. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

862. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

863. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

864. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Sodic Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Broad-leaved pepperweed*
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210624-175251.jpg



photo_W-20210624-175300.jpg



photo_Soil-20210624-175215.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_1*		Date: *June 25, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in alluvium derived from mixed rocks with a component of loess and volcanic ash over lacustrine deposits or alluvium*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1424.17* m	Aspect: *10°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *53* cm	

Type and depth of diagnostic horizons:				in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/4, subangular, blocky, slightly effervescent, some litter, gravely from fine to very coarse; coarse sandy loam*
					2	*9 - 53 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular, blocky, dry, gravely; fine to coarse in size; very few fibrous roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.63 miles south of the TS Power Plant, mile marker 7.6 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.823524 N. Latitude
Section 1/4 Section		m		-116.496615 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, canal, substation	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_1*		Date: *June 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(577) Assign 17 indicator ratings, record comments and any measurements. (578) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (579) Assign overall rating for each attribute based on preponderance of evidence. (580) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Missing perennial bunchgrasses and perennial forbs from functional structure groups*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *40*% Depth: *2 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils as expected.						*Decrease in perennial bunchgrasses and an increase in annual forbs may alter infiltration and runoff*						*Missing perennial bunchgrasses and perennial forbs, significant increase in annual forbs and grasses*
0	1	0	0	9		0	2	0	0	8		0	2	2	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_1* **Date:** *June 25, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

865. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

866. Observe and list the F/S groups present in the evaluation area.

867. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

868. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

869. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

870. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210625-204038.jpg



photo_E-20210625-204052.jpg



photo_S-20210625-204101.jpg



photo_W-20210625-204115.jpg



photo_Soil-20210625-204002.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_2*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash over lacustrine deposits or alluvium*	Slope: *No slope°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1435.447* m	Aspect: *NA°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *57* cm	

Type and depth of diagnostic horizons:					in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff[2]	Other		Soil horizon	Depth	Texture	Eff[2]	Other
						1	*0 - 8 cm*	*Loam*		*Dry 10YR5/3; moist 10YR4/4, loose subangular structure, friable, sticky, some litter, some fine root material*
						2	*8 - 31 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR3/4, weak subangular structures, very friable, sticky, some root material*
						3	*31 - 45 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 7.5YR4/3, slightly granular, very friable, loose; fine sandy loam*
						4	*45 - 57 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular, granular, hard, duranoids, dry, friable*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 4.4 miles south of the TS Power Plant, mile marker 9.4 of the Segment #2 TS Power Plant Loop to GS project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.849253 N. Latitude
Section 1/4 Section			m		-116.497818 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, heavy livestock use					
Offsite influences: Access road, power lines, mining activity					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 2.3 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_2*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(581) Assign 17 indicator ratings, record comments and any measurements. (582) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (583) Assign overall rating for each attribute based on preponderance of evidence. (584) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *43* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Lacking shrubs, deep-rooted bunchgrasses and forbs provides potential for reduced infiltration and increased runoff*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *N-S*		
c. Number of F/S groups: *E-T*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *45*% Depth: *2 cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Increased bare ground due to heavy grazing and absent and reduced f/s groups						*Greatly reduced infiltration and increased runoff due to absent and reduced functional structure groups*						*All functional structure groups absent and almost completely reduced*
0	0	1	0	9		1	1	1	0	7		4	1	0	1	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_2* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

871. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

872. Observe and list the F/S groups present in the evaluation area.

873. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

874. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

875. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

876. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210628-162212.jpg



photo_S-20210628-162223.jpg



photo_W-20210628-162234.jpg



photo_Soil-20210628-162137.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_3*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess/volcanic ash*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1425.676* m	Aspect: *355°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 13 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, friable, some fine gravel, fibrous roots and fine litter throughout; coarse sandy clay loam*
					2	*13 - 39 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR2/2, slightly moist, subangular blocky texture, some fine gravel, some fibrous to medium roots*
					3	*39 - 52 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, granular with some subangular blockiness*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.98 miles south of the TS Power Plant, mile marker 7.9 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.828664 N. Latitude
Section 1/4 Section		m		-116.497727 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_3*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(585) Assign 17 indicator ratings, record comments and any measurements. (586) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (587) Assign overall rating for each attribute based on preponderance of evidence. (588) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Moderate to extreme loss of perennial plant community within survey area has potentially lead to severe reduction in infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *M-E*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *40*% Depth: *1 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected for site, although likely some disturbance occurring.						*Extreme lack of infiltration due to lack of dominant and subdominant functional structure groups.*						*Near total dominance from functional structure groups not expected at the site.*
0	0	0	0	10		0	1	1	0	8		4	0	1	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_3* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

877. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

878. Observe and list the F/S groups present in the evaluation area.

879. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

880. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

881. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

882. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210628-155316.jpg



photo_S-20210628-155323.jpg



photo_W-20210628-155330.jpg



photo_Soil-20210628-155353.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_4*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess/volcanic ash*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1452.254* m	Aspect: *356°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR2/2, friable, gravelly, litter and fine roots throughout; coarse sandy clay loam*
					2	*5 - 19 cm*	*Sandy Clay*		*Dry 10YR6/3, moist 10YR3/3, subangular blocky structure, gravelly; coarse to fine in size, some cobbles present*
					3	*19 - 52 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/3, slightly moist, gravelly; medium to coarse, some cobbles; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.15 miles south of the TS Power Plant, mile marker 11.1 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.874616 N. Latitude
Section 1/4 Section		m		-116.504715 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant, pivot fields, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_4*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(589) Assign 17 indicator ratings, record comments and any measurements. (590) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (591) Assign overall rating for each attribute based on preponderance of evidence. (592) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *S-M*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *M*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Extreme lack of vegetation to aid in any infiltration,.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *70*% Depth: *N/A cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soil loss from lack of vegetative cover.						*Severe lack of infiltration due to lack of perennial plants and shrub cover.*						*Cheatgrass and annual mustards are the dominant species now.*
0	0	2	1	7		1	1	2	0	6		4	1	1	0	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_4* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

883. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

884. Observe and list the F/S groups present in the evaluation area.

885. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

886. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

887. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

888. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



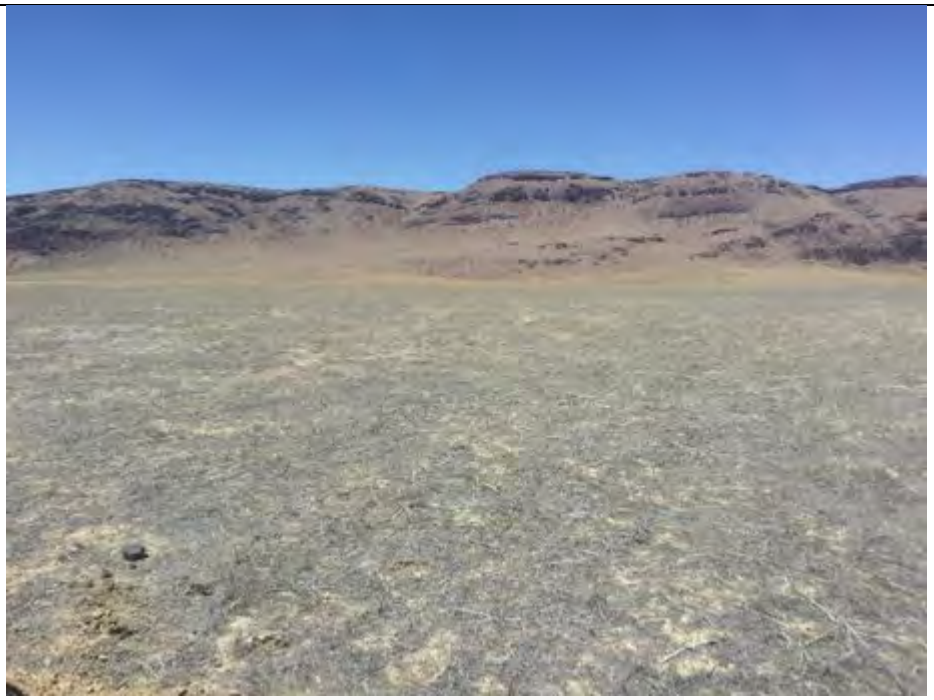
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photo_S-20210628-195055.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_5*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/21/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess/volcanic ash*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1445.719* m	Aspect: *354°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *44* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Clay Loam*		*Dry 10YR5/7; moist 10YR3/3, slightly platy structure, gravelly, fine roots and litter*
					2	*7 - 44 cm*	*Sandy Clay*		*Dry 10YR6/3; moist 10YR4/3, subangular blockiness, slightly moist, slightly porous, large cobbles throughout, some fine to coarse gravel. Refusal at 44 cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.45 miles south of the TS Power Plant, mile marker 10.4 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.864511	N. Latitude
Section 1/4 Section		m		-116.500772	W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Pivot fields, access road, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_5*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(593) Assign 17 indicator ratings, record comments and any measurements. (594) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (595) Assign overall rating for each attribute based on preponderance of evidence. (596) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Likely moderate to extreme reduction in infiltration within survey area due to general lack of healthy perennial grasses and extreme lack of shrub cover*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *40*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_5* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

889. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

890. Observe and list the F/S groups present in the evaluation area.

891. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

892. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

893. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

894. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



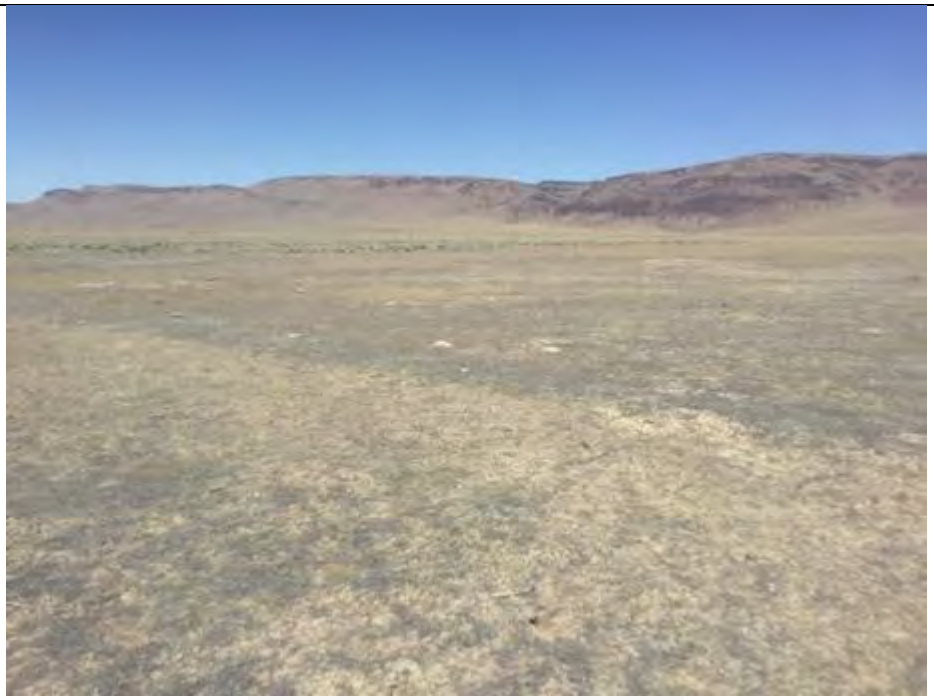
photo_N-20210628-173713.jpg



photo_E-20210628-173718.jpg



photo_S-20210628-173723.jpg



photo_W-20210628-173728.jpg



photo_Soil-20210628-173735.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_6*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess/volcanic ash*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1424.465* m	Aspect: *350°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 11 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, subangular blockiness, slightly effervescent, dry*
					2	*11 - 23 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR3/3, subangular blocky structure, slightly porous, fibrous roots throughout*
					3	*23 - 52 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, subangular blockiness, some small fibrous roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.74 miles south of the TS Power Plant, mile marker 7.7 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.825182 N. Latitude	
Section 1/4 Section		m		-116.497604 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_6*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(597) Assign 17 indicator ratings, record comments and any measurements. (598) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (599) Assign overall rating for each attribute based on preponderance of evidence. (600) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *9* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *S-M*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Extreme lack of infiltration due to complete lack of sagebrush and perennial bunchgrasses within survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *55*% Depth: *1 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Significant disturbance within survey area. Soils have been affected by disturbance.						*Extreme lack of infiltration within survey area due to the lack of perennial functional structure groups.*						*Complete lack of dominant and sub dominant perennial functional structure groups and high presence of annual forbs.*
0	0	0	1	9		1	0	1	0	8		4	0	1	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_6* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

895. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

896. Observe and list the F/S groups present in the evaluation area.

897. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

898. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

899. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

900. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210628-144237.jpg



photo_W-20210628-144244.jpg



photo_Soil-20210628-144306.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_7*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess/volcanic ash*	Slope: *2°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1450.687* m	Aspect: *60°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *15* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 15 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist N/A, extremely gravelly; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.97 miles south of the TS Power Plant, mile marker 10.9 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.872085 N. Latitude
Section 1/4 Section		m		-116.505027 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Agriculture, livestock

Offsite influences: Pivot fields, power plant, access road

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 4.1 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_7*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(601) Assign 17 indicator ratings, record comments and any measurements. (602) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (603) Assign overall rating for each attribute based on preponderance of evidence. (604) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *M*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Slight lack of infiltration due to lack of shrub cover*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *M-E* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *40*% Depth: *2 cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *M*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Potential effects of disturbance from agricultural use.						*Lack of infiltration due to lack of shrub cover. Artificial watering likely plays a role in hydrology within the survey site as well.*						*Extreme disturbance in biotic community due to agricultural use. Lack of diversity.*
0	0	1	0	9		0	1	1	1	7		0	3	2	1	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_7* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

901. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

902. Observe and list the F/S groups present in the evaluation area.

903. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

904. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

905. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

906. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	*Cultivated hay*
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



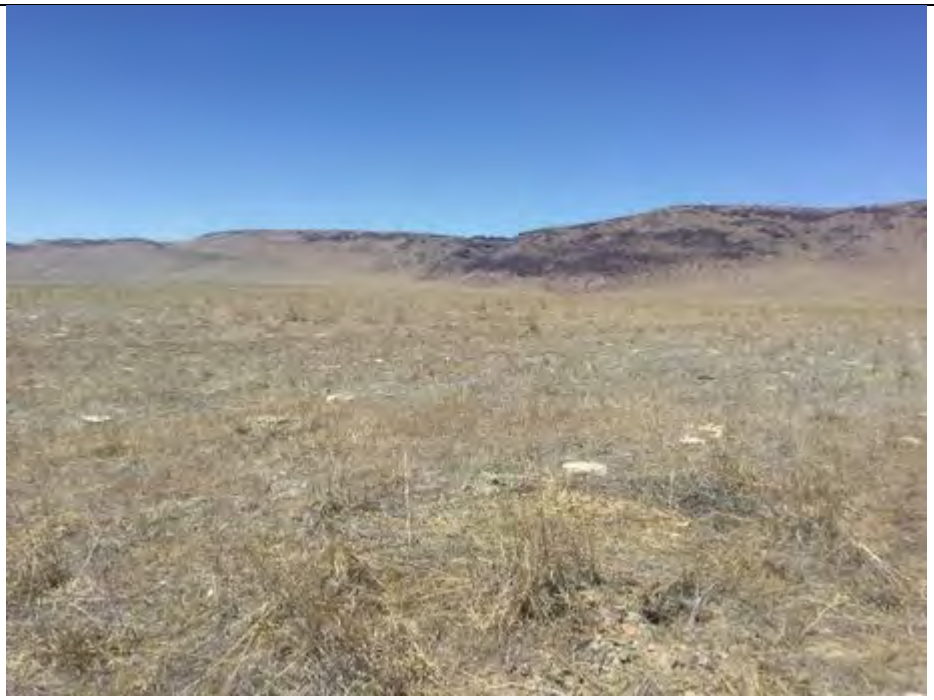
photo_N-20210628-184944.jpg



photo_E-20210628-184952.jpg



photo_S-20210628-184959.jpg



photo_W-20210628-185007.jpg



photo_Soil-20210628-185021.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_8*		Date: *June 29, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess/volcanic ash*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1444.277* m	Aspect: *320°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *49* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 11 cm*	*Clay Loam*		*Dry 10YR7/2, moist 10YR4/4, slightly porous, gravelly; fine to coarse in size; fibrous roots*
					2	*12 - 24 cm*	*Sandy Clay*		*Dry 10YR6/3; moist 10YR3/4 subangular blockiness, slightly sticky, gravelly, fine roots throughout*
					3	*24 - 49 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, slightly moist, gravelly; fine to coarse; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.33 miles south of the TS Power Plant, mile marker 10.3 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.862774 N. Latitude
Section 1/4 Section		m		-116.508339 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Access road, pivot fields, power plant, ranch	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_8*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(605) Assign 17 indicator ratings, record comments and any measurements. (606) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (607) Assign overall rating for each attribute based on preponderance of evidence. (608) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *21* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *M*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Moderate lack of infiltration due to lack of rooted vegetation in survey area and lack of deep rooted perennial bunchgrasses and shrub cover.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *S-M*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *45*% Depth: *N/A cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Some surface soil disturbance from wind erosion and heavy livestock use.						*Lack of infiltration due to lack of deep rooted perennial grasses and shrubs.*						*Lack of dominant and subdominant functional structure groups and increasing presence of annual grass and forbs.*
0	0	1	0	9		0	1	2	0	7		1	2	3	0	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_8* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

907. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

908. Observe and list the F/S groups present in the evaluation area.

909. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

910. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

911. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

912. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Wooly star*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210629-150433.jpg



photo_W-20210629-150441.jpg



photo_Soil-20210629-150547.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Mf_9*		Date: *June 29, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Mf*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rocks with a component of loess/volcanic ash*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1444.874* m	Aspect: *230°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, loose, dry, gravelly; fine to medium gravel, fine litter present; coarse sandy clay loam*
					2	*6 - 15 cm*	*Sandy Clay*		*Dry 10YR6/4; moist 10YR3/3, subangular blocky structure, friable, gravelly; fine to coarse, fine roots; coarse sandy clay*
					3	*15 - 52 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, subangular blocky structure, gravelly; fine to coarse gravel; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.42 miles south of the TS Power Plant, mile marker 10.4 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.864116 N. Latitude
Section 1/4 Section		m		-116.507614 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Access road, ranch, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Mf_9*		Date: *June 29, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(609) Assign 17 indicator ratings, record comments and any measurements. (610) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (611) Assign overall rating for each attribute based on preponderance of evidence. (612) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *20* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *S-M*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Moderate reduction in infiltration due to lack of deep rooted perennial bunchgrasses and shrubs.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *42*% Depth: *N/A cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Disturbance may be contributing to soil surface loss and erosion.						*Lack of infiltration due to lack of deep rooted perennials and shrubs.*						*Lack of dominant and subdominant functional structure groups within survey site.*
0	0	0	2	8		0	1	1	2	6		1	2	1	2	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Mf_9* **Date:** *June 29, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

913. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

914. Observe and list the F/S groups present in the evaluation area.

915. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

916. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

917. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

918. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Wooly star*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210629-140905.jpg



photo_W-20210629-140912.jpg



photo_Soil-20210629-140925.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ms_1*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ms*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Silty alluvium and loess over very gravelly alluvium*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1461.364* m	Aspect: *315°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 11 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, some blockiness, friable and hard, some effervescence, gravelly*
					2	*11 - 25 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, subangular blockiness, effervescent, slightly sticky, some fine to medium gravel*
					3	*25 - 52 cm*	*Sandy Clay Loam*		*Dry 10YR6/4; moist 10YR3/4, Hard, very gravelly; fine to medium in size, some fibrous roots; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.03 miles northeast of the Goldstrike Mine, mile marker 11.7 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.883018 N. Latitude
Section 1/4 Section		m		-116.496801 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Pivot fields, access road, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ms_1*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(613) Assign 17 indicator ratings, record comments and any measurements. (614) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (615) Assign overall rating for each attribute based on preponderance of evidence. (616) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *S-M*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Extreme lack of perennial bunchgrasses and shrubs to aid in infiltration*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *45*% Depth: *N/A cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected for the most part.						*Severe lack of infiltration due to lack of any perennial functional structure groups that aid in infiltration.*						*Annuals not expected at the site are now dominant in the survey area*
0	0	0	1	9		0	2	0	1	7		4	1	0	1	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ms_1* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

919. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

920. Observe and list the F/S groups present in the evaluation area.

921. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

922. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

923. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

924. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210628-211136.jpg



photo_S-20210628-211144.jpg



photo_W-20210628-211151.jpg



photo_Soil-20210628-211218.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ms_2*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ms*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in silty alluvium and loess over very gravely alluvium*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1458.625* m	Aspect: *126°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/3, loose, some subangular weak structures; fine sandy loam*
					2	*2 - 19 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR5/4, friable, subangular, dry, lots of fine roots throughout; fine sandy loam*
					3	*19 - 36 cm*	*Sandy Loam*		*Dry 7.5YR5/3; moist 7.5YR4/4, dry, subangular, friable, slightly sticky, fewer fine roots ;fine sandy loam*
					4	*36 - 60 cm*	*Sandy Loam*		*Dry 7.5YR5/4 ; moist 7.5YR4/4, subangular or granular structure, friable but harder than previous layer, sticky; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.22 miles northeast of the Goldstrike Mine, mile marker 11.5 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*			UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range		OR	m	OR	40.879677 N. Latitude
Section 1/4 Section			m		-116.496858 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, heavy livestock use					
Offsite influences: Access roads, residual mining activity, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ms_2*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(617) Assign 17 indicator ratings, record comments and any measurements. (618) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (619) Assign overall rating for each attribute based on preponderance of evidence. (620) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *9* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Lack of perennial plants, especially shrubs, decreases soil water availability and recharge, lack of bunchgrasses reduces infiltration and increases runoff*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *S-M*		
c. Number of F/S groups: *E-T*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *58*% Depth: *1 cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*S-M*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					Soils as expected for site						*Infiltration greatly reduced and runoff increased due to lack of perennial functional structure groups and increased litter from annual grasses*						*All dominant and subdominant perennial functional structure groups are nearly absent within the survey area*
0	0	0	1	9		1	1	0	1	7		3	1	0	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ms_2* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

925. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

926. Observe and list the F/S groups present in the evaluation area.

927. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

928. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

929. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

930. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210628-195632.jpg



photo_W-20210628-195643.jpg



photo_Soil-20210628-195554.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ms_3*		Date: *June 28, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ms*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in silty alluvium and loess over gravely alluvium*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1460.796* m	Aspect: *230°*
Topographic position: Alluvial fans		Topographic position: *Alluvial fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR5/2 ; moist 10YR3/3, loose, some porous subangular structure, some fine dead roots, some gravel, litter; fine sandy loam*
					2	*3 - 31 cm*	*Sandy Clay Loam*		*Dry 10YR5/2, moist 10YR4/4, hard but friable subangular structure, some platiness, some gravel, some roots; fine sandy clay loam,*
					3	*31 - 58 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 7.5YR4/4, subangular, granular, some duranoids, friable, some coarse gravel; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.11 miles northeast of the Goldstrike Mine, mile marker 11.6 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR		40.881732 N. Latitude
Section 1/4 Section		m			-116.497186 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, heavy livestock use	
Offsite influences: Access roads, power lines, historical mining infrastructure	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ms_3*		Date: *June 28, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(621) Assign 17 indicator ratings, record comments and any measurements. (622) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (623) Assign overall rating for each attribute based on preponderance of evidence. (624) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *S-M*	
5. Gullies	S | H *M-E*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Lack of perennial plants, especially shrubs, decreases soil water availability and recharge, lack of bunchgrasses reduces infiltration and increases runoff,*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *S-M*		
c. Number of F/S groups: *E-T*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *64*% Depth: *1 cm*	H B *E-T*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Greatly increased litter due to missing dominant and subdominant functional structure groups and increased annual grass and forbs						*Infiltration greatly reduced and runoff increased due to missing dominant and subdominant functional structure groups*						*Dominant and subdominant functional structure groups are largely absent and annual grass and forbs are now dominant*
0	1	0	1	8		2	1	0	1	6		5	0	0	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ms_3* **Date:** *June 28, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

931. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

932. Observe and list the F/S groups present in the evaluation area.

933. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

934. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

935. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

936. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210628-205420.jpg



photo_S-20210628-205430.jpg



photo_W-20210628-205442.jpg



photo_Soil-20210628-205350.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Od_1*		Date: *June 8, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Od*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rock, and a component of volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1435.854* m	Aspect: *65°*
Topographic position: NA		Topographic position: *Floodplain; flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Silty Clay*		*Dry 10YR7/1; moist 10YR3/3, loose, some effervescence*
					2	*5 - 11 cm*	*Silty Clay*		*Dry 10YR7/2; moist 10YR5/3, weak platy structure, fine roots throughout*
					3	*11 - 22 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist N/A, subangular blocky structure, appears dry and compacted, few fine roots*
					4	*22 - 52 cm*	*Silty Clay*		*Dry 10YR7/2; moist 10YR4/4, very hard texture, fine tubular pores, some fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.76 miles north of the town of Beowawe, mile marker 31.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.571761 N. Latitude
Section 1/4 Section		m		-116.463259 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Highway and railroad within close proximity.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Od_1*		Date: *June 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(625) Assign 17 indicator ratings, record comments and any measurements. (626) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (627) Assign overall rating for each attribute based on preponderance of evidence. (628) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *16* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Perennial grasses aid in infiltration*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *13*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Od_1* **Date:** *June 8, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

937. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

938. Observe and list the F/S groups present in the evaluation area.

939. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

940. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

941. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

942. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Poverty weed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210608-175042.jpg



photo_W-20210608-175050.jpg



photo_Soil-20210608-175059.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ok_1*		Date: *June 7, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Bottom*	Ecological site ID: *R024XY007NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ok*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Alluvium, mixed rocks, and component of volcanic ash*	Slope: *No slope°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1433.835* m	Aspect: *NA°*
Topographic position: NA		Topographic position: *Floodplain; flats*	
Precipitation range: NA cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR7/1; moist 10YR4/3, effervescent, platy structure, no roots, fine sandy loam*
					2	*3 - 9 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR4/3, loose, platy structure; fine sandy clay loam*
					3	*9 - 19 cm*	*Sandy Clay Loam*		*Dry 10YR6/4; moist 10YR4/6, weak platy structure, fine roots throughout; very fine sandy clay loam*
					4	*19 - 35 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR4/6, holding some moisture, platy structure; very fine sandy clay loam*
					5	*35 - 53 cm*	*Sandy Clay Loam*		*Dry 10YR4/4; moist 10YR3/4,some moisture present, subangular blockiness; fine sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.51 miles north of the town of Beowawe, mile marker 31.9 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.575455 N. Latitude
Section 1/4 Section			m		-116.461137 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Railroad with large access road running parallel, highway, powerlines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ok_1*		Date: *June 7, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(629) Assign 17 indicator ratings, record comments and any measurements. (630) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (631) Assign overall rating for each attribute based on preponderance of evidence. (632) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *23* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Some evidence of increased runoff within survey area.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *2*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Ok_1* **Date:** *June 7, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

943. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

944. Observe and list the F/S groups present in the evaluation area.

945. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

946. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

947. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

948. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Bottom*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210607-185126.jpg



photo_S-20210607-185131.jpg



photo_W-20210607-185138.jpg



photo_Soil-20210607-185148.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *OSB_1*		Date: *July 14, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *OSB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in loess high in volcanic ash or alluvium derived from volcanic rocks and vitric pyroclastic materials.*	Slope: *2°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1479.147* m	Aspect: *260°*
Topographic position: Alluvial fans		Topographic position: *Inset fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons:					in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff [2]	Other		Soil horizon	Depth	Texture	Eff [2]	Other
						1	*0 - 5 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, loose, dry, fine, gravelly fine to medium, a lot of fine roots throughout, some litter*
						2	*5 - 28 cm*	*Sandy Clay Loam*		*Dry 10YR6/2; moist 10YR4/4, dry, granular, slightly plastic, fine to medium gravel, some fibrous roots, slightly porous*
						3	*28 - 52 cm*	*Clay*		*Dry 10YR6/4; moist 10YR3/4, slightly moist, subangular blocky structure, very sticky, plastic, some gravel fine to coarse, some fibrous roots, porous; clay with some sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 6.19 miles west of the TS Power Plant, mile marker 5.4 of the Welches Creek Road project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.785558 N. Latitude
Section 1/4 Section			m		-116.382456 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access road					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *OSB_1*		Date: *July 14, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(633) Assign 17 indicator ratings, record comments and any measurements. (634) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (635) Assign overall rating for each attribute based on preponderance of evidence. (636) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *16* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Decrease in almost all expected dominant and subdominant functional structure groups and increase in invasive annual grass results in decreased infiltration and increased runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *E-T*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *27*% Depth: *1 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils functioning as expected for site.						*Increased runoff and decreased infiltration due to change in vegetative community.*						*Almost all expected dominant and subdominant functional structure groups are missing or severely reduced.*
0	0	0	0	10		0	1	0	1	8		4	1	0	1	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *OSB_1* **Date:** *July 14, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

949. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

950. Observe and list the F/S groups present in the evaluation area.

951. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

952. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

953. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

954. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *OSB_2*		Date: *July 14, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *OSB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed from loess high in volcanic ash over alluvium derived from mixed rocks or volcanic rocks and vitric pyroclastic materials.*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1467.015* m	Aspect: *280°*
Topographic position: Alluvial fans		Topographic position: *Inset fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 2 cm*	*Loam*		*Dry N/A; moist 10YR3/3; loose, dry, friable, fine platy, lots of litter and fine roots*
					2	*2 - 19 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/3, dry, fine subangular blocky structure, some fine to medium gravel, some fine roots, some tubular pores; very fine sandy loam*
					3	*19 - 34 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, dry, slightly sticky, plastic, subangular blocky, some fine gravel, some duranoids, some fine roots, some pores*
					4	*34 - 50 cm*	*Sandy Clay*		*Dry 10YR7/2,; moist 10YR3/3, slightly moist, slightly sticky, plastic, fine subangular blocky, gravel fine to medium, some fine roots throughout, some salt on roots; fine sandy clay*

Evaluation Area Location					
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.					
Location description/directions: Approximately 5.87 miles west of the TS Power Plant, mile marker 5.0 of the Welches Creek Road project segment.					
Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.785086 N. Latitude	
Section 1/4 Section		m		-116.388668 W. Longitude	
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access road					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *OSB_2*		Date: *July 14, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(637) Assign 17 indicator ratings, record comments and any measurements. (638) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (639) Assign overall rating for each attribute based on preponderance of evidence. (640) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *15* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Absence of most dominant and subdominant functional structure groups and an increase in invasive annual grass reduces infiltration and increases runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *E-T*		
c. Number of F/S groups: *E-T*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *34*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils functioning as expected for site.						*Increased runoff and decreased infiltration due to change in vegetative community.*						*All expected functional structure groups are missing and invasive annual grass is now dominant throughout the survey area.*
0	0	0	0	10		1	0	0	0	9		4	0	0	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_OSB_2* **Date:** *July 14, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

955. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

956. Observe and list the F/S groups present in the evaluation area.

957. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

958. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

959. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

960. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210714-183901.jpg



photo_S-20210714-183923.jpg



photo_W-20210714-183912.jpg



photo_Soil-20210714-183836.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *OSB_3*		Date: *July 14, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *OSB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed from loess high in volcanic ash or alluvium derived from volcanic rocks and vitric pyroclastic materials.*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1452.798* m	Aspect: *N/A°*
Topographic position: Alluvial fans		Topographic position: *Inset fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/2; fine, dry, loose, some fine gravel, lots of fine roots; fine sandy loam*
					2	*5 - 27 cm*	*Loam*		*Dry 10YR7/2; moist 10YR4/4, dry, compact, fine, subangular blocky structure, slightly porous, gravel; fine to coarse in size, some fine roots*
					3	*27 - 51 cm*	*Sandy Clay Loam*		*Dry 10YR7/3; moist 10YR3/4; slightly moist, loose, subangular granular, gravelly fine to medium; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.4 miles west of the TS Power Plant, mile marker 4.6 of the Welches Creek Road project segment.

Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.784728 N. Latitude

Section 1/4 Section	OR	m	OR	-116.397511 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *OSB_3*		Date: *July 14, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(641) Assign 17 indicator ratings, record comments and any measurements. (642) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (643) Assign overall rating for each attribute based on preponderance of evidence. (644) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *10* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Reduced shrubs, perennial forbs, and native grasses and increased invasive annual grass reduces infiltration and increases runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *E-T*		
c. Number of F/S groups: *E-T*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *37*% Depth: *1 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected for site.						*Increased runoff and decreased infiltration due to change in vegetative community.*						*All expected functional structure groups are missing or completely dead and invasive annual grass is dominant throughout the survey area.*
0	0	0	0	10		1	0	0	1	8		4	1	0	1	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *OSB_3* **Date:** *July 14, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

961. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

962. Observe and list the F/S groups present in the evaluation area.

963. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

964. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

965. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

966. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_Soil-20210714-195753.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *OSB_4*		Date: *July 20, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *OSB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1455.828* m	Aspect: *N/A°*
Topographic position: Alluvial fans		Topographic position: *Inset fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *50* cm	

Type and depth of diagnostic horizons:					**Type and depth of diagnostic horizons:**				
Soil horizon	Depth in / cm	Texture	Eff[2]	Other	Soil horizon	Depth in / cm	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Loam*		*Dry 10YR7/2; moist 10YR3/3, fine plate structure, dry, friable, loose, litter, gravely - fine*
					2	*2 - 12 cm*	*Clay Loam*		*Dry 10YR7/2; moist - 10YR3/4; very fine platy, compact, hard, dry, slightly plastic, some fine roots, some tubular pores, fine to medium gravel throughout*
					3	*12 - 31 cm*	*Sandy Loam*		*Dry 10YR7/3; moist 10YR5/6, subangular blocky, dry, some salt pockets, salt-encrusted fine fibrous roots, gravely; fine to medium*
					4	*31 - 50 cm*	*Sandy Loam*		*Dry 10YR7/3; moist 10YR4/4, subangular blocky, salt deposits, dry, salt-encrusted fibrous roots, gravely; fine to medium*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 5.52 miles west of the TS Power Plant, mile marker 4.7 of the Welches Creek Road project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.784593 N. Latitude
Section 1/4 Section		m			-116.395395 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access road, pivot					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *OSB_4*		Date: *July 20, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(645) Assign 17 indicator ratings, record comments and any measurements. (646) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (647) Assign overall rating for each attribute based on preponderance of evidence. (648) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Missing shrubs and perennial bunchgrasses and perennial forbs and invasive annual grass and annual forbs are now dominant; likely severe reduction in infiltration capabilities within the survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *E-T*	*E-T*	
b. F/S groups not expected at the site: *E-T*		
c. Number of F/S groups: *M-E*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *22*% Depth: *N/A*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					As expected for site.						*Infiltration reduced due to absent shrubs, perennial bunchgrasses, and perennial forbs.*						*Dominant shrubs and perennial bunchgrasses absent, subdominant perennial bunchgrasses and perennial forbs absent; invasive annual grass and annual forbs now dominant.*
0	0	0	1	9		1	0	0	1	8		3	0	0	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *OSB_4* **Date:** *July 20, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

967. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

968. Observe and list the F/S groups present in the evaluation area.

969. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

970. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

971. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

972. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210720-221213.jpg



photo_W-20210720-221230.jpg



photo_Soil-20210720-221038.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *OtA_1*		Date: *July 15, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *OtA*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rocks.*	Slope: *1°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1493.887* m	Aspect: *192°*
Topographic position: Alluvial fans		Topographic position: *Inset fan*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *53* cm	

Type and depth of diagnostic horizons:					in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff[2]	Other		Soil horizon	Depth	Texture	Eff[2]	Other
						1	*0 - 9 cm*	*Sandy Loam*		*Dry 10YR5/2; moist 10YR2/2, dry, fine subangular blocky, effervescent, fibrous roots throughout, some fine gravel*
						2	*9 - 30 cm*	*Sandy Clay Loam*		*Dry 10YR5/3,; moist 10YR3/3, subangular blocky structure, slightly porous, dry, some fine roots, some fine to medium gravel*
						3	*30 - 41 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, angular blocky structure, slightly moist, hard, some fibrous roots, some fine gravel, some duranoids*
						4	*41 - 53 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, angular blocky structure, moist, very compact, salt-encapsulated fibrous roots, some duranoids*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.24 miles northeast of the town of Carlin, mile marker 0.5 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.704512 N. Latitude
Section 1/4 Section		m			-116.123591 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock, waste storage					
Offsite influences: Railroad tracks, access roads, parking area, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *OtA_1*		Date: *July 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(649) Assign 17 indicator ratings, record comments and any measurements. (650) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (651) Assign overall rating for each attribute based on preponderance of evidence. (652) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *15* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Reduced dominant and subdominant perennial bunchgrasses moderately decreases infiltration and increases runoff.*
11. Compaction layer	S | H | B *M*	
12. Functional/structural groups a. Relative dominance: *M-E* b. F/S groups not expected at the site: *N-S* c. Number of F/S groups: *N-S* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *14*% Depth: *1 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *N-S*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: S-M					Rationale:	Attribute Rating: S-M					Rationale:	Attribute Rating: M					Rationale:
					Compaction layer at 42cm. is a departure from expected soil characteristics at the site and within our survey area.						*Significantly reduced dominant and subdominant perennial bunchgrasses may slightly reduce infiltration and increase runoff.*						*Dominant and subdominant perennial bunchgrasses now trace, annual forbs now subdominant.*
0	0	1	0	9		0	0	2	1	7		0	1	2	1	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_OtA_1* **Date:** *July 15, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

973. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

974. Observe and list the F/S groups present in the evaluation area.

975. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

976. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

977. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

978. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Burning bush*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210715-135014.jpg



photo_W-20210715-135033.jpg



photo_Soil-20210715-134930.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Pk_1*		Date: *June 25, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Dry Floodplain*	Ecological site ID: *R024XY006NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/17/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Pk*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash*	Slope range: *0-2%*	Parent material: *Alluvium derived from mixed rock*	Slope: *1°*
Elevation range: *1189 - 1524* m	Aspect NA (if specified):	Elevation: *1419.594* m	Aspect: *336°*
Topographic position: Valley bottoms, fan skirts, intermittent drainageways		Topographic position: *Floodplain*	
Precipitation range: 0.15 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution:		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 12 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR3/3, slightly moist, subangular and blocky, some fine to medium gravel, fibrous roots throughout*
					2	*12 - 31 cm*	*Sandy Clay Loam*		*Dry N/A; moist - 10YR4/3, slightly moist, subangular and blocky, some fine gravel, fine to medium roots; coarse sandy clay loam*
					3	*31 - 50 cm*	*Sandy Loam*		*Dry N/A; moist - 10YR4/4, subangular blocky, fine to medium roots,; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.37 miles southwest of the TS Power Plant, mile marker 6.0 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.802595 N. Latitude
Section 1/4 Section		m		-116.487309 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Pk_1*		Date: *June 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(653) Assign 17 indicator ratings, record comments and any measurements. (654) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (655) Assign overall rating for each attribute based on preponderance of evidence. (656) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *30* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Missing perennial bunchgrasses and perennial forbs, potentially reducing infiltration and increasing runoff*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *M-E*	*E-T*	
b. F/S groups not expected at the site: *M*		
c. Number of F/S groups: *E-T*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *5*% Depth: *N/A cm*	H | B *E-T*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *N-S*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					N/A						*Largely absent perennial functional structure groups may contribute to reduced infiltration and increased runoff*						*Lacking shrub biodiversity, missing perennial functional structure groups, and increased invasive annual grass within survey area.*
0	0	0	0	10		2	0	0	0	8		2	1	0	0	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Pk_1* **Date:** *June 25, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

979. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

980. Observe and list the F/S groups present in the evaluation area.

981. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

982. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

983. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

984. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Dry Floodplain*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210625-142101.jpg



photo_S-20210625-142109.jpg



photo_W-20210625-142127.jpg



photo_Soil-20210625-142016.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Pk_2*		Date: *June 24, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Dry Floodplain*	Ecological site ID: *R024XY006NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/17/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Pk*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed rocks with a component of loess and volcanic ash*	Slope range: *0-2%*	Parent material: *Alluvium derived from mixed rock*	Slope: *2°*
Elevation range: *1189 - 1524* m	Aspect NA (if specified):	Elevation: *1415.626* m	Aspect: *215°*
Topographic position: Valley bottoms, fan skirts, intermittent drainageways		Topographic position: *Floodplain*	
Precipitation range: 0.15 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution:		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR3/3, subangular blocky, effervescent, friable, very sticky*
					2	*5 - 15 cm*	*Silty Clay*		*Dry 10YR5/4; moist 10YR4/4, subangular, platy, hard, sticky, slightly moist*
					3	*15 - 39 cm*	*Loam*		*Dry N/A ; moist - 10YR4/4, subangular, blocky, moist, some tubular pores, some fibrous roots*
					4	*39 - 54 cm*	*Sandy Loam*		*Dry N/A ; moist - 10YR4/4, subangular, blocky , small amount of fibrous roots; some redox along roots; coarse sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.82 miles west of the TS Power Plant, mile marker 4.6 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.782498 N. Latitude

Section 1/4 Section	OR	m	OR	-116.484912 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Pk_2*		Date: *June 24, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(657) Assign 17 indicator ratings, record comments and any measurements. (658) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (659) Assign overall rating for each attribute based on preponderance of evidence. (660) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *9* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Increased shrubs and reduced perennial bunchgrasses may reduce infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *M-E*	*M-E*	
b. F/S groups not expected at the site: *S-M*		
c. Number of F/S groups: *N-S*		
d. Spp # in dom & subdom F/S groups: *N-S*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *2*% Depth: *1 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*S-M*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					Soils as expected.						*Reduced perennial bunchgrasses and increased shrubs may decrease infiltration and increase runoff.*						*Missing dominant and subdominant functional structure groups from the survey area.*
0	0	0	1	9		0	0	1	2	7		0	1	3	0	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *Pk_2* **Date:** *June 24, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

985. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

986. Observe and list the F/S groups present in the evaluation area.

987. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

988. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

989. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

990. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Dry Floodplain*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Broad-leaved pepperweed*
Non-sprouting shrubs	*Four-wing saltbush, Saltbush, Shadscale*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	*Tamarisk*
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*4*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210624-193502.jpg



photo_S-20210624-193512.jpg



photo_W-20210624-193524.jpg



photo_Soil-20210624-193435.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RaA_1*		Date: *June 25, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RaA*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rocks*	Slope: *4°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1418.665* m	Aspect: *308°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Clay*		*Dry 10YR6/2; moist 10YR4/3, subangular, blocky, slightly effervescent. very sticky, medium gravel, some litter*
					2	*6 - 37 cm*	*Clay Loam*		*Dry N/A, moist - 10YR4/3, subangular, blocky, moist, sticky, medium to coarse gravel, lots of fibrous roots throughout*
					3	*37 - 54 cm*	*Sandy Loam*		*Dry N/A; moist 5.5YR5/4, 10YR4/3, subtle redox features, hard compacted soil pieces throughout ranging from 1-4 cm, some fibrous roots, some fine gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.51 miles southwest of the TS Power Plant, mile marker 6.2 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.805175 N. Latitude	
Section 1/4 Section		m		-116.487897 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power plants, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RaA_1*		Date: *June 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(661) Assign 17 indicator ratings, record comments and any measurements. (662) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (663) Assign overall rating for each attribute based on preponderance of evidence. (664) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial bunchgrasses and perennial forbs potentially decreases infiltration and increases runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *5*% Depth: *1 cm*	H B *S-M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*S-M*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					Soil as expected.						*Potentially reduced infiltration due to the lack of dominant and subdominant functional structure groups.*						*Lack of dominant and subdominant functional structure groups and increased annual forbs*
0	0	0	1	9		0	0	1	2	7		0	0	2	2	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *RaA_1* **Date:** *June 25, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

991. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

992. Observe and list the F/S groups present in the evaluation area.

993. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

994. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

995. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

996. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *2.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Broad-leaved pepperweed, Burning bush*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210625-170220.jpg



photo_E-20210625-170228.jpg



photo_S-20210625-170242.jpg



photo_W-20210625-170251.jpg



photo_Soil-20210625-170203.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RaA_2*		Date: *June 25, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RaA*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rock*	Slope: *3°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1418.506* m	Aspect: *325°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *63* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Clay*		*Dry 10YR6/2; moist 10YR4/4, subangular, blocky, effervescent, friable, sticky, some fine to medium gravel, some litter*
					2	*6 - 20 cm*	*Clay Loam*		*Dry N/A; moist 10YR3/3, subangular and blocky, moist, some fine to coarse gravel, fine to medium roots*
					3	*20 - 42 cm*	*Loam*		*Dry N/A; moist - 10YR5/4, subangular, blocky, very moist, some coarse gravel, some medium roots*
					4	*42 - 63 cm*	*Silty Clay Loam*		*Dry N/A; moist 19YR4/4, subangular, blocky, moist, medium to coarse gravel, some fibrous and medium roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 1.44 miles southwest of the TS Power Plant, mile marker 6.1 of the Segment #2 TS Power Plant Loop to GS project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.804024 N. Latitude
Section 1/4 Section			m		-116.487968 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads, power plants, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RaA_2*		Date: *June 25, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(665) Assign 17 indicator ratings, record comments and any measurements. (666) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (667) Assign overall rating for each attribute based on preponderance of evidence. (668) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *17* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Lack of shrubs, missing perennial bunchgrasses and perennial forbs, and increased annual forbs may reduce infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B *E-T*	
a. Relative dominance: *E-T*		
b. F/S groups not expected at the site: *M*		
c. Number of F/S groups: *E-T*		
d. Spp # in dom & subdom F/S groups: *E-T*		
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *2*% Depth: *1 cm*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils as expected for site.						*Missing functional structure groups which may result in reduced infiltration and increased runoff*						*Lack of shrub diversity and tall-statured shrubs; missing perennial bunchgrasses and perennial forbs; increased annual forbs*
0	0	0	0	10		1	1	0	0	8		2	1	0	2	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RaA_2* **Date:** *June 25, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

997. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

998. Observe and list the F/S groups present in the evaluation area.

999. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1000. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1001. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1002. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Broad-leaved pepperweed*
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210625-153334.jpg



photo_S-20210625-153341.jpg



photo_W-20210625-153351.jpg



photo_Soil-20210625-153317.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RaB_1*		Date: *June 30, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RaB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Loess over alluvium derived from mixed rocks*	Slope: *2°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1429.638* m	Aspect: *150°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 10YR5/3, subangular blocky structure, some fine gravel and fine roots throughout*
					2	*4 - 23 cm*	*Silty Clay Loam*		*Dry 10YR7/2; moist 10YR4/4, weak subangular blocky structure, gravelly; fine in size, roots throughout*
					3	*23 - 51 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 10YR3/6, weak subangular blocky structure, gravelly; coarse sandy clay loam*
					4	*51 - 58 cm*	*Loamy Sand*		*Dry 10YR6/3; moist 10YR4/4, granular, some durinode-like structure; loamy coarse sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 3.77 miles west of the TS Power Plant, mile marker 2.9 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.782104 N. Latitude
Section 1/4 Section		m		-116.428652 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Appears to have been a fire at some point. Evidence of some charred shrub remnants and some disturbance to the soils.	
Land treatment type(s) and date(s): Potentially some re-seeding efforts within larger survey area; crested wheatgrass present just outside our survey area	
Wildlife, livestock, recreation, or other uses: Wildlife, Livestock	
Offsite influences: Two track running through survey area, pivot fields, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RaB_1*		Date: *June 30, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(669) Assign 17 indicator ratings, record comments and any measurements. (670) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (671) Assign overall rating for each attribute based on preponderance of evidence. (672) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *9* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *S-M*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Complete lack of perennial functional structure groups to aid in infiltration within the survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *20*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Some surface soil loss due to disturbance from fire.						*Moderate to extreme reduction in infiltration due to the lack of perennial plants.*						*Complete dominance of invasive annual grasses and forbs.*
0	0	0	1	9		1	0	0	1	8		4	0	0	1	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RaB_1* **Date:** *June 30, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1003. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1004. Observe and list the F/S groups present in the evaluation area.

1005. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1006. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1007. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1008. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Dead shrubs*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Mustards, Pepperweed, Prickly lettuce, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210630-152519.jpg



photo_S-20210630-152533.jpg



photo_W-20210630-152541.jpg



photo_Soil-20210630-152556.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RaB_2*		Date: *June 30, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RaB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Loess over alluvium derived from mixed rocks*	Slope: *2°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1443.046* m	Aspect: *154°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Loam*		*Dry 10 YR5/3, moist 10YR3/4, subangular blocky structure, dry ; fine roots throughout*
					2	*3 - 17 cm*	*Silty Clay*		*Dry 10YR7/2; moist 10YR4/4, platy and porous, some gravel, sticky; some fine roots throughout*
					3	*17 - 39 cm*	*Sandy Clay Loam*		*Dry 10 YR6/3; moist 10YR5/6, subangular blocky structure, slightly sticky, fine roots throughout, gravelly; fine in size; coarse sandy clay loam*
					4	*39 - 54 cm*	*Silty Clay*		*Dry 7.5YR5/6; moist 7.5YR4/4, some subangular blocky structure, plastic and sticky, friable and loose*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 4.88 miles west of the TS Power Plant, mile marker 4.0 of the Welches Creek Road project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.783808 N. Latitude

Section 1/4 Section	OR	m	OR	-116.407571 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Evidence of wildfire within larger survey area. No fire affected shrubs leftover at the survey site but soils do show some disturbance from fire. Assumed likely disturbance from same fire.	
Land treatment type(s) and date(s): Likely some re-seeding efforts; crested wheatgrass present	
Wildlife, livestock, recreation, or other uses: Wildlife, Livestock	
Offsite influences: Two track running through survey area, pivot fields, power plant	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RaB_2*		Date: *June 30, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(673) Assign 17 indicator ratings, record comments and any measurements. (674) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (675) Assign overall rating for each attribute based on preponderance of evidence. (676) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *E-T*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Total lack of perennial plants and shrubs to aid in infiltration.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *40*% Depth: *2 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Some disturbance to the soils due to fire.						*Extreme impact on infiltration due to lack of perennial plants and shrubs.*						*Invasive annual grasses and annual forbs are the dominant species at the survey site now.*
1	0	0	0	9		2	0	1	0	7		5	0	1	0	3	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RaB_2* **Date:** *June 30, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1009. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1010. Observe and list the F/S groups present in the evaluation area.

1011. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1012. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1013. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1014. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Burning bush*
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210630-142650.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_1*		Date: *June 10, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*	Soil Map Unit: *RbB*
Soil and site reference description Description Source: Ecological Site Description	**Evaluation area soil and site characterization**
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess* Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rock* Slope: *No slope°*
Elevation range: *1097 - 1981* m Aspect NA (if specified):	Elevation: *1438.016* m Aspect: *NA°*
Topographic position: Alluvial fans	Topographic position: *Fan remnant, flats*
Precipitation range: 0.13 - 0.20 cm	Average annual precipitation: *9.27953257 in*
Seasonal precipitation distribution: 70% occurs November- May	Seasonal precipitation distribution:
Soil depth[1]: Very Deep	Pit depth: *62* cm

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 13 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/4, loose, some weak platy structure, slightly sticky, fine roots throughout; fine sandy loam*
					2	*13 - 35 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular blockiness, medium roots throughout; fine sandy loam*
					3	*35 - 62 cm*	*Sandy Loam*		*Dry 10YR5/4; moist 10YR4/4, holding some moisture, subangular blockiness, harder texture; fine sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.97 miles northwest of the town of Beowawe, mile marker 32.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.570731 N. Latitude
Section 1/4 Section		m		-116.45084 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Railroad and access road within close proximity to the north.	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_1*		Date: *June 10, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(677) Assign 17 indicator ratings, record comments and any measurements. (678) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (679) Assign overall rating for each attribute based on preponderance of evidence. (680) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *4* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Lack of perennial bunchgrasses may result in reduced infiltration capabilities within the survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *S-M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *20*% Depth: *N/A cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M*					Rationale:
					Soil functioning as expected within site.						*Some overall lack of infiltration due to reduced presence of perennial grasses.*						*Shrub community still dominant, although some potential for invasives to become more dominant.*
0	1	0	0	9		0	2	0	0	8		0	1	1	2	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_1* **Date:** *June 10, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1015. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1016. Observe and list the F/S groups present in the evaluation area.

1017. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1018. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1019. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1020. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Annual forbs, Mustard, Mustards, Pepperweed, Wooly star*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

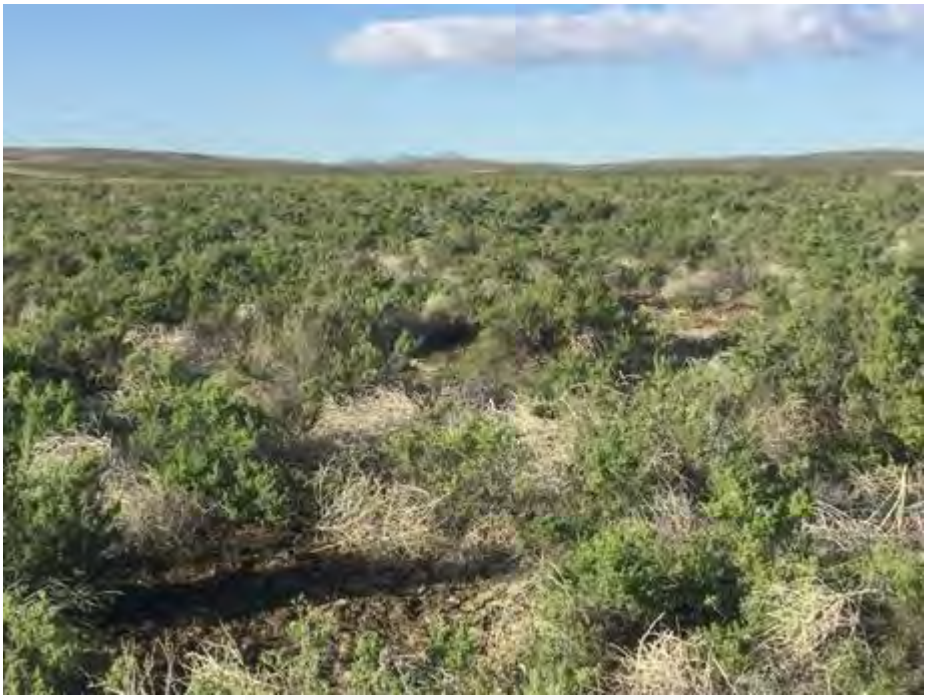
Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



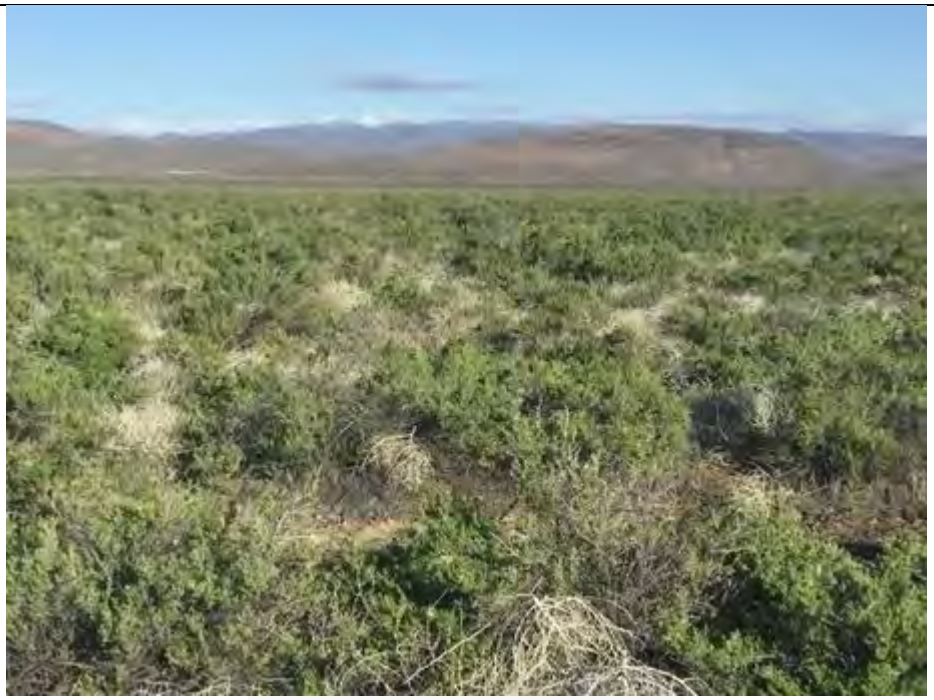
photo_N-20210610-140252.jpg



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photo_S-20210610-140306.jpg



photo_W-20210610-140311.jpg



photo_Soil-20210610-140324.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_10*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Loess over alluvium derived from mixed rocks*	Slope: *N/A°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1416.719* m	Aspect: *NA°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *73* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/3, loose with some subangular structure, litter, fine roots; fine sandy loam*
					2	*5 - 22 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/3, subangular structure, friable, slightly sticky, some fine roots; fine sandy loam*
					3	*22 - 47 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular, friable, many fine roots; fine sandy loam*
					4	*47 - 73 cm*	*Sandy Loam*		*Dry N/A; moist N/A, very weak small subangular structures, friable, mostly loose; fine sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the TS Power Plant, mile marker 1.1 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.738684 N. Latitude	
Section 1/4 Section		m		-116.505883 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant, power lines, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_10*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(681) Assign 17 indicator ratings, record comments and any measurements. (682) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (683) Assign overall rating for each attribute based on preponderance of evidence. (684) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *4* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *M*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial bunchgrasses and increased annual grasses potentially reduce infiltration and increase runoff*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M*	
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *8*% Depth: *3 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*M*</u>					Rationale:
					N/A						*Lack of perennial bunchgrasses potentially reduce infiltration and increase runoff*						*Lacking or missing perennial bunchgrasses and mixed salt scrub*
0	*0*	*1*	*0*	*9*		0	*0*	*1*	*1*	*8*		0	*1*	*3*	*1*	*4*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_10* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1021. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1022. Observe and list the F/S groups present in the evaluation area.

1023. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1024. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1025. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1026. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-185516.jpg



photo_S-20210621-185535.jpg



photo_W-20210621-185602.jpg



photo_Soil-20210621-185436.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_2*		Date: *June 10, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rock*	Slope: *No slope°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1437.313* m	Aspect: *NA°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant, flats*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 12 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, loose, friable, granular texture, fine roots throughout; fine sandy loam*
					2	*12 - 39 cm*	*Sandy Loam*		*Dry 10YR6/4; moist 10YR4/4, medium roots throughout; fine sandy loam*
					3	*39 - 55 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, harder texture, some subangular blockiness*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.92 miles northwest of the town of Beowawe, mile marker 32.5 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.570855 N. Latitude
Section 1/4 Section		m		-116.452582 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road and railroad within close proximity to the north	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_2*		Date: *June 10, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(685) Assign 17 indicator ratings, record comments and any measurements. (686) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (687) Assign overall rating for each attribute based on preponderance of evidence. (688) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *13* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial grasses may result in decreased infiltration within the survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *S-M*		
b. F/S groups not expected at the site: *S-M*	*M*	
c. Number of F/S groups: *M*		
d. Spp # in dom & subdom F/S groups: *M*		
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *20*% Depth: *N/A cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:
					Soils functioning as expected within site.						*Lack of infiltration capabilities as a result of the lack of perennial bunchgrasses.*						*Lack of diversity in shrubs and missing subdominant functional structure groups.*
0	*1*	*0*	*0*	*9*		0	*1*	*2*	*0*	*7*		0	*0*	*4*	*1*	*4*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_2* **Date:** *June 10, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1027. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1028. Observe and list the F/S groups present in the evaluation area.

1029. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1030. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1031. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1032. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

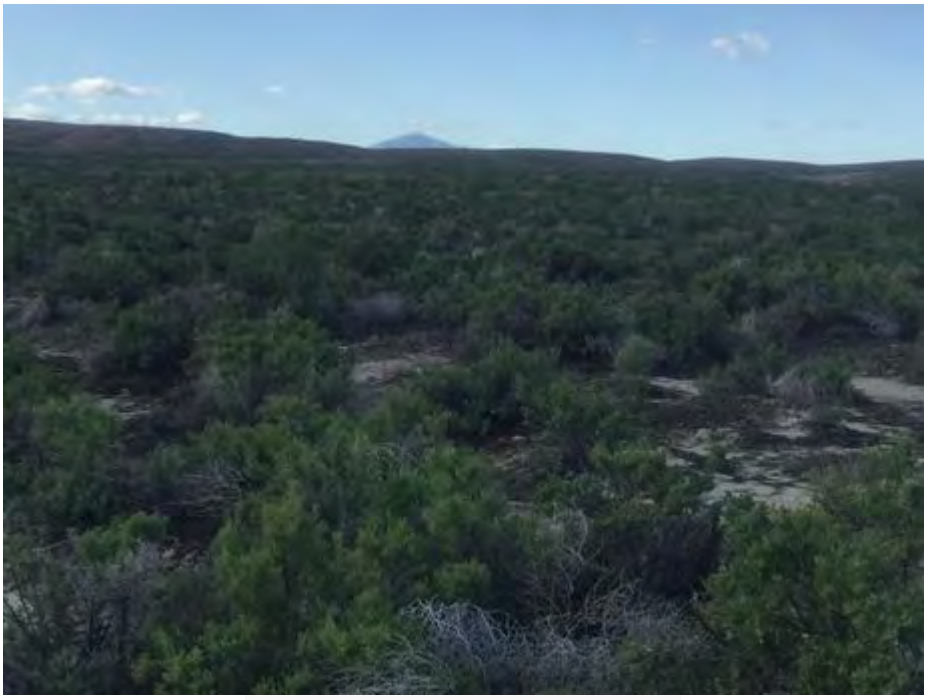
Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210610-145349.jpg



photo_W-20210610-145355.jpg



photo_Soil-20210610-145404.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_3*		Date: *June 10, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rock*	Slope: *No slope°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1442.463* m	Aspect: *NA°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant, flats*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/3, loose, platy structure, fine roots throughout; fine sandy loam*
					2	*8 - 48 cm*	*Silt Loam*		*Dry 10YR6/3; moist 10YR5/4, subangular blockiness, fine roots and sporadic coarse gravel*
					3	*48 - 60 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR5/3, weak, subangular blockiness*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.08 miles northwest of the town of Beowawe, mile marker 32.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.568793 N. Latitude
Section 1/4 Section		m		-116.451151 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road and railroad within close proximity .	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_3*		Date: *June 10, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(689) Assign 17 indicator ratings, record comments and any measurements. (690) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (691) Assign overall rating for each attribute based on preponderance of evidence. (692) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H *E-T*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Lack of infiltration and increased runoff due to lack of perennial functional structure groups within survey area.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *E-T*	
14. Litter cover and depth Observed cover: *45*% Depth: *1 cm*	H | B *E-T*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as intended at site.						*Lack of infiltration due to lack of perennial functional structure groups.*						*Dominant and subdominant functional structure groups are no longer present. Non-native and invasive annuals dominate.*
1	0	0	0	9		3	0	0	0	7		5	0	0	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_3* **Date:** *June 10, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1033. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1034. Observe and list the F/S groups present in the evaluation area.

1035. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1036. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1037. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1038. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Mustards, Pepperweed, Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210610-153201.jpg



photo_W-20210610-153207.jpg



photo_Soil-20210610-153221.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_4*		Date: *June 10, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rock*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1440.709* m	Aspect: *284°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant, flats*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Loose, some subangular crust structure. Fine roots throughout. Dry 10YR6;2; moist 10YR4/3. Fine sandy loam.*
					2	*5 - 33 cm*	*Sandy Loam*		*Dry 10YR6/3, moist 10YR4/4, subangular blockiness, some chunky porous sections, fine roots; fine sandy loam*
					3	*33 - 58 cm*	*Loamy Sand*		*Dry 10YR7/2; moist 10YR5/6, granular, weak subangular blockiness, no roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.15 miles northwest of the town of Beowawe, mile marker 32.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.568636	N. Latitude
Section 1/4 Section		m		-116.448711	W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road and railroad within close proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_4*		Date: *June 10, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(693) Assign 17 indicator ratings, record comments and any measurements. (694) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (695) Assign overall rating for each attribute based on preponderance of evidence. (696) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *E-T*	*Total lack of perennial vegetation may lead to reduced infiltration within survey area*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *E-T* b. F/S groups not expected at the site: *E-T* c. Number of F/S groups: *E-T* d. Spp # in dom & subdom F/S groups: *E-T*	B *E-T*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *35*% Depth: *1.5 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *E-T*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M-E*					Rationale:	Attribute Rating: *E-T*					Rationale:
					Soils functioning as expected for site.						*Lack of infiltration from missing perennial functional structure groups.*						*Complete dominance of invasive annual grass and annual forbs.*
0	1	0	0	9		1	1	1	0	7		3	0	2	0	4	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_4* **Date:** *June 10, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1039. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1040. Observe and list the F/S groups present in the evaluation area.

1041. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1042. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1043. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1044. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*0*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*0*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210610-160743.jpg



photo_W-20210610-160749.jpg



photo_Soil-20210610-160757.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_5*		Date: *June 10, 2021 1:00 PM*
Management unit: *GEYSER*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Alluvium derived from mixed rock*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1439.548* m	Aspect: *248°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant, flats*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *9.27953257 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR7/2, moist 10YR3/3, loose, weak subangular structure fine roots throughout; fine sandy loam*
					2	*4 - 33 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR5/3, subangular structure, fine to medium roots throughout; fine sandy loam*
					3	*33 - 60 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, weak subangular blockiness, no roots; fine sandy loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.17 miles northwest of the town of Beowawe, mile marker 32.6 of the Segment #1 - Range Front to UP project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.569232 N. Latitude
Section 1/4 Section		m		-116.446805 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road and railroad within close proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_5*		Date: *June 10, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(697) Assign 17 indicator ratings, record comments and any measurements. (698) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (699) Assign overall rating for each attribute based on preponderance of evidence. (700) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Lack of perennial bunchgrasses may have an impact on infiltration, however stronger shrub presence may aid in that.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *S-M*	
14. Litter cover and depth Observed cover: *N/A*% Depth: *N/A*	H | B *M-E*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:
					N/A						*N/A*						*N/A*
0	*1*	*0*	*0*	*9*		0	*2*	*1*	*0*	*7*		0	*2*	*2*	*1*	*4*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_5* **Date:** *June 10, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1045. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1046. Observe and list the F/S groups present in the evaluation area.

1047. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1048. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1049. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1050. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Mustard, Mustards*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210610-164219.jpg



photo_S-20210610-164225.jpg



photo_W-20210610-164233.jpg



photo_Soil-20210610-164240.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_6*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rocks*	Slope: *1°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1416.829* m	Aspect: *30°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR4/3, platy, effervescent structure, fine roots throughout*
					2	*6 - 24 cm*	*Silty Clay Loam*		*Dry 10YR6/4; moist 10YR5/3, weak blockiness, some fine pores, some fine roots throughout*
					3	*24 - 52 cm*	*Sandy Clay Loam*		*Dry 10YR6/4; moist 10YR5/4, slightly blocky in texture, slightly porous, some spots of salt encrusted fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.45 miles west of the TS Power Plant, mile marker 2.6 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.753848 N. Latitude
Section 1/4 Section		m		-116.492118 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Power plant in close proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_6*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(701) Assign 17 indicator ratings, record comments and any measurements. (702) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (703) Assign overall rating for each attribute based on preponderance of evidence. (704) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Lack of perennial bunchgrasses and shrub cover within survey area may lead to reduced infiltration and increased runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *M-E* d. Spp # in dom & subdom F/S groups: *M-E*	B *M-E*	
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *40*% Depth: *1.5 cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>M</u>					Rationale:	Attribute Rating: <u>M-E</u>					Rationale:
					Soils functions as expected for site						*N/A*						*Annual forbs are now dominant within the survey area.*
0	*0*	*1*	*0*	*9*		0	*1*	*2*	*0*	*7*		0	*3*	*1*	*1*	*4*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_6* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1051. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1052. Observe and list the F/S groups present in the evaluation area.

1053. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1054. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1055. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1056. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Burning bush*
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-154553.jpg



photo_S-20210621-154604.jpg



photo_W-20210621-154610.jpg



photo_Soil-20210621-154620.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_7*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*	Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rocks*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1417.278* m	Aspect: *83°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR3/3, thin platy structure, slightly effervescent, friable, fine roots throughout*
					2	*8 - 35 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular blockiness, some salt-encrusted fine roots throughout*
					3	*35 - 52 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, holding some moisture, subangular blockiness; fine roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.3 miles west of the TS Power Plant, mile marker 2.3 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.750889 N. Latitude
Section 1/4 Section		m		-116.494834 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant within close proximity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_7*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(705) Assign 17 indicator ratings, record comments and any measurements. (706) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (707) Assign overall rating for each attribute based on preponderance of evidence. (708) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *4* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Lack of perennial bunchgrasses may be contributing to reduced infiltration capabilities.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *S-M* b. F/S groups not expected at the site: *M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *40*% Depth: *N/A cm*	H | B *M*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M-E*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *M-E*					Rationale:
					Soils functioning as expected for site.						*N/A*						*NA*
0	*1*	*0*	*0*	*9*		0	*2*	*1*	*0*	*7*		0	*1*	*3*	*0*	*5*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_7* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1057. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1058. Observe and list the F/S groups present in the evaluation area.

1059. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1060. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1061. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1062. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Burning bush*
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Mustards, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-174935.jpg



photo_S-20210621-174941.jpg



photo_W-20210621-174947.jpg



photo_Soil-20210621-175006.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_8*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rocks*	Slope: *3°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1417.614* m	Aspect: *96°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *66* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, loose and some blocky subangular structure, litter, fine roots; fine sandy loam*
					2	*6 - 33 cm*	*Sandy Loam*		*Dry 10YR7/2; moist 10YR5/3, subangular structure, fine roots throughout; fine sandy loam*
					3	*33 - 38 cm*	*Sandy Loam*		*Dry 10YR4/4; moist 10YR3/4, subangular to angular, granular, duranoids and concretions, crispy band; coarse sandy loam*
					4	*38 - 66 cm*	*Silty Clay Loam*		*Dry 10YR6/4; moist 10YR4/4, subangular, heavy, friable*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the TS Power Plant, mile marker 1.2 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.738866 N. Latitude	
Section 1/4 Section		m		-116.502978 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant, power lines, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_8*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(709) Assign 17 indicator ratings, record comments and any measurements. (710) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (711) Assign overall rating for each attribute based on preponderance of evidence. (712) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *5* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Lack of perennial bunchgrasses and increased annual grasses potentially reduces infiltration and increases runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance: *M*	*M*	
b. F/S groups not expected at the site: *S-M*		
c. Number of F/S groups: *M*		
d. Spp # in dom & subdom F/S groups: *M*		
13. Dead or dying plants or plant parts	B *M-E*	
14. Litter cover and depth Observed cover: *12*% Depth: *1 cm*	H | B *N/A*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N/A*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*N/A*</u>					Rationale:
					N/A						*Lack of perennial bunchgrasses potentially reduce infiltration and increase runoff.*						*N/A*
0	*0*	*0*	*0*	*10*		0	*0*	*0*	*1*	*9*		0	*1*	*2*	*1*	*3*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_8* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1063. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1064. Observe and list the F/S groups present in the evaluation area.

1065. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1066. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1067. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1068. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*1*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*1*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-200314.jpg



photo_S-20210621-200333.jpg



photo_W-20210621-200351.jpg



photo_Soil-20210621-200228.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RbB_9*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 5-8 P.Z.*	Ecological site ID: *R024XY002NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *12/2/2009*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RbB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived mixed parent material with surficial deposits of loess*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rocks*	Slope: *2°*
Elevation range: *1097 - 1981* m	Aspect NA (if specified):	Elevation: *1413.419* m	Aspect: *272°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.13 - 0.20 cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR5/4, structurally effervescent, platy top layer, thin salt crust; fine sandy loam*
					2	*9 - 21 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR4/4, subangular structures, roots throughout*
					3	*21 - 53 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR5/4, subangular, harder, sticky, few coarse roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the TS Power Plant, mile marker 1.0 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.73847 N. Latitude	
Section 1/4 Section		m		-116.507866 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant, power line, access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RbB_9*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(713) Assign 17 indicator ratings, record comments and any measurements. (714) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (715) Assign overall rating for each attribute based on preponderance of evidence. (716) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	
2. Water flow patterns	S | H *M-E*	
3. Pedestals and/or terracettes	S | H *M-E*	
4. Bare ground (observed): *7* %	S | H *M-E*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Potentially decreased infiltration due to increased annual grasses and lack of perennial bunchgrasses*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *M* d. Spp # in dom & subdom F/S groups: *M*	B *M*	
13. Dead or dying plants or plant parts	B *M*	
14. Litter cover and depth Observed cover: *7*% Depth: *2 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *S-M*					Rationale:	Attribute Rating: *M*					Rationale:	Attribute Rating: *S-M*					Rationale:
					Landscape position may suggest the Saline Bottom ESD; not consistent with Loamy 5-8 P.Z.; mosaic sheet flows						*Not consistent with ESD, sheet flow prevalent, large, and connected*						*Missing subdominant functional structure groups-; perennial bunchgrasses.*
0	3	0	0	7		0	3	1	0	6		0	0	3	1	5	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RbB_9* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1069. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1070. Observe and list the F/S groups present in the evaluation area.

1071. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1072. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1073. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1074. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 5-8 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-174639.jpg



photo_S-20210621-174648.jpg



photo_W-20210621-174702.jpg



photo_Soil-20210621-174546.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RE_1*		Date: *July 16, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*		Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rocks.*	Slope: *5°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1488.219* m	Aspect: *110°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *63* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR5/2; moist 10YR3/3, loose, slightly sticky, very weak subangular structure, fine to coarse gravel and some rocks roots, grasses, litter*
					2	*6 - 20 cm*	*Clay Loam*		*Dry 10YR5/2; moist 10YR3/4, friable, sticky, weak subangular structure, some rock, fine roots, some coarse roots*
					3	*20 - 43 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/4, fairly subangular structure, friable, sticky, many woody coarse roots, some fine roots*
					4	*43 - 63 cm*	*Silty Clay Loam*		*Dry 10YR4/4; moist 7.5YR3/3, some subangular structure, dry, friable, sticky,*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.54 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*			UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range		OR	m	OR	40.679758 N. Latitude
Section 1/4 Section			m		-116.153094 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Train track, power line					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RE_1*		Date: *July 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(717) Assign 17 indicator ratings, record comments and any measurements. (718) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (719) Assign overall rating for each attribute based on preponderance of evidence. (720) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *6* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *N-S*	*Plant community largely intact and supporting normal infiltration capabilities for this site.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *N-S* b. F/S groups not expected at the site: *N-S* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *N-S*	B *S-M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *7*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *N-S*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *N-S*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>N-S</u>					Rationale:
					As expected for this site.						*As expected for this site.*						*Vegetative community largely intact.*
0	0	0	0	10		0	0	0	0	10		0	0	0	1	8	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RE_1* **Date:** *July 16, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1075. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1076. Observe and list the F/S groups present in the evaluation area.

1077. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1078. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1079. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1080. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Green rabbitbrush, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed, Russian thistle, Scotch thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210716-172245.jpg



photo_W-20210716-172252.jpg



photo_Soil-20210716-172224.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RE_1a*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed in loess over alluvium derived from mixed rocks.*	Slope: *10°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1526.018* m	Aspect: *76°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/4, loose with some subangular structure, dry; fine sandy loam.*
					2	*7 - 15 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/4, fine roots; fine sandy loam.*
					3	*15 - 37 cm*	*Sandy Loam*		*Dry 10YR5/3; moist 10YR3/4, fine granular to subangular structure, platy, coarse and fine roots throughout*
					4	*37 - 54 cm*	*Silty Clay Loam*		*Dry 10YR7/2; moist 10YR5/3, some weak subangular structure, loose, sticky, slightly plastic, some fine gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.4 miles east of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.700725 N. Latitude
Section 1/4 Section		m		-116.145429 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power line, nearby houses	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RE_1a*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(721) Assign 17 indicator ratings, record comments and any measurements. (722) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (723) Assign overall rating for each attribute based on preponderance of evidence. (724) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *21* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Decrease in dominant bunchgrasses and increase in invasive annual grass may decrease infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B *M-E*	
a. Relative dominance: *M-E*		
b. F/S groups not expected at the site: *M*		
c. Number of F/S groups: *S-M*		
d. Spp # in dom & subdom F/S groups: *S-M*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *11*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *S-M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N-S*					Rationale:	Attribute Rating: *N-S*					Rationale:	Attribute Rating: *S-M*					Rationale:
					As expected for this site.						*Slightly increased runoff and decreased infiltration due to changes in plant community.*						*Missing dominant grasses and forbs and cheatgrass is becomingly increasingly more dominate throughout*
0	0	0	0	10		0	0	0	1	9		0	1	1	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RE_1a* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1081. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1082. Observe and list the F/S groups present in the evaluation area.

1083. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1084. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1085. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1086. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*3*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210719-173917.jpg



photo_S-20210719-173927.jpg



photo_W-20210719-173941.jpg



photo_Soil-20210719-173904.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RE_2*		Date: *July 16, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Droughty Loam 8-10 P.Z.*	Ecological site ID: *R024XY020NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *2/5/2010*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *4-15%*	Parent material: *Formed alluvium derived from mixed rocks.*	Slope: *N/A°*
Elevation range: *1219 - 1829* m	Aspect NA (if specified):	Elevation: *1527.154* m	Aspect: *90°*
Topographic position: Fan piedmonts, fan remnants, inset fans		Topographic position: *Fan remnant*	
Precipitation range: 0.16 - 0.22 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *42* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Sandy Clay Loam*		*Dry 7.5YR6/2; moist 10YR3/3; weak subangular structure, slightly sticky, mostly loose, some fine to medium gravel, fine roots throughout*
					2	*4 - 24 cm*	*Sandy Clay*		*Dry 7.5YR6/2; moist 7.5YR3/4, very weak small subangular structure, lots of tubular pores, very dry, granular, slightly sticky, plastic, very gravelly fine to coarse, fine roots throughout*
					3	*24 - 42 cm*	*Clay*		*Dry 7.5YR6/2; moist 7.5YR3/3; some granular structure, fine powder, sticky, plastic, extremely rocky, extremely gravelly fine to coarse, some cobble. Refusal (rock) at 42 cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.81 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*			UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range		OR	m	OR	40.676476 N. Latitude
Section 1/4 Section			m		-116.155879 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Train track, power line					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RE_2*		Date: *July 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(725) Assign 17 indicator ratings, record comments and any measurements. (726) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (727) Assign overall rating for each attribute based on preponderance of evidence. (728) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *2* %	S | H	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M-E*	*Decrease in dominant shrubs and increase in annual invasive grass may reduce infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *M* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *S-M* d. Spp # in dom & subdom F/S groups: *N-S*	B *M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *20*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M-E*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *S-M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: *S-M*					Rationale:
					N/A						*N/A*						*Vegetative community mostly intact except for absence of sagebrush and increase in invasive grass and forb.*
0	0	0	0	9		0	1	0	0	8		0	1	1	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RE_2* **Date:** *July 16, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1087. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1088. Observe and list the F/S groups present in the evaluation area.

1089. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1090. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1091. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1092. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Droughty Loam 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass, Slender wheatgrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood, Green rabbitbrush, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Scotch thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210716-142653.jpg



photo_W-20210716-142706.jpg



photo_Soil-20210716-142535.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RE_3*		Date: *July 16, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R024XY005NV*
Reference sheet used/authors: *Attachment to provisional ESD/ Winnemucca Rangeland Health Class (May 12-15, 2005)*	Date: *5/20/2005*
Soil component: *GIS CALCS*	Composition based on : Annual Production

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *2-30%*	Parent material: *Formed from loess over alluvium derived from mixed rocks.*	Slope: *9°*
Elevation range: *1371 - 2133* m	Aspect NA (if specified):	Elevation: *1522.025* m	Aspect: *90°*
Topographic position: Alluvial fans		Topographic position: *Fan remnant*	
Precipitation range: 0.20 - 0.25 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Deep		Pit depth: *64* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 7 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, fine, dry, friable, mostly loose with some weak subangular structure, gravelly fine to coarse*
					2	*7 - 18 cm*	*Clay*		*Dry 10YR5/4; moist 7.5YR4/4, granular to rough blocky structure, slightly sticky, very extremely gravelly fine to rocks, lots of woody to coarse lateral roots*
					3	*18 - 38 cm*	*Sandy Clay Loam*		*Dry 10YR7/2; moist 10YR5/4, loose, dry, powdery, slightly sticky, rough blocky structure, very extremely gravelly fine to coarse, woody coarse lateral roots throughout. Coarse sand clay loam;*
					4	*38 - 64 cm*	*Sandy Loam*		*Dry 7.5YR7/2; moist 7.5YR5/3, soft, mostly loose, slightly sticky, hard blocky structure, gravelly. Coarse sandy loam.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type

indicated by the SWreGAP.					
Location description/directions: Approximately 2.6 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR		40.679762 N. Latitude
Section 1/4 Section		m			-116.154728 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Train track, power line					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RE_3*		Date: *July 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(729) Assign 17 indicator ratings, record comments and any measurements. (730) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (731) Assign overall rating for each attribute based on preponderance of evidence. (732) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *7* %	S | H *N-S*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *S-M*	*Infiltration reduced in large cheatgrass patches, but sagebrush patches likely catch runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups a. Relative dominance: *S-M* b. F/S groups not expected at the site: *S-M* c. Number of F/S groups: *N-S* d. Spp # in dom & subdom F/S groups: *S-M*	B *S-M*	
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *3*% Depth: *1 cm*	H | B *S-M*	
15. Annual production: Observed: _ ÷ Expected = *%*	B *N-S*	
16. Invasive plants	B *M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *S-M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*N-S*</u>					Rationale:	Attribute Rating: <u>*S-M*</u>					Rationale:
					As expected for this site.						*Slightly increased runoff and decreased infiltration due to changes in vegetative community composition.*						*All functional structure groups are still present, however, cheatgrass is scattered throughout.*
0	0	0	0	10		0	0	0	2	8		0	0	1	3	5	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RE_3* **Date:** *July 16, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1093. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1094. Observe and list the F/S groups present in the evaluation area.

1095. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1096. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1097. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1098. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bluebunch wheatgrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Scotch thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*4*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*3*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210716-161639.jpg



photo_E-20210716-161645.jpg



photo_S-20210716-161651.jpg



photo_W-20210716-161658.jpg



photo_Soil-20210716-161632.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RE_3a*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Droughty Loam 8-10 P.Z.*	Ecological site ID: *R024XY020NV*	
Reference sheet used/authors: *Attachment to provisional ESD/ P. Novak-Echenique*		Date: *2/5/2010*
Soil component: *GIS CALCS*	Composition based on : Annual Production	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *Alluvium derived from mixed parent material*	Slope range: *4-15%*	Parent material: *Formed alluvium derived from mixed rocks.*	Slope: *2°*
Elevation range: *1219 - 1829* m	Aspect NA (if specified):	Elevation: *1512.104* m	Aspect: *140°*
Topographic position: Fan piedmonts, fan remnants, inset fans		Topographic position: *Fan remnant*	
Precipitation range: 0.16 - 0.22 cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: 70% occurs November- May		Seasonal precipitation distribution:	
Soil depth[1]: Very Deep		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Sandy Clay*		*Dry 10YR3/3; moist 10YR2/2, dry, loose, sticky, plastic, very gravelly, fine to medium gravel, roots, debris; coarse sand clay.*
					2	*6 - 35 cm*	*Sandy Clay*		*Dry 5YR4/3; moist 5YR4/3, coarse granular to blocky structure, hard, very gravelly, coarse and fine roots; coarse sand clay.*
					3	*35 - 54 cm*	*Sandy Clay*		*Dry 7.5YR4/4; moist 7.5YR4/4, fine to coarse granular structure, very hard, sticky, plastic, fine to coarse gravel; coarse sand clay.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.48 miles east of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.69886 N. Latitude
Section 1/4 Section		m		-116.146086 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power line, nearby houses	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RE_3a*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(733) Assign 17 indicator ratings, record comments and any measurements. (734) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (735) Assign overall rating for each attribute based on preponderance of evidence. (736) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S | H *N-S*	*Not present*
2. Water flow patterns	S | H *N-S*	
3. Pedestals and/or terracettes	S | H *N-S*	
4. Bare ground (observed): *3* %	S | H *S-M*	
5. Gullies	S | H *N-S*	
6. Wind-scoured and/or depositional areas	S *N-S*	
7. Litter movement (wind or water)	S *N-S*	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S | H | B *N-S*	
9. Soil surface loss and degradation	S | H | B *N-S*	
10. Effects of plant community composition and distribution relative to infiltration	H *M*	*Reduced bunchgrasses and increased invasive annual grass may reduce infiltration and increase runoff.*
11. Compaction layer	S | H | B *N-S*	
12. Functional/structural groups	B *E-T*	
a. Relative dominance: *E-T*		
b. F/S groups not expected at the site: *E-T*		
c. Number of F/S groups: *S-M*		
d. Spp # in dom & subdom F/S groups: *M-E*		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *7*% Depth: *1 cm*	H | B *N-S*	
15. Annual production: Observed: _ ÷ Expected = _ %	B *N-S*	
16. Invasive plants	B *E-T*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *S-M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: <u>N-S</u>					Rationale:	Attribute Rating: <u>S-M</u>					Rationale:	Attribute Rating: -					Rationale:
					Less bare ground due to increased rock cover.						*Increased runoff and decreased infiltration due to changes in the vegetative community.*						*Perennial bunchgrasses reduced and cheatgrass is now dominant throughout*
0	0	0	1	9		0	0	1	1	8		2	0	0	1	6	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RE_3a* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1099. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1100. Observe and list the F/S groups present in the evaluation area.

1101. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1102. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1103. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1104. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Droughty Loam 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Indian ricegrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Mustard, Mustards, Pepperweed, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*2*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*2*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210719-161417.jpg



photo_S-20210719-161424.jpg



photo_W-20210719-161433.jpg



photo_Soil-20210719-161357.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RF_1*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Cobbly Claypan 8-12 P.Z.*	Ecological site ID: *R025XY022NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum, colluvium, derived from limestone, chert, volcanic rock, tuff, andesite, rhyolite, sedimentary rock, or dolomite with a component of loess high in volcanic ash*	Slope: *15°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1819.896* m	Aspect: *68°*
Topographic position: NA		Topographic position: *Mountains; fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *5* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Clay*		*Dry 2.5Y6/2; moist 10YR3/3, dry, granular, friable, sticky, gravely, some cobble; clay with some sand*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.5 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.844772 N. Latitude
Section 1/4 Section		m		-116.315641 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, possibly open to livestock

Offsite influences: Access roads	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RF_1*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(737) Assign 17 indicator ratings, record comments and any measurements. (738) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (739) Assign overall rating for each attribute based on preponderance of evidence. (740) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *13* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration supported by perennial bunchgrasses and shrub layer.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *7*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RF_1* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1105. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1106. Observe and list the F/S groups present in the evaluation area.

1107. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1108. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1109. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1110. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Cobbly Claypan 8-12 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Slender wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Daggerpod*
Non-sprouting shrubs	*Big sagebrush, Bitterbrush, Utah serviceberry*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210701-154534.jpg



photo_S-20210701-154542.jpg



photo_W-20210701-154600.jpg



photo_Soil-20210701-154516.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RF_2*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Cobbly Claypan 8-12 P.Z.*	Ecological site ID: *R025XY022NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum, colluvium, derived from limestone, chert, volcanic rock, tuff, andesite, rhyolite, sedimentary rock, or dolomite with a component of loess high in volcanic ash*	Slope: *12°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1792.3* m	Aspect: *102°*
Topographic position: NA		Topographic position: *Mountain; fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 10 cm*	*Sandy Clay Loam*		*Dry 10YR4/4; moist 10YR2/2, slightly porous, loose, dry, some gravel from fine to coarse, some fibrous roots*
					2	*10 - 34 cm*	*Sandy Clay Loam*		*Dry 10YR5/4; moist 10YR3/3, slightly blocky, slightly porous, subangular, some gravel throughout; from fine to coarse some fine roots*
					3	*34 - 52 cm*	*Sandy Loam*		*Dry 10YR5/4; moist 10YR3/3, loose, mostly large cobbles, some fine to medium gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.55 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR		40.844296 N. Latitude
Section 1/4 Section		m			-116.314438 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Evidence of a past wildfire	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, potential livestock access	
Offsite influences: Access roads, remnant mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RF_2*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(741) Assign 17 indicator ratings, record comments and any measurements. (742) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (743) Assign overall rating for each attribute based on preponderance of evidence. (744) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *9* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration capabilities are influenced by the increased presence of annual grasses and forbs*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *3*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RF_2* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1111. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1112. Observe and list the F/S groups present in the evaluation area.

1113. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1114. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1115. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1116. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Cobbly Claypan 8-12 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Slender wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Daggerpod*
Non-sprouting shrubs	*Big sagebrush, Bitterbrush, Low sagebrush, Utah serviceberry*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Lewis flax, Prickly lettuce, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210701-172116.jpg



photo_S-20210701-172123.jpg



photo_W-20210701-172136.jpg



photo_Soil-20210701-172059.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RF_3*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum, colluvium, derived from limestone, chert, volcanic rock, tuff, andesite, rhyolite, sedimentary rock, or dolomite with a component of loess high in volcanic ash*	Slope: *14°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1785.041* m	Aspect: *110°*
Topographic position: NA		Topographic position: *Mountain; fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *42* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Clay*		*Dry 10YR6/2; moist 10YR2/2, dry, friable, loose, gravely; fine to coarse, some litter and fine roots; clay*
					2	*8 - 40 cm*	*Clay*		*Dry 10YR5/3; moist 10YR2/2, subangular, granular, very hard, very sticky, some fine roots throughout*
					3	*40 - 42 cm*	*Clay*		*Tightly compacted clay. Refusal at 42 cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.45 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.846069	N. Latitude
Section 1/4 Section		m		-116.313298	W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): Evidence of a past wildfire	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock access likely	
Offsite influences: Access road, remnant mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RF_3*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(745) Assign 17 indicator ratings, record comments and any measurements. (746) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (747) Assign overall rating for each attribute based on preponderance of evidence. (748) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *3* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration capabilities are good for the survey area*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *8*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RF_3* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1117. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1118. Observe and list the F/S groups present in the evaluation area.

1119. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1120. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1121. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1122. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Indian ricegrass, Slender wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Daggerpod, Fringed puccoon, Hawksbeard*
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Bull thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210701-184501.jpg



photo_W-20210701-184512.jpg



photo_Soil-20210701-184337.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RF_4*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum, colluvium, derived from limestone, chert, volcanic rock, tuff, andesite, rhyolite, sedimentary rock, or dolomite with a component of loess high in volcanic ash*	Slope: *12°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1755.273* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Mountain; backslope*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *9* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Sandy Clay*		*Dry 10YR5/2; moist 10YR2/2, N/A. Refusal at 9 cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.57 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.844853 N. Latitude
Section 1/4 Section		m		-116.310868 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, likely livestock access

Offsite influences: Access roads, remnant mining activity

Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RF_4*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(749) Assign 17 indicator ratings, record comments and any measurements. (750) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (751) Assign overall rating for each attribute based on preponderance of evidence. (752) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *N/A*% Depth: *N/A*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _*RF_4*_____ **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1123. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1124. Observe and list the F/S groups present in the evaluation area.

1125. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1126. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1127. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1128. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *2.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210701-201336.jpg



photo_S-20210701-201345.jpg



photo_W-20210701-201405.jpg



photo_Soil-20210701-201235.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RF_5*		Date: *July 5, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from tuff, andesite, volcanic rocks, chert, sedimentary rocks, limestone, dolomite, or rhyolite with a component of loess high in volcanic ash.*	Slope: *10°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1777.213* m	Aspect: *128°*
Topographic position: NA		Topographic position: *Mountain; backslope*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *24* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR5/2; moist 10YR3/3, dry, platy, some roots, gravely; fine to coarse in size; fine sandy loam*
					2	*6 - 24 cm*	*Sandy Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, slightly effervescent, subangular blocky, friable, some gravel throughout; fine to medium, large cobbles throughout; fine sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.85 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.83933	N. Latitude
Section 1/4 Section		m		-116.315709	W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock access	
Offsite influences: Access roads, remnant mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RF_5*		Date: *July 5, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(753) Assign 17 indicator ratings, record comments and any measurements. (754) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (755) Assign overall rating for each attribute based on preponderance of evidence. (756) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *16* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Substantial shrub cover and perennial bunchgrasses increase infiltration and reduce runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *2*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *RF_5* **Date:** *July 5, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1129. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1130. Observe and list the F/S groups present in the evaluation area.

1131. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1132. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1133. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1134. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Daggerpod*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210705-152321.jpg



photo_S-20210705-152329.jpg



photo_W-20210705-152337.jpg



photo_Soil-20210705-152304.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *RF_6*		Date: *July 5, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *RF*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from tuff, andesite, volcanic rocks, chert, sedimentary rocks, limestone, dolomite, or rhyolite with a component of loess high in volcanic ash.*	Slope: *10°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1761.034* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Mountain; base of backslope*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Clay Loam*		*Dry 10YR4/3; moist 10YR2/2, slightly effervescent, subangular, granular, some fibrous roots throughout, some litter*
					2	*5 - 33 cm*	*Clay*		*Dry 10YR4/4; moist 10YR2/2, subangular, granular, dry, sticky, plastic, fibrous roots throughout, some gravel*
					3	*33 - 51 cm*	*Clay*		*Dry 10YR5/4; moist 10YR3/3, subangular, blocky, dry, some gravel, very small amount of fibrous roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.96 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR		40.837406 N. Latitude
Section 1/4 Section		m			-116.317078 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock access	
Offsite influences: Access roads, remnant mining activity	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *RF_6*		Date: *July 5, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(757) Assign 17 indicator ratings, record comments and any measurements. (758) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (759) Assign overall rating for each attribute based on preponderance of evidence. (760) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Significantly reduced perennial bunchgrasses, reduced shrubs, and increased annual grasses and forbs are potentially decreasing infiltration and reducing runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *10*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_RF_6* **Date:** *July 5, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1135. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1136. Observe and list the F/S groups present in the evaluation area.

1137. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1138. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1139. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1140. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass, Bottlebrush squirreltail, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow, Western stoneseed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Bull thistle, Mustard, Prickly lettuce, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ru_1*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Terrace 6-8 P.Z.*	Ecological site ID: *R024XY012NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ru*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess capped silty alluvium or lacustrine materials derived from mixed rock/ volcanic ash*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1416.602* m	Aspect: *85°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR4/3, some slight platy structure, extremely effervescent, dry, and friable, some fibrous roots and litter throughout*
					2	*6 - 32 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR4/4, slightly moist, subangular blocky texture, some fine roots throughout*
					3	*32 - 52 cm*	*Clay Loam*		*Dry 10YR6/4; moist 10YR4/4, some moisture present, subangular blockiness, slightly porous, fine to medium roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.4 miles west of the TS Power Plant, mile marker 2.3 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.750419 N. Latitude
Section 1/4 Section		m		-116.49299 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant in close proximity, access road and powerlines to the south	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ru_1*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(761) Assign 17 indicator ratings, record comments and any measurements. (762) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (763) Assign overall rating for each attribute based on preponderance of evidence. (764) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Likely some lack of infiltration due to lack of perennial bunchgrass presence*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *18*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ru_1* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1141. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1142. Observe and list the F/S groups present in the evaluation area.

1143. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1144. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1145. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1146. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210621-184608.jpg



photo_W-20210621-184618.jpg



photo_Soil-20210621-184631.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ru_2*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Terrace 6-8 P.Z.*	Ecological site ID: *R024XY012NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ru*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess capped silty alluvium or lacustrine materials derived from mixed rocks*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1415.184* m	Aspect: *134°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 3 cm*	*Clay*		*Dry 10YR7 2; moist 10YR4/3, extremely effervescent, very hard, dry, and compacted*
					2	*3 - 13 cm*	*Silt Loam*		*Dry 10YR6/3; moist 10YR5/4, slightly moist, subangular blockiness, slightly sticky*
					3	*13 - 52 cm*	*Sandy Clay Loam*		*Dry 10YR6/4; moist 10YR3/4, subangular blockiness, slightly porous and moist, fine to medium gravel throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.22 miles west of the TS Power Plant, mile marker 1.6 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.740419 N. Latitude
Section 1/4 Section		m		-116.496355 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant within close association	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ru_2*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(765) Assign 17 indicator ratings, record comments and any measurements. (766) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (767) Assign overall rating for each attribute based on preponderance of evidence. (768) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H *E-T*	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potential lack of infiltration capabilities due to hard surface layer. Overall lack of perennial bunchgrasses as well.*
11. Compaction layer	S H B	
12. Functional/structural groups a. Relative dominance: b. F/S groups not expected at the site:_ c. Number of F/S groups: d. Spp # in dom & subdom F/S groups:	B	
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *10*% Depth: *1.5 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ru_2* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1147. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1148. Observe and list the F/S groups present in the evaluation area.

1149. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1150. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1151. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1152. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-200952.jpg



photo_S-20210621-201002.jpg



photo_W-20210621-201010.jpg



photo_Soil-20210621-201029.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ru_2a*		Date: *July 22, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Terrace 6-8 P.Z.*	Ecological site ID: *R024XY012NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ru*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess capped silty alluvium or lacustrine materials derived from mixed rock sources with some influence of volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1418.979* m	Aspect: *295°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *43* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, fine platy structure, loose, dry, effervescent, sticky, some fine roots*
					2	*5 - 7 cm*	*Silty Clay Loam*		*Dry 10YR6/2; moist 10YR4/3, weak subangular blocky, very sticky, plastic, moist, fine roots throughout - many salt-lined*
					3	*7 - 43 cm*	*Silt Loam*		*Dry N/A ; moist 10YR5/4, subangular blocky, moist, fibrous roots - many salt-lined*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.79 miles west of the TS Power Plant, mile marker 0.9 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.778901 N. Latitude	
Section 1/4 Section		m		-116.466415 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, coal processing plant, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ru_2a*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(769) Assign 17 indicator ratings, record comments and any measurements. (770) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (771) Assign overall rating for each attribute based on preponderance of evidence. (772) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *20* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absent perennial bunchgrasses and perennial forbs likely to moderately decrease infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *6*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ru_2a* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1153. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1154. Observe and list the F/S groups present in the evaluation area.

1155. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1156. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1157. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1158. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Four-wing saltbush, Saltbush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



photo_N-20210722-161012.jpg



photo_E-20210722-161023.jpg



photo_S-20210722-161032.jpg



photo_W-20210722-161046.jpg



photo_Soil-20210722-160953.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ru_2b*		Date: *July 22, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Terrace 6-8 P.Z.*	Ecological site ID: *R024XY012NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ru*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess capped silty alluvium or lacustrine materials derived from mixed rock sources with some influence of volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1416.839* m	Aspect: *315°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *57* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 1 cm*	*Silt*		*No color given. Hard salt crust present.*
					2	*1 - 7 cm*	*Clay*		*Dry N/A; moist 10YR5/3, platy, moist, plastic, slightly sticky, some fibrous roots, porous*
					3	*7 - 19 cm*	*Silty Clay*		*Dry N/A; moist 10YR4/4, subangular blocky, moist, fine to medium roots throughout*
					4	*19 - 57 cm*	*Clay Loam*		*Dry N/A; moist 10YR5/4, weak subangular blocky, moist, fine to medium salt-line roots, tubular pores throughout.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.1 miles west of the TS Power Plant, mile marker 0.2 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.777846 N. Latitude
Section 1/4 Section		m		-116.479618 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, coal processing plant, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ru_2b*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(773) Assign 17 indicator ratings, record comments and any measurements. (774) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (775) Assign overall rating for each attribute based on preponderance of evidence. (776) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *24* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced perennial bunchgrasses and absent perennial forbs likely to moderately reduce infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *10*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ru_2b* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1159. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1160. Observe and list the F/S groups present in the evaluation area.

1161. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1162. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1163. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1164. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood, Winterfat*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210722-171034.jpg



photo_W-20210722-171052.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ru_2c*		Date: *July 22, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Terrace 6-8 P.Z.*	Ecological site ID: *R024XY012NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ru*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess capped silty alluvium or lacustrine materials derived from mixed rock sources with some influence of volcanic ash.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1420.815* m	Aspect: *278°*
Topographic position: NA		Topographic position: *Alluvial flat*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 12 cm*	*Silty Clay Loam*		*Dry 10YR7/2; moist 10YR4/3, very fine weak platy structure, friable, loose, dry, some litter, fibrous roots throughout.*
					2	*12 - 55 cm*	*Silt Loam*		*Dry 10YR6/4; moist 10YR5/4, subangular blocky, dense, dry, soft, fibrous roots - some salt-lined, very few tubular pores*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.35 miles west of the TS Power Plant, mile marker 1.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.779955 N. Latitude
Section 1/4 Section		m		-116.455876 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road, coal processing plant, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ru_2c*		Date: *July 22, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(777) Assign 17 indicator ratings, record comments and any measurements. (778) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (779) Assign overall rating for each attribute based on preponderance of evidence. (780) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration may be moderately reduced and runoff increased due to absent perennial bunchgrasses and perennial forbs.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *24*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ru_2c* **Date:** *July 22, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1165. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1166. Observe and list the F/S groups present in the evaluation area.

1167. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1168. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1169. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1170. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush, Four-wing saltbush, Saltbush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Halogeton, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Ru_3*		Date: *June 21, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kristyn Klecko*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Saline Terrace 6-8 P.Z.*	Ecological site ID: *R024XY012NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Ru*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess capped silty alluvium/lacustrine derived from mixed rock/ volcanic ash*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1416.325* m	Aspect: *60°*
Topographic position: NA		Topographic position: *Alluvial flats*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR4/3, subangular blockiness, slightly effervescent and friable, some fibrous roots throughout*
					2	*5 - 25 cm*	*Silty Clay*		*Dry 10YR6/3; moist 10YR4/4, friable, slightly platy and porous, fibrous roots throughout*
					3	*25 - 52 cm*	*Silty Clay*		*Dry 10YR6/4; moist 10YR5/4, slightly moist, some subangular blockiness, fine in texture, some pores, fine to medium roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.35 miles west of the TS Power Plant, mile marker 2.4 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.751336 N. Latitude
Section 1/4 Section		m		-116.49386 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Power plant within close association	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Ru_3*		Date: *June 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(781) Assign 17 indicator ratings, record comments and any measurements. (782) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (783) Assign overall rating for each attribute based on preponderance of evidence. (784) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *9* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Shrub cover aids in infiltration, but overall lack of perennial bunchgrasses within survey area may have some effect of infiltration capabilities as well.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Ru_3* **Date:** *June 21, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kristyn Klecko*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1171. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1172. Observe and list the F/S groups present in the evaluation area.

1173. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1174. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1175. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1176. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Saline Terrace 6-8 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210621-165147.jpg



photo_S-20210621-165153.jpg



photo_W-20210621-165206.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SBB_1*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SBB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess high in volcanic ash over alluvium derived from shale, chert, and volcanic rocks.*	Slope: *6°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1733.206* m	Aspect: *220°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Silt Loam*		*Dry 10YR5/2; moist 10Y3/3, loose, some platy structure, gravelly; fine to medium, many fine roots*
					2	*6 - 14 cm*	*Silty Clay*		*Dry 10YR4/3; moist 7.5YR2.5/3, weak subangular blocky structure; sticky, gravelly; fine in size; fine roots throughout*
					3	*14 - 37 cm*	*Silty Clay*		*Dry 7.5YR3/3; moist 7.5YR2.5/3, subangular blockiness, dry and hard, sticky, plentiful fine to coarse roots, gravelly; fine to medium in size*
					4	*37 - 54 cm*	*Clay Loam*		*Dry 7.5YR3/3; moist 7.5YR3/3, hard, blocky texture, cobbley and gravelly*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.21 miles north of the Goldstrike Mine, mile marker 11.4 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.834101 N. Latitude
Section 1/4 Section		m		-116.314895 W. Longitude
Supplemental Information & Reference Community Phase				
Recent weather (last 2 years): Drought				
Natural disturbance type(s) and date(s): NA				
Land treatment type(s) and date(s): Potentially some reseeding efforts; crested wheat grass present				
Wildlife, livestock, recreation, or other uses: Wildlife, livestock				
Offsite influences: Two track running through survey area. Stock pond just north of survey site				
Photos taken? Yes	Quantitative data collected: No			
F/S groups worksheet completed? Yes				
Reference community phase/description[3]: 5.1 Community Phase				

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SBB_1*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(785) Assign 17 indicator ratings, record comments and any measurements. (786) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (787) Assign overall rating for each attribute based on preponderance of evidence. (788) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potentially some reduced infiltration due to heavy presence of annual grass and reduced shrub cover*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *23*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SBB_1* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1177. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1178. Observe and list the F/S groups present in the evaluation area.

1179. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1180. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1181. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1182. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Knapweed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass, Japanese brome*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Prickly lettuce, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SBB_2*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SBB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess high in volcanic ash over alluvium derived from shale, chert, and volcanic rocks*	Slope: *6°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1711.192* m	Aspect: *230°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *64* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 5 cm*	*Silt Loam*		*Dry 10YR5/2; moist 10YR2/2, dry and loose, some gravel, lots of fine roots*
					2	*5 - 16 cm*	*Silty Clay*		*Dry 10YR5/2;moist 10YR3/3, weak platy structure, some subangular blockiness, slightly sticky, some roots throughout*
					3	*16 - 64 cm*	*Silty Clay*		*Dry 10YR3/4; moist 7.5YR2.5/3, subangular blocky structure, tubular pores, sticky, plentiful roots; fine to coarse*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.36 miles north of the Goldstrike Mine, mile marker 11.2 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.831062 N. Latitude
Section 1/4 Section		m		-116.317927 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): Potential past reseeding efforts; crested wheatgrass present.	
Wildlife, livestock, recreation, or other uses: Livestock, wildlife	
Offsite influences: Two track running through survey area	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SBB_2*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(789) Assign 17 indicator ratings, record comments and any measurements. (790) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (791) Assign overall rating for each attribute based on preponderance of evidence. (792) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Likely some lack of infiltration due to heavy annual grass presence and lack of shrub cover, despite perennial grass presence.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SBB_2* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1183. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1184. Observe and list the F/S groups present in the evaluation area.

1185. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1186. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1187. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1188. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow, Lupine*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass, Japanese brome*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_Soil-20210701-165506.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SBB_3*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SBB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess high in volcanic ash over alluvium derived from shale, chert, and volcanic rocks.*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1693.315* m	Aspect: *176°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/3, slight subangular blocky structure, loose, plentiful fine roots throughout*
					2	*4 - 14 cm*	*Silty Clay*		*Dry 10YR5/3; moist 10YR3/4, subangular blocky structure, loose, somewhat friable, slightly sticky many fine roots*
					3	*14 - 25 cm*	*Silty Clay*		*Dry 10YR5/2; moist 10YR3/3, subangular blockiness and granular structure, hard, gravelly; coarse in size, medium roots throughout*
					4	*25 - 55 cm*	*Silty Clay*		*Dry 10YR3/3; moist 7.5YR2.5/2, dry and hard, fine and medium roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.62 miles north of the Goldstrike Mine, mile marker 10.9 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.827086 N. Latitude
Section 1/4 Section		m			-116.317999 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): Potentially some reseeding efforts; presence of crested wheatgrass.					
Wildlife, livestock, recreation, or other uses: Livestock grazing, wildlife					
Offsite influences: Two track running through survey area					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SBB_3*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(793) Assign 17 indicator ratings, record comments and any measurements. (794) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (795) Assign overall rating for each attribute based on preponderance of evidence. (796) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Potentially some reduction in infiltration due to the heavy presence of annual grasses compared to perennial grasses. Presence of some sagebrush aids in some water retention within the survey area though.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SBB_3* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1189. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1190. Observe and list the F/S groups present in the evaluation area.

1191. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1192. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1193. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1194. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Poverty weed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass, Japanese brome*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SBB_4*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SBB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess high in volcanic ash over alluvium derived from shale, chert, and volcanic rocks*	Slope: *10°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1758.333* m	Aspect: *122°*
Topographic position: NA		Topographic position: *Fan remnant; backslope of low lying hillside*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 7.5YR3/3, slight subangular blocky structure, loose, some gravel, fine roots throughout*
					2	*4 - 16 cm*	*Silty Clay*		*Dry 10YR4/4, moist 7.5YR2.5/3, some platy and subangular blocky structure, friable, roots throughout; fine to coarse*
					3	*16 - 58 cm*	*Silty Clay*		*Dry 7.5YR3/4; moist 7.5YR3/3, subangular blocky structure, porous, heavy, some fine gravel, some fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.99 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.836789 N. Latitude
Section 1/4 Section		m		-116.317272 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Two track, stock pond	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SBB_4*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(797) Assign 17 indicator ratings, record comments and any measurements. (798) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (799) Assign overall rating for each attribute based on preponderance of evidence. (800) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decent amount of perennial plants within survey area; facing competition from annual grass*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SBB_4* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1195. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1196. Observe and list the F/S groups present in the evaluation area.

1197. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1198. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1199. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1200. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SBB_5*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SBB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess high in volcanic ash over alluvium derived from shale, chert, and volcanic rocks*	Slope: *8°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1767.387* m	Aspect: *138°*
Topographic position: NA		Topographic position: *Fan remnant; backslope of small hill*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *12* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 12 cm*	*Clay Loam*		*Dry 10YR6/2; moist 10YR4/4, porous and loose, sticky, extremely gravelly; fine to coarse in size; some cobble. Refusal at 12cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.92 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.838 N. Latitude
Section 1/4 Section		m		-116.316575 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Two track running through survey area, stock tank to the east

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes
Reference community phase/description[3]: 4.1 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SBB_5*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(801) Assign 17 indicator ratings, record comments and any measurements. (802) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (803) Assign overall rating for each attribute based on preponderance of evidence. (804) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *21* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Likely increased runoff due to bare ground present, however higher presence of perennial plants aids in overall infiltration*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *3*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SBB_5* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1201. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1202. Observe and list the F/S groups present in the evaluation area.

1203. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1204. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1205. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1206. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Tall wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Buckwheat*
Non-sprouting shrubs	*Big sagebrush, Utah serviceberry*
Sprouting shrubs	
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SBB_6*		Date: *July 1, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Nicole St John / Kevin Cutrera*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SBB*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Loess high in volcanic ash over alluvium derived from shale, chert, and volcanic rocks*	Slope: *7°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1750.893* m	Aspect: *65°*
Topographic position: NA		Topographic position: *Fan remnant; base of hill before backslope*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *28* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/4, weak subangular structure, porous, fine roots throughout, gravelly; fine in size*
					2	*4 - 12 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, platy and subangular blocky in structure, extremely gravelly; coarse gravel, stones present, and some roots. Refusal at 12 cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.96 miles north of the Goldstrike Mine, mile marker 11.5 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.837988 N. Latitude
Section 1/4 Section		m		-116.314578 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): Evidence of a potential wildfire or prescribed burn

Land treatment type(s) and date(s): Sagebrush appears to have been burned and cut; no longer present in survey area.	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Two track running through survey area, stock pond	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SBB_6*		Date: *July 1, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(805) Assign 17 indicator ratings, record comments and any measurements. (806) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (807) Assign overall rating for each attribute based on preponderance of evidence. (808) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Lacking shrubs to aid in infiltration and perennial plants are present, but competing with heavy annual forb presence*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *15*% Depth: *0.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SBB_6* **Date:** *July 1, 2021 1:00 PM* **Evaluator(s):** *Nicole St John / Kevin Cutrera*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1207. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1208. Observe and list the F/S groups present in the evaluation area.

1209. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1210. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1211. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1212. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Lupine*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Green rabbitbrush, Rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Blue mustard, Mustard, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_Soil-20210701-212223.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *SD_1*		Date: *July 8, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		
Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *SD*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from basic tuff, chert, shale, or quartzite with a small component loess containing volcanic ash, and minor admixtures of alluvium from andesite and basalt.*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1580.78* m	Aspect: *198°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Sandy Loam*		*Dry 10YR4/2; moist 10YR2/2, subangular blocky structure, dry, friable, some litter, very gravely; fine to very coarse, coarse sandy loam*
					2	*9 - 24 cm*	*Sandy Clay Loam*		*Dry 10YR5/2; moist 10YR2/2, loose, dry, very gravely; fine to very coarse; coarse sandy clay loam*
					3	*24 - 53 cm*	*Sandy Clay Loam*		*Dry 10YR4/2; wet 10YR2/2; slightly moist, granular, slightly sticky very gravely; fine to very coarse; coarse sandy clay loam*

Evaluation Area Location		
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 8.84 miles west of the TS Power Plant, mile marker 8.4 of the Welches Creek Road project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.794421 N. Latitude
Section 1/4 Section			m		-116.332382 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 2.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SD_1*		Date: *July 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(809) Assign 17 indicator ratings, record comments and any measurements. (810) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (811) Assign overall rating for each attribute based on preponderance of evidence. (812) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Few to no shrubs, reduced perennial bunchgrasses, and increased invasive annual grass - cheatgrass, may greatly reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *12*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SD_1* **Date:** *July 8, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1213. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1214. Observe and list the F/S groups present in the evaluation area.

1215. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1216. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1217. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1218. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce, Storksbill, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210708-205308.jpg



photo_W-20210708-205331.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *SD_2*		Date: *July 9, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		
Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *SD*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum or colluvium from basic tuff, chert, shale, and quartzite with minor admixtures of alluvium from andesite and basalt and a small component of loess containing volcanic ash*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1556.615* m	Aspect: *240°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *66* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/3, some subangular structure, loose, slightly sticky, some fine roots from annual grasses, very gravely ; fine to coarse*
					2	*4 - 25 cm*	*Sandy Clay*		*Dry 10YR4/3; moist 7.5YR2.5/3, fairly weak subangular structure, sticky, plastic, some fine roots throughout, very gravely; fine to coarse; coarse sandy clay*
					3	*25 - 66 cm*	*Sandy Clay Loam*		*Dry 7.5YR5/3; moist 7.5YR2.5/3, granular to blocky structures, slightly sticky, some fine roots throughout, extremely gravely - fine to coarse; coarse sandy clay loam*

Evaluation Area Location
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 8.5 miles west of the TS Power Plant, mile marker 7.9 of the Welches Creek Road project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.789479 N. Latitude
Section 1/4 Section		m			-116.338465 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access road					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SD_2*		Date: *July 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(813) Assign 17 indicator ratings, record comments and any measurements. (814) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (815) Assign overall rating for each attribute based on preponderance of evidence. (816) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced perennial bunchgrasses and shrubs, increased invasive annual grass- cheatgrass - greatly decreasing infiltration and increasing runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *10*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SD_2* **Date:** *July 9, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1219. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1220. Observe and list the F/S groups present in the evaluation area.

1221. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1222. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1223. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1224. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Bluebunch wheatgrass, Crested wheatgrass, Slender wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210709-174132.jpg



photo_S-20210709-174138.jpg



photo_W-20210709-174146.jpg



photo_Soil-20210709-174101.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SD_3*		Date: *July 8, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SD*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum or colluvium from basic tuff, chert, shale, and quartzite with minor admixtures of alluvium from andesite and basalt and a small component of loess containing volcanic ash*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1639.542* m	Aspect: *196°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Sandy Loam*		*Dry 10YR4/3; moist 10YR2/2, porous, slightly platy, dry, fine to medium gravel throughout, many fibrous roots, some litter; Coarse sandy loam*
					2	*8 - 30 cm*	*Sandy Clay*		*Dry 10YR5/3; moist 10YR3/3, subangular, granular, dry, slightly sticky, some fibrous roots throughout, gravely; fine to coarse ; Coarse sandy clay*
					3	*30 - 51 cm*	*Sandy Clay*		*Dry 10YR4/3; moist 10YR3/3, granular, dry, hard, sticky, very gravely; fine to very coarse in size; coarse sandy clay*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.35 miles west of the TS Power Plant, mile marker 9.7 of the Welches Creek Road project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.811576 N. Latitude
Section 1/4 Section		m			-116.325626 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SD_3*		Date: *July 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(817) Assign 17 indicator ratings, record comments and any measurements. (818) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (819) Assign overall rating for each attribute based on preponderance of evidence. (820) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced shrubs and perennial bunchgrasses combined with increased invasive annual grass - cheatgrass- and annual forbs significantly reduces infiltration and increases runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *27*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SD_3* **Date:** *July 8, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1225. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1226. Observe and list the F/S groups present in the evaluation area.

1227. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1228. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1229. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1230. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Western stoneseed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210708-192538.jpg



photo_W-20210708-192548.jpg



photo_Soil-20210708-192447.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SD_4*		Date: *July 9, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SD*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum or colluvium from basic tuff, chert, shale, and quartzite with minor admixtures of alluvium from andesite and basalt and a small component of loess containing volcanic ash*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1628.833* m	Aspect: *144°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 10YR5/3; moist 10YR3/3, platy, decent amount of organic matter, plentiful fine roots throughout, some loose fine gravel*
					2	*4 - 24 cm*	*Silty Clay*		*Dry 7.5YR5/2; moist 7.5YR3/2; blocky subangular, sticky, fine roots throughout, some fine gravel*
					3	*24 - 53 cm*	*Clay*		*Dry 7.5YR4/2; moist 7.5YR3/2, granular to blocky, fragmented claypan ,hard, dry, some fine gravel, fewer roots than previous layer.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.19 miles west of the TS Power Plant, mile marker 9.4 of the Welches Creek Road project segment.

Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.807796 N. Latitude

Section 1/4 Section	OR	m	OR	-116.327693 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power line	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SD_4*		Date: *July 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(821) Assign 17 indicator ratings, record comments and any measurements. (822) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (823) Assign overall rating for each attribute based on preponderance of evidence. (824) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decreased shrub and perennial bunchgrasses likely greatly reduces infiltration and increases runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *24*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SD_4* **Date:** *July 9, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1231. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1232. Observe and list the F/S groups present in the evaluation area.

1233. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1234. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1235. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1236. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Bull thistle, Mustard, Tansy mustard, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210709-145245.jpg



photo_S-20210709-145255.jpg



photo_W-20210709-145308.jpg



photo_Soil-20210709-145222.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SD_5*		Date: *July 9, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SD*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum or colluvium from basic tuff, chert, shale, and quartzite with minor admixtures of alluvium from andesite and basalt and a small component of loess containing volcanic ash*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1603.581* m	Aspect: *188°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 4 cm*	*Loam*		*Dry 7.5YR4/2; moist 7.5YR2/2; mostly lose with some to loose weak prismatic, dry, some fine gravel, lots of root litter and debris*
					2	*4 - 13 cm*	*Silt Loam*		*Dry 10YR4/2; moist 10YR2/2, subangular structure, fine gravel, lots of fine roots throughout*
					3	*13 - 36 cm*	*Sandy Clay Loam*		*Dry 7.5YR4/1; moist 10YR2/2, subangular structure, granular, hard, slightly sticky, plastic, fine roots, some fine gravel*
					4	*36 - 53 cm*	*Sandy Clay*		*Dry 10YR3/2; moist 10YR2/2; subangular, hard, slightly sticky, some fine roots, gravely - fine; coarse sandy clay*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.0 miles west of the TS Power Plant, mile marker 8.9 of the Welches Creek Road project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.800939 N. Latitude
Section 1/4 Section		m			-116.330084 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SD_5*		Date: *July 9, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(825) Assign 17 indicator ratings, record comments and any measurements. (826) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (827) Assign overall rating for each attribute based on preponderance of evidence. (828) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduction in perennial bunchgrasses and shrubs, significant increase in invasive annual grass, and annual forbs, likely severely reducing infiltration and increasing runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *24*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SD_5* **Date:** *July 9, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1237. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1238. Observe and list the F/S groups present in the evaluation area.

1239. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1240. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1241. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1242. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Bull thistle, Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*

Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210709-162500.jpg



photo_W-20210709-162508.jpg



photo_Soil-20210709-162418.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SG_1*		Date: *July 8, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from chert, shake, and quartzite, with a small component of loess containing volcanic ash; or, formed in loess high in volcanic ash over residuum derived from tuff*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1668.378* m	Aspect: *188°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *50* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR5/2; moist 10YR2/2, platy, hard, dry, some litter and fibrous roots; fine sandy loam*
					2	*6 - 14 cm*	*Clay Loam*		*Dry 10YR5/3; moist 10YR3/3, slightly platy, friable, hard, dry, some fine to coarse gravel*
					3	*14 - 50 cm*	*Clay*		*Dry 10YR5/2; moist 10YR3/3, subangular blocky structure, very compacted, sticky, hard, dry, some fine gravel throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.76 miles west of the TS Power Plant, mile marker 10.3 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.819719 N. Latitude	
Section 1/4 Section		m		-116.319836 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Evidence of a historical wildfire	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SG_1*		Date: *July 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(829) Assign 17 indicator ratings, record comments and any measurements. (830) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (831) Assign overall rating for each attribute based on preponderance of evidence. (832) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced shrubs, perennial bunchgrasses, and forbs, and increased annual grass and forbs likely moderately reducing infiltration and increasing runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SG_1* **Date:** *July 8, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1243. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1244. Observe and list the F/S groups present in the evaluation area.

1245. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1246. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1247. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1248. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Western stoneseed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210708-165103.jpg



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photo_Soil-20210708-165137.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SG_2*		Date: *July 5, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from chert, shale, and quartzite with a small component of loess containing volcanic ash; formed in loess high in volcanic ash over residuum derived from tuff.*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1690.773* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *55* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 9 cm*	*Clay Loam*		*Dry 10YR3/2; moist 10YR2/1, platy, slightly moist, some roots, some litter*
					2	*9 - 55 cm*	*Clay*		*Dry 10YR5/3; moist 10YR2/2, subangular, blocky, sticky, dry, hard, some fibrous roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.75 miles north of the Goldstrike Mine, mile marker 10.8 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.825341 N. Latitude	
Section 1/4 Section		m		-116.317342 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): Some evidence of a historic wildfire

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: NA	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SG_2*		Date: *July 5, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(833) Assign 17 indicator ratings, record comments and any measurements. (834) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (835) Assign overall rating for each attribute based on preponderance of evidence. (836) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *8* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *20*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *SG_2* **Date:** *July 5, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1249. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1250. Observe and list the F/S groups present in the evaluation area.

1251. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1252. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1253. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1254. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210705-180106.jpg



photo_W-20210705-180123.jpg



photo_Soil-20210705-180028.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *SG_3*		Date: *July 8, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *SG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from chert, shake, and quartzite, with a small component of loess containing volcanic ash; or, formed in loess high in volcanic ash over residuum derived from tuff*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1655.704* m	Aspect: *205°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR3/4; moist 10YR2/2, very dry, granular, some organic matter, fine to medium gravel throughout, many fibrous and medium roots throughout*
					2	*6 - 29 cm*	*Clay*		*Dry 10YR5/2; moist 10YR2/2, subangular blocky, very hard, very dry, very sticky and plastic, some fibrous roots*
					3	*29 - 53 cm*	*Clay*		*Dry 10YR4/2; moist 10YR2/1, subangular blocky, slightly porous, dry, hard*

Evaluation Area Location			
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.			
Location description/directions: Approximately 9.63 miles west of the TS Power Plant, mile marker 10.1 of the Welches Creek Road project segment.			
Size of evaluation area: *acre*	UTM Zone:	Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m		40.816876 N. Latitude

Section	1/4 Section	OR	m	OR	-116.321605	W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Evidence of a historical wildfire	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: SG_3		Date: *July 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(837) Assign 17 indicator ratings, record comments and any measurements. (838) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (839) Assign overall rating for each attribute based on preponderance of evidence. (840) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Few to no shrubs, greatly reduced perennial bunchgrasses and forbs, greatly increased cheatgrass all significantly decrease infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *35*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _SG_3 **Date:** *July 8, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1255. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1256. Observe and list the F/S groups present in the evaluation area.

1257. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1258. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1259. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1260. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Bull thistle, Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*

Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_Soil-20210708-175514.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SG_4*		Date: *July 5, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 10-12 P.Z.*	Ecological site ID: *R025XY014NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from chert, shale, and quartzite with a small component of loess containing volcanic ash; formed in loess high in volcanic ash over residuum derived from tuff.*	Slope: *N/A°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1681.338* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Clay Loam*		*Dry 10YR5/2; moist 10YR2/2, slightly moist, platy, plentiful fibrous roots throughout*
					2	*8 - 30 cm*	*Clay*		*Dry 10YR5/3; moist 10YR2/2,subangular blocky, hard, slightly sticky, small amount of sand, some fibrous roots*
					3	*30 - 54 cm*	*Clay*		*Dry 10YR5/2; moist 10YR2/2, subangular blocky, sticky, dry, hard, some fibrous roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.82 miles north of the Goldstrike Mine, mile marker 10.7 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.824196	N. Latitude
Section 1/4 Section		m		-116.318103	W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s):	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SG_4*		Date: *July 5, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(841) Assign 17 indicator ratings, record comments and any measurements. (842) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (843) Assign overall rating for each attribute based on preponderance of evidence. (844) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *21*% Depth: *N/A*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _SG_4 **Date:** *July 5, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1261. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1262. Observe and list the F/S groups present in the evaluation area.

1263. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1264. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1265. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1266. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 10-12 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Western stoneseed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210705-184810.jpg



photo_S-20210705-184820.jpg



photo_W-20210705-184835.jpg



photo_Soil-20210705-184738.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *SG_5*		Date: *July 8, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *SG*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in residuum and colluvium derived from chert, shake, and quartzite, with a small component of loess containing volcanic ash; or, formed in loess high in volcanic ash over residuum derived from tuff*	Slope: *5°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1668.351* m	Aspect: *183°*
Topographic position: NA		Topographic position: *Mountain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 12 cm*	*Clay Loam*		*Dry 10YR5/3 ; moist 10YR2/2, subangular blocky structure, dry, friable, small amount of fine to medium gravel, fibrous roots throughout*
					2	*12 - 52 cm*	*Sandy Clay*		*Dry 10YR5/3; moist 10YR3/3, subangular blocky structure, slightly porous, dry, very small amount of fine gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 9.77 miles west of the TS Power Plant, mile marker 10.4 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.820119 N. Latitude	
Section 1/4 Section		m		-116.319949 W. Longitude	

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *SG_5*		Date: *July 8, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(845) Assign 17 indicator ratings, record comments and any measurements. (846) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (847) Assign overall rating for each attribute based on preponderance of evidence. (848) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *3* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Increased annual grass slightly reduces perennial bunchgrasses, slightly decreasing infiltration and increasing runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *21*% Depth: *2 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _SG_5 **Date:** *July 8, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1267. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1268. Observe and list the F/S groups present in the evaluation area.

1269. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1270. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1271. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1272. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bluebunch wheatgrass, Slender wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210708-145535.jpg



photo_S-20210708-145544.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_1*		Date: *July 14, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash or alluvium derived from mixed but dominantly sedimentary rocks and pyroclastic materials*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1486.514* m	Aspect: *267°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons:				in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Sandy Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, very loose, slightly platy, tubular pores throughout, some fine to medium gravel, a lot of fine roots throughout, some litter; fine sandy clay loam*
					2	*4 - 13 cm*	*Clay Loam*		*Dry 10YR7/2; moist 10YR4/4, dry, slightly sticky, blocky subangular structure, some tubular pores, some fine to medium gravel, some duranoids, some fine roots*
					3	*13 - 28 cm*	*Sandy Clay Loam*		*Dry 10YR7/2, moist 10YR4/4, granular, some blocky subangular structure, some fine roots, some fine to medium gravel, some duranoids, tubular pores throughout; fine sandy clay loam*
					4	*28 - 53 cm*	*Silty Clay*		*Dry 10YR6/3, moist 10YR4/4, sticky, slightly plastic, slightly moist, subangular blocky structure, some fine*

									roots, some fine gravel; silty clay with fine sand

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 6.39 miles west of the TS Power Plant, mile marker 5.6 of the Welches Creek Road project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.785869 N. Latitude
Section [1]/4 Section		m		-116.378762 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Access road

Photos taken? Yes	Quantitative data collected: No

F/S groups worksheet completed? Yes

Reference community phase/description[3]: 4.2 Community Phase

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_1*		Date: *July 14, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(849) Assign 17 indicator ratings, record comments and any measurements. (850) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (851) Assign overall rating for each attribute based on preponderance of evidence. (852) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *13* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Missing potential dominant and subdominant perennial functional structure groups and increased annual invasive grass severely decreases infiltration and increases runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *26*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_1* **Date:** *July 14, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1273. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1274. Observe and list the F/S groups present in the evaluation area.

1275. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1276. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1277. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1278. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Russian thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210714-155258.jpg



photo_S-20210714-155303.jpg



photo_W-20210714-155309.jpg



photo_Soil-20210714-155240.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_2*		Date: *July 16, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1487.44* m	Aspect: *138°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons:				in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Sandy Clay Loam*		*Dry 10YR3/3; moist 10YR2/2, granular, fine to coarse gravel, full of fine perennial grass roots and root hairs*
					2	*10 - 23 cm*	*Sandy Clay Loam*		*Dry 10YR3/3; moist 10YR2/2, subangular structure, loose, slightly sticky, fine to coarse gravel, lots of fine lateral roots throughout; coarse sand clay loam.*
					3	*23 - 53 cm*	*Loamy Sand*		*Dry 10YR3/2; moist 10YR3/2, some moisture, loose, soft, heavy, granular structure, some roots throughout, gravelly fine to coarse*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 2.34 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.682786 N. Latitude

Section 1/4 Section	OR	m	OR	-116.151705 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Train track, power line	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_2*		Date: *July 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(853) Assign 17 indicator ratings, record comments and any measurements. (854) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (855) Assign overall rating for each attribute based on preponderance of evidence. (856) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Dense foliage significantly increases infiltration, decreases runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *0*% Depth:	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_2* **Date:** *July 16, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1279. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1280. Observe and list the F/S groups present in the evaluation area.

1281. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1282. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1283. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1284. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Western wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Yarrow*
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	*Russian olive*
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed, Scotch thistle, Silverscale saltbush*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210716-191743.jpg



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photo_Soil-20210716-191715.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_3*		Date: *July 12, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash or alluvium derived from mixed but dominantly sedimentary rocks and pyroclastic materials*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1527.751* m	Aspect: *270°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR3/3, some subangular blocky structure, mostly loose, fine roots and cheatgrass; fine sandy loam*
					2	*3 - 31 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR3/4; blocky subangular structure, slightly sticky, plastic, some medium gravel, fine roots*
					3	*31 - 53 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR4/4, subangular blocky structure, slightly sticky, plastic, some coarse gravel and duranoids, fine roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 7.28 miles west of the TS Power Plant, mile marker 6.5 of the Welches Creek Road project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.788953 N. Latitude

Section	1/4 Section	OR	m	OR	-116.361887 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_3*		Date: *July 12, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(857) Assign 17 indicator ratings, record comments and any measurements. (858) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (859) Assign overall rating for each attribute based on preponderance of evidence. (860) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *18* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Increase in invasive annual grass and decrease in perennial bunch grasses likely moderately decreases infiltration and increases runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *40*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_3* **Date:** *July 12, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1285. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1286. Observe and list the F/S groups present in the evaluation area.

1287. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1288. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1289. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1290. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *5.3 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Globemallow*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Prickly lettuce*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210712-174509.jpg



photo_S-20210712-174529.jpg



photo_W-20210712-174536.jpg



photo_Soil-20210712-174449.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_3a*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1488.491* m	Aspect: *20°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *57* cm	

Type and depth of diagnostic horizons:				in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Sandy Loam*		*Dry 10YR7/1; moist 10YR5/2, loose, dusty, porous, slightly sticky, 3.5-4cm crust on top, crust effervescent; fine sandy loam.*
					2	*8 - 18 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR4/4, weak subangular platy structures, sticky, lots of tubular pores; fine sandy loam.*
					3	*18 - 30 cm*	*Silty Clay*		*Dry 5YR5/3; moist 5YR4/4, large blocky structure, hard, brittle, sticky, plastic, requires pulverization, lots of fine and coarse roots*
					4	*30 - 57 cm*	*Sandy Clay*		*Dry 5YR5/4; moist 5YR5/4, blocky granular structure, hard, sticky, plastic, concreted silica, requires pulverization, coarse fibrous roots; coarse sand clay.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.93 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.687358 N. Latitude
Section 1/4 Section		m			-116.146715 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Train track, power line					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_3a*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(861) Assign 17 indicator ratings, record comments and any measurements. (862) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (863) Assign overall rating for each attribute based on preponderance of evidence. (864) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *18* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decreases in bunchgrasses and forbs along with an increase in invasive grass and forbs may slightly reduce infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *15*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_3a* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1291. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1292. Observe and list the F/S groups present in the evaluation area.

1293. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1294. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1295. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1296. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210717-182555.jpg



photo_W-20210717-182639.jpg



photo_Soil-20210717-182530.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_4*		Date: *July 19, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1490.371* m	Aspect: *172°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *58* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Silty Clay*		*Dry 10YR4/4; moist 10YR3/6, some subangular structure, loose, dry, sticky, plastic, fine gravel, some litter.*
					2	*7 - 32 cm*	*Silty Clay*		*Dry 7.5YR4/4; moist 7.5YR3/4, fine granular to large blocky structure, hard, sticky, plastic, gravelly, fine gravel, some coarse roots*
					3	*32 - 58 cm*	*Silty Clay*		*Dry 7.5YR4/4; moist 7.5YR3/4, large blocky structure, hard, sticky, plastic, fine gravel throughout, some fine roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.52 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.695889 N. Latitude

Section	1/4 Section	OR	m	OR	-116.145265 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, train track, nearby houses, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_4*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(865) Assign 17 indicator ratings, record comments and any measurements. (866) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (867) Assign overall rating for each attribute based on preponderance of evidence. (868) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *21* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Sagebrush absent, but greasewood likely able to capture moisture. Replacement of perennial bunchgrasses by cheatgrass may moderately reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *16*% Depth: *1 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_4* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1297. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1298. Observe and list the F/S groups present in the evaluation area.

1299. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1300. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1301. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1302. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Shadscale*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210719-131502.jpg



photo_W-20210719-131510.jpg



photo_Soil-20210719-131438.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_5*		Date: *July 12, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Henson DeBruler / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash or alluvium derived from mixed but dominantly sedimentary rocks and pyroclastic materials*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1524.605* m	Aspect: *282°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Sandy Loam*		*Dry 10YR6/3; moist 10YR4/4, blocky subangular structure, very sticky, plastic, some fine gravel, fine roots and cheatgrass*
					2	*8 - 24 cm*	*Sandy Clay*		*Dry 10YR6/3; moist 10YR5/4, subangular blocky structure, slightly moist, hard, fine to medium gravel, some fine roots*
					3	*24 - 53 cm*	*Sandy Clay*		*Dry 10YR5/4; moist 10YR3/4, subangular blocky structure, some moisture, slightly effervescent, slightly sticky, some fine to medium gravel; coarse sandy clay*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 7.17 miles west of the TS Power Plant, mile marker 6.4 of the Welches Creek Road project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.787359 N. Latitude

Section 1/4 Section	OR	m	OR	-116.363861 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_5*		Date: *July 12, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(869) Assign 17 indicator ratings, record comments and any measurements. (870) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (871) Assign overall rating for each attribute based on preponderance of evidence. (872) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *15* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Decreased forbs and perennial bunchgrasses, and increase in invasive annual grass moderately decreases infiltration and increases runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *32*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_5* **Date:** *July 12, 2021 1:00 PM* **Evaluator(s):** *Henson DeBruler / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1303. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1304. Observe and list the F/S groups present in the evaluation area.

1305. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1306. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1307. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1308. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210712-194317.jpg



photo_W-20210712-194323.jpg



photo_Soil-20210712-194249.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_5a*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1494.822* m	Aspect: *N/A°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *40* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 8 cm*	*Silty Clay*		*Dry 10YR5/4; moist 10YR4/4, some very weak coarse granular structure, loose, slightly sticky, slightly plastic, gravelly, fine gravel, debris*
					2	*8 - 27 cm*	*Sandy Clay*		*Dry 7.5YR4/6; moist 7.YR4/4, large blocky subangular structure, some fine granular structure, dry, sticky, plastic, very gravelly, fine rock fragments and gravel throughout, up to coarse gravel, coarse and fine roots throughout; fine sand clay.*
					3	*27 - 40 cm*	*Sandy Clay*		*Loose from fine to coarse gravel, slightly stick; very coarse sandy clay. Refusal (gravel) at 40cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.5 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.697241 N. Latitude
Section 1/4 Section		m			-116.145766 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads, train track, power lines, nearby houses					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_5a*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(873) Assign 17 indicator ratings, record comments and any measurements. (874) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (875) Assign overall rating for each attribute based on preponderance of evidence. (876) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Present but minimal; scarce and scattered*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *20* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Increase in invasive annual grass and a decrease in native grasses and forbs slightly reduces infiltration and increases runoff. Codominant big sagebrush and greasewood likely aid in capturing snowmelt.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *9*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_5a* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1309. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1310. Observe and list the F/S groups present in the evaluation area.

1311. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1312. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1313. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1314. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *3.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_6*		Date: *July 14, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash or alluvium derived from mixed but dominantly sedimentary rocks and pyroclastic materials*	Slope: *3°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1500.555* m	Aspect: *255°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *59* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 3 cm*	*Clay Loam*		*Dry 10YR6/3; moist 10YR3/4, platy, slightly effervescent, friable, some litter and fine gravel*
					2	*3 - 15 cm*	*Silty Clay Loam*		*Dry 10YR6/3; moist 10YR5/4, hard, subangular structure, platy, dry, plastic*
					3	*15 - 40 cm*	*Sandy Loam*		*Dry 10YR6/4, moist 10YR3/4, slightly porous, slightly moist, subangular blocky structure, very few fibrous roots*
					4	*40 - 59 cm*	*Sandy Loam*		*Dry 10YR7/3; moist 10YR5/4, moist, subangular blocky structure, loose, fine to medium gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 6.72 miles west of the TS Power Plant, mile marker 5.9 of the Welches Creek Road project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes
Township Range	m	40.78665 N. Latitude

Section	1/4 Section	OR	m	OR	-116.372355 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_6*		Date: *July 14, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(877) Assign 17 indicator ratings, record comments and any measurements. (878) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (879) Assign overall rating for each attribute based on preponderance of evidence. (880) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *7* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Increase in annual invasive grass and decrease in bunchgrasses and forbs moderately decreases infiltration and increases runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *37*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_6* **Date:** *July 14, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1315. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1316. Observe and list the F/S groups present in the evaluation area.

1317. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1318. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1319. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1320. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Russian thistle, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_Soil-20210714-142102.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_6a*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *10°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1499.692* m	Aspect: *148°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *15* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 4 cm*	*Sandy Loam*		*Dry 10YR4/3; moist 10YR3/3, fine gravel with some loose soil material, dry, litter and cheatgrass roots; coarse sandy loam.*
					2	*4 - 15 cm*	*Sandy Clay*		*Dry 7.5YR6/2; moist 7.5YR3/4, fine gravel with loose soil, slightly sticky, plastic; coarse sand clay. Refusal (gravel) at 15cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.5 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.697932 N. Latitude
Section 1/4 Section		m		-116.146062 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, train track, nearby houses	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 3.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_6a*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(881) Assign 17 indicator ratings, record comments and any measurements. (882) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (883) Assign overall rating for each attribute based on preponderance of evidence. (884) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *2* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absence of potentially expected perennial functional structure groups and an increase in invasive annual grass may severely reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *12*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_TN_6a* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1321. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1322. Observe and list the F/S groups present in the evaluation area.

1323. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1324. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1325. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1326. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Mustards, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_7*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1487.455* m	Aspect: *112°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *57* cm	

Type and depth of diagnostic horizons:				in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 5 cm*	*Silty Clay Loam*		*Dry 10YR5/2; moist 7.5YR2.5/2, some weak subangular structure, quite dry, mostly loose, slightly sticky, slightly plastic, some roots and litter*
					2	*5 - 38 cm*	*Silty Clay*		*Dry 10YR5/2; moist 7.5YR2.5/3, blocky to granular, weak, crumbly, dry, sticky, some rock, coarse and fine roots throughout*
					3	*38 - 57 cm*	*Clay Loam*		*Dry 10YR3/4; moist 7.5YR2.5/3, fine granular, blocky, friable, dry, sticky, plastic, requires pulverization, some duranoids, some fine roots throughout*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Approximately 2.25 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range	OR	m	OR	40.683193 N. Latitude	
Section 1/4 Section		m		-116.149824 W. Longitude	
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Train track, power line					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 4.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_7*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(885) Assign 17 indicator ratings, record comments and any measurements. (886) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (887) Assign overall rating for each attribute based on preponderance of evidence. (888) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *5* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Absence of shrubs and native forbs, and increase in invasive annual forbs may slightly reduce infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *11*% Depth: *2 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_7* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1327. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1328. Observe and list the F/S groups present in the evaluation area.

1329. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1330. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1331. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1332. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Knapweed, Russian knapweed*
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210717-170637.jpg



photo_S-20210717-170645.jpg



photo_W-20210717-170652.jpg



photo_Soil-20210717-170624.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_8*		Date: *July 16, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *40°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1489.167* m	Aspect: *104°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR6/2; moist 10YR3/4, slightly sticky, some weak subangular structure, almost platy, loose with fine to coarse gravel*
					2	*6 - 32 cm*	*Sandy Clay Loam*		*Dry 10YR5/2; moist 10YR3/, sticky, granular structure, very gravelly, fine to coarse gravel, fine roots throughout*
					3	*32 - 60 cm*	*Sandy Clay Loam*		*Dry 10YR4/4, moist 10YR4/4, some subangular structure, slightly moist, slightly sticky, heavy, loose, some fine to medium gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.41 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.681974 N. Latitude
Section 1/4 Section		m		-116.152506 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Train track, power line	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_8*		Date: *July 16, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(889) Assign 17 indicator ratings, record comments and any measurements. (890) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (891) Assign overall rating for each attribute based on preponderance of evidence. (892) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *0* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Slight increase in cheatgrass but enough remaining forbs, bunchgrasses, and shrubs to limit runoff*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *4*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_8* **Date:** *July 16, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1333. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1334. Observe and list the F/S groups present in the evaluation area.

1335. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1336. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1337. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1338. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Clasping pepperweed, Halogeton, Mustard, Pepperweed, Silverscale saltbush, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210716-203919.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_8a*		Date: *July 19, 2021 1:00 PM*
Management unit: *PALISADE*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *30°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1503.589* m	Aspect: *90°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 10 cm*	*Loamy Sand*		*Dry 10YR4/3; moist 10YR2/2, some loose soil in fine to coarse gravel, litter, lots of organic material; coarse loamy sand.*
					2	*10 - 51 cm*	*Sandy Clay*		*Dry 10YR3/3; moist 10YR3/3, some weak subangular structure, somewhat moist, slightly sticky, fine to coarse gravel, some cobbles, lots of fine roots, very porous; coarse sand clay.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 1.48 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.698453 N. Latitude
Section 1/4 Section		m		-116.146005 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, power lines, train track, nearby houses	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_8a*		Date: *July 19, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(893) Assign 17 indicator ratings, record comments and any measurements. (894) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (895) Assign overall rating for each attribute based on preponderance of evidence. (896) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduction in perennial grasses and increase in invasive annual grass may greatly reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *12*% Depth: *1 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_8a* **Date:** *July 19, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1339. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1340. Observe and list the F/S groups present in the evaluation area.

1341. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1342. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1343. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1344. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.2 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Storksbill, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210719-152907.jpg



photo_S-20210719-152916.jpg



photo_W-20210719-152922.jpg



photo_Soil-20210719-152849.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *TN_9*		Date: *July 17, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy 8-10 P.Z.*	Ecological site ID: *R025XY019NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *TN*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in loess high in volcanic ash over alluvium derived from mixed rock, sedimentary rocks, and pyroclastic materials.*	Slope: *NA°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1487.167* m	Aspect: *100°*
Topographic position: NA		Topographic position: *Fan remnant*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *28* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 28 cm*	*Sand*		*Highly disturbed mottled gravel soils; refusal at 28cm.*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 2.42 miles northeast of the town of Carlin, mile marker 0.0 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.681235 N. Latitude
Section 1/4 Section		m		-116.151733 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA

Wildlife, livestock, recreation, or other uses: Wildlife, livestock

Offsite influences: Train track, power line

Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	

Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *TN_9*		Date: *July 17, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(897) Assign 17 indicator ratings, record comments and any measurements. (898) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (899) Assign overall rating for each attribute based on preponderance of evidence. (900) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *38* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*No real runoff due to wetland characteristics*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *2*% Depth: *0 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _ *TN_9* **Date:** *July 17, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1345. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1346. Observe and list the F/S groups present in the evaluation area.

1347. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1348. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1349. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1350. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy 8-10 P.Z.*	**Reference phase for evaluation area:** *4.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	*Common cattail*
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Dock*
Non-sprouting shrubs	
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Pepperweed*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210717-163042.jpg



photo_S-20210717-163049.jpg



photo_W-20210717-163056.jpg



photo_Soil-20210717-163020.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Wc_1*		Date: *July 15, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Wet Meadow*	Ecological site ID: *R025XY005NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Wc*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks and vitric pyroclastic materials.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1490.429* m	Aspect: *140°*
Topographic position: NA		Topographic position: *Flood plain*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 12 cm*	*Sandy Loam*		*Dry NA; moist 10YR2/2, subangular granular, organic, loose, many fine to medium roots throughout, some fine gravel; fine sandy loam*
					2	*12 - 27 cm*	*Sandy Clay Loam*		*Dry NA; moist 10YR3/3, subangular blocky, some redox, very moist, fine to medium roots, some fine to medium gravel*
					3	*27 - 52 cm*	*Loamy Sand*		*Dry NA; moist 10YR3/3; subangular granular, wet, some fine roots, gravely - fine to medium*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.18 miles north of the town of Carlin, mile marker 0.4 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.703871 N. Latitude
Section 1/4 Section		m		-116.119833 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): NA

Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Railroad tracks, access roads, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Wc_1*		Date: *July 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(901) Assign 17 indicator ratings, record comments and any measurements. (902) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (903) Assign overall rating for each attribute based on preponderance of evidence. (904) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *0* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*High invasive annual forbs and reduced perennial grasses slightly decreasing infiltration and increasing runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *4*% Depth: *2.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Wc_1* **Date:** *July 15, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1351. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1352. Observe and list the F/S groups present in the evaluation area.

1353. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1354. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1355. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1356. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Wet Meadow*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Western wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	*Alkali sacaton*
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass, Timothy*
Shallow-rooted, emergent perennials	*Broad-leaf cattail*
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Baltic rush, Broad-leaved pepperweed, Knapweed, Rocky Mountain iris, Russian knapweed*
Non-sprouting shrubs	*Currant*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	*Russian olive*
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mapleleaf goosefoot, Musk thistle, Pepperweed, Prickly lettuce, Scotch thistle*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210715-201941.jpg



photo_W-20210715-201949.jpg



photo_Soil-20210715-201900.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Wc_2*		Date: *July 15, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Wet Meadow*	Ecological site ID: *R025XY005NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Wc*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks and vitric pyroclastic materials.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1490.604* m	Aspect: *125°*
Topographic position: NA		Topographic position: *Flood plains*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Sandy Loam*		*Dry 10YR3/3; moist 10YR2/2, loose, dry, spongy, a lot of fibrous to medium roots, a lot of litter, porous; peat*
					2	*7 - 28 cm*	*Sandy Clay*		*Dry NA; moist 10YR2/1, angular blocky structure, slightly sticky, some fine to medium roots, some fine gravel*
					3	*28 - 36 cm*	*Clay*		*Dry NA; moist 80% 10YR2/1 and 20% 10YR4/2 , subangular blocky structure, very moist, slightly sticky, fine to medium roots, fine gravel throughout*
					4	*36 - 53 cm*	*Sandy Clay*		*Dry NA; moist 10YR4/2, subangular, granular, wet, some fine roots, gravely; fine to medium in size; coarse sandy clay*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.16 miles northeast of the town of Carlin, mile marker 0.5 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*			UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range		OR	m	OR	40.704872 N. Latitude
Section 1/4 Section			m		-116.121887 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads, livestock infrastructure, power lines,					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.2 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Wc_2*		Date: *July 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(905) Assign 17 indicator ratings, record comments and any measurements. (906) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (907) Assign overall rating for each attribute based on preponderance of evidence. (908) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *0* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Increase in annual forbs and decrease in perennial bunchgrasses likely to reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *11*% Depth: *2.5 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Wc_2* **Date:** *July 15, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1357. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1358. Observe and list the F/S groups present in the evaluation area.

1359. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1360. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1361. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1362. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Wet Meadow*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Alpine timothy, Bluegrass, Sandberg bluegrass, Timothy*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Baltic rush, Broad-leaved pepperweed, Hoary cress, Knapweed, Russian knapweed, Smartweed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Field pennycress, Mapleleaf goosefoot, Musk thistle, Mustard, Pepperweed, Prickly lettuce, Scotch thistle, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_W-20210715-153152.jpg



photo_Soil-20210715-153055.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Wc_3*		Date: *July 15, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Wet Meadow*	Ecological site ID: *R025XY005NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Wc*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks and vitric pyroclastic materials.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1490.674* m	Aspect: *128°*
Topographic position: NA		Topographic position: *Flood plain, meadow*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 6 cm*	*Sandy Loam*		*Dry 10YR3/3; moist 10YR2/2, granular, loose, spongy, litter, a lot of fine to medium roots, some fine gravel; fine sandy loam*
					2	*6 - 26 cm*	*Clay*		*Dry NA; moist 10YR3/2, angular blocky structure, very moist, slightly sticky fibrous roots throughout, some fine gravel, tubular pores*
					3	*26 - 39 cm*	*Sandy Clay*		*Dry NA; moist 15% 10YR3/1 and 85% 10YR4/2, angular blocky, sticky, fine to medium roots throughout, some fine gravel, some tubular pores; fine sandy clay*
					4	*39 - 53 cm*	*Sandy Clay*		*Dry NA; moist 95% 10YR3/3 and 5% 10YR3/1, wet, loose, some fine to medium roots, fine gravel*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.15 miles northeast of the town of Carlin, mile marker 0.5 of the Carlin to GQ Private Bush Street project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m		OR	40.704811 N. Latitude
Section 1/4 Section		m			-116.121637 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): NA					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads, railroad tracks, power line					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: State-and-Transition models not developed for this draft ecological site description					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Wc_3*		Date: *July 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(909) Assign 17 indicator ratings, record comments and any measurements. (910) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (911) Assign overall rating for each attribute based on preponderance of evidence. (912) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration maintained by dominant perennial grasses*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *3*% Depth: *0.25 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Wc_3* **Date:** *July 15, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1363. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1364. Observe and list the F/S groups present in the evaluation area.

1365. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1366. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1367. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1368. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Wet Meadow*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass, Timothy*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Broad-leaved pepperweed, Knapweed, Russian knapweed, Smartweed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Musk thistle, Mustard, Pepperweed, Prickly lettuce, Scotch thistle, Tansy mustard, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210715-172803.jpg



photo_W-20210715-172816.jpg



photo_Soil-20210715-172617.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *Wc_4*		Date: *July 15, 2021 1:00 PM*
Management unit: *NA*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Wet Meadow*	Ecological site ID: *R025XY005NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *Wc*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks and vitric pyroclastic materials.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1490.939* m	Aspect: *143°*
Topographic position: NA		Topographic position: *Flood plain*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *54* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 9 cm*	*Sandy Loam*		*Dry 10YR4/3; moist 10YR3/3, subangular, blocky, dry, loose, spongy, litter, lots of fibrous roots, some fine gravel; fine sandy loam*
					2	*9 - 23 cm*	*Sandy Clay*		*Dry 10YR5/3; moist 10YR3/2, subangular blocky, slightly moist, sticky, plastic, a lot of fine to medium roots throughout, fine gravel; fine sandy clay*
					3	*23 - 54 cm*	*Sandy Clay*		*Dry N/A; moist 10YR2/2; subangular blocky, very moist, slightly sticky, plastic, fine to medium gravel; fine sandy clay*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.15 miles northeast of the town of Carlin, mile marker 0.5 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.70454 N. Latitude
Section 1/4 Section		m		-116.120983 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, railroad tracks, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.1 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *Wc_4*		Date: *July 15, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(913) Assign 17 indicator ratings, record comments and any measurements. (914) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (915) Assign overall rating for each attribute based on preponderance of evidence. (916) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *1* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Increased invasive annual forbs and decreased perennial grasses may reduce infiltration and increase runoff.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *4*% Depth: *N/A cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_Wc_4* **Date:** *July 15, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1369. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1370. Observe and list the F/S groups present in the evaluation area.

1371. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1372. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1373. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1374. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Wet Meadow*	**Reference phase for evaluation area:** *State-and-Transition models not developed for this draft ecological site description*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Western wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	*Alkali sacaton*
Shallow-rooted, cool-season perennial bunchgrasses	*Bluegrass, Sandberg bluegrass*
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Broad-leaved pepperweed, Slender cinquefoil*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Rubber rabbitbrush*
Evergreen trees	*Russian olive*
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	*Smooth brome, smooth brome*
Annual forbs	*Musk thistle, Mustard, Pepperweed, Scotch thistle, Tumble mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210715-190137.jpg



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INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *WE_1*		Date: *July 13, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy Bottom 8-14 P.Z.*	Ecological site ID: *R025XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *WE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks, vitric pyroclastic materials, or siliceous rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1581.382* m	Aspect: *176°*
Topographic position: NA		Topographic position: *Flood plains*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *56* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 7 cm*	*Silty Clay Loam*		*Dry 10YR4/2; moist 7.5YR2.5/2, loose weak platy structure, some subangular, sticky, some charred organic matter, no roots, no gravel*
					2	*7 - 17 cm*	*Silty Clay*		*Dry 7.5YR5/2 , Moist - 7.5YR3/2; crisp/baked, slightly sticky, weak subangular structure, coarse and fine roots throughout*
					3	*17 - 41 cm*	*Silty Clay Loam*		*Dry 7.5YR6/2; moist 7.5YR3/3, subangular, hard, slightly sticky, powdery, some coarse roots*
					4	*41 - 56 cm*	*Sandy Clay Loam*		*Dry 7.5YR6/2; moist 7.5YR3/4, weak subangular structure, slightly sticky, friable; coarse sandy clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.		
Location description/directions: Is within the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.		
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*	Position by GPS? Yes

Township Range		OR	m	OR	40.983674 N. Latitude
Section 1/4 Section			m		-116.403319 W. Longitude
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): Evidence of mitigation and revegetation efforts					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads, heavy mining activity, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *WE_1*		Date: *July 13, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(917) Assign 17 indicator ratings, record comments and any measurements. (918) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (919) Assign overall rating for each attribute based on preponderance of evidence. (920) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *6* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration capabilities are likely as expected - perennial bunchgrasses and shrubs maintain infiltration.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B *N-S*	
14. Litter cover and depth Observed cover: *14*% Depth: *2 cm*	H B *N/A*	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_WE_1* **Date:** *July 13, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1375. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1376. Observe and list the F/S groups present in the evaluation area.

1377. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1378. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1379. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1380. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy Bottom 8-14 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	*Desert saltgrass, Saltgrass*
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Mustard, Prickly lettuce, Western salsify*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210713-162737.jpg



photo_S-20210713-162745.jpg



photo_W-20210713-162756.jpg



photo_Soil-20210713-162713.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1 Complete the following information as necessary for project documentation and assessment purposes.		
Evaluation area name or ID: *WE_2*		Date: *July 12, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Chris Hensley*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***		
Ecological site name: *Loamy Bottom 8-14 P.Z.*	Ecological site ID: *R025XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***			
Soil Survey: *NA*		Soil Map Unit: *WE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks, vitric pyroclastic materials, or siliceous rocks.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1529.307* m	Aspect: *182°*
Topographic position: NA		Topographic position: *N/A*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *51* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 2 cm*	*Silt Loam*		*Dry 10YR4/3; moist 10YR3/3, some subangular blocky structure, grass roots and material*
					2	*2 - 23 cm*	*Silty Clay Loam*		*Dry 10YR4/2; moist 10YR2/2, blocky subangular structure, slightly sticky, plastic, fine roots*
					3	*23 - 42 cm*	*Silty Clay*		*Dry 10YR4/2; moist 10YR2/2, blocky subangular structure, granular texture, fine roots*
					4	*42 - 51 cm*	*Silty Clay*		*Dry 10YR4/2; moist 10YR2/2, blocky subangular structure, sticky, slightly plastic, granular, fine roots*

Evaluation Area Location			
Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.			
Location description/directions: Approximately 7.71 miles west of the TS Power Plant, mile marker 7.1 of the Welches Creek Road project segment.			
Size of evaluation area: *acre*	UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	m		40.789951 N. Latitude

Section 1/4 Section	OR	m	OR	-116.353559 W. Longitude

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): NA	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access road	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *WE_2*		Date: *July 12, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(921) Assign 17 indicator ratings, record comments and any measurements. (922) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (923) Assign overall rating for each attribute based on preponderance of evidence. (924) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *35* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Reduced perennial bunch grasses and increased annual invasive grass potentially reduces infiltration and increases runoff*
11. Compaction layer	S H B *N-S*	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *16*% Depth: *1 cm*	H B *N/A*	
15. Annual production: Observed: _ ÷ Expected = _%	B *N-S*	
16. Invasive plants	B *S-M*	
17. Vigor with an emphasis on reproductive capability of perennial plants	B *M*	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:	Attribute Rating: *N/A*					Rationale:
					N/A						*N/A*						*N/A*
0	0	0	0	7		0	0	0	0	6		0	0	1	1	1	
E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S		E-T	M-E	M	S-M	N-S	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: _*WE_2*_____ **Date:** *July 12, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Chris Hensley*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1381. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1382. Observe and list the F/S groups present in the evaluation area.

1383. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1384. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1385. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1386. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy Bottom 8-14 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Bottlebrush squirreltail, Crested wheatgrass, Squirreltail*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Greasewood, Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210712-162715.jpg



photo_W-20210712-162709.jpg



photo_Soil-20210712-162627.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *WE_3*		Date: *July 13, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy Bottom 8-14 P.Z.*	Ecological site ID: *R025XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *WE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks, vitric pyroclastic materials, or siliceous rocks.*	Slope: *1°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1573.839* m	Aspect: *238°*
Topographic position: NA		Topographic position: *Flood plain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *60* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff [2]	Other	Soil horizon	Depth	Texture	Eff [2]	Other
					1	*0 - 8 cm*	*Sandy Clay Loam*		*Dry 10YR5/2; moist 10YR3/3, dry, friable, loose with some weak subangular structure, some fine to coarse annual grass and forb roots throughout, some fine to medium gravel; fine sand clay loam*
					2	*8 - 20 cm*	*Sandy Loam*		*Dry 10YR4/3; moist 7.5YR3/3, very loose with some blocky subangular structure, very friable, very gravely - fine to coarse; fine sandy loam*
					3	*20 - 36 cm*	*Silty Clay Loam*		*Dry 7.5YR5/2,; moist 7.5YR2.5/3, friable, weak subangular structure, slightly sticky, powdery, coarse and fine roots throughout*
					4	*36 - 60 cm*	*Sandy Clay Loam*		*Dry 10YR4/3; moist 7.5YR2.5/2; friable, loose, some subangular structure, lots of fine roots; fine sand clay loam*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.					
Location description/directions: Is within the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.					
Size of evaluation area: *acre*		UTM Zone:	Datum: *WGS 1984*	Position by GPS? Yes	
Township Range	OR	m	OR	40.980266 N. Latitude	
Section 1/4 Section		m		-116.408872 W. Longitude	
Supplemental Information & Reference Community Phase					
Recent weather (last 2 years): Drought					
Natural disturbance type(s) and date(s): Historical wildfire evidence					
Land treatment type(s) and date(s): NA					
Wildlife, livestock, recreation, or other uses: Wildlife, livestock					
Offsite influences: Access roads, heavy mining activity, power lines					
Photos taken? Yes	Quantitative data collected: No				
F/S groups worksheet completed? Yes					
Reference community phase/description[3]: 3.1 Community Phase					

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *WE_3*		Date: *July 13, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(925) Assign 17 indicator ratings, record comments and any measurements. (926) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (927) Assign overall rating for each attribute based on preponderance of evidence. (928) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Slightly higher presence of shrubs at site; infiltration likely maintained.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site:_		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *2 cm*	H B	
15. Annual production: Observed: _÷ Expected = _%	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_WE_3* **Date:** *July 13, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1387. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1388. Observe and list the F/S groups present in the evaluation area.

1389. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1390. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1391. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1392. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy Bottom 8-14 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	*Hoary cress, Poverty weed*
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Fleabane, Mustard, Prickly lettuce, Tansy mustard*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_S-20210713-175413.jpg



photo_W-20210713-175420.jpg



photo_Soil-20210713-175342.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *WE_4*		Date: *July 13, 2021 1:00 PM*
Management unit: *T LAZY S*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kevin Cutrera / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy Bottom 8-14 P.Z.*	Ecological site ID: *R025XY003NV*	
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*		Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA	

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *WE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks, vitric pyroclastic materials, or siliceous rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1574.564* m	Aspect: *240°*
Topographic position: NA		Topographic position: *Floodplain*	
Precipitation range: NA cm		Average annual precipitation: *8.96850878 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *53* cm	

Type and depth of diagnostic horizons:					in / cm	**Type and depth of diagnostic horizons:**				in / cm
Soil horizon	Depth	Texture	Eff[2]	Other		Soil horizon	Depth	Texture	Eff[2]	Other
						1	*0 - 10 cm*	*Silty Clay Loam*		*Dry 10YR5/2; moist 7.5YR2.5/2, loose with some subangular structure, slightly sticky, fairly platy, some roots throughout*
						2	*10 - 37 cm*	*Silty Clay Loam*		*Dry 10YR5/3; moist 10YR3/4, friable and weak subangular structure, slightly sticky, powdery, slightly plastic, interstitial pores, fine and coarse roots throughout*
						3	*37 - 53 cm*	*Silty Clay Loam*		*Dry 10YR5/4; moist 10YR3/3, hard possibly duripan, subangular to angular, some granular, sticky, plastic, no roots*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Is within the Goldstrike Mine, mile marker 17.7 of the Segment #2 TS Power Plant Loop to GS project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes	
Township Range	OR	m	OR	40.980471 N. Latitude	
Section 1/4 Section		m		-116.408073 W. Longitude	

Supplemental Information & Reference Community Phase	
Recent weather (last 2 years): Drought	
Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): Evidence of remediation and revegetation efforts	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Access roads, heavy mining activity, power lines	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 5.3 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *WE_4*		Date: *July 13, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(929) Assign 17 indicator ratings, record comments and any measurements. (930) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (931) Assign overall rating for each attribute based on preponderance of evidence. (932) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*Not present*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *4* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*Infiltration slightly reduced due to increased litter from subdominant perennial bunchgrasses.*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *5*% Depth: *3 cm*	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_WE_4* **Date:** *July 13, 2021 1:00 PM* **Evaluator(s):** *Kevin Cutrera / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1393. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1394. Observe and list the F/S groups present in the evaluation area.

1395. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1396. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1397. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1398. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy Bottom 8-14 P.Z.*	**Reference phase for evaluation area:** *3.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	*Cheatgrass*

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Prickly lettuce*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210713-190427.jpg



photo_S-20210713-190437.jpg



photo_W-20210713-190457.jpg



photo_Soil-20210713-190358.jpg

INTERPRETING INDICATORS OF RANGELAND HEALTH VERSION 5 EVALUATION FORM – PAGE 1
Complete the following information as necessary for project documentation and assessment purposes.

Evaluation area name or ID: *WE_5*		Date: *July 21, 2021 1:00 PM*
Management unit: *MARYS MOUNTAIN*	State: *NV*	Office: *Tuscarora Field Office*
Evaluator(s): *Kristyn Klecko / Henson DeBruler*		

Ecological Site/Reference Sheet Used for Evaluation ***(Complete this section last)***

Ecological site name: *Loamy Bottom 8-14 P.Z.*	Ecological site ID: *R025XY003NV*
Reference sheet used/authors: *Draft ESD; no reference sheet available. Used DIRH protocol.*	Date: *NA*
Soil component: *GIS CALCS*	Composition based on : NA

Ecological Site Determination ***(Describe reference on the left and observations of the evaluation area on the right.)***

Soil Survey: *NA*		Soil Map Unit: *WE*	
Soil and site reference description Description Source: Ecological Site Description		**Evaluation area soil and site characterization**	
Parent material: *NA*	Slope range: *NA*	Parent material: *Formed in alluvium derived from volcanic rocks, vitric pyroclastic materials, or siliceous rocks.*	Slope: *2°*
Elevation range: *NA* m	Aspect NA (if specified):	Elevation: *1512.345* m	Aspect: *136°*
Topographic position: NA		Topographic position: *Flood plains*	
Precipitation range: NA cm		Average annual precipitation: *12.98032197 in*	
Seasonal precipitation distribution: NA		Seasonal precipitation distribution:	
Soil depth[1]: NA		Pit depth: *52* cm	

Type and depth of diagnostic horizons: in / cm					**Type and depth of diagnostic horizons:** in / cm				
Soil horizon	Depth	Texture	Eff[2]	Other	Soil horizon	Depth	Texture	Eff[2]	Other
					1	*0 - 11 cm*	*Loam*		*Dry 10YR5/3; moist 10YR2/22, weak subangular blocky, loose, very effervescent, fibrous roots, some litter.*
					2	*11 - 31 cm*	*Silty Clay*		*Dry 10YR6/2; moist 10YR3/3, subangular blocky, dry, some fibrous roots, tubular pores*
					3	*31 - 52 cm*	*Silt*		*Dry 10YR6/2; moist 10YR2/2, angular blocky, slightly moist, hard, some duranoids, tubular pores*

Evaluation Area Location

Criteria used to select evaluation area: Randomized selection of a sample point within the soil map unit and land cover type indicated by the SWreGAP.

Location description/directions: Approximately 0.73 miles east of the town of Carlin, mile marker 1.7 of the Carlin to GQ Private Bush Street project segment.

Size of evaluation area: *acre*		UTM Zone: Datum: *WGS 1984*		Position by GPS? Yes
Township Range	OR	m	OR	40.720161 N. Latitude
Section 1/4 Section		m		-116.140065 W. Longitude

Supplemental Information & Reference Community Phase

Recent weather (last 2 years): Drought

Natural disturbance type(s) and date(s): Historical wildfire evidence	
Land treatment type(s) and date(s): NA	
Wildlife, livestock, recreation, or other uses: Wildlife, livestock	
Offsite influences: Freeway, access roads,	
Photos taken? Yes	Quantitative data collected: No
F/S groups worksheet completed? Yes	
Reference community phase/description[3]: 4.2 Community Phase	

[1] Depth classes: Very shallow < 25 cm; Shallow 25-50 cm; Moderate 50-100 cm; Deep 100-150 cm; Very Deep > 150 cm

[2] Soil effervescence (Eff) codes: NE – non-eff.; VS – very slightly eff.; SL – slightly eff.; ST – strongly eff.; V – violently eff.

[3] If F/S worksheet is not completed, describe expected reference community F/S groups' relative dominance in this field.

Figure A4.2. Example of a completed page 1 of the evaluation sheet.

Completing Page 2 of the Evaluation Sheet

Record indicator ratings and observations and overall attribute ratings and justifications on page 2 of the evaluation sheet. Figure A4.3 provides a completed example of page 2 of the evaluation sheet.

- For each indicator, record the departure rating in the corresponding blank cell. Standardized abbreviations for departure ratings are provided at the top of page 2.
- Write notes supporting each indicator rating in the comments section.

Use of the functional/structural groups worksheet is strongly recommended to support the rating for indicator 12. Detailed instructions for completing this worksheet are provided in this appendix.

Once all 17 indicators have been rated, summarize ratings in the three charts at the bottom of the evaluation sheet, which are used for rating the three attributes. There is one chart, rating box, and rationale space for each attribute. The letters S, H, or B found in the rating column for each indicator identify the attribute(s) to which each indicator is related. For example, bare ground is related to soil/site stability (S) and hydrologic function (H), while annual production is related to biotic integrity (B).

- Populate each attribute's chart by identifying the indicators related to that attribute and writing the indicator number in the appropriate departure category column within the chart. Work from the bottom up to create a histogram of the indicator departure ratings related to the attribute.
- Once the charts have been populated for each of the three attributes, review the indicator departure patterns of each attribute. Use a preponderance of evidence approach to assign a departure rating for each attribute (see Section 7.5).
- To the right of each chart, provide a short rationale for the attribute rating.

A blank evaluation sheet is provided at the end of this appendix.

Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2)		
Evaluation area name or ID: *WE_5*		Date: *July 21, 2021 1:00 PM*
Departure from Expected	**Code**	**Instructions**
None to slight Slight to moderate Moderate Moderate to extreme Extreme to total	N-S S-MM M-E E-T	(933) Assign 17 indicator ratings, record comments and any measurements. (934) In the attribute rating tables at the bottom of the form, write the indicator number in the appropriate column for each indicator applicable to the attribute. (935) Assign overall rating for each attribute based on preponderance of evidence. (936) Provide rationale for each attribute rating in writing.
Indicator	**Rating**	**Comments**
1. Rills	S H	*N/A*
2. Water flow patterns	S H	
3. Pedestals and/or terracettes	S H	
4. Bare ground (observed): *35* %	S H	
5. Gullies	S H	
6. Wind-scoured and/or depositional areas	S	
7. Litter movement (wind or water)	S	
8. Soil surface resistance to erosion Interspace: _ Plant canopy:	S H B	
9. Soil surface loss and degradation	S H B	
10. Effects of plant community composition and distribution relative to infiltration	H	*N/A*
11. Compaction layer	S H B	
12. Functional/structural groups	B	
a. Relative dominance:		
b. F/S groups not expected at the site: _		
c. Number of F/S groups:		
d. Spp # in dom & subdom F/S groups:		
13. Dead or dying plants or plant parts	B	
14. Litter cover and depth Observed cover: *7*% Depth:	H B	
15. Annual production: Observed: _ ÷ Expected = _ %	B	
16. Invasive plants	B	
17. Vigor with an emphasis on reproductive capability of perennial plants	B	

Soil/Site Stability "S" *(10 indicators)*						**Hydrologic Function "H"** *(10 indicators)*						**Biotic Integrity "B"** *(9 indicators)*					
Attribute Rating:					Rationale:	Attribute Rating:					Rationale:	Attribute Rating: -					Rationale:
					NA						*NA*						*NA*
0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*		0	*0*	*0*	*0*	*0*	
E-T	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**		**E-T**	**M-E**	**M**	**S-M**	**N-S**	

Figure A4.3. Example of a completed page 2 of the evaluation sheet.

Functional/Structural Groups Worksheet Instructions

The functional/structural groups worksheet is used to document observed species, functional/structural groups, and relative dominance at an evaluation area. The worksheet is also used to compare those observations to the appropriate reference phase from the functional/structural groups table for indicator 12 in the reference sheet in a consistent manner. An example of a completed functional/structural groups worksheet is provided in Figures A4.4 and A4.5. A blank functional/structural groups worksheet is provided at the end of this appendix.

In section 1 of the worksheet, record the ecological site, and identify the most appropriate reference plant community phase for the evaluation area.

In sections 2 and 3, list the observed functional/structural groups and associated species within each respective group that are found in the evaluation area. Remember that species or functional/structural groups in the evaluation area may be different than the groups or species identified for the selected reference phase. If an unexpected species occurs in the evaluation area, follow the process described for step 2 in Appendix 1b, and assign the species to the appropriate functional/structural group based on its characteristics. If the unexpected species does not fit one of the expected groups, it should be listed under a new functional/structural group name.

In section 4, specify whether plant species composition estimates are based on the current growing season's annual production or foliar cover. Next, refer to the functional/structural groups table for indicator 12 in the reference sheet, and copy the relative dominance information for the selected reference plant community phase in the "Expected" column. If adjustments to the selected reference community phase are needed based on time since disturbances in the evaluation area, record adjustments and rationale in the "Comments" field. See step 1 in Section 7.4.12 for additional information on adjustments. One approach to portraying adjustments is to modify the relative dominance in the "Expected" column to reflect changes in relative dominance described in the "Comments" field.

In the "Observed" column, record the relative dominance of the functional/structural groups observed in the evaluation area. More than one functional/structural group may be assigned to each relative dominance category. Refer to step 3 in Appendix 1b for instructions for calculating relative abundance from quantitative data.

To complete section 5 of the functional/structural groups worksheet, refer to step 4 in Section 7.4.12. Rate the four subindicators by circling the best fit for each on the evaluation matrix included in the worksheet. Finally, in section 6, record the overall departure for indicator 12.

Keep this worksheet with the evaluation sheet to support the ratings and observations made at each evaluation area.

INTERPRETING INDICATORS OF RANGELAND HEALTH *VERSION 5*
Functional/Structural Groups Worksheet

Evaluation Area ID: *_WE_5* **Date:** *July 21, 2021 1:00 PM* **Evaluator(s):** *Kristyn Klecko / Henson DeBruler*

Instructions (Numbers correspond to fields in the worksheet; see Appendix 4 for detailed instructions.):

1399. Record the ecological site for the evaluation area. Considering the disturbance and land treatment history at the evaluation area, select the appropriate reference community phase from the F/S groups table in the reference sheet.

1400. Observe and list the F/S groups present in the evaluation area.

1401. Record the species within each F/S group present in the evaluation area. At the bottom of this section, record the number of expected F/S groups and number of species in expected dominant and subdominant groups observed in theevaluation area.

1402. Copy the relative dominance for the selected reference phase from the reference sheet to the **Expected** column. In the**Observed** column, document the relative dominance of F/S groups at the evaluation area. Use the **Comments** field to make notes, including any adjustments to relative dominance and rationale.

1403. For each subindicator, circle the departure category description that best fits the observed changes in F/S groups in the evaluation area.

1404. Rate the overall departure for the F/S groups indicator by choosing the greatest departure category of the four subindicators.

1) Ecological site: *Loamy Bottom 8-14 P.Z.*	**Reference phase for evaluation area:** *5.1 Community Phase*
2) F/S Groups in Evaluation Area	**3) Species List**
Deep-rooted, cool-season perennial bunchgrasses	*Basin wildrye, Crested wheatgrass*
Deep-rooted, warm-season, perennial bunchgrasses	
Shallow-rooted, cool-season perennial bunchgrasses	
Shallow-rooted, emergent perennials	
Shallow-rooted, warm-season, perennial grasses	
Shallow-rooted, cool-season, perennial graminoid	
Perennial forbs	
Non-sprouting shrubs	*Big sagebrush*
Sprouting shrubs	*Rabbitbrush, Rubber rabbitbrush, Yellow rabbitbrush*
Evergreen trees	
Annual grasses	

Perennial bunchgrass	
Cool-season perennial grasses	
Annual forbs	*Halogeton*
Sprouting succulent	
Biological soil crusts[1]	*5% cover of mosses and lichens. Cyanobacteria present but not recorded in cover measurements.*
Number of expected F/S groups present[2] in evaluation area:	*NA*
Number of species in expected dominant and subdominant groups present in evaluation groups:	*NA*

[1] Biological soil crust dominance is determined based on cover, rather than production. If biological soil crusts are an expected dominant or subdominant group, the number of expected life forms (e.g., lichen, moss) is listed, rather than number of individual species.

[2] When an F/S group that is expected to be dominant, subdominant, or minor is reduced in the evaluation area to a few remnant individuals, the group is considered to not be "functionally present" and is not included in the number of F/S groups present (12c).

Figure A4.4. Example of a completed functional/structural groups worksheet (sections 1-3).



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photo_E-20210721-192623.jpg



photo_S-20210721-192633.jpg



photo_W-20210721-192651.jpg



photo_Soil-20210721-192557.jpg

APPENDIX B
WATER RESOURCES

B.1. Surveyed Wetland and Water Features Figures

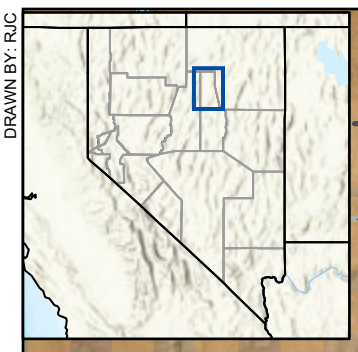
B.2. Representative Photographs

B.3. Proper Functioning Condition Data

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B.1. SURVEYED WETLAND AND WATER FEATURES FIGURES

DRAWN BY: RJC



T36 R48 | T36 R49 | T36 R50 | T36 R51 | T36 R52 | T36 R53 | T36.5 R53

T35 R47 | T35 R48 | T35 R49 | T35 R50 | T35 R51 | T35 R52 | T35 R53

T34 R47 | T34 R48 | T34 R49 | T34 R50 | T34 R51 | T34 R52 | T34 R53

T33 R47 | T33 R48 | T33 R49 | T33 R50 | T33 R51 | T33 R52 | T33 R53

T32 R47 | T32 R48 | T32 R49 | T32 R50 | T32 R51 | T32 R52 | T32 R53

T31 R47 | T31 R48 | T31 R49 | T31 R50 | T31 R51 | T31 R52 | T31 R53

T30 R47 | T30 R48 | T30 R49 | T30 R50 | T30 R51 | T30 R52 | T30 R53

T29 R47 | T29 R48 | T29 R49 | T29 R50 | T29 R51 | T29 R52 | T29 R53

T28 R47 | T28 R48 | T28 R49 | T28 R50 | T28 R51 | T28 R52 | T28 R53

T27 R47 | T27 R48 | T27 R49 | T27 R50 | T27 R51 | T27 R52 | T27 R53

SHEEP CREEK RANGE
INDEPENDENCE MOUNTAINS
BOULDER VALLEY
BOULDER FLAT
BOBS FLAT
WHIRLWIND VALLEY
SHOSHONE RANGE
DRY HILLS
CRESCENT VALLEY
CORTEZ MOUNTAINS
PINON MOUNTAINS
Susie Creek
Humboldt River
Pine Creek
Carlin
7358 ft
8693 ft
8459 ft
LANDER COUNTY
ELKO COUNTY
EUREKA COUNTY

Survey Boundary
Map Page
Bureau of Land Management
Township/Range Boundary
Bureau of Reclamation

N

0 29,000 58,000
Feet

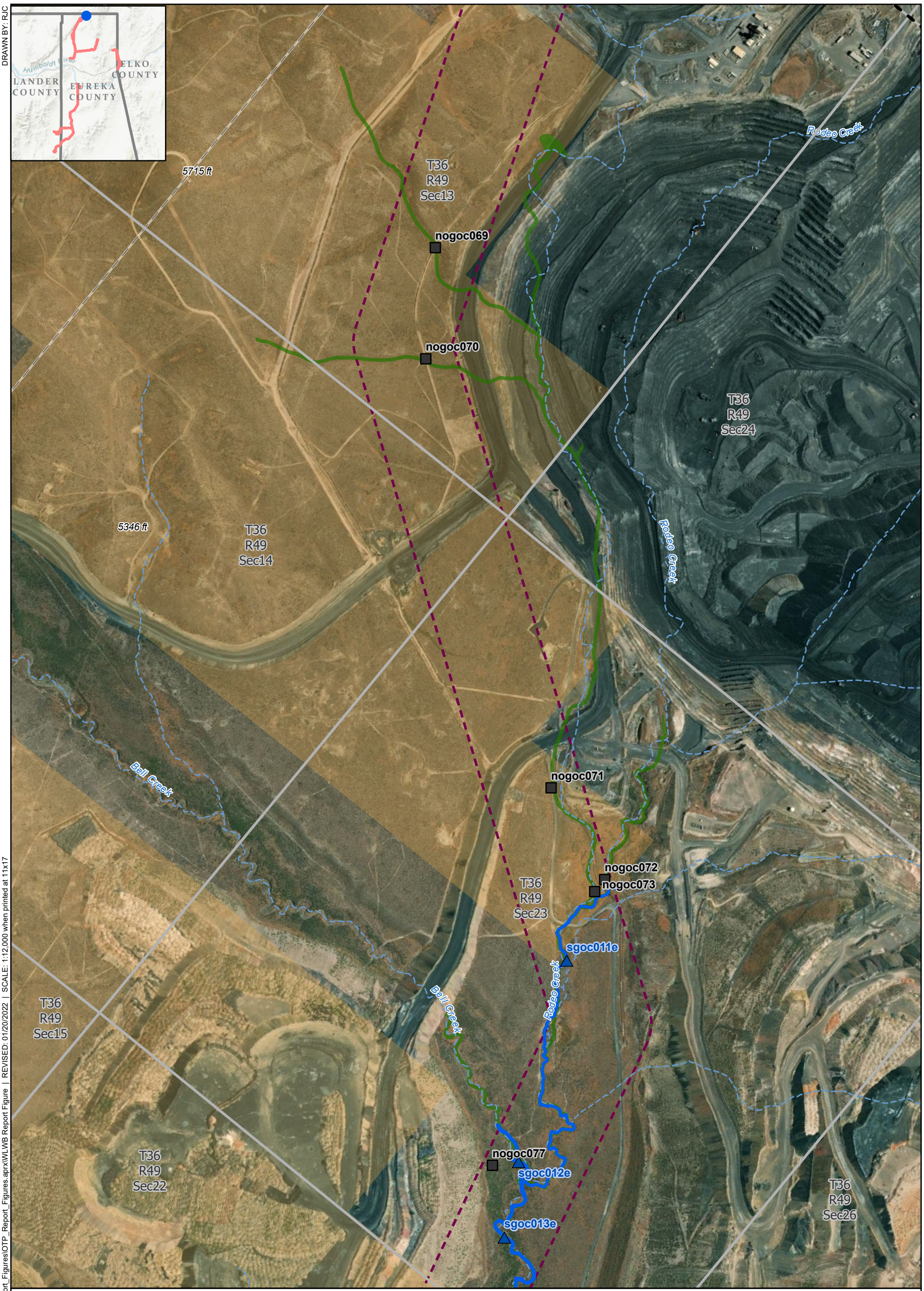
Appendix B-1
Wetland and Waterbody Survey Index
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

NEVADA GOLDMINES

Environmental Resources Management
www.erm.com
ERM

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Source: Esri - Terrain: Hillshade, SWReGAP Landcover;



Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

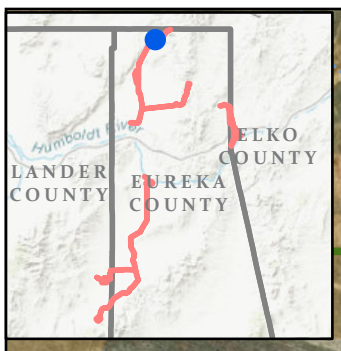
Environmental Resources Management
www.erm.com

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DRAWN BY: RJC

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T36 R49 Sec26

T36 R49 Sec22

nogoc074

nogoa086

sgoa004i

Boulder Creek

Rodeo Creek

T36 R49 Sec27

T36 R49 Sec21

nogoa087

nogoa088

nogoa091

T36 R49 Sec34

nogoa089

nogoa092

T36 R49 Sec28

nogoa093

nogoa090

sgoa006e

sgoa005e

nogoc048

nogoa094

T36 R49 Sec33

sgoa007e

nogoc052

nogoc054

Boulder Flat Rd

T36 R49 Sec29

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

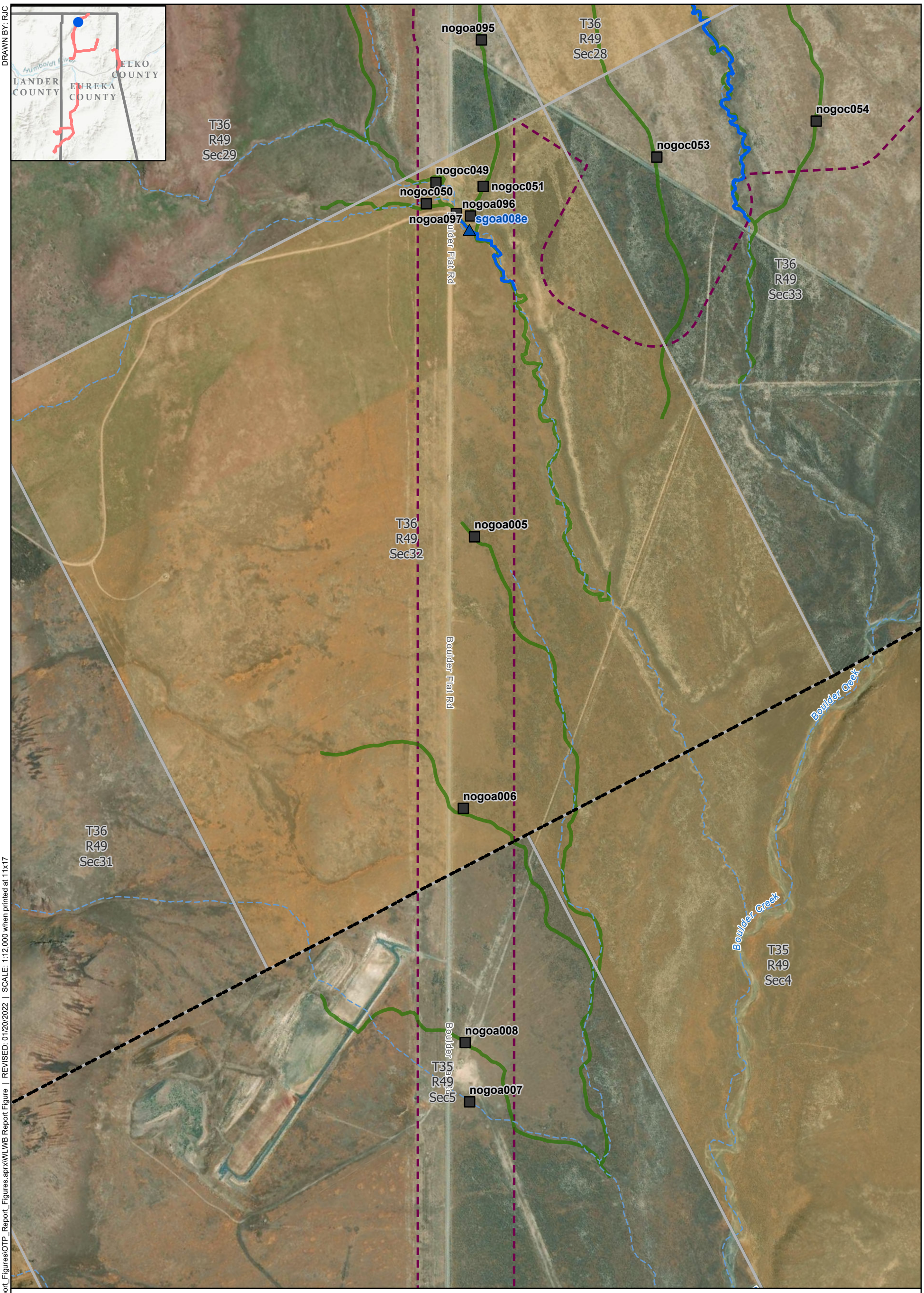
Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

NEVADA GOLDMINES

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Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

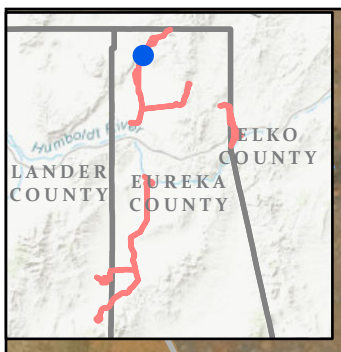
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T35 R49 Sec4

T35 R49 Sec5

T35 R49 Sec6

T35 R49 Sec7

T35 R49 Sec8

T35 R49 Sec9

T35 R49 Sec17

T35 R49 Sec18

Boulder Flat Rd

Boulder Creek

nogoa009

nogoa010

nogoa011

nogoa012

nogoa013

nogoa014

5165 ft

5073 ft

Non-Waterbody Point (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

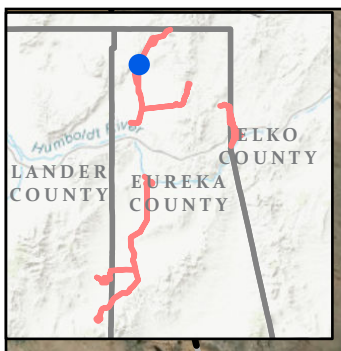
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nogoa014
4876 ft
Boulder Flat Rd
Boulder Creek
T35 R49 Sec17
50
T35 R49 Sec18
nogoa015
T35 R48 Sec13
nogoa016
T35 R49 Sec20
4835 ft
nogoa017
nogoa018
nogoa004
sgoa001e
T35 R49 Sec19
sgoc001e_01
sgoc001e_03
sgoc001e_02
4815 ft
T35 R48 Sec24
nogoc014
sgoc001e_04
sgoc001e_05
nogoc026
T35 R49 Sec30

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results

NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

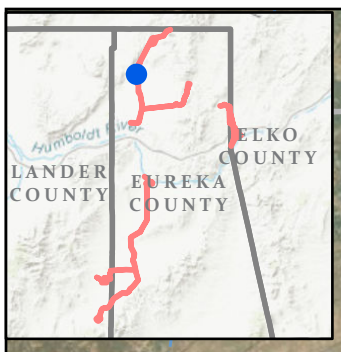
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T35 R48 Sec24
4794 ft
nogoc026
nogoc046
nogoc045
sgoc001e_06
nogoa003
Boulder at Rd
nogoc022
Boulder Creek
T35 R48 Sec25
sgoc001e_07
T35 R49 Sec30
sgoc001e_08
nogoc047
nogoc023
sgoc001e_09
Boulder Flat Rd
sgoc001e_10
4768 ft
nogoc010
sgoc001e_11
sgoc001e_12
4745 ft
4746 ft
Boulder Creek
Boulder Flat Rd
T35 R48 Sec36
T35 R49 Sec31
nogoc013
nogoc012
nogoc011
sgoc001e_13
nogoc027
sgoc001e_14
sgoc001e_15
Boulder
Boulder

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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T35 R48 Sec36

T35 R49 Sec31

T34 R48 Sec1

T34 R49 Sec6

T34 R48 Sec12

T34 R49 Sec7

nogoc024
nogoc025
nogoc028
nogoc029
nogoa001
nogoa002
nogoc032
nogoc030
nogoc031
nogoc033
nogoc034
nogoc035
nogoc036
nogoc037
nogoc038
nogoc039
nogoc040
nogoa050
nogoc041
nogoc042
nogoa052

4723 ft
4720 ft
4694 ft
4693 ft

Boulder Creek
Boulder Flat Rd

Non-Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
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Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

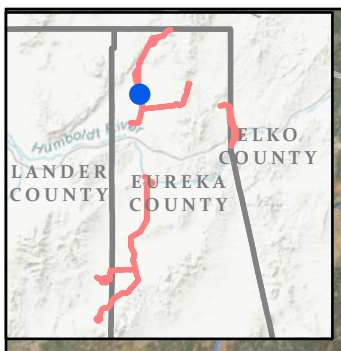
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nogoc042
nogoa052
nogoa051
nogoc043
nogoc009
sgoa002e
nogoa049
nogoc044
nogoa048
nogoa047
nogoc008
nogoc007
nogo006

T34 R48 Sec12
T34 R49 Sec7
T34 R48 Sec13
T34 R49 Sec18
T34 R48 Sec24
T34 R49 Sec19
T34 R49 Sec17
T34 R49 Sec20

4673 ft
4674 ft
4658 ft
4663 ft
4666 ft

Boulder Flat Rd
Boulder Creek

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NHD Waterbody
NWI Wetland
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
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Nevada Gold Mines
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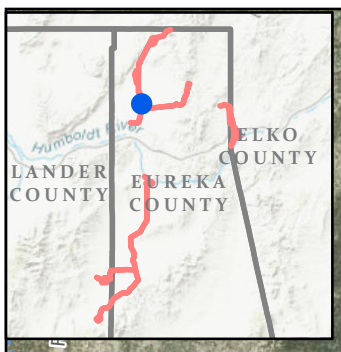
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nogo006

nogo005

T34
R49
Sec19

T34
R49
Sec20

Boulder Flat

T34
R49
Sec30

4664 ft

T34
R49
Sec29

4654

nogo003

nogo004

nogo004_2

T34
R49
Sec31

T34
R49
Sec32

nogoa038

Non-Waterbody Point (Surveyed)
NHD Flowline
NWI Wetland
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
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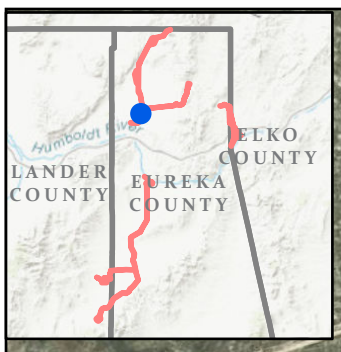
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nogoa037
nogoa038
T34
R49
Sec32
T34
R49
Sec31
nogoa039
nogoa040
nogoa041
nogoa042
nogoa046
nogoa045
nogoa044
nogoa043
Boulder Flat Rd
T33
R49
Sec5
T33
R49
Sec6
nogoc001
T33
R48
Sec1
Boulder Flat Rd
4650 ft
T33
R49
Sec8
T33
R49
Sec7
nogoc002
T33
R48
Sec12
4650 ft
Boulder

Non-Waterbody Point (Surveyed)
NHD Flowline
NWI Wetland
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

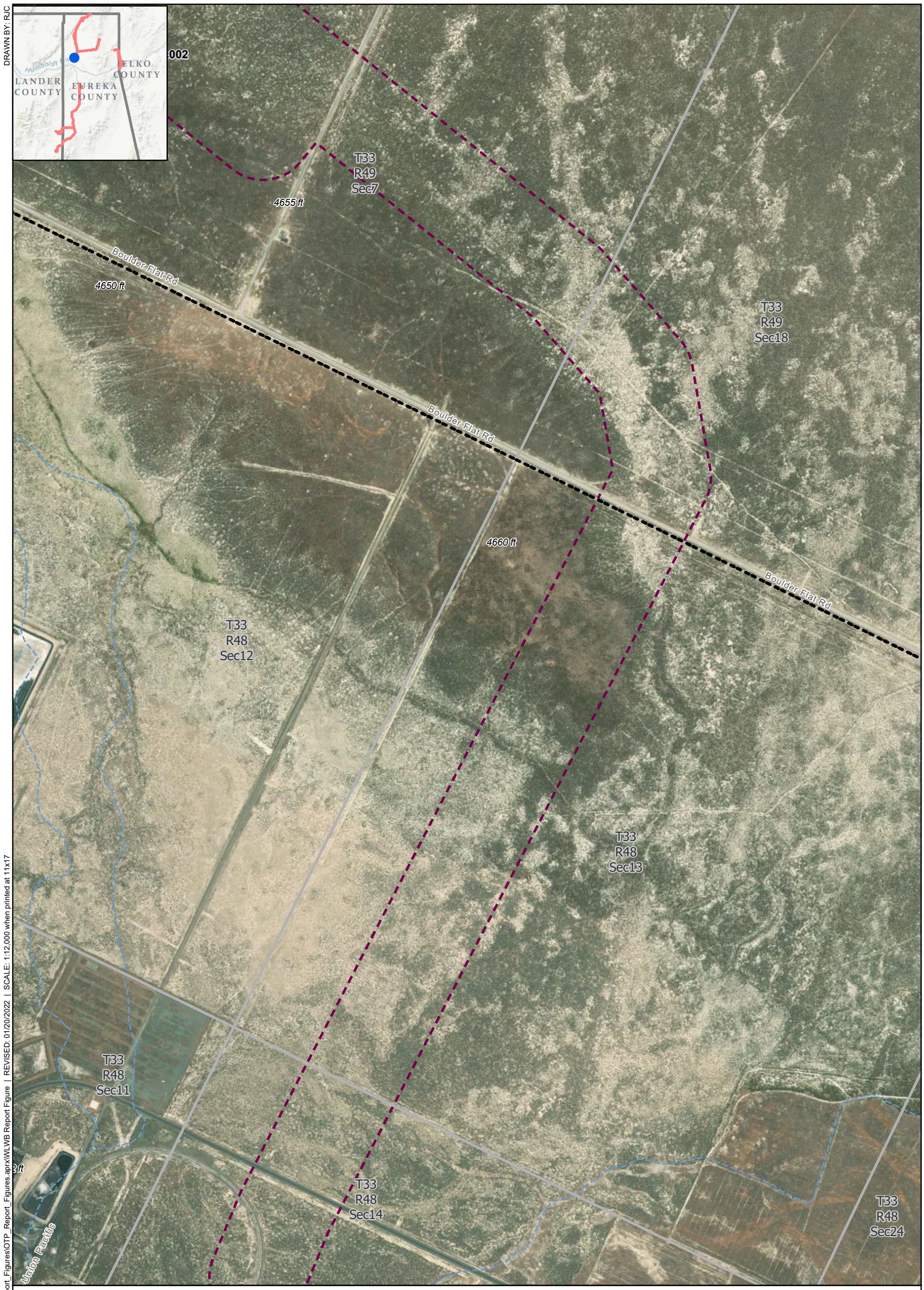
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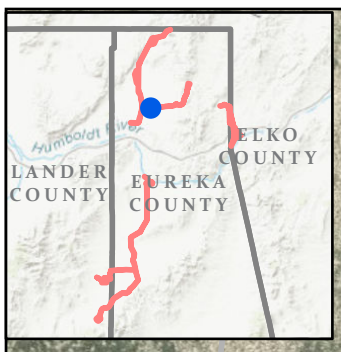
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T34 R49 Sec32

T34 R49 Sec29

T33 R49 Sec4

4673 ft

nogoa035

T34 R49 Sec33

4660 ft

nogoa034

T34 R49 Sec28

nogoa030

nogoa031

nogoa032

4679 ft

nogoa033

nogoa026

nogoa027

nogoa028

4684 ft

T34 R49 Sec34

ogoa001e

nogoa029

pgoa_001

T34 R49 Sec27

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Seep/Spring Point (Surveyed)
Waterbody Polygon (Surveyed)
NWI Wetland
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

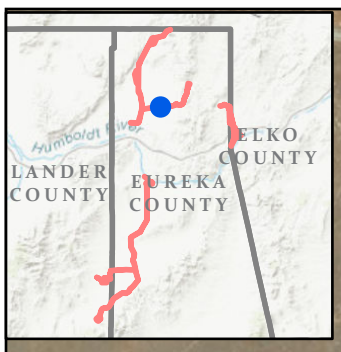
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T34
R49
Sec34

T34
R49
Sec27

nogoa025

4714 ft

T34
R49
Sec35

T34
R49
Sec26

4734 ft

nogoa024

nogoa023

nogoa022

T34
R49
Sec36

T34
R49
Sec25

Non-Waterbody Point (Surveyed)
NHD Flowline
NWI Wetland
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elkо County, Nevada

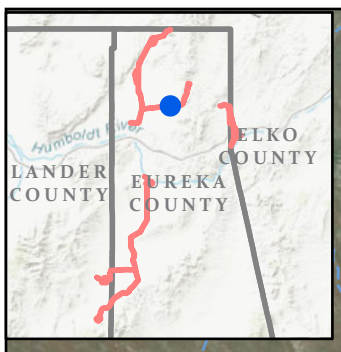
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T34
R49
Sec36

T34
R49
Sec25

nogoa021

nogoa020

nogoa019

T34
R50
Sec31

sgoc009e

nogoc066

nogoc067

T34
R50
Sec30

5051 ft

T34
R50
Sec32

nogoc065

T34
R50
Sec29

nogoc062

nogoc063

nogoc064

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
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nogoa077
nogoa078
nogoa079
pgoa003
ogoa006e
nogoa080
nogoa081
nogoa082
nogoa083
nogoa084
nogoa085
nogoc075
nogoc055
sgoa003p
sgoc004e
nogoc056
sgoc005e
sgoa003p_2
sgoc006i
wgoc001e_w
nogoc059
nogoc058
nogoc057
sgoc007p
sgoc008i
nogoc076
nogoc060
nogoc061
nogoc064
nogoc063
nogoc062

Welches Creek

T34 R50 Sec21
T34 R50 Sec27
T34 R50 Sec28
T34 R50 Sec20
T34 R50 Sec29
T34 R50 Sec33
T34 R50 Sec32

5289 ft

PEM Data Point
Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Seep/Spring Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
Seep/Spring Point (NHD)
Spring Point (NGM)
NHD Flowline
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
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Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

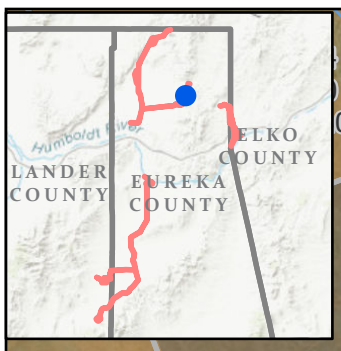
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ogoa002e
nogoa053
nogoa054
nogoa061
nogoa060
nogoa062
nogoa064
nogoa063
nogoa098
ogoa004e
nogoa100
nogoa099
nogoa101
nogoa065
nogoa066
nogoa067
nogoa068
nogoa069
nogoa070
nogoa071
nogoa072
nogoa073
ogoa005e
nogoa074
nogoa075
nogoa076
nogoa077

T34 R50 Sec14
T34 R50 Sec15
T34 R50 Sec16
T34 R50 Sec21
T34 R50 Sec22
T34 R50 Sec27

5816 ft
6028 ft
0 ft

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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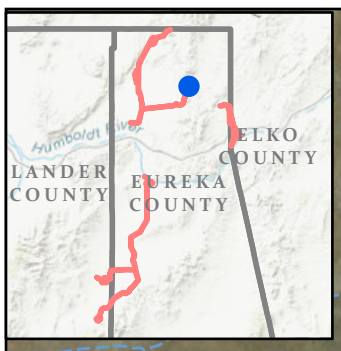
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Source: Esri - World Imagery;

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T34 R51 Sec7

T34 R50 Sec2

nogoc021

nogoc020

T34 R50 Sec3

nogoc018

nogoc017

nogoc016

nogoc019

nogoc015

nogoa059

T34 R50 Sec11

nogoa058

nogoa056

pgoa002

ogoa003e

RICHMOND SUMMIT

nogoa057

T34 R50 Sec10

6019 ft

nogoa055

T34 R50 Sec14

T34 R50 Sec15

T34 R50 Sec9

ogoa002e

nogoa053

nogoa054

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Seep/Spring Point (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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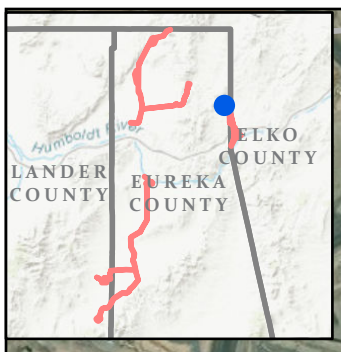
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James Creek

nocaa017

5190 ft

T33
R51
Sec1

T34
R51
Sec36

State Route 766

5216 ft

James Creek

T33
R52
Sec6

T34
R52
Sec31

scac004e

scac005e

scac006e

ocac001e

scac007e

5170 ft

nocaa018

ocac002e

scac008e_2

nocaa019

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

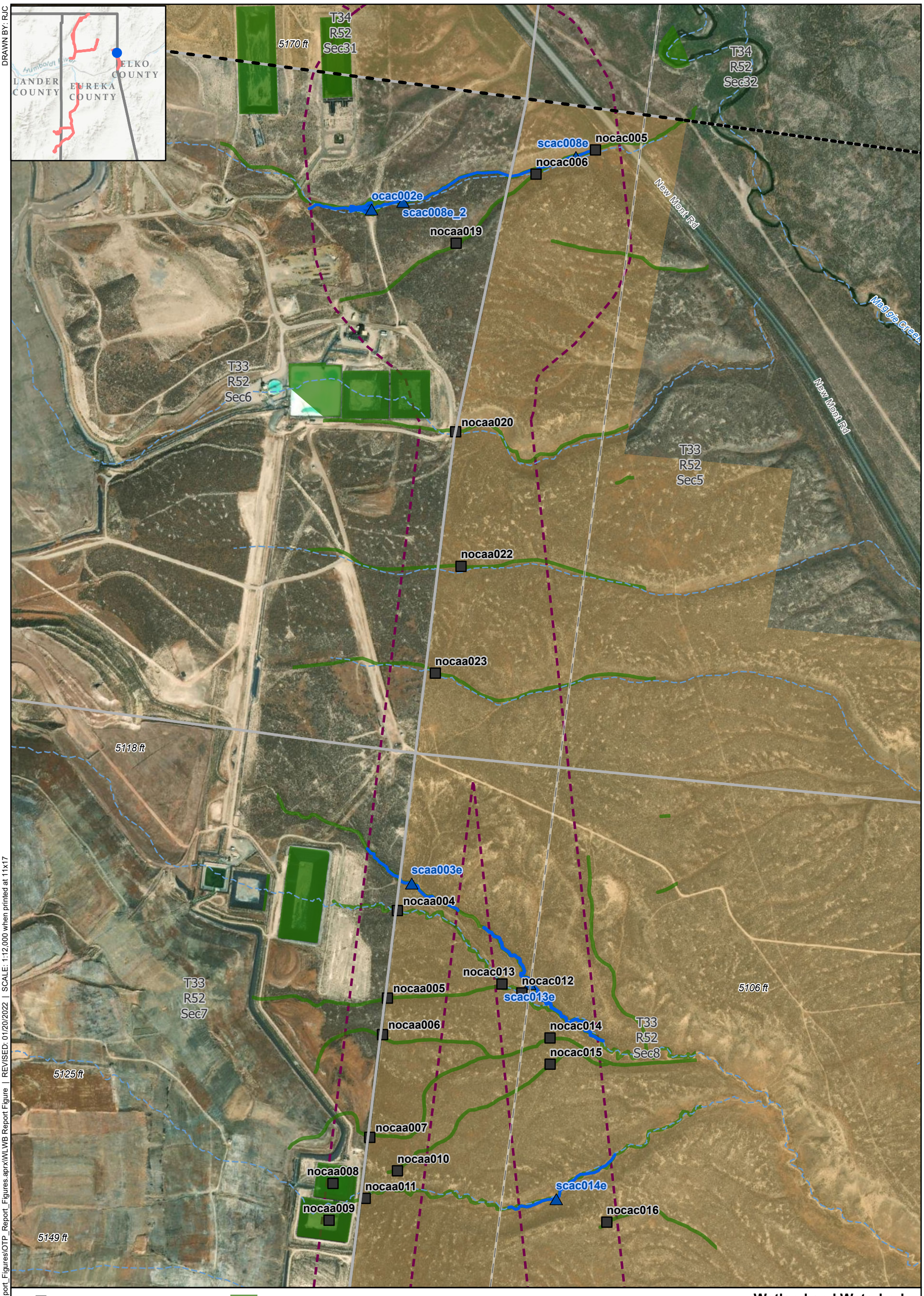
Wetland and Waterbody Survey Results
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

NEVADA GOLDMINES

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Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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NGM Ore Transportation Project
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Nevada Gold Mines
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T33 R52 Sec7
T33 R52 Sec8
T33 R52 Sec18
T33 R52 Sec17
T33 R52 Sec19
T33 R52 Sec20
T33 R52 Sec21

scac014e
nocac016
nocaa012
nocac017
nocac018
nocaa013
nocac019
nocaa014
nocaa015
nocac020
nocac021
nocac022
scaa002e
scac015e
nocac023
nocaa021
nocaa016
nocac011
nocac010
scac012e

5084 ft
5171 ft

James Creek Rd
James Creek Rd
James Creek Rd
Marys Creek
Marys Creek
Marys Creek

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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T33 R52 Sec20

5087 ft

Marys Creek

James Creek Rd

T33 R52 Sec21

Marys Creek

James Creek Rd

James Creek Rd

T33 R52 Sec29

scac011e

nocac009

scac010e

nocac008

nocac007

scac009e

80

80

T33 R52 Sec28

Marys Creek

5064 ft

scac003e

scac002e

Fish Pond Rd

Chestnut St

T33 R52 Sec32

wcac004e_w

nocac004

Tyrol

Fish Pond

Fish Pond Rd

Fish Pond Rd

5127 ft

T33 R52 Sec33

T33 R52 Sec27

Cortez Cir

Sage St

Bush St

W Bush St

PEM Data Point
Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
Seep/Spring Point (NHD)
NHD Flowline
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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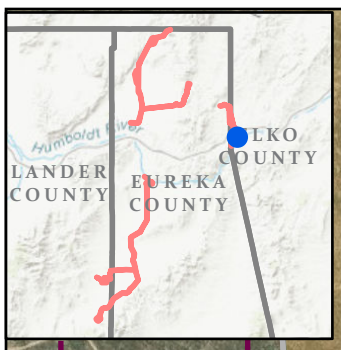
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T33 R52 Sec28
T33 R52 Sec27
T33 R52 Sec33
T33 R52 Sec32
T32 R52 Sec5
T32 R52 Sec4
T32 R52 Sec3
5127 ft
4878 ft
4906 ft
Fish Pond
Fish Pond Rd
Cortez Cir
Sage St
W Birch St
W Cedar St
Willow St
Bush St
Tomera Ranch Rd
Woodruff Creek
Union Pacific
nocac004
wcac004e_w
Tyrol
nocaa001
wcaa001e_w
wcaa002e_w
wcaa002s_w
wcaa003e_w
wcac003e_w
nocac003
noca002
scac001p
pcac001
pcac002
nocaa002
nocaa003
scaa001e

PEM Data Point
PSS Data Point
Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Seep/Spring Point (Surveyed)
Waterbody Line (Surveyed)

N

0 1,000 2,000
Feet

Wetland and Waterbody Survey Results
NGM Ore Transportation Project
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Nevada Gold Mines
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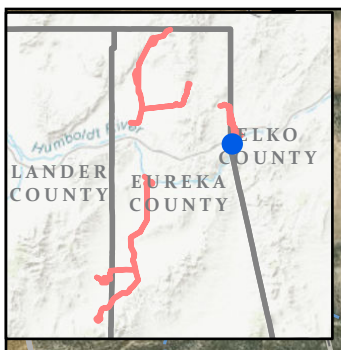
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Tomera R

T32 R52 Sec4

4878 ft

T32 R52 Sec5

scaa001e

nocaa002

nocaa003

Union Pacific

T32 R52 Sec6

wcac002e_w

Union Pacific

T32 R52 Sec9

wcac001e_w

T32 R52 Sec8

nocac001

T32 R52 Sec7

5773 ft

Union Pacific

Union Pacific

T32 R52 Sec17

PEM Data Point
Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
Seep/Spring Point (NHD)
Spring Point (NGM)
NHD Flowline
NHD Area
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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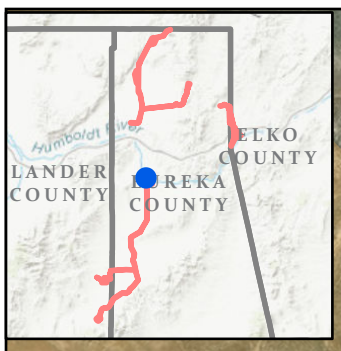
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T31 R49 Sec6

5014 ft

Corbett Canal

State Route 306

Insl'ena Rnch

T32 R49 Sec32

4927 ft

Highline Canal

Beowawe

Industrial Rd

scra012e

ocra006e

T31 R49 Sec5

T31 R49 Sec7

State Route 306

Union Pacific

Indian Cemetery

Beowawe Safford Cyn

T31 R49 Sec8

nocra039

T31 R49 Sec4

scra011e

T31 R49 Sec9

nocra036

nocra037

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NHD Area
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

Wetland and Waterbody Survey Results
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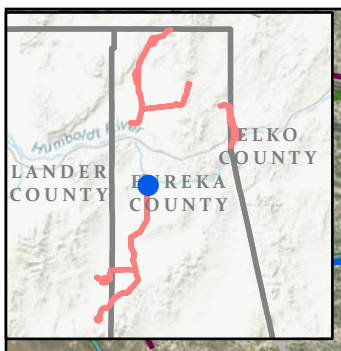
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Industrial Rd
Industrial Rd
scra014e
nocra038
T31 R49 Sec10
Beowawe Safford Cyn
scra011e
Beowawe Safford Cyn
nocra036
T31 R49 Sec9
4745 ft
nocra037
T31 R49 Sec8
Indian Cemetery
Indian Cemetery
T31 R49 Sec16
nocra040
scra013e
T31 R49 Sec17
T31 R49 Sec21
T31 R49 Sec20
nocra029

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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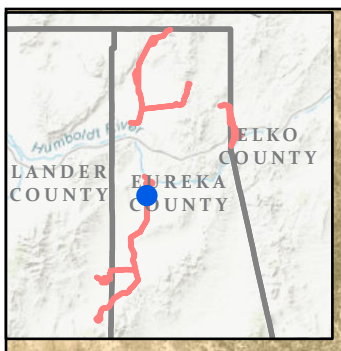
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4747 ft

nocra029

nocra029_2

T31
R49
Sec20

T31
R49
Sec21

4865 ft

nocra030

4784 ft

scra010e

nocra028

T31
R49
Sec29

T31
R49
Sec28

nocra027

T31
R49
Sec32

T31
R49
Sec33

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

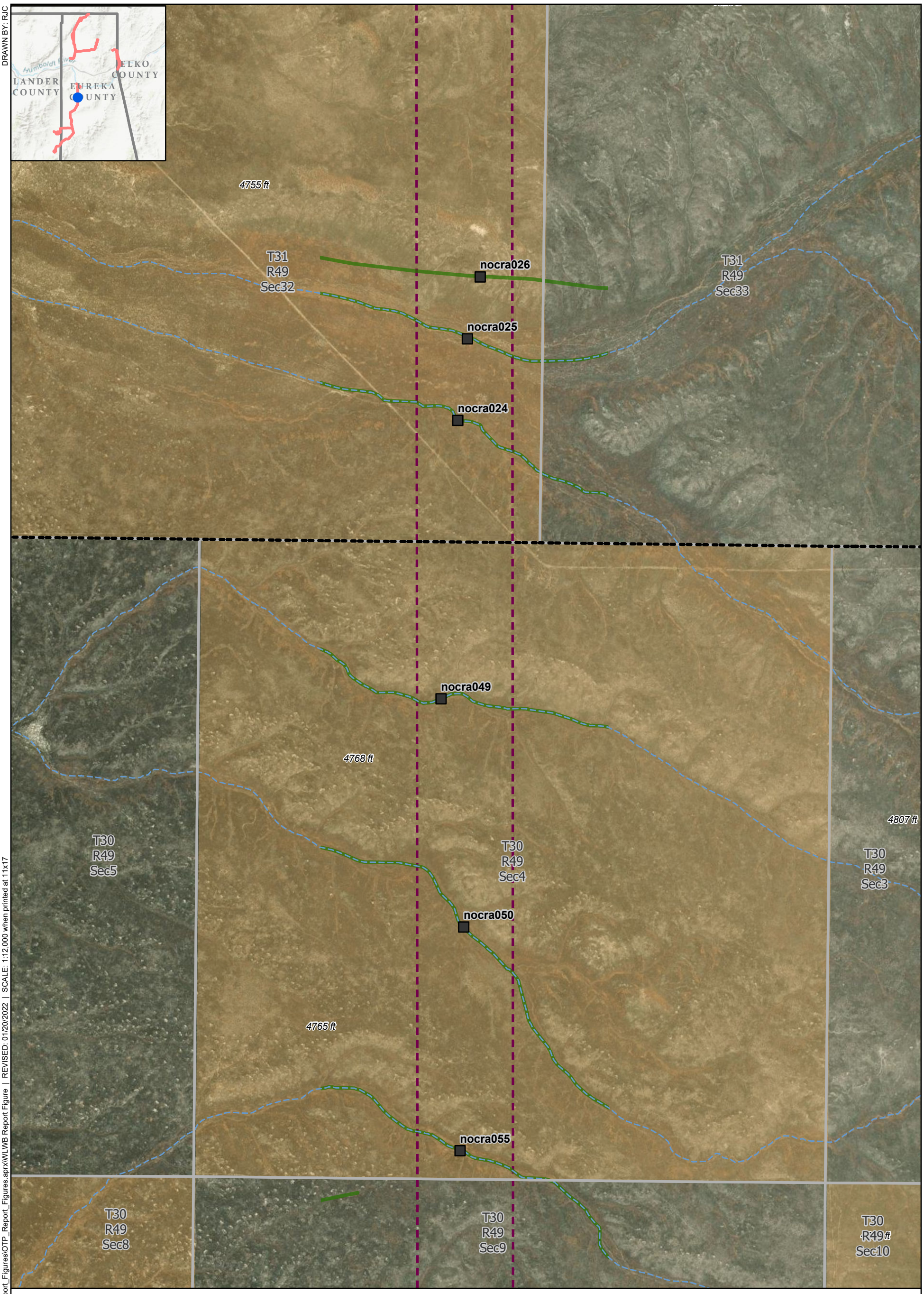
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nocra051
nocra052
nocra053
nocra054
scra016e
nocra068
nocra069
nocra070
nocra071
nocra072
nocra073
nocra074
4745 ft
4752 ft
T30 R49 Sec8
T30 R49 Sec9
T30 R49 Sec10
T30 R49 Sec15
T30 R49 Sec16
T30 R49 Sec17
T30 R49 Sec20
T30 R49 Sec21
T30 R49 Sec22

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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nocra074
T30 R49 Sec16
nocra101
nocra076
T30 R49 Sec21
nocra077
4730 ft
nocrc001
nocrc002
T30 R49 Sec20
Cold Spring Pt
nocrc003
nocrc004
nocrc005
nocrc006
nocrc007
T30 R49 Sec28
nocrc008
nocrc009
Cold Spring Pt
nocra031
nocra032
T30 R49 Sec29
T30 R49 Sec30
5086 ft
nocra034
Cold Spri
T30 R49 Sec32

Non-Waterbody Point (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

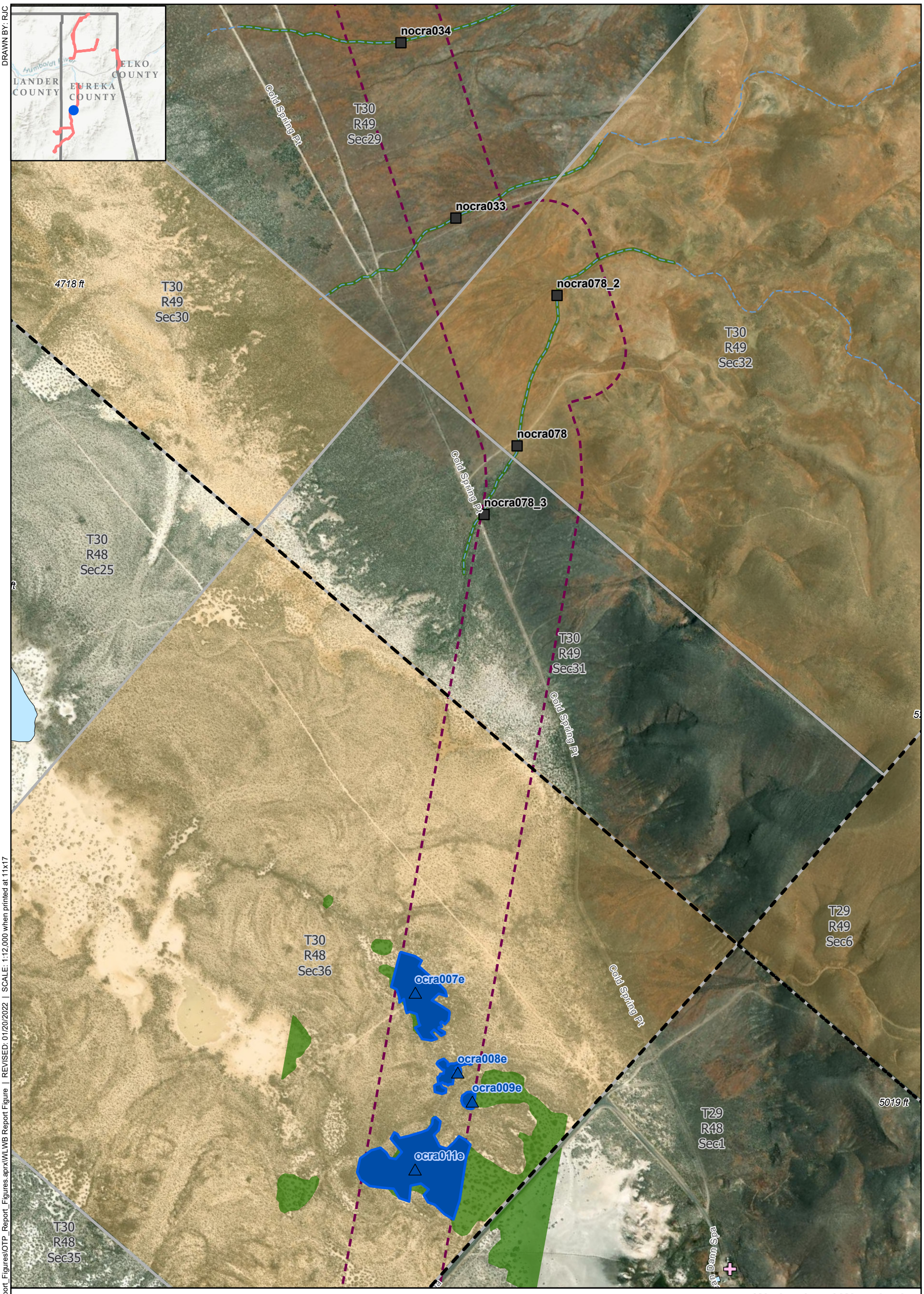
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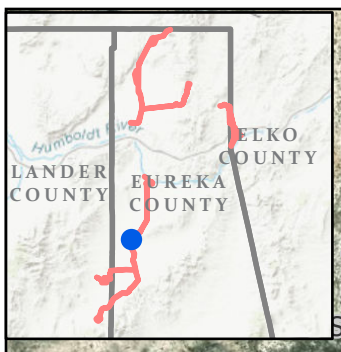
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Lander, Eureka, and Elko County, Nevada

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T30
R48
Sec36

T30
R48
Sec35

T29
R48
Sec1

T29
R48
Sec2

T29
R48
Sec3

T29
R48
Sec12

T29
R48
Sec11

T29
R48
Sec10

Dean Dann Spa

4722 ft

4724 ft

wcrc001e_w

wcrc002e_w

scrc002e

nocrc022

ocrc002e_a

ocrc002e_b

ocrc002e_c

ocrc002e_d

ocrc004e

ocrc005e

PEM Data Point
Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
Seep/Spring Point (NHD)
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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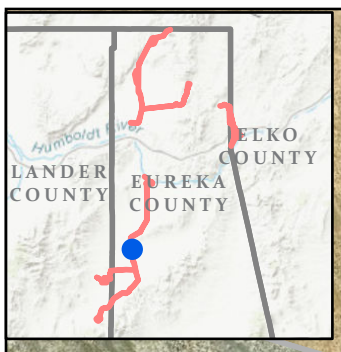
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ocra010e
4730 ft
T29 R48 Sec11
T29 R48 Sec15
scrc004e
4735 ft
T29 R48 Sec12
nocrc023
nocrc020
Dean Dann Spa
T29 R48 Sec14
4737 ft
nocrc019
T29 R48 Sec13
ocrc007e
ocrc008e
T29 R48 Sec23
T29 R48 Sec24
scrc003e

Non-Waterbody Point (Surveyed)
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NHD Flowline
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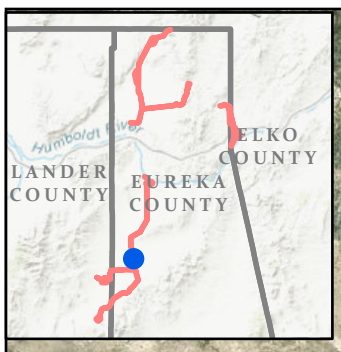
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CRESCENT VALLEY

4739 ft

ocrc009e

T29
R48
Sec23

T29
R48
Sec24

nocrc018

nocra096

4739 ft

T29
R48
Sec26

T29
R48
Sec25

nocra095

scra022e

pcra004

T29
R48
Sec35

T29
R48
Sec36

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Seep/Spring Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Waterbody
NWI Wetland
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0 925 1,850
Feet

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scra004
nocra011
pcra002
T29
R48
Sec35
scra005e
scra006e
T29
R48
Sec36
wcra001e_w
scra007e
pcra001
4741 ft
wcra002s_w
T29
R49
Sec31
wcra008s_w
4767 ft
wcra007e_w
wcra007s_w
T28
R48
Sec2
wcra005s_w
Dean Dann Spa
wcra006e_w
wcra006s_w
T28
R48
Sec1
T28
R49
Sec6
4750 ft
wcra012s_w
T28
R48
Sec12

PEM Data Point
PSS Data Point
Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Seep/Spring Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
PSS Wetland Boundary (Surveyed)
Seep/Spring Point (NHD)
NHD Waterbody
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N

0 925 1,850
Feet

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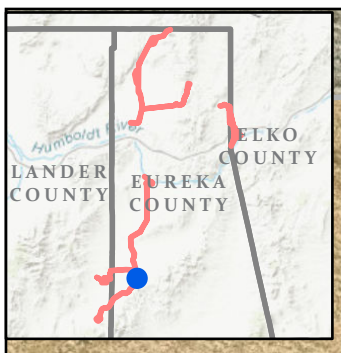
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DRAWN BY: RJC



nocra089

scra003e

4751 ft

T28
R48
Sec12

T28
R49
Sec7

scra002i

nocra015

nocra016

nocra017

Cottonwood Creek

T28
R48
Sec13

T28
R49
Sec18

scra020e

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PSS Wetland Boundary (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

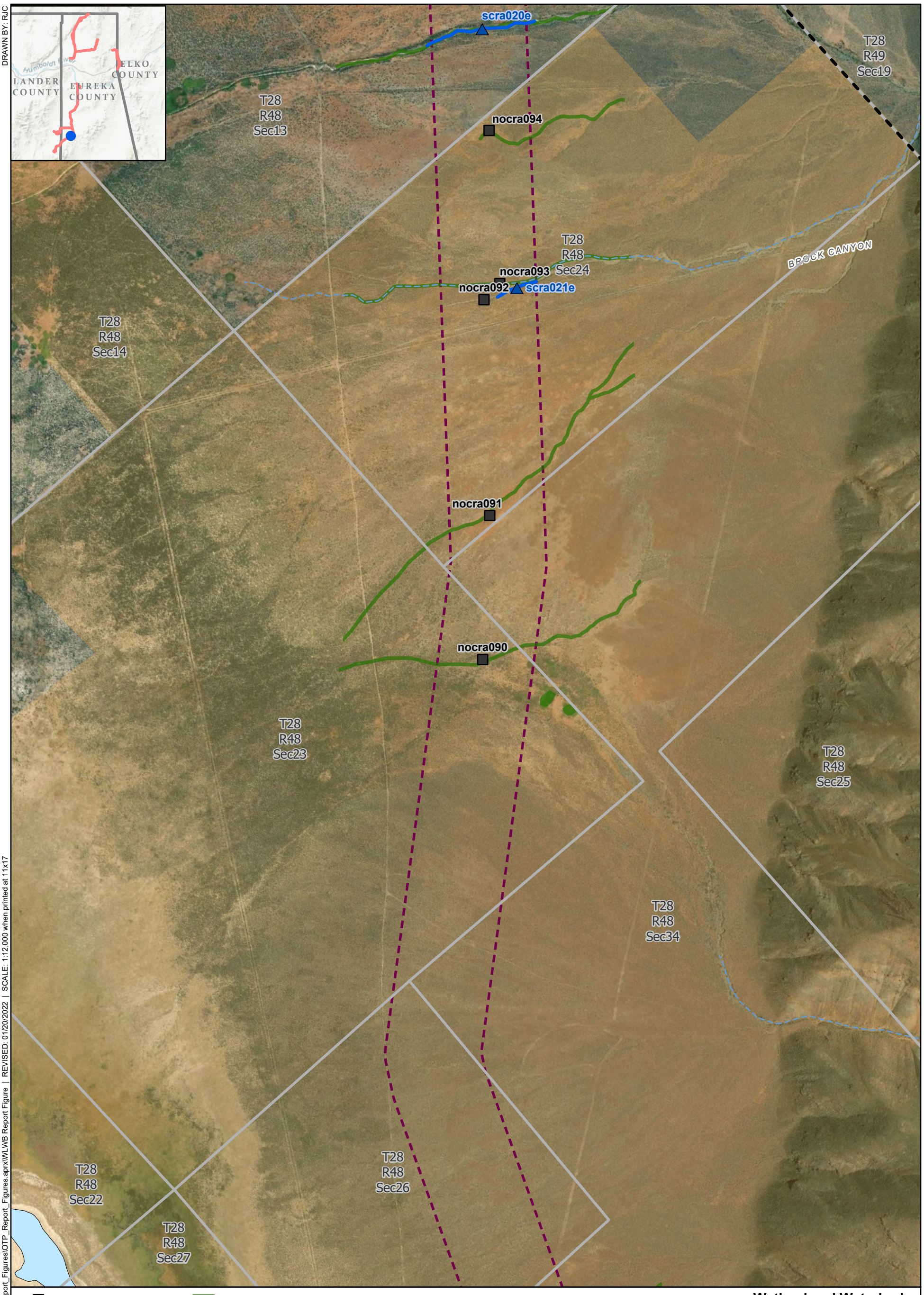
Wetland and Waterbody Survey Results
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Biological Baseline Study
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Lander, Eureka, and Elko County, Nevada

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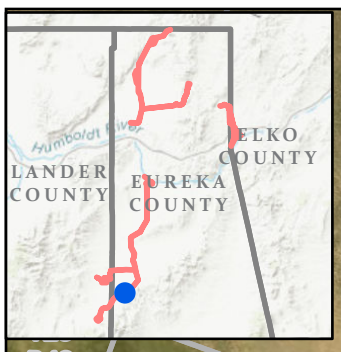
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T28
R48
Sec26

nocra023

T28
R48
Sec22

T28
R48
Sec35

T28
R48
Sec27

T28
R48
Sec34

scrc001e

4742 ft

T28
R48
Sec28

T28
R48
Sec33

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
Seep/Spring Point (NHD)
NHD Flowline
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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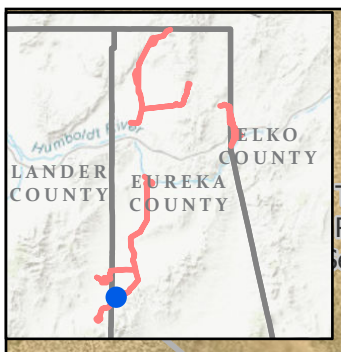
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DRAWN BY: RJC



T28
R48
Sec28

4755 ft

T28
R48
Sec29

nocrc021

nocrc012

T28
R48
Sec33

T28
R48
Sec32

nocrc013

nocrc014

4762 ft

T27
R48
Sec4

nocrc015

T27
R48
Sec5

nocrc016

T28
R48
Sec31

nocrc017

T27
R48
Sec6

Non-Waterbody Point (Surveyed)
Seep/Spring Point (NHD)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

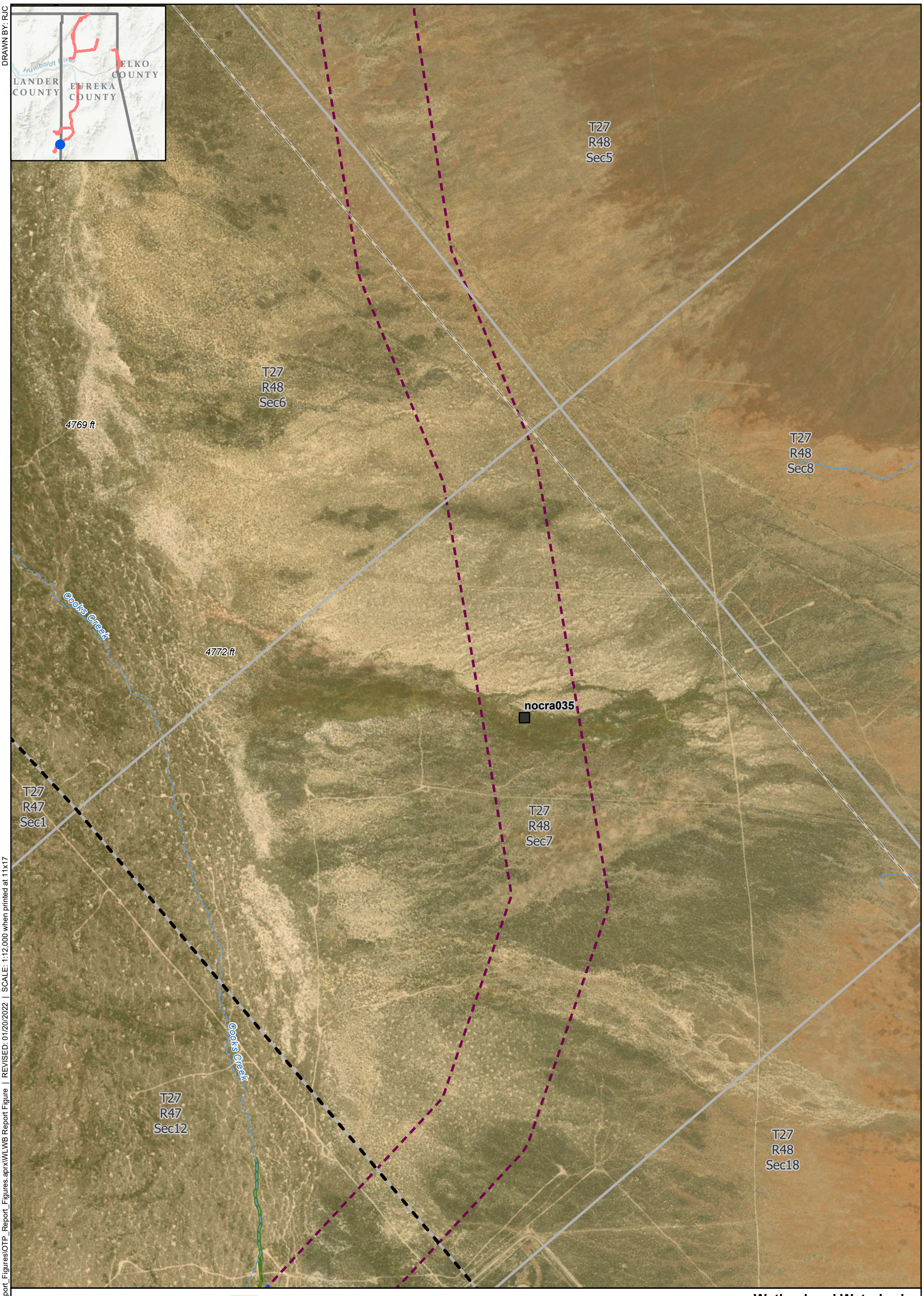
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Non-Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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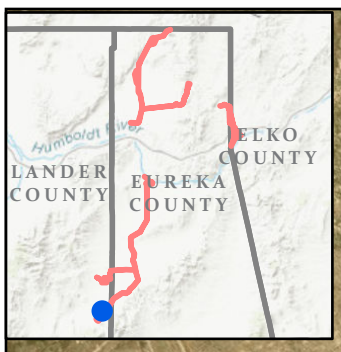
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T27
R48
Sec7

T27
R48
Sec18

T27
R47
Sec12

4778 ft
scra009e

nocra019

T27
R47
Sec11

nocra018

nocra020

nocra021

4784 ft

T27
R47
Sec13

ocra005p

ocra004p

nocra022

ocra003p

Cortez Canyon Rd

T27
R47
Sec14

ocra002p

T27
R47
Sec24

T27
R47
Sec23

Cortez Canyon Rd

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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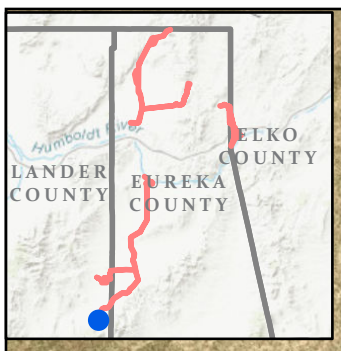
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nocra080
nocra081
nocra082
nocra083
nocra084
scra017e
scra018e
nocra085
scra019e
nocra088
nocra102
nocra086
T27 R47 Sec24
T27 R47 Sec23
T27 R47 Sec25
T27 R47 Sec26
T27 R47 Sec27
T27 R47 Sec35
T27 R47 Sec36
T27 R47 Sec34
Cortez Canyon Rd
CORTEZ CANYON
5620 ft
5263 ft

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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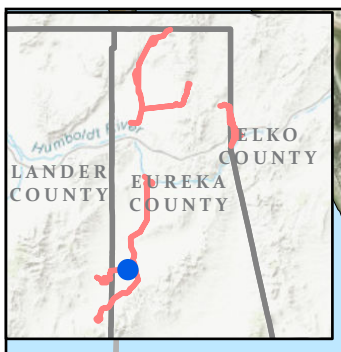
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T28 R48 Sec10

T28 R48 Sec3

T29 R48 Sec34

T28 R48 Sec2

T29 R48 Sec35

Dean Dann Spa

wcra014e_w

wcra013e_w

ocra001e

wcra004e_w

wcra003e_w

4738 ft

4748 ft

wcra011e_w

wcra010e_w

wcra008s_w

wcra007e_w

PEM Data Point
PSS Data Point
Waterbody Point (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
PSS Wetland Boundary (Surveyed)
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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nocra007
nocra008
nocra006
nocra005
scra008e
4765 ft
4747 ft
Dean Dann Spa

T28 R48 Sec8
T28 R48 Sec5
T29 R48 Sec32
T28 R48 Sec9
T28 R48 Sec4
T29 R48 Sec33
T28 R48 Sec10
T28 R48 Sec3
T29 R48 Sec34

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
NHD Waterbody
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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DRAWN BY: RJC



Dean Dann Spa

T28
R48
Sec5

T28
R48
Sec6

nocra009

nocra010

T28
R48
Sec8

4788 ft

T28
R48
Sec7

Hilltop Rd

Hilltop Rd

Indian Creek

T28
R47
Sec12

nocra041

scra015p

T28
R48
Sec18

Indian Creek

nocra042

nocra048

nocra043

T28
R47
Sec13

scra001e

nocra047

Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
NHD Flowline
NWI Wetland
Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 925 1,850
Feet

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T28 R47 Sec15

T28 R47 Sec10

nocra013

nocra012

Gold Acres

T28 R47 Sec23

T28 R47 Sec14

nocra001

T28 R47 Sec11

nocra002

nocra067

nocra003

4836 ft

nocra056

nocra057

nocra058

nocra061

nocra059

nocra060

nocra062

nocra004

T28 R47 Sec24

4287 ft

T28 R47 Sec13

pcra003

wcra009e_w

scra001e

T28 R47 Sec12

nocra063

nocra064

Indian Creek

nocra045

nocra065

nocra066

nocra100

nocra046

Hilltop Rd

T28 R48 Sec19

T28 R48 Sec18

nocra044

scra015p

T28 R48 Sec7

nocra047

nocra043

nocra048

4769 ft

Hilltop Rd

PEM Data Point
Non-Waterbody Point (Surveyed)
Waterbody Point (Surveyed)
Seep/Spring Point (Surveyed)

Waterbody Line (Surveyed)
Waterbody Polygon (Surveyed)
PEM Wetland Boundary (Surveyed)
NHD Flowline
NWI Wetland

Bureau of Land Management
Survey Boundary
Section Boundary
Township/Range Boundary

N

0 1,000 2,000
Feet

Wetland and Waterbody Survey Results
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B.2. REPRESENTATIVE PHOTOGRAPHS

Representative Photographs – Wetlands

Site ID: wgoc001e	**Survey Area:** Goldstrike
Date: 07/09/2021	**Description:** PEM wetland





Representative Photographs – Wetlands

Site ID: wcaa002e	**Survey Area:** Carlin
Date: 07/14/2021	**Description:** PEM wetland; Humboldt River floodplain; historic channel bed





Representative Photographs – Wetlands

Site ID: wcaa003e	**Survey Area:** Carlin
Date: 07/15/2021	**Description:** PEM wetland



Site ID: wcaa003s	**Survey Area:** Carlin
Date: 07/15/2021	**Description:** PSS wetland



Representative Photographs – Wetlands

Site ID: wcac001e	**Survey Area:** Carlin
Date: 07/16/2021	**Description:** PEM wetland; vegetation is becoming stressed especially along edges; not normal circumstances due to drought conditions





Representative Photographs – Wetlands

Site ID: wcac001e	**Survey Area:** Carlin
Date: 07/16/2021	**Description:** PEM wetland; vegetation is becoming stressed, especially along edges; not normal circumstances due to drought conditions





Representative Photographs – Wetlands

Site ID: wcac002e	**Survey Area:** Carlin
Date: 07/16/2021	**Description:** PEM wetland; water culverted and manipulated to run under railroad tracks; flow altered; soil so saturated and dark unable to see redox, assumed due to the saturation





Representative Photographs – Wetlands

Site ID: wcac002e	**Survey Area:** Carlin
Date: 07/16/2021	**Description:** PEM wetland; water culverted and manipulated to run under railroad tracks; flow altered; soil so saturated and dark unable to see redox, assumed due to the saturation





Representative Photographs – Wetlands

Site ID: wcac004e	**Survey Area:** Carlin
Date: 07/19/2021	**Description:** PEM wetland





Representative Photographs – Wetlands

Site ID: wcac004e	**Survey Area:** Carlin
Date: 07/19/2021	**Description:** PEM wetland





Representative Photographs – Wetlands

Site ID: wcra002s	**Survey Area:** Crescent Valley
Date: 05/29/2021	**Description:** PSS wetland; greasewood shrubs are on pedestals that show extreme signs of stress; seep wetland in depressional area at break of topography; area near seep is continually saturated and has formed gleyed soils



Site ID: wcra004e	**Survey Area:** Crescent Valley
Date: 05/31/2021	**Description:** PEM wetland; salt crust, bio crust, position, hydro veg, saturation



Representative Photographs – Wetlands

Site ID: wcra006e	**Survey Area:** Crescent Valley
Date: 05/31/2021	**Description:** PEM wetland; hydric soils, hydrology, hydro veg



Site ID: wcra007s	**Survey Area:** Crescent Valley
Date: 07/06/2021	**Description:** PSS wetland; distressed greasewood on islands/terraces; hydrology, hydro plants, and hydric soils; surface water on portions, saturation, stressed scrub



Representative Photographs – Wetlands

Site ID: wcra008s	**Survey Area:** Crescent Valley
Date: 06/12/2021	**Description:** PSS wetland



Site ID: wcra009e	**Survey Area:** Crescent Valley
Date: 06/14/2021	**Description:** PEM wetland; overflow from cattle trough



Representative Photographs – Wetlands

Site ID: wcrc002e	**Survey Area:** Crescent Valley
Date: 06/22/2021	**Description:** PEM wetland; Salt crusts on herbs, some distressed herbs; stream floodplain





Representative Photographs – Waterbodies
Non-Water Points

Site ID: nocra002	**Project Area:** Crescent Valley Area
Date: 05/27/2021	**Description:** Non-water; this appears to be an old ditched feature that does not function; small areas that suggest ephemeral ponding





Representative Photographs – Waterbodies
Non-Water Points

Site ID: nocra003	**Project Area:** Crescent Valley Area
Date: 05/27/2021	**Description:** Non-water; this appears to be an old ditched feature that does not function





Representative Photographs – Waterbodies
Non-Water Points

Site ID: nogoc003	**Project Area:** Goldstrike Area
Date: 06/24/2021	**Description:** Non-water



Site ID: nogoc004	**Project Area:** Goldstrike Area
Date: 06/24/2021	**Description:** Non-water



Representative Photographs – Waterbodies
Non-Water Points

Site ID: nogoc010	**Project Area:** Goldstrike Area
Date: 06/28/2021	**Description:** Non-water



Representative Photographs – Waterbodies
Open Waterbodies

Site ID: ocac001e	**Project Area:** Carlin Area
Date: 07/21/2021	**Description:** Ephemeral open waterbody



Site ID: ocac002e	**Project Area:** Carlin Area
Date: 07/21/2021	**Description:** Ephemeral open waterbody; dry at time of visit



Representative Photographs – Waterbodies
Open Waterbodies

Site ID: ocra001e	**Project Area:** Crescent Valley Area
Date: 05/31/2021	**Description:** Ephemeral open waterbody; episodic ephemeral playa pond/lake



Site ID: ocra002p	**Project Area:** Crescent Valley Area
Date: 06/02/2021	**Description:** Perennial open waterbody



Representative Photographs – Waterbodies
Open Waterbodies

Site ID: ocra003p	**Project Area:** Crescent Valley Area
Date: 06/02/2021	**Description:** Perennial open waterbody



Site ID: ocra006e	**Project Area:** Crescent Valley Area
Date: 06/07/2021	**Description:** Ephemeral open waterbody; excavated pit area



Representative Photographs – Waterbodies
Open Waterbodies

Site ID: ocrc002e	**Project Area:** Crescent Valley Area
Date: 06/22/2021	**Description:** Ephemeral open waterbody; noticeable soil surface change including texture and presence of cracks, visible depressional area; dry at time of visit



Site ID: ogoa001e	**Project Area:** Goldstrike Area
Date: 06/30/2021	**Description:** Ephemeral open waterbody; stock pond



Representative Photographs – Waterbodies
Open Waterbodies

Site ID: ogoa003e	**Project Area:** Goldstrike Area
Date: 07/01/2021	**Description:** Ephemeral open waterbody; bermed stock pond



Site ID: ogoa005e	**Project Area:** Goldstrike Area
Date: 07/05/2021	**Description:** Ephemeral open waterbody; low quality stock pond



Representative Photographs – Waterbodies
Streams

Site ID: scaa001e	**Project Area:** Carlin Area
Date: 07/14/2021	**Description:** Ephemeral linear feature



Site ID: scaa002e	**Project Area:** Carlin Area
Date: 07/22/2021	**Description:** Ephemeral linear feature; does not appear to function any longer; manipulated at mine upstream; filling in; banks degrading



Representative Photographs – Waterbodies
Streams

Site ID: scaa003e	**Project Area:** Carlin Area
Date: 07/23/2021	**Description:** Ephemeral linear feature





Representative Photographs – Waterbodies
Streams

Site ID: scac001p	**Project Area:** Carlin Area
Date: 07/16/2021	**Description:** Perennial linear feature (Humboldt River)





Representative Photographs – Waterbodies
Streams

Site ID: scac006e	**Project Area:** Carlin Area
Date: 07/21/2021	**Description:** Ephemeral linear feature



Site ID: scac009e	**Project Area:** Carlin Area
Date: 07/22/2021	**Description:** Ephemeral linear feature; dry at time of visit



Representative Photographs – Waterbodies
Streams

Site ID: scac009e	**Project Area:** Carlin Area
Date: 07/22/2021	**Description:** Ephemeral linear feature; dry at time of visit



Site ID: scac012e	**Project Area:** Carlin Area
Date: 07/23/2021	**Description:** Ephemeral linear feature (Marys Creek); dry at time of visit



Representative Photographs – Waterbodies
Streams

Site ID: scra001e	**Project Area:** Crescent Valley Area
Date: 05/27/2021	**Description:** Ephemeral linear feature





Representative Photographs – Waterbodies
Streams

Site ID: scra002i	**Project Area:** Crescent Valley Area
Date: 05/28/2021	**Description:** Intermittent linear feature (Cottonwood Creek); very manipulated





Representative Photographs – Waterbodies
Streams

Site ID: scra004e	**Project Area:** Crescent Valley Area
Date: 05/29/2021	**Description:** Ephemeral linear feature





Representative Photographs – Waterbodies
Streams

Site ID: scra011e	**Project Area:** Crescent Valley Area
Date: 06/07/2021	**Description:** Ephemeral linear feature; maintained ditch; no evidence of flow



Site ID: scra012e	**Project Area:** Crescent Valley Area
Date: 06/07/2021	**Description:** Ephemeral linear feature (Coyote Creek); very weak ephemeral channel, many swale sections, but all continuous; borderline jurisdictional "stream"



Representative Photographs – Waterbodies
Streams

Site ID: scra012e	**Project Area:** Crescent Valley Area
Date: 06/07/2021	**Description:** Ephemeral linear feature (Coyote Creek); very weak ephemeral channel, many swale sections, but all continuous; borderline jurisdictional "stream"



Site ID: scra014e	**Project Area:** Crescent Valley Area
Date: 06/10/2021	**Description:** Ephemeral linear feature; maintained ditch



Representative Photographs – Waterbodies
Streams

Site ID: scra015p	**Project Area:** Crescent Valley Area
Date: 06/10/2021	**Description:** Perennial linear feature; manipulated; culverts, discharge pipes, artificial channelized with berms





Representative Photographs – Waterbodies
Streams

Site ID: scra022e	**Project Area:** Crescent Valley Area
Date: 07/08/2021	**Description:** Ephemeral linear feature; weak ephemeral channelization; from/to overland erosional flow





Representative Photographs – Waterbodies
Streams

Site ID: scrc003e	**Project Area:** Crescent Valley Area
Date: 06/23/2021	**Description:** Ephemeral linear feature; dry at time of visit





Representative Photographs – Waterbodies
Streams

Site ID: sgoa001e	**Project Area:** Goldstrike Area
Date: 06/29/2021	**Description:** Ephemeral linear feature (Boulder Creek); large ephemeral desert wash





Representative Photographs – Waterbodies
Streams

Site ID: sgoa002e	**Project Area:** Goldstrike Area
Date: 06/30/2021	**Description:** Ephemeral linear feature; ephemeral drainage through invasive annual grass and forb area





Representative Photographs – Waterbodies
Streams

Site ID: sgoa003p	**Project Area:** Goldstrike Area
Date: 07/05/2021	**Description:** Perennial linear feature (Welches Creek); fringe PEM wetland





Representative Photographs – Waterbodies
Streams

Site ID: sgoa008e	**Project Area:** Goldstrike Area
Date: 07/20/2021	**Description:** Ephemeral linear feature; weakly defined ephemeral stream; bed/bank recognizable





Representative Photographs – Waterbodies
Streams

Site ID: sgoc001e_01	**Project Area:** Goldstrike Area
Date: 06/29/2021	**Description:** Ephemeral linear feature (Boulder Creek); braided channel in some areas





Representative Photographs – Waterbodies
Streams

Site ID: sgoc004e	**Project Area:** Goldstrike Area
Date: 07/09/2021	**Description:** Ephemeral linear feature





Representative Photographs – Waterbodies
Streams

Site ID: sgoc006i	**Project Area:** Goldstrike Area
Date: 07/09/2021	**Description:** Intermittent linear feature (Welches Creek); perennial turns intermittent; loses waterflow





Representative Photographs – Waterbodies
Streams

Site ID: sgoc007p	**Project Area:** Goldstrike Area
Date: 07/09/2021	**Description:** Perennial linear feature (Welches Creek); fringe PEM wetland





Representative Photographs – Seeps/Springs

Site ID: pgoa001	**Project Area:** Goldstrike Area
Date: 06/30/2021	**Description:** Pump-operated stock tank; potentially historic seep



Site ID: pgoa002	**Project Area:** Goldstrike Area
Date: 07/01/2021	**Description:** Mechanical pump-driven storage tank and cattle trough; likely historic seep/spring; fills stock pond, ogoa003e



Representative Photographs – Seeps/Springs

Site ID: pgoa003	**Project Area:** Goldstrike Area
Date: 07/05/2021	**Description:** Cattle trough with float and tap; adjacent to bermed stock



Site ID: pcac001	**Project Area:** Carlin Area
Date: 07/16/2021	**Description:** Potential spring from within the Humboldt River



Representative Photographs – Seeps/Springs

Site ID: pcac001	**Project Area:** Carlin Area
Date: 07/16/2021	**Description:** Potential spring from within the Humboldt River



Site ID: pcac002	**Project Area:** Carlin Area
Date: 07/16/2021	**Description:** Hot spring draining to the Humboldt River



Representative Photographs – Seeps/Springs

Site ID: pcra003	**Project Area:** Crescent Valley Area
Date: 06/14/2021	**Description:** Artificial livestock watering hole; spillover creating artificial ponding area

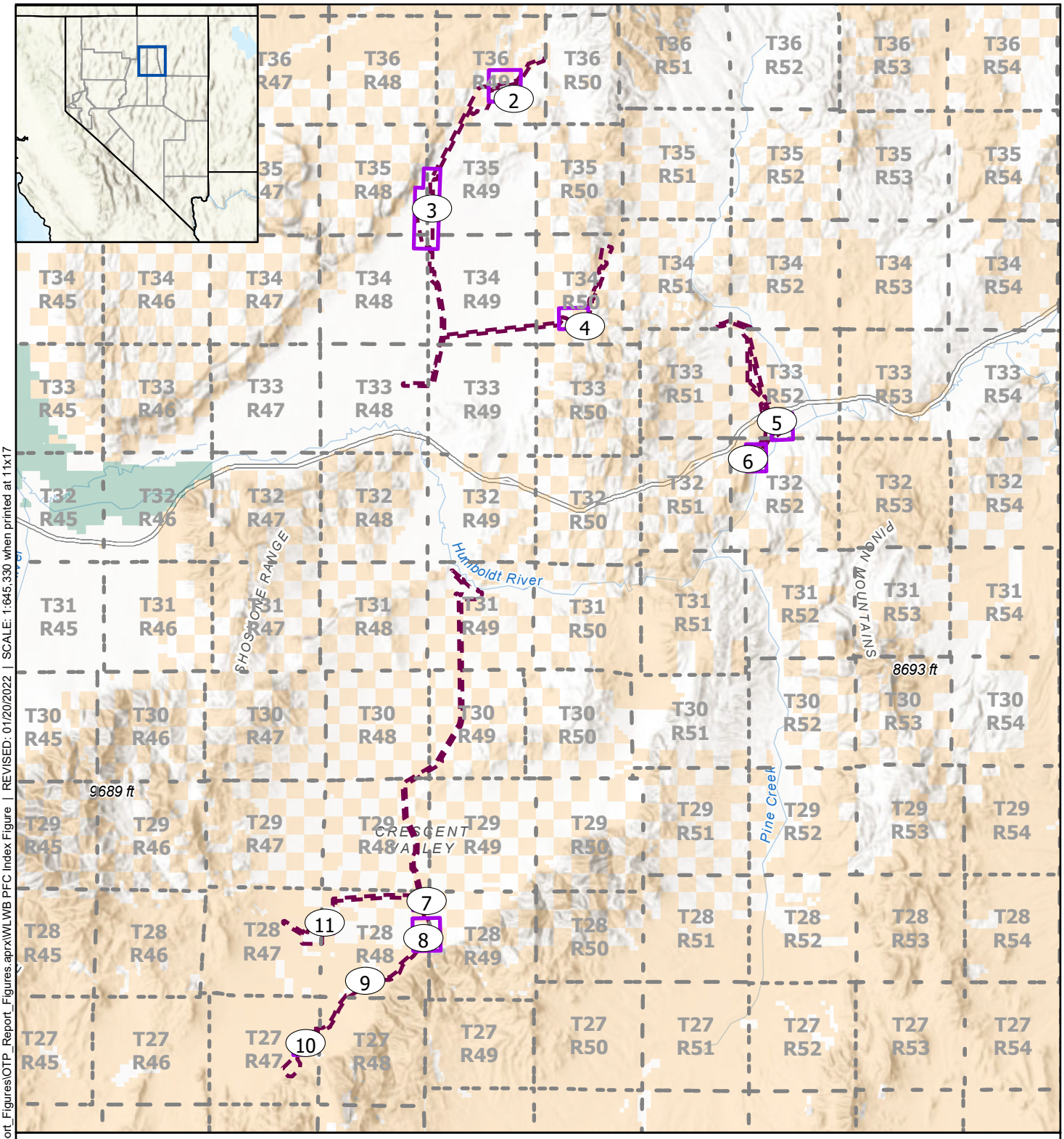


Site ID: pcra004	**Project Area:** Crescent Valley Area
Date: 07/08/2021	**Description:** Seeping area with hydric soils



B.3. PROPER FUNCTIONING CONDITION DATA

DRAFT



Map Page
Survey Boundary
Bureau of Land Management
Bureau of Reclamation
Township/Range Boundary

N

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Feet

Page 1 of 11

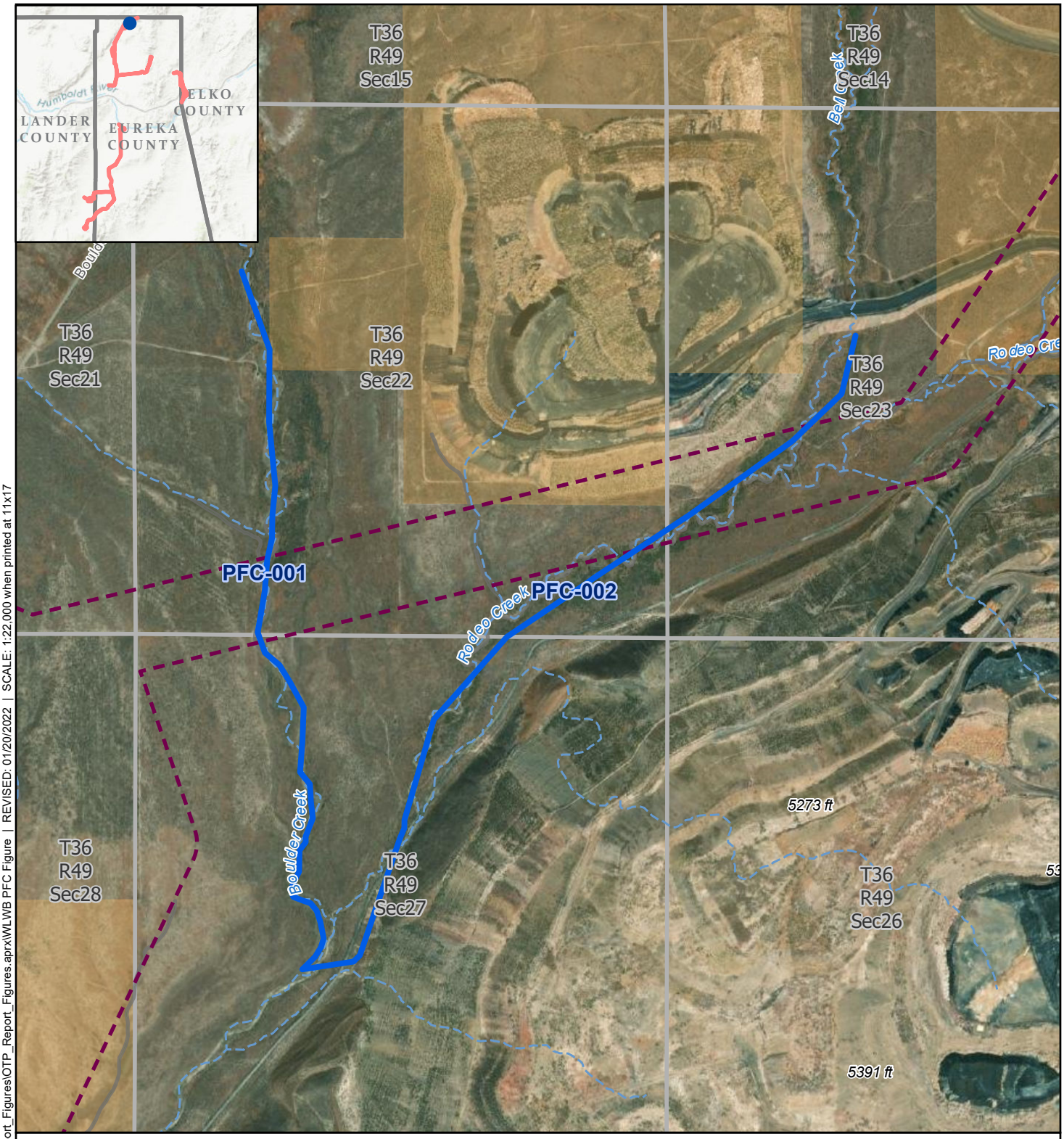
Appendix B-3
PFC Survey Locations
NGM Ore Transportation Project
Biological Baseline Study
Nevada Gold Mines
Lander, Eureka, and Elko County, Nevada

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FILE: M:\Clients\M-O\NGM\OTP\ArcGIS\OTP_Report_Figures\OTP_Report_Figures.aprx\WLWB PFC Index Figure | REVISED: 01/20/2022 | SCALE: 1:645,330 when printed at 11x17

Source: Esri - World Imagery;



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PFC Line
NHD Flowline
NWI Wetland
Bureau of Land Management
Section Boundary
Township/Range Boundary

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Feet

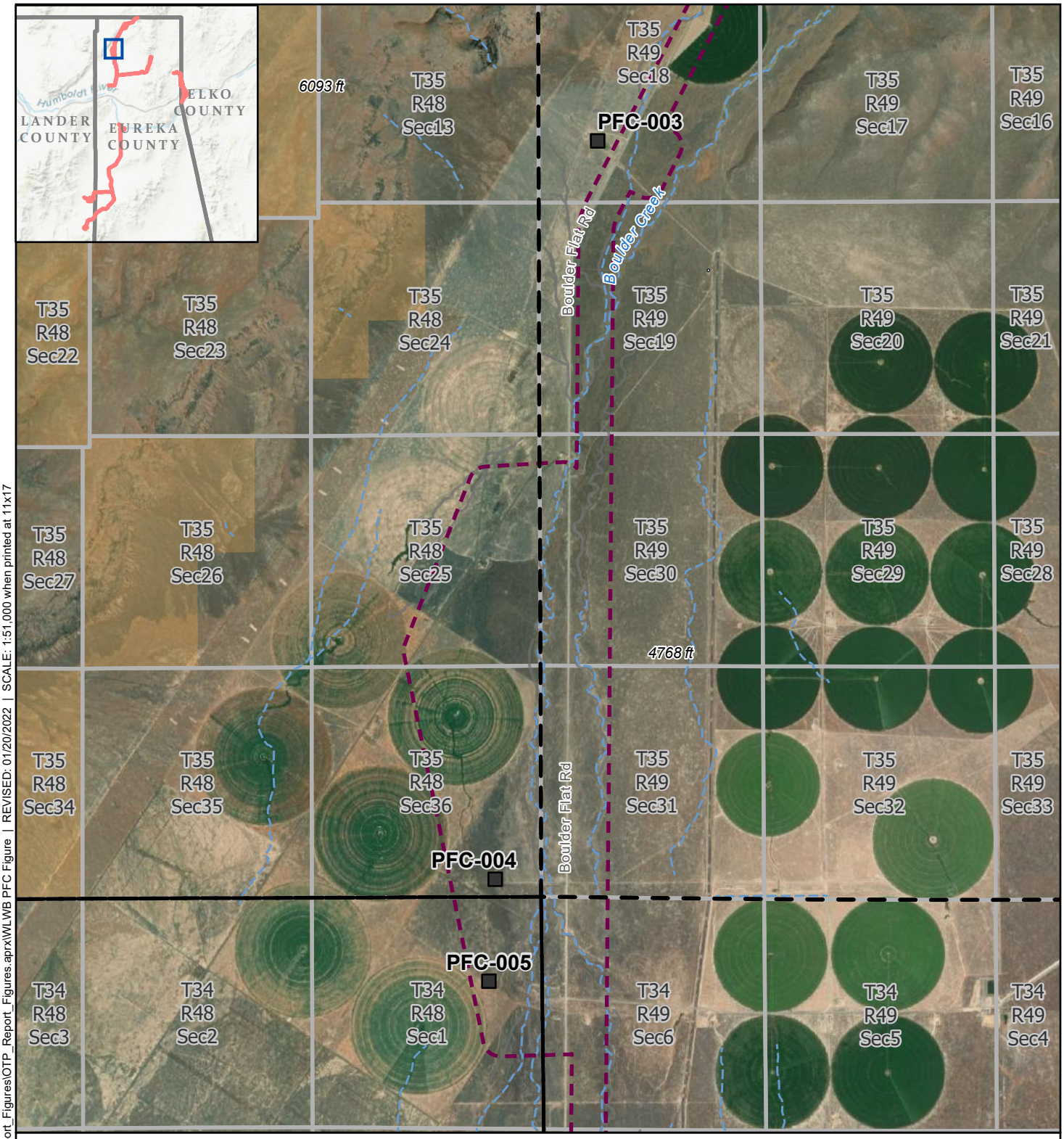
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Source: Esri - World Imagery;



Survey Boundary
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NWI Wetland
NHD Waterbody
Bureau of Land Management
Not Assessed
Section Boundary
Township/Range Boundary

N

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Feet

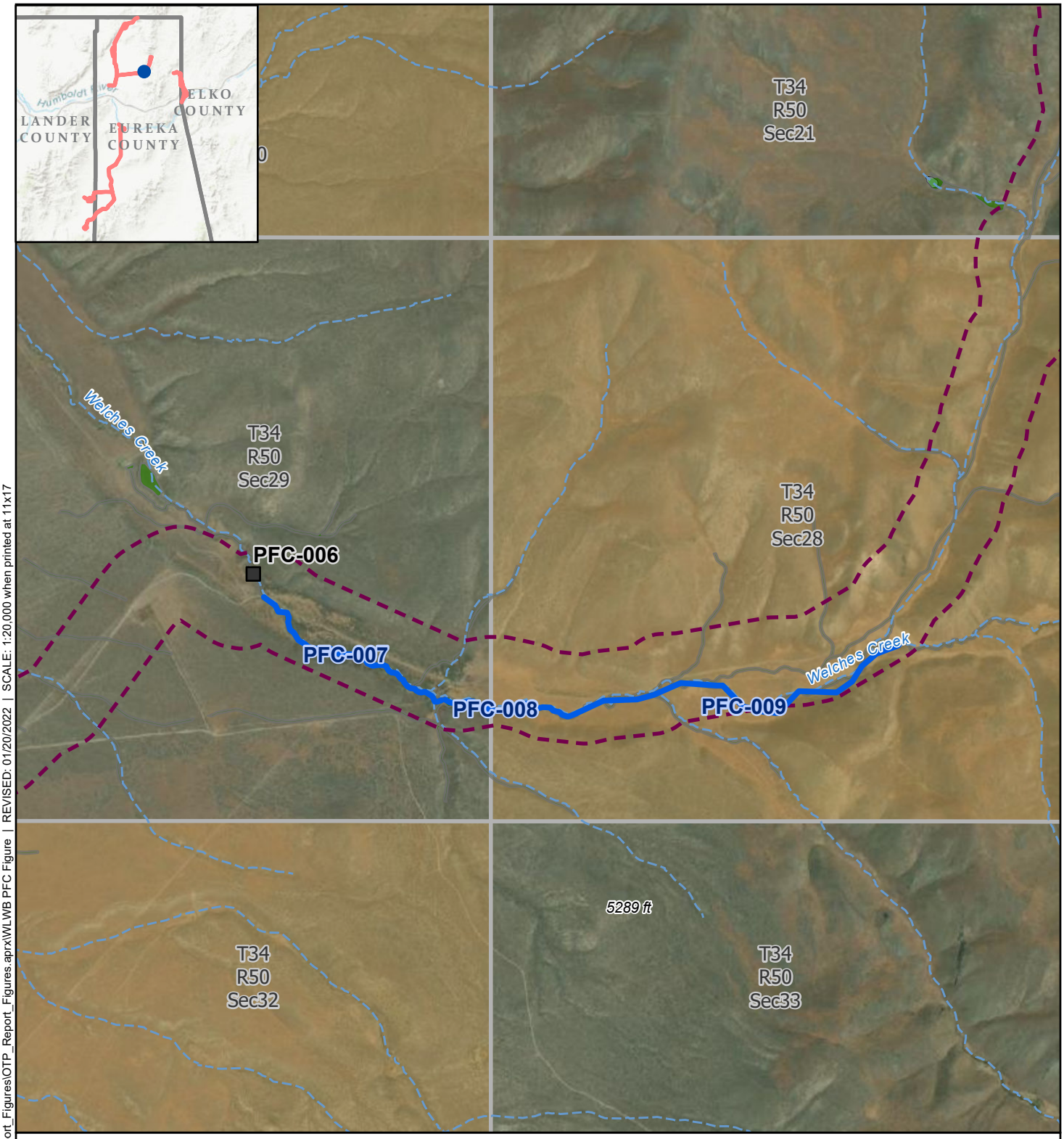
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Survey Boundary
PFC Line
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NHD Waterbody
Bureau of Land Management
Not Assessed
Section Boundary
Township/Range Boundary

N

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Feet

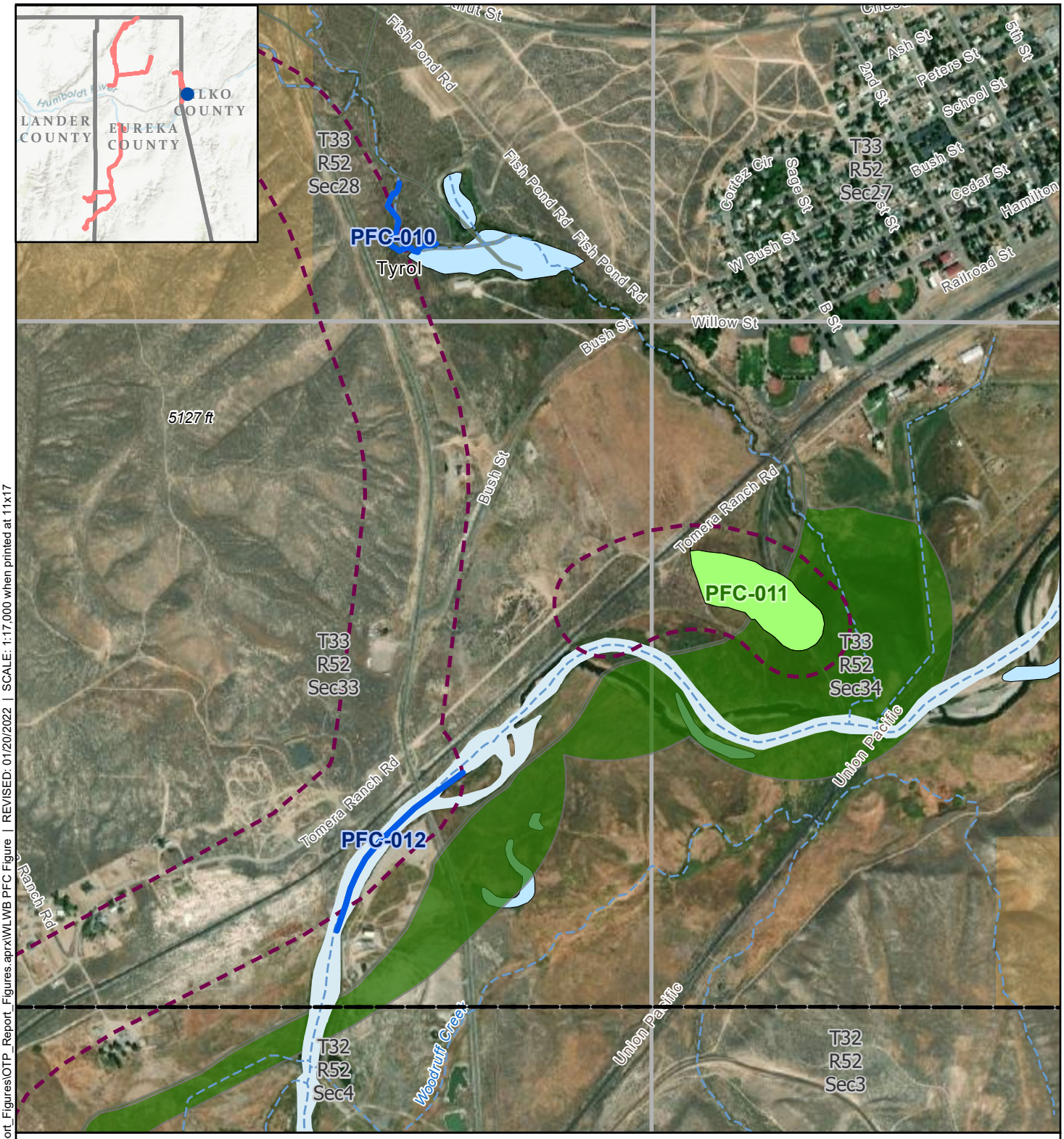
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Survey Boundary
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PFC Polygon
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Bureau of Land Management
Section Boundary
Township/Range Boundary

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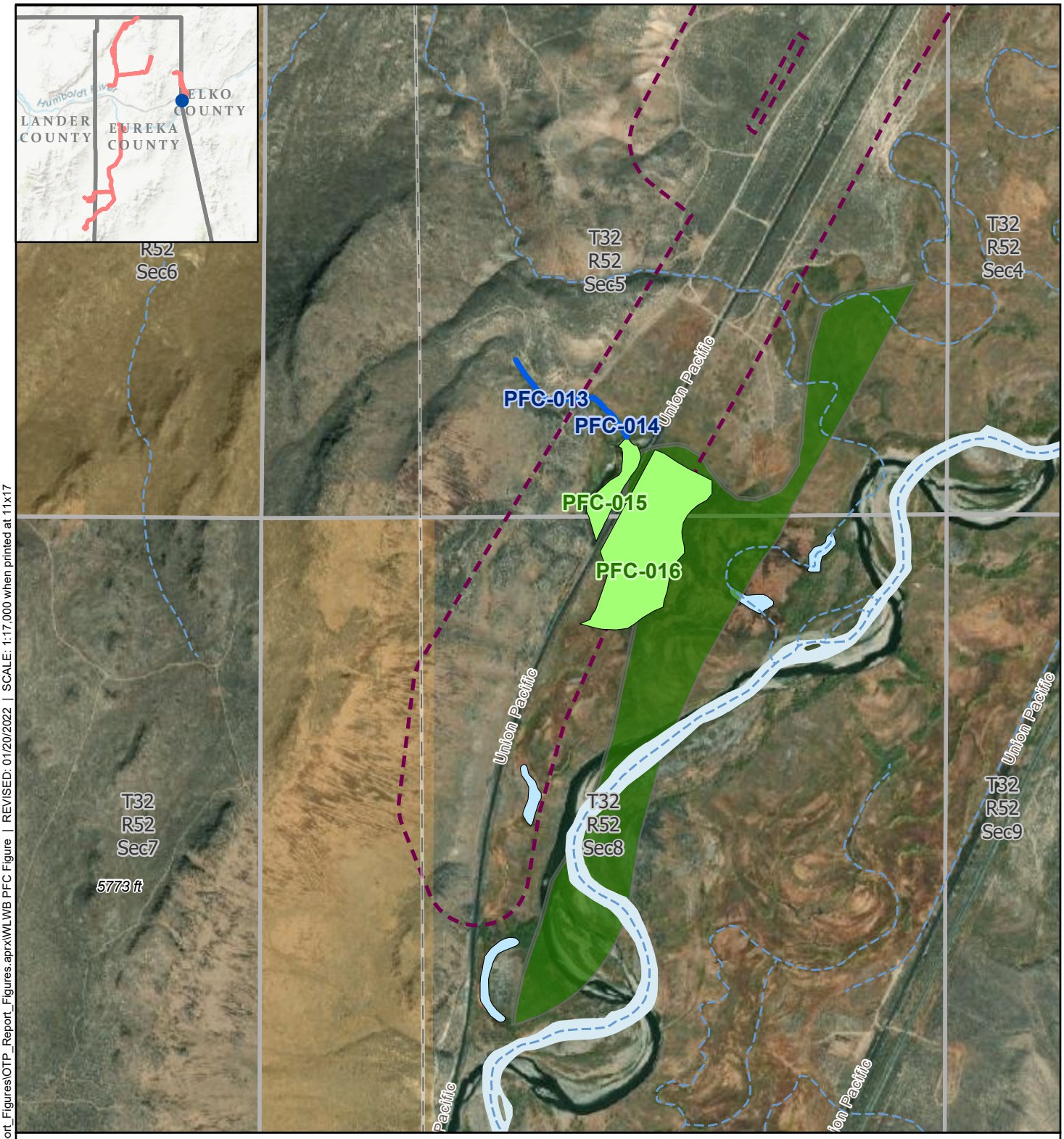
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Survey Boundary
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PFC Polygon
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NHD Waterbody
Bureau of Land Management
Section Boundary
Township/Range Boundary

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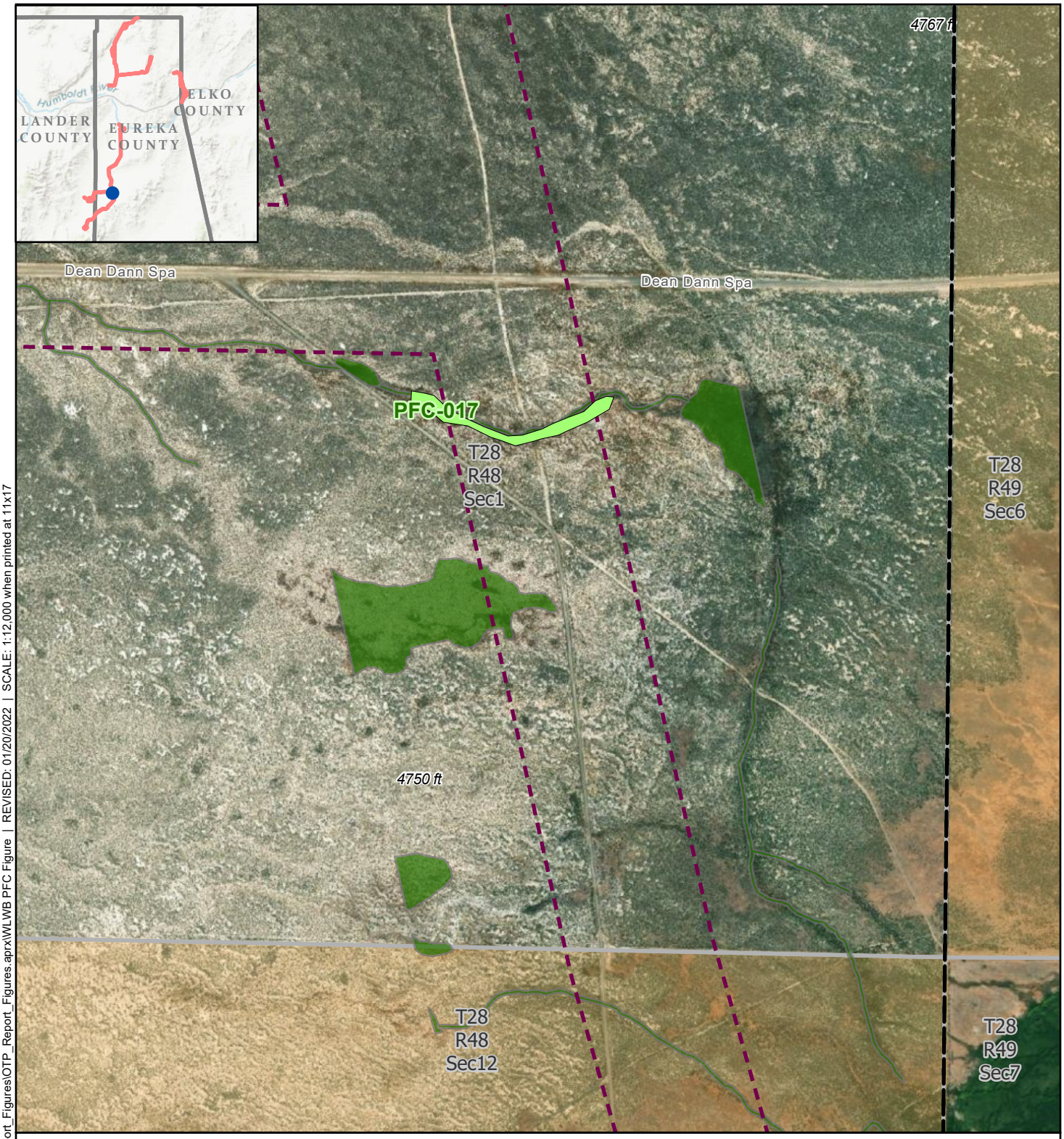
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Bureau of Land Management
Section Boundary
Township/Range Boundary

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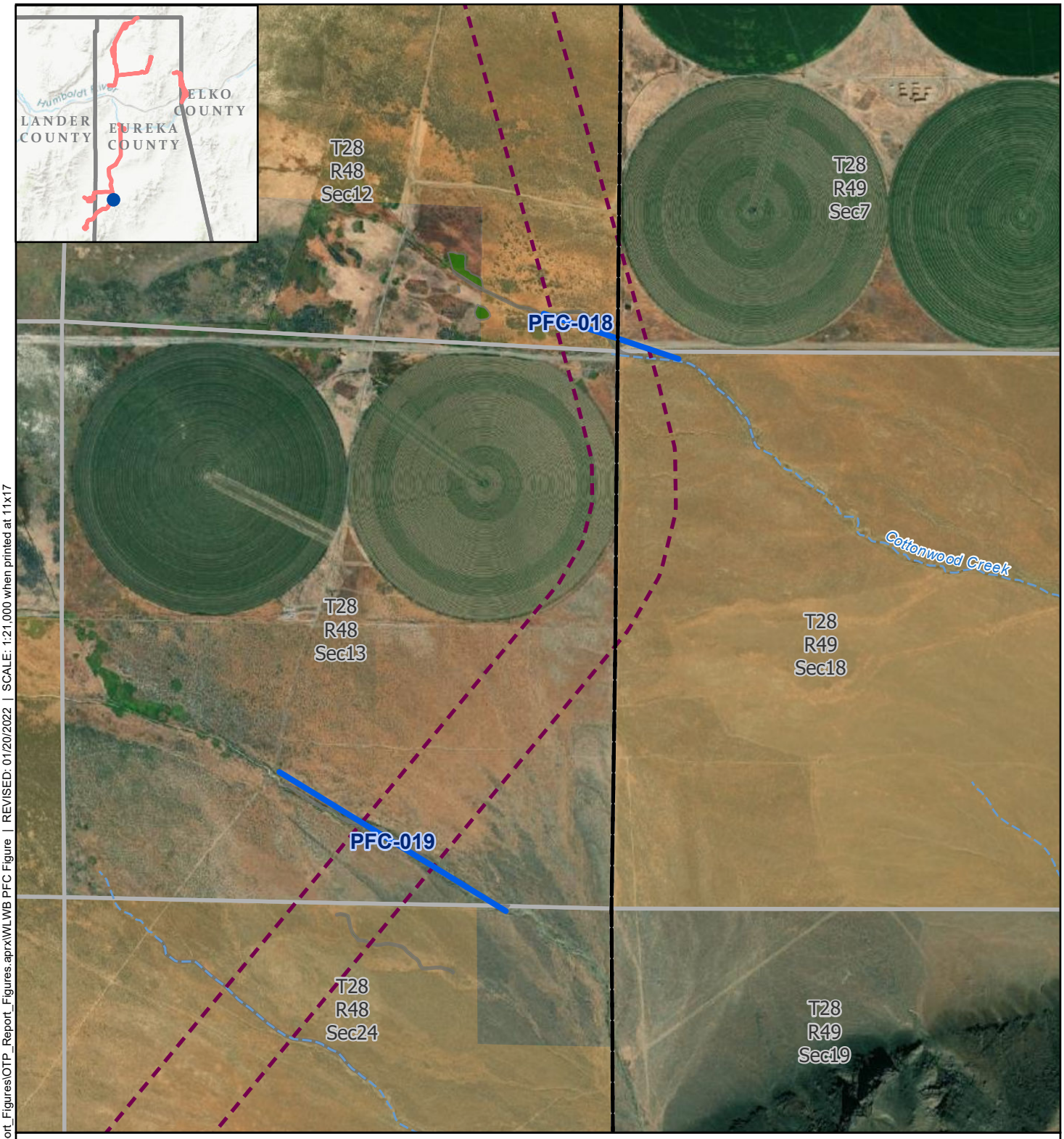
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Survey Boundary
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Bureau of Land Management
Section Boundary
Township/Range Boundary

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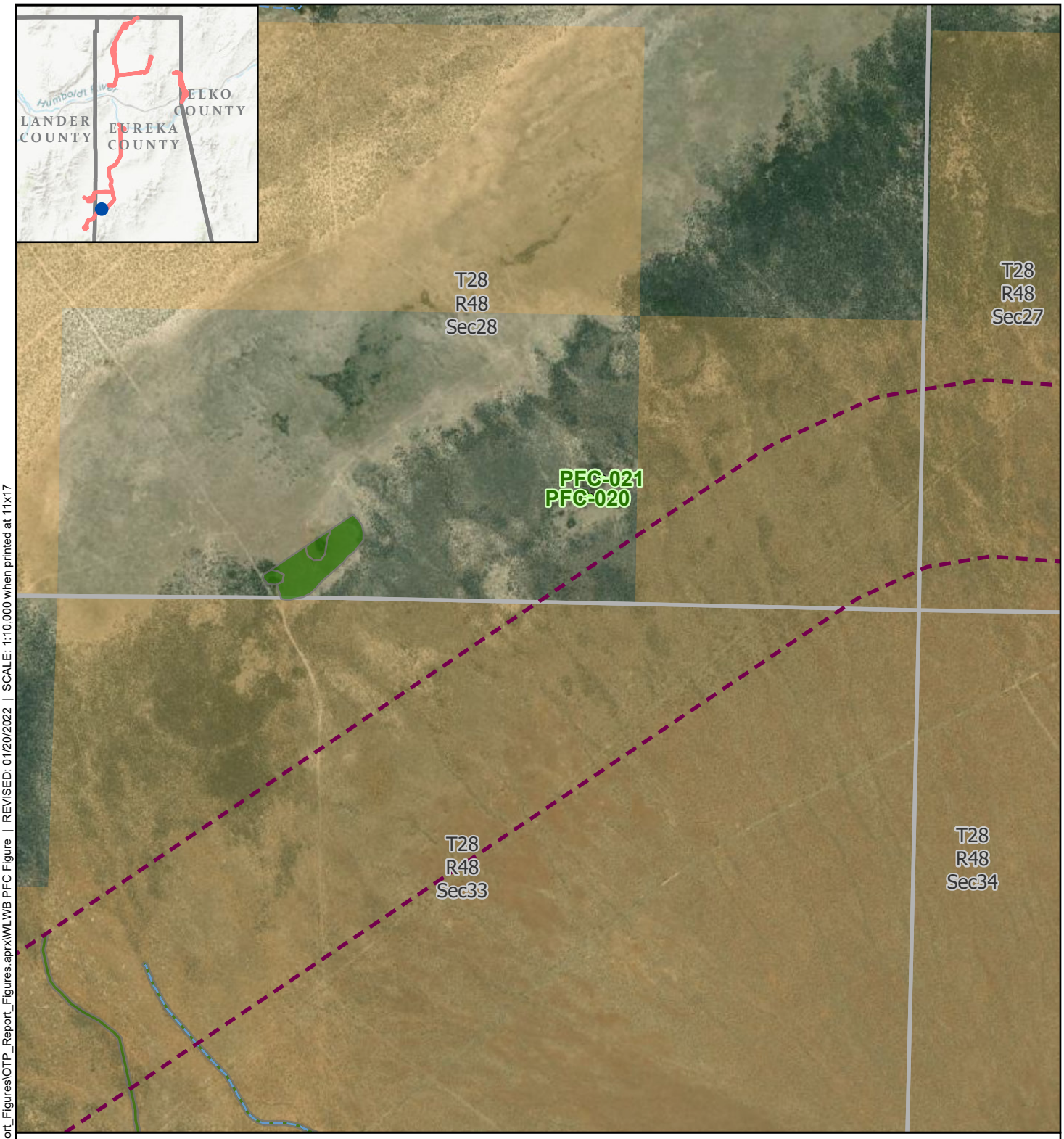
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Bureau of Land Management
Section Boundary
Township/Range Boundary

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Feet

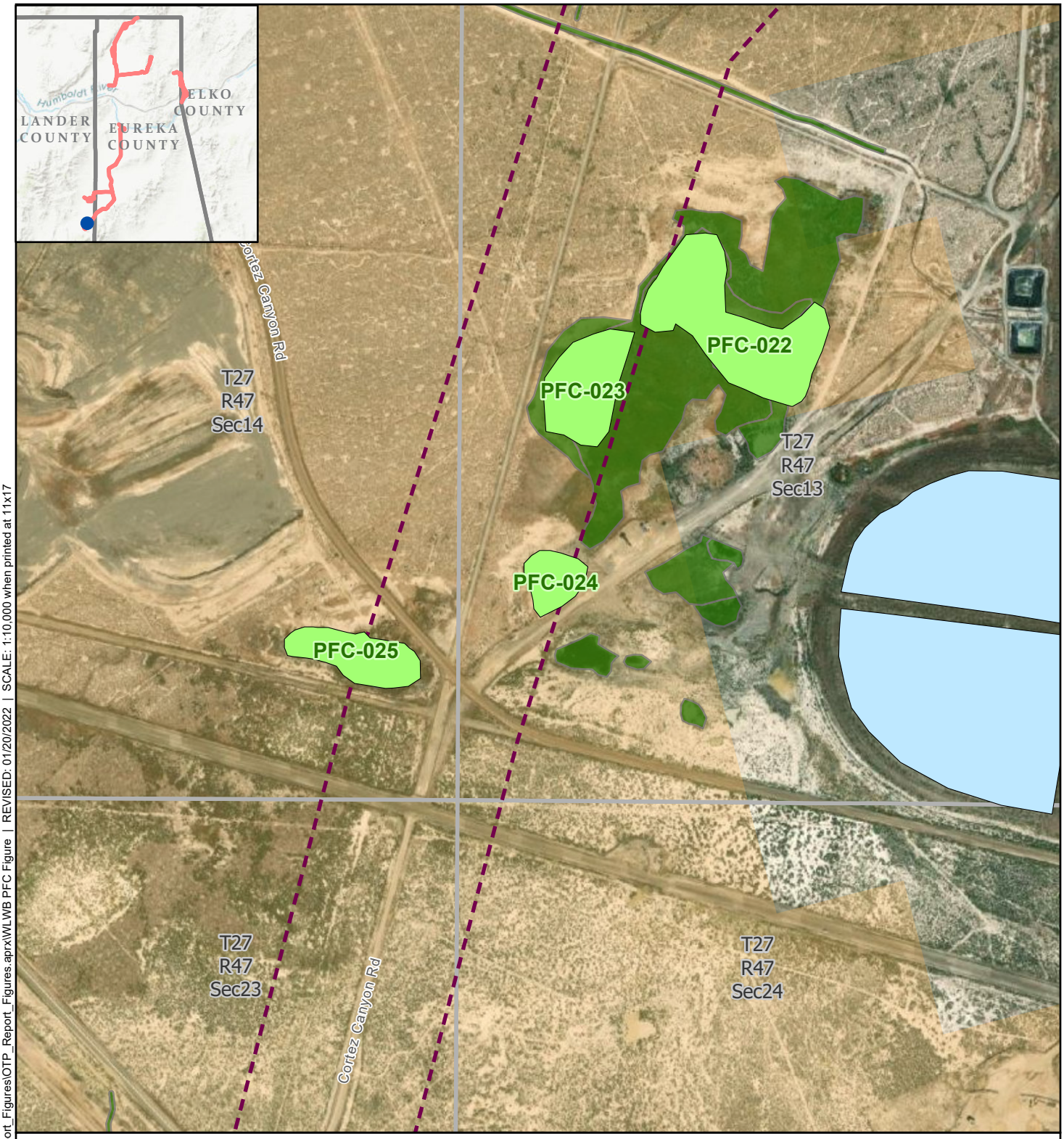
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Source: Esri - World Imagery;



Survey Boundary
PFC Polygon
NHD Flowline
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NHD Waterbody
Bureau of Land Management
Section Boundary
Township/Range Boundary

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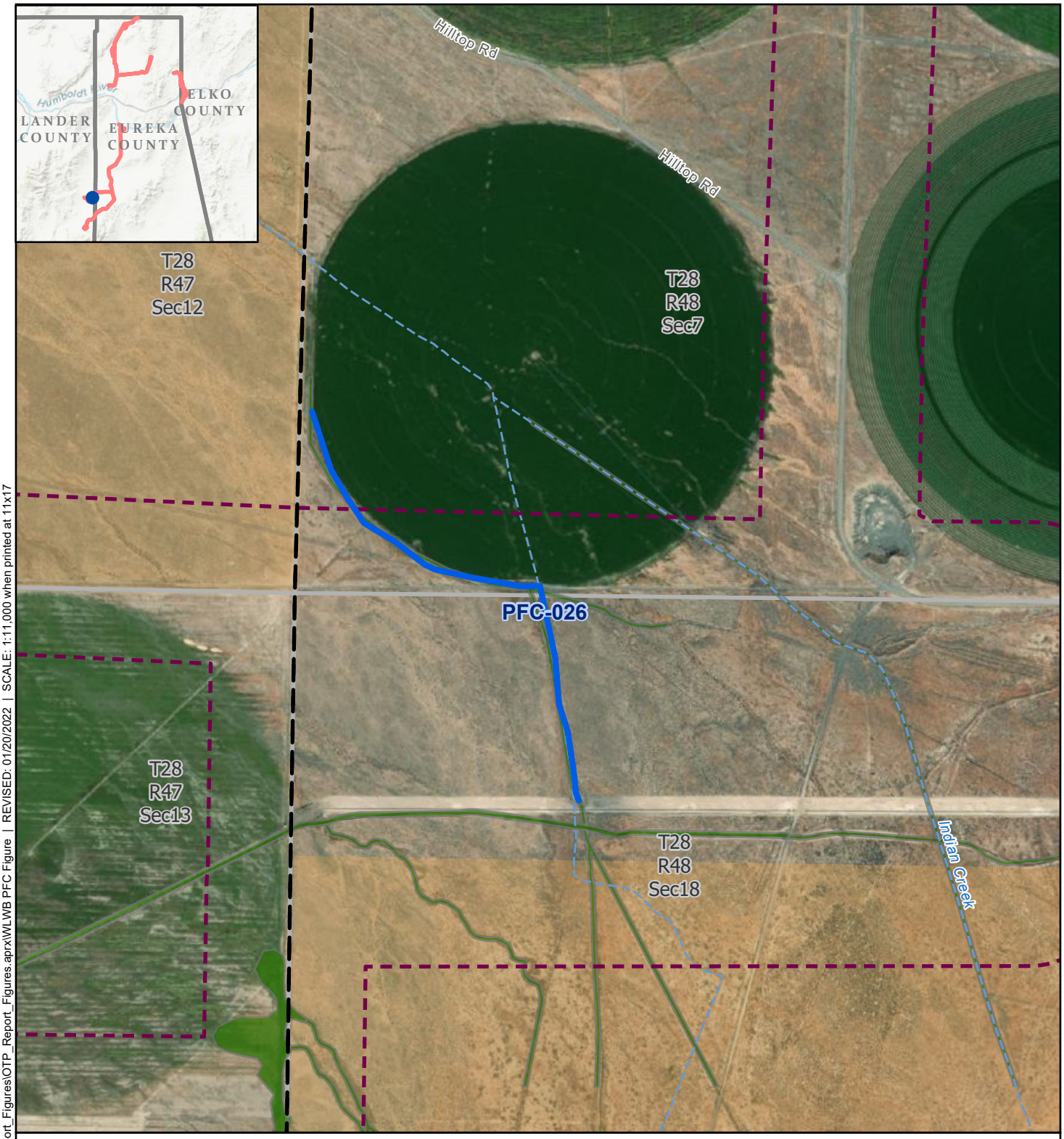
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Survey Boundary
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0 575 1,150
Feet

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Source: Esri - World Imagery;

Boulder Creek - Reach 1 8-18-21

lotic
~~Lentic~~ Riparian-Wetland Assessment Area Information Form – Evans, Barrett

Altered Potential Attachment

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

Yes. Large scale mining operations in upstream areas and in surrounding watershed have altered normal water and sediment supply regimes. Soil profiles show evidence of historic riparian and floodplain functions; now currently functions as emphemeral or intermittent channel with no or limited riparian functions. Evidence of excessive gravel, cobble, sand deposit across floodprone area.

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

APPENDIX – PFC PHOTO LOG

File Name	Image
Boulder Creek_IMG_2973.jpg	
Boulder Creek_IMG_2974.jpg	

APPENDIX – PFC PHOTO LOG

Boulder Creek_IMG_2975.jpg	
Boulder Creek_IMG_2976.jpg	

APPENDIX – PFC PHOTO LOG

Boulder Creek_IMG_2977.jpg	
Boulder Creek_IMG_2978.jpg	

APPENDIX – PFC PHOTO LOG

Boulder Creek_IMG_2979.jpg	
Boulder Creek_IMG_2980.jpg	

APPENDIX – PFC PHOTO LOG

Boulder Creek_IMG_2997.jpg	
Boulder Creek_IMG_2998.jpg	

APPENDIX – PFC PHOTO LOG

Boulder Creek_IMG_2999.jpg	
Boulder Creek_IMG_3001.jpg	

8-18-21
Barrett, Evans

lotic Rodeo Creek - Reach 1

~~Lentic~~ Riparian-Wetland Assessment Area Information Form

Altered Potential Attachment

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

Yes. Large scale mining operations upstream and in surrounding watershed have altered historic water and sediment supply regimes. Currently functions as emphemeral channel. No riparian plant communities present with exception of a few scattered clumps of SAEX. Tributary to Boulder Creek, now essentially a dry wash.

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2981.jpg	
Rodeo Creek_IMG_2982.jpg	

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2983.jpg	
Rodeo Creek_IMG_2984.jpg	

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2985.jpg	
Rodeo Creek_IMG_2986.jpg	

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2987.jpg	
Rodeo Creek_IMG_2988.jpg	

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2989.jpg	
Rodeo Creek_IMG_2990.jpg	

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2991.jpg	
Rodeo Creek_IMG_2992.jpg	

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2993.jpg	
Rodeo Creek_IMG_2994.jpg	

APPENDIX – PFC PHOTO LOG

Rodeo Creek_IMG_2995.jpg	
Rodeo Creek_IMG_2996.jpg	

Stock Tanks 1, 2, 3 - No Data Forms
These areas were not assessed due to the lack of wetland or riparian functions

APPENDIX – PFC PHOTO LOG

Stock Tanks 1-3_IMG_3002.jpg	
Stock Tanks 1-3_IMG_3003.jpg	

APPENDIX – PFC PHOTO LOG

Stock Tanks 1-3_IMG_3004.jpg	
Stock Tanks 1-3_IMG_3005.jpg	

APPENDIX – PFC PHOTO LOG

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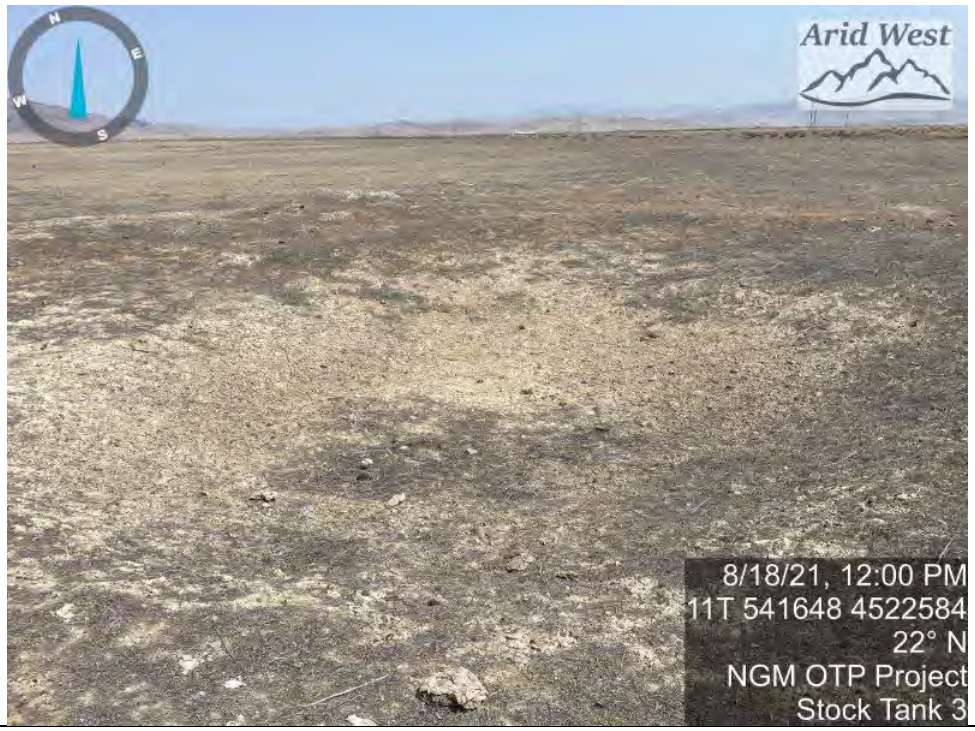
APPENDIX – PFC PHOTO LOG

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APPENDIX – PFC PHOTO LOG

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Stock Tanks 1-3_IMG_3011.jpg	

APPENDIX – PFC PHOTO LOG

Stock Tanks 1-3_IMG_3012.jpg	
Stock Tanks 1-3_IMG_3013.jpg	

Welches Creek - No Data Forms
This area was not assess due to the lack of wetland or riparian functions

APPENDIX – PFC PHOTO LOG

Not Assessed_IMG_3049.jpg	
Not Assessed_IMG_3050.jpg	

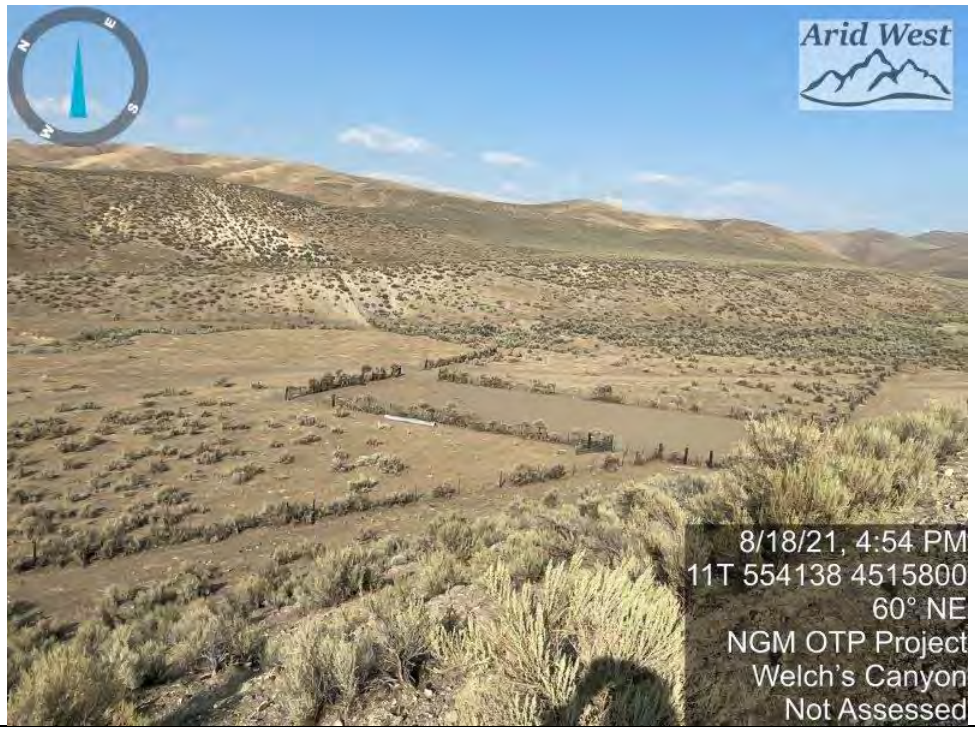
APPENDIX – PFC PHOTO LOG

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APPENDIX – PFC PHOTO LOG

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Not Assessed_IMG_3054.jpg	

APPENDIX – PFC PHOTO LOG

Not Assessed_IMG_3055.jpg	
Not Assessed_IMG_3056.jpg	

Reach Information Form (Lotic)

I. **Background information:** Date: 8-18-21

Riparian area/stream name: Welcher Creek Reach ID: 3

Management unit (allotment/pasture, other): Several pastures

Administrative unit/state: BLM Allotment - TS Allotment

ID team members: Evans / Bennett

Assessment method: Reach length (miles/km): 0.36 miles

- ☐ Complete reconnaissance
- ☐ Selective inspection of representative areas
- ☐ Remote imagery with selective ground inspection

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with reach breaks indicated.

II. **Reach break location:**

Reach starting point (upstream)	Reach ending point (downstream)
40.788389 N. Lat. UTM E _____ m	40.790944 N. Lat. UTM E _____ m
or	or
116.349841 W. Long. N _____ m	116.355798 W. Long. N _____ m

Positions by GPS? ☒ Yes ☐ No Photos taken? ☒ Yes ☐ No UTM Zone: _____

Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84 ☐ Other (specify): _____

Rationale for reach breaks: Upper end: Reach Break more natural for response when dry gulch above lower end; end of assessment area, channel becomes more intermittent/ephemeral below.

III. **Description of potential and rationale** (should include description of hydrologic regime, stream type(s), and riparian plant communities at potential; may include additional information such as valley type, gradient, entrenchment ratio, sinuosity, width/depth ratio, and bed and bank materials):

The reach is an interrupted intermittent reach marked by fluctuations in the depth to water. In places the water daylights and supports small communities of wetland obligates. In many places small floodplains or terraces support 'CANE2', but shows signs of water stress

in many places.
The channel type varies between a G and C channel and has some limited floodplain development in places. In other places, historic floodplains have developed but been abandoned by channel down cutting.

Channel gradient is overstraightened and over steepened relative to the natural landscape setting as a result of historic gullying. Channel entrenchment is high and sinuosity is low.

Grazing impacts are generally high on the channel as well as the adjacent uplands.

IV. Other assessment or monitoring data or information about the reach:
- Limited function intermittent drainage
- Historic Gullying
- Interrupted flows
- Potential to have limited recovery inset within gully and maybe more intermittent flows throughout reach

Stands of narrowleaf milkweed (Asclepias sp.) (?) and a few scattered plants of showy milkweed (ASSP) in lower part of reach. No evidence of use by Monarch butterflies.

Int. Reach

PFC Assessment Form (Lotic)

Riparian area/stream name: Welches Creek Reach ID: 3 Date: 8-18-21

Yes	No	NA	HYDROLOGY
	✓		1) Floodplain is inundated in "relatively frequent" events.

Rationale: Periodic small floodplains have developed in past within confined gully. Relatively recent incision has caused localized abandonment of these small floodplains.

		X	2) Beaver dams are stable.

Rationale: No evidence past or present occupancy by beaver. Site currently not suitable.

	X		3) Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region).

Rationale: Channel is over straightened and oversteepened. Generally, still a Rosgen G gully although where gully width has increased, some evidence of G channel starting to transition to C channel.

	X		4) Riparian area is expanding or has achieved potential extent.

Rationale: Limited riparian zone in areas where soil moisture is adequate to support riparian species is contracting due to current livestock grazing practices as well as small scale localized incision of small floodplains.

X			5) Riparian impairment from the upstream or upland watershed is absent.

Rationale: Historically, severely affected by aggradation and erosion associated with condition of upstream channel and watershed, however watershed not currently being impaired. Now in state of arrested degradation.

Yes	No	NA	VEGETATION
✓			6) There is adequate diversity of stabilizing riparian vegetation for recovery/maintenance.
Rationale: Intermittent channel with limited requirements for stabilizing species. Riparian species which provide for stability in this setting are Eleocharis sp. and JUAR2. POPR also provides for some stability in this setting.			
	X		7) There are adequate age classes of stabilizing riparian vegetation for recovery/maintenance.
Rationale: limited herbaceous riparian communities including Eleocharis sp, JUAR2 and small amounts of PANE2 present on remnant floodplain are contracting.			
	X		8) Species present indicate maintenance of riparian soil-moisture characteristics.
Rationale: where soil moisture is sufficient to support at least some riparian species, species are absent or show severe stress from drying and heavy grazing.			
	X		9) Stabilizing plant communities capable of withstanding moderately high streamflow events are present along the streambank.
Rationale: Potential for development of stabilizing plant communities limited by lack of soil moisture and by lacking. lack of floodplain development. However, where potential is present for establishment of appropriate species for site, developing plant communities stressed by recent small scale incision and by chronic heavy grazing pressure.			
	X		10) Riparian plants exhibit high vigor.
Rationale: Riparian species on small floodplain including PANE2 show water and grazing stress. Yellow coloration and stunted growth forms.			
	X	X	11) An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.
Rationale: NO, where applicable in places where floodplains can develop and where soil moisture is sufficient to grow riparian plants. Some dry rocky areas NA			

		X	12) Plant communities are an adequate source of woody material for maintenance/recovery.

Rationale: Interm. Hdtt gully setting. Gully widening is mechanism for energy dissipation/ recovery at this stage.

Yes	No	NA	GEOMORPHOLOGY
	X		13) Floodplain and channel characteristics (i.e., rocks, woody material, vegetation, floodplain size, overflow channels) are adequate to dissipate energy.

Rationale: Channel is too gullied to dissipate energy. Where small, inset floodplains have formed in recent past, these are abandoned from recent incision.

	X		14) Point bars are revegetating with stabilizing riparian plants.

Rationale: Relatively recently formed small, inset floodplains actively eroding. Plant communities on these small floodplains dying and contracting.

	X		15) Streambanks are laterally stable.

Rationale: Overall channel is deep, narrow gully, but where small inset floodplains have formed, streambanks are poorly vegetated and unstable.

X			16) Stream system is vertically stable (not incising).

Rationale: Probably at base level on rocky bed acting as control against further large-scale incision.

	X		17) Stream is in balance with the water and sediment that is being supplied by the drainage basin (i.e., no excessive erosion or deposition).

Rationale: The severity and extent of the modern gully that now characterizes Welches Creek is a strong indication of excessive erosion resulting from imbalances of water and sediment being supplied by watershed. However, gully is legacy from past events. Currently, weak no due to localized incision and abandonment of small developing inset floodplains indicating gully still concentrates too much energy for setting.

Summary Determination

Functional rating (check one)

- ☐ Proper functioning condition
- ☐ Functional–at risk
- ☒ Nonfunctional



Trend (check one)

Monitored trend	Apparent trend
☐ Upward	☐ Upward
☐ Downward	☒ Downward
☐ Static	☐ Not apparent

Rationale for rating: Where system ran and should develop functionality (i.e. where sufficient soil moisture is present and where activity has widened somewhat) conditions are deteriorating. Small inset floodplains are drying out and riparian species show high levels of stress.

Overall, system has somewhat limited potential for response.

Rationale for trend: Drying and abandonment of small inset floodplain riparian communities present high stressed from lack of water and chronic heavy grazing impacts (both utilization and trampling and compaction of moist soils).

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☐ Yes ☒ No

If yes, what are those factors? Check all that apply.

☐ Flow regulations ☐ Road encroachment

☐ Mining activities ☐ Oil field water discharge

☐ Upstream channel conditions ☐ Augmented flows

☐ Channelization ☐ Other (specify:) Current grazing practices

Explain factors preventing achievement of PFC:

Current grazing practices preventing establishment of riparian plant communities in areas of persistent soil moisture.

Current gully limits potential, however changes in current grazing practices would allow for some progress towards achieving PFC and/or more desirable conditions.

(Revised 2014)

APPENDIX – PFC PHOTO LOG

Reach 3_IMG_3036.jpg	
Reach 3_IMG_3037.jpg	

APPENDIX – PFC PHOTO LOG

Reach 3_IMG_3038.jpg	
Reach 3_IMG_3039.jpg	

APPENDIX – PFC PHOTO LOG

Reach 3_IMG_3040.jpg	
Reach 3_IMG_3041.jpg	

APPENDIX – PFC PHOTO LOG

Reach 3_IMG_3042.jpg	

Note: PFC assessment not conducted. Limited riparian functions, limited potential for change/improvement.

Reach Information Form (Lotic)

I. **Background information:** Date: 8-18-21

Riparian area/stream name: Welches Creek Reach ID: 2

Management unit (allotment/pasture, other): several pastures

Administrative unit/state: BCNI Allotment - TS Allotment

ID team members: Burch, Evans

Assessment method: Reach length (miles/km): 0.25 mi.

- ☑ Complete reconnaissance
- ☐ Selective inspection of representative areas
- ☐ Remote imagery with selective ground inspection

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with reach breaks indicated.

II. **Reach break location:**

Reach starting point (upstream)	Reach ending point (downstream)
40.787980 N. Lat. UTM E _____ m	40.788389 N. Lat. UTM E _____ m
or	or
116.34553 W. Long. N _____ m	116.34984 W. Long. N _____ m

Positions by GPS? ☑ Yes ☐ No Photos taken? ☑ Yes ☐ No UTM Zone: _____

Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84 ☐ Other (specify): _____

Rationale for reach breaks: Upper end: end of perennial flow, start of intermittent reach, lower end: start of intermittent reach with more potential for function

III. **Description of potential and rationale** (should include description of hydrologic regime, stream type(s), and riparian plant communities at potential; may include additional information such as valley type, gradient, entrenchment ratio, sinuosity, width/depth ratio, and bed and bank materials):

Similar to Reach 1 but persistent surface flows lacking. Stream channel is in very deep narrow gully with minimal potential for aggradation or widening.

Potential is for development of FAC and/or uplond plant communities dominated by RCWD within confines of gully walls. Scattered patches of Eleocharis sp. occur along very limited remnants of small floodplains. These sparse Eleocharis communities are dead and/or dying from lack of moisture. Overall low energy intermittent drainage with very little potential for change from deep ROSGR to channel (gully). Plant community composition unlikely to change due to lack of water as well as gully configuration and current grazing practices.

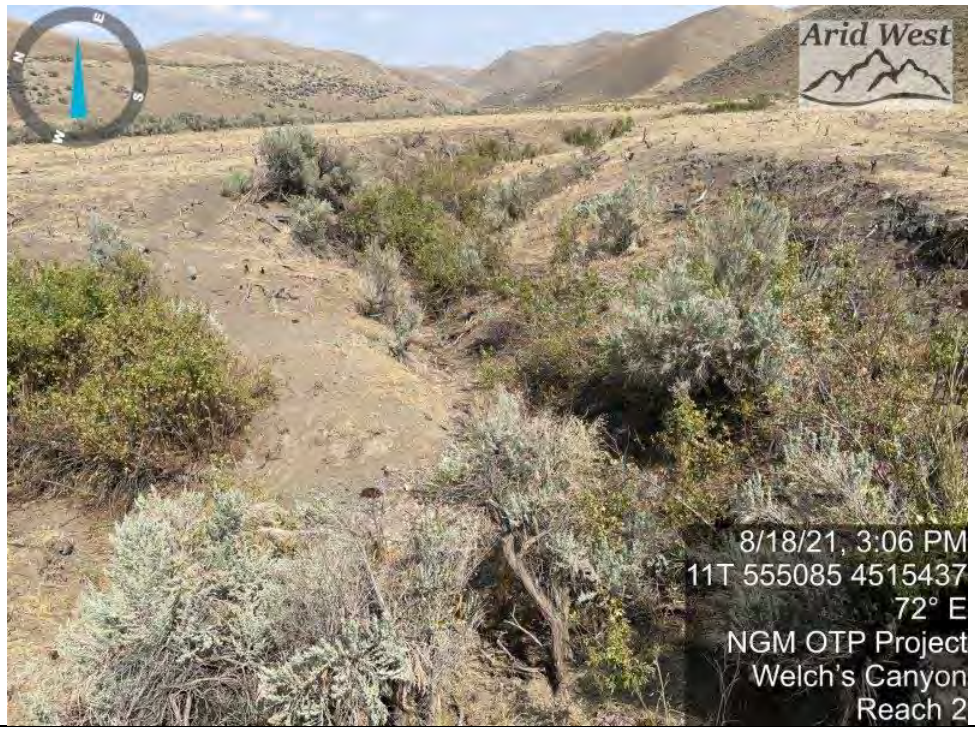
IV. Other assessment or monitoring data or information about the reach:

Heavy livestock use along drainage and surrounding uplands. Wildfires have reduced stabilizing watershed cover and increased threat of loss.

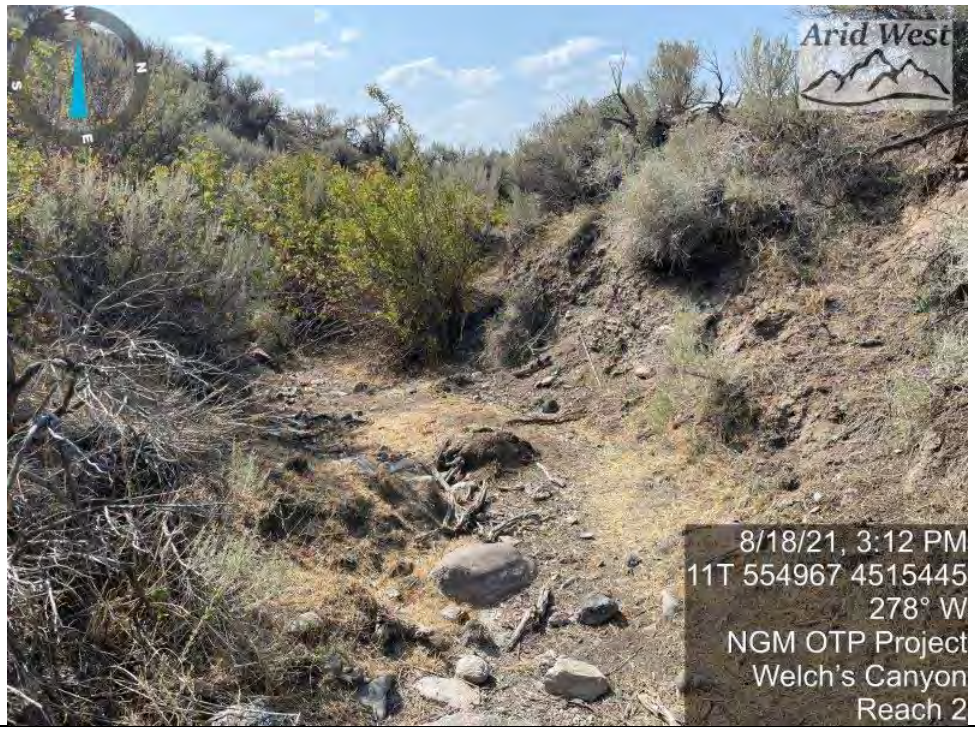
APPENDIX – PFC PHOTO LOG

Reach 2_IMG_3028.jpg	
Reach 2_IMG_3029.jpg	

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_3030.jpg	
Reach 2_IMG_3031.jpg	

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_3032.jpg	
Reach 2_IMG_3033.jpg	

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_3034.jpg	
Reach 2_IMG_3035.jpg	

Reach Information Form (Lotic)

I. Background information: Date: 8-18-21

Riparian area/stream name: Welches Creek Reach ID: Reach 1

Management unit (allotment/pasture, other): several pastures

Administrative unit/state: BLM Allotment - TS Allotment

ID team members: Barrett / Evans

Assessment method: Reach length (miles/km): 0.61 miles

- [x] Complete reconnaissance
- [ ] Selective inspection of representative areas
- [ ] Remote imagery with selective ground inspection

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with reach breaks indicated.

II. Reach break location:

Reach starting point (upstream)	Reach ending point (downstream)
40.789650 N. Lat. UTM E _____ m	40.787980 N. Lat. UTM E _____ m
or	or
116.335362 W. Long. N _____ m	116.334531 W. Long. N _____ m

Positions by GPS? [x] Yes [ ] No Photos taken? [x] Yes [ ] No UTM Zone: _____

Datum: [ ] NAD27 [ ] NAD83 [ ] WGS84 [ ] Other (specify): _____

Rationale for reach breaks: Upper end: Project area boundary, lower end: end of perennial flow

III. **Description of potential and rationale** (should include description of hydrologic regime, stream type(s), and riparian plant communities at potential; may include additional information such as valley type, gradient, entrenchment ratio, sinuosity, width/depth ratio, and bed and bank materials):

Potential is for very limited herbaceous riparian community with bottom of very deep narrow gully. / Minimal floodplain development. Rosgen G-5 or 6 channel (estimated) modern gully is about 10-15' deep and about 5-10' wide in bottom.

Historically channel likely functioned on top of cracked across deep alluvial fill (meadow) within canyon setting. High levels of grazing combined with loss of stabilizing watershed cover, flood events, fires and naturally erosive soils likely caused severe downcutting which migrated up through alluvium as well as filled in pond at top of reach. The gullying event also created an avulsion on the south side of the valley. Especially here, but elsewhere as well channel is severely overstraightened. In the absence of mechanical intervention, channel will likely remain indeeply gullied setting for many decades or even centuries.

IV. Other assessment or monitoring data or information about the reach:

Current levels of grazing are very heavy and preventing any riparian zone development. Floodplain width is also lacking in gully setting. Riparian communities occur primarily as scattered patches of Eleocharis spp and JUNCUS. Willow could occur here but seed sources completely lacking. Stream meanders series of pasture fences. All pastures have trample present and show effects of chronic, hot season grazing.

Stream power lacking to widen gully.

PFC Assessment Form (Lotic)

Riparian area/stream name: Welch's Creek Reach ID: Reach 1 Date: 8/18/21

Yes	No	NA	HYDROLOGY
	X		1) Floodplain is inundated in "relatively frequent" events.
Rationale: Historic belly of the drainage created a deep gully that is absent of a floodplain in most locations. In place small floodplains may be attempting to form, but current geology is prohibiting permanent formation.			
		X	2) Beaver dams are stable.
Rationale:			
	X		3) Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region).
Rationale: Reach is over straightened and over steepened by cutting. With no change in grazing management, recovery of stream ~~width~~ inset within the gully may be possible over time; limited opportunity for floodplain development			
	X		4) Riparian area is expanding or has achieved potential extent.
Rationale: recruitment and establishment of willow and cottonwood vegetation is limited by current grazing management.			
X			5) Riparian impairment from the upstream or upland watershed is absent.
Rationale: Uplands are burned and grazing impacts may be excessive, but uplands are not impacting the current state in to current state.			

Yes	No	NA	VEGETATION
	X		6) There is adequate diversity of stabilizing riparian vegetation for recovery/maintenance.
Rationale:	Limited pockets of Eleocharis sp. and CAREZ ; but overall Limited Diversity of colonizing riparian vegetation = Grazing management & sustaining wetland Veg		
	X		7) There are adequate age classes of stabilizing riparian vegetation for recovery/maintenance.
Rationale:	Small pockets of riparian veg but recruitment is Limited and bare ground is present. Grazing management supporting recruitment of wetland veg		
	X		8) Species present indicate maintenance of riparian soil-moisture characteristics.
Rationale:	Limited to No recruitment of wet Veg and bare ground present. FAC species common along stream edges.		
	X		9) Stabilizing plant communities capable of withstanding moderately high streamflow events are present along the streambank.
Rationale:	Limited to no wetland veg capable to stabilizing banks present, bare ground and FAC to wetland veg common along rocky		
	X		10) Riparian plants exhibit high vigor.
Rationale:	Limited to No recruitment of wetland or riparian veg only a few pockets were wet veg present. FAC species along stream edge in rocky locales		
	X		11) An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.
Rationale:	Bare ground & FAC Sp are most common along stream edge. Limited to No stabilizing Veg		

	X	X	12) Plant communities are an adequate source of woody material for maintenance/recovery.

Rationale: No Woody Species - No willow Very limited cover in places.

Yes	No	NA	GEOMORPHOLOGY
	X		13) Floodplain and channel characteristics (i.e., rocks, woody material, vegetation, floodplain size, overflow channels) are adequate to dissipate energy.

Rationale: Limited to the floodplain development within the drainage.

	X		14) Point bars are revegetating with stabilizing riparian plants.

Rationale: Limited to no recruitment of stabilizing plant species - Limited to no point bar development

X			15) Streambanks are laterally stable.

Rationale: Drainage is confined in a steep incised gully - walls of the gully may be unstable for recovery to stable as stream energy may slow bank erosion

X			16) Stream system is vertically stable (not incising).

Rationale: Stream is at a base elevation and Not able to continue to cut to a lower elevation.

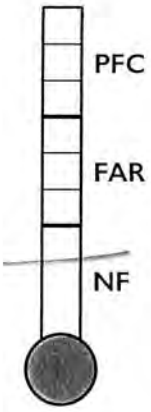
X			17) Stream is in balance with the water and sediment that is being supplied by the drainage basin (i.e., no excessive erosion or deposition).

Rationale: Deep gully - Historic incision but aggrying processes currently not active. Further incision arrested by basel level rock controls. Further gully widening may be limited by efficiency of narrow, deep gully to transport water and by lack of large flows in watershed (i.e. small stream).

Summary Determination

Functional rating (check one)

- ☐ Proper functioning condition
- ☐ Functional–at risk
- ☒ Nonfunctional



Trend (check one)

Monitored trend	Apparent trend
☐ Upward	☐ Upward
☐ Downward	☐ Downward
☐ Static	☒ Not apparent

Rationale for rating: Stream is a narrow gully with limited floodplain development, limited Recruitment of wetland veg and grass + management to maintain/improve recruitment of what was necessary to begin floodplain development. Further widening of the gully is required to ~~development~~ develop inset floodplains - but unlikely to occur naturally in a long timeframe

Rationale for trend: Stuck in a deep gully with low streams energy

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☒ Yes ☐ No

If yes, what are those factors? Check all that apply.

- ☐ Flow regulations
- ☐ Mining activities
- ☐ Upstream channel conditions
- ☐ Channelization
- ☐ Road encroachment
- ☐ Oil field water discharge
- ☐ Augmented flows
- ☐ Other (specify:)

Explain factors preventing achievement of PFC: Grazing management preventing recruitment of wetland veg

(Revised 2014)

APPENDIX – PFC PHOTO LOG

Welches Creek_IMG_3014.jpg	
Reach 1_IMG_3015.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_3016.jpg	
Reach 1_IMG_3017.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_3018.jpg	
Reach 1_IMG_3019.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_3020.jpg	
Reach 1_IMG_3021.jpg	

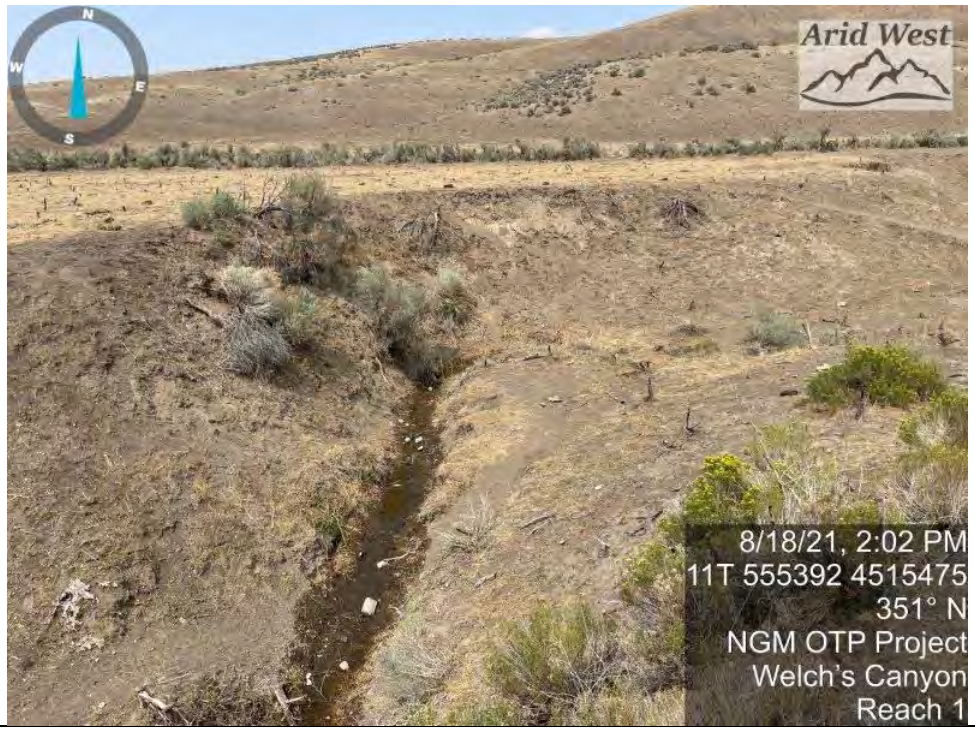
APPENDIX – PFC PHOTO LOG

Reach 1_IMG_3022.jpg	
Reach 1_IMG_3023.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_3024.jpg	
Reach 1_IMG_3025.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_3026.jpg	
Reach 1_IMG_3027.jpg	

Lentic Riparian-Wetland Assessment Area Information Form

I. Background information: Date: 8-17-21

Riparian-wetland area name: Marys Creek Area ID: Reach 1

Management unit (allotment/pasture, other): Chinese Gardens Park area

Administrative unit/state: City of Carlin

ID team members: Barrett, Evans

Areal extent of riparian-wetland assessment area: 0.05 miles (acres/hectares – circle one)
Thin stringer ≈ 10-30' wide

Assessment method:

- [x] Complete ground reconnaissance
- [ ] Ground inspection of selected representative areas
- [ ] Remote imagery with selective ground inspection of representative or other areas requiring closer inspection

II. Location of riparian-wetland assessment area:

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with the riparian-wetland assessment area delineated. Use GIS in the office or GPS in the field to obtain a representative location to affix a point to the riparian-wetland assessment area.

GIS/GPS point location of riparian-wetland assessment area

Latitude: 40.712025 N Longitude: 116.130516 W

or

UTM E _____ m UTM N _____ m

Datum: [ ] NAD27 [ ] NAD83 [ ] WGS84 [ ] Other (specify): _____

UTM Zone (required for UTM coordinates): _____

III. Description of potential and rationale: Should include description of hydrologic regime, geomorphic setting, important soil properties, and riparian-wetland plant communities at potential (if altered potential is present, use the "Altered Potential Attachment" below):

Potential is for small, stable diverse wetland-riparian community established in bottom of deep historic gully which appears to have

intercepted ground-water. Streamflow from upstream Marys Creek and tributary provides seasonal flow inputs.

Potential riparian plant communities are very diverse and include obligate wetland species including Typha, SCPU10, JUAR2 Eleocharis species that occur in patches. Dense willow communities are dominated by SAEX. Site at potential also supports a variety of diverse mesic forbs species on drier edges of wetland.

IV. Other assessment or monitoring data or information about the riparian-wetland assessment area:

Cutbank profiles and visible evidence of very high levels of aggraded sediments indicate area has been influenced by flood events which have included both excessive deposits and excessive gullying. Modern gully is about 10 feet deep but appears to have stabilized vertically. Standing water is present in channel bottoms in this portion of gully but stream channel is dry and apparently intermittent upstream. Old fence segments are buried by deep flood deposits.

Site may be currently close to potential for this deeply incised, narrow gully. SAEX communities have extensively colonized available areas through rhizomatous expansion.

PFC Assessment Form (Lentic)

Riparian-wetland area name: Marys. Creek Date: 8/17/21

Assessment ID team members: Evans, Barrett

Riparian-wetland area ID: Reach 1

Yes	No	NA	HYDROLOGY
X			1. Riparian-wetland area is saturated at or near the surface or inundated in "relatively frequent" events.
Rationale: System is saturated @ Site supports wetland obl. Vegetation with surface water present throughout the Bottom of the gully. Groundwater supports site			
X			2. Fluctuation of water levels is within a range that maintains hydrologic functions and riparian-wetland vegetation.
Rationale: Site supports a diverse community of wetland vegetation comprising the sparsely the Bottom of the gully. Wetland Veg is vigorous.			
X			3. Riparian-wetland area is enlarging or has achieved potential extent.
Rationale: Site at potential extent - wetland veg in gully Bottom and SAEX community extends into uplands - Site may be slowly expanding - willow expanding			
X	X		4. Riparian-wetland impairment from the contributing area is absent.
Rationale: Uplands stable and not impairing Wetland functions. Uplands/ areas adjacent to "creek" are comprised of fines and alluvium - but system may be naturally flashy - Site is a lentic in bottom of gully			
X			5. Water quality is sufficient to support riparian-wetland plants.
Rationale: No signs of impairment in the Vegetation - Wetland Veg healthy and vigorous throughout the Site			

X			6. Disturbances or features that negatively affect surface- and subsurface- flow patterns are absent. These disturbances/features include but are not limited to hoof action, dams, dikes, levees, spring boxes, diversions, trails, roads, rills, gullies, drilling activities.
Rationale: Site is contained within the confines of a gully - but historic gullying is not adversely affecting the current wetland functions.			
		X	7. Impoundment structure accommodates safe passage of flows (e.g., no headcut affecting dam or spillway).
Rationale:			

Yes	No	NA	VEGETATION
X			8. There is adequate diversity of stabilizing riparian-wetland vegetation for recovery/ maintenance.
Rationale: Site supports a diverse community of wetland veg including Typhea, Juncus, Spike Rush, bulrush and willows extending ~~into uplands and~~ into gully			
X			9. There are adequate age classes of stabilizing riparian-wetland vegetation for recovery/maintenance.
Rationale: Wetland veg at potential extent dominated by a diverse community of wetland species comprising multiple age classes.			
X			10. Species present indicate maintenance of riparian-wetland soil-moisture characteristics.
Rationale: Wetland veg dominates the gully bottom and fills ~~the~~ space where groundwater is. Present			

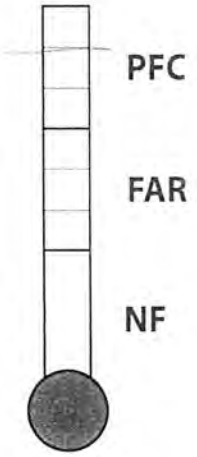
X			11. Stabilizing plant communities are present that are capable of withstanding overland flows (e.g., storm events, snowmelt), and wind and wave actions, and can resist physical alteration.
Rationale: System appears to be naturally "fleshy" and may be subject to extreme flows moving large amounts of sediments, but community present is able to withstand reasonable flow events			
X			12. Riparian-wetland plants exhibit high vigor.
Rationale: Wetland community at potential extent - where conditions allow, Wetland vegetation present and vigorous - Likely expanding			
X	X		13. An adequate amount of stabilizing riparian-wetland vegetation is present to protect soil surfaces and shorelines, to dissipate energy from overland flows and wind and wave actions, and to resist physical alteration.
Rationale: System naturally fleshy and gully walls may Concentrate High flow events - but current community robust and able to withstand "normal" flow events - rationale adjusted for Lotic site supporting lentic system			
X			14. Abnormal frost or hydrologic heaving is absent.
Rationale: No abnormal frost heaving			
		X	15. Favorable microsite condition (e.g., woody material, water temperature) is maintained by adjacent site characteristics.
Rationale:			

Yes	No	NA	SOILS/GEOMORPHOLOGY
X			16. Accumulation of chemicals affecting plant productivity/composition is absent.
Rationale: No observation of chemical accumulation			
		X	17. Saturation of soils (i.e., ponding, flooding frequency, and duration) is sufficient to compose and maintain hydric soils.
Rationale: Hydrology sufficient to maintain wetland veg. Hydric soils building - Weak yes!			
X			18. Underlying geologic material/soil material/permafrost is capable of restricting water percolation.
Rationale: Site is supported by ground water and underlying Structure is sufficient to support and maintain Wetland Veg.			
X	X		19. Riparian-wetland area is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).
Rationale: ??? question for site - Site is on back side in bottom of stream gully. The system is flashy and moves large amounts of sediment in Large storms and cut a deep gully. Between floods Lentic system traps sediments and rebuilds site			
		X	20. Islands and shoreline characteristics (i.e., rocks, coarse and/or large woody material) are adequate to dissipate wind- and wave-event energies.
Rationale: Site is Not an open water wetland			

Summary Determination

Functional rating (check one)

- [x] Proper functioning condition
- [ ] Functional–at risk
- [ ] Nonfunctional



Trend for FAR rating (check one)

Monitored trend	Apparent trend
[ ] Upward	[x] Upward
[ ] Downward	[ ] Downward
[ ] Static	[x] Not apparent

Rationale for rating: Stable lentic system with a diverse community of wetland species present supported by groundwater. System may be subject to extreme flood events. Not typical for a lentic setting. System is likely aggrading but may be cut by future flood events.

Rationale for trend (for FAR rating):

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☐ Yes ☐ No NA

If yes, what are those factors? Check all that apply.

☐ Flow regulation ☐ Land ownership ☐ Road encroachment

☐ Mining activity ☐ Dewatering ☐ Oil field water discharge

☐ Watershed condition ☐ Dredging activity ☐ Augmented flows

☐ Other (specify): _____

Explain factors preventing achievement of PFC: Site is at PFC

Large floods may lead to further aggradation at the site.

APPENDIX – PFC PHOTO LOG

Mary's Creek_IMG_2963.jpg	
Mary's Creek_IMG_2964.jpg	

APPENDIX – PFC PHOTO LOG

Mary's Creek_IMG_2965.jpg	
Mary's Creek_IMG_2966.jpg	

APPENDIX – PFC PHOTO LOG

Mary's Creek_IMG_2967.jpg	
Mary's Creek_IMG_2968.jpg	

APPENDIX – PFC PHOTO LOG

Mary's Creek_IMG_2969.jpg	
Mary's Creek_IMG_2970.jpg	

APPENDIX – PFC PHOTO LOG

Mary's Creek_IMG_2971.jpg	
Mary's Creek_IMG_2972.jpg	

8-17-21

Humboldt River UPRR - Reach 2

Lentic Riparian-Wetland Assessment Area Information Form – Altered Potential Attachment

Barrett, Evans

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

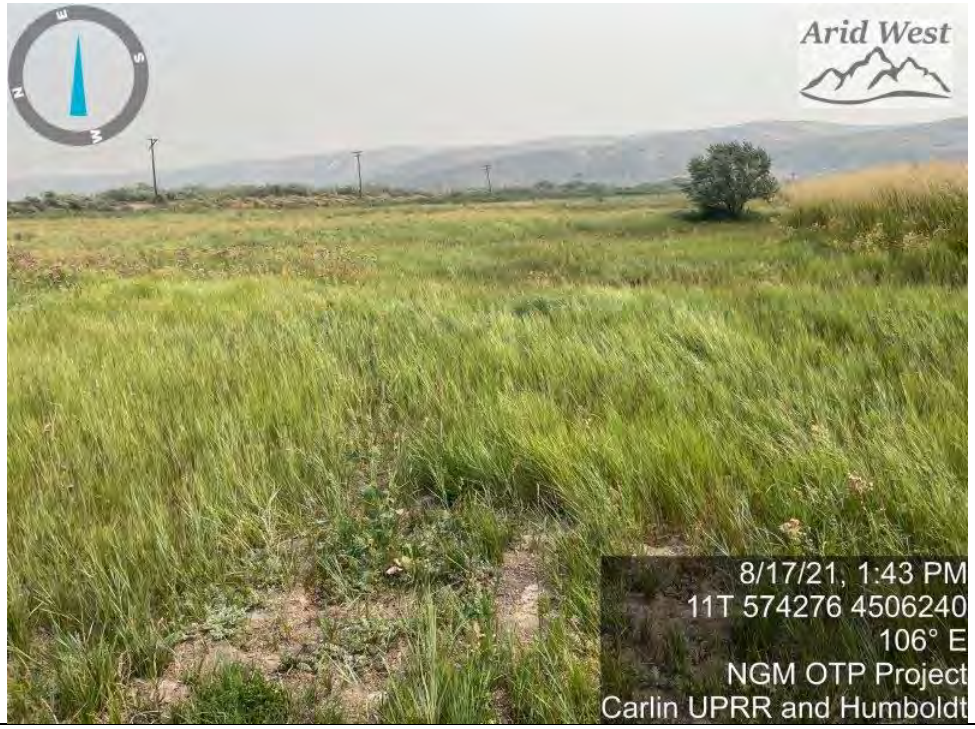
Yes. FAC hay meadow. Altered from historic functions, no longer supports riparian functions. Heavy infestations of weeds including PANU4, LELA2, CIAR4, LETR5, ARAN7 and Agropyron sp. common on site. Small TYLA communities where moisture accumulates along RR tracks. Center: 40, 7/2025, 116.130516 0.40 acres

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_2957.jpg	
Reach 2_IMG_2958.jpg	

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_2959.jpg	
Reach 2_IMG_2960.jpg	

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_2961.jpg	

Reach Information Form (Lotic)

I. Background information: NV278 Date: 8-17-21

Riparian area/stream name: Humboldt River Reach ID: NV278-1

Management unit (allotment/pasture, other): Private pasture

Administrative unit/state: Private pasture along Humboldt River

ID team members: Barrett, Evans

Assessment method: Reach length (miles/km): 0.3 miles

- ☐ Complete reconnaissance
- ☑ Selective inspection of representative areas
- ☐ Remote imagery with selective ground inspection

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with reach breaks indicated.

II. Reach break location:

Reach starting point (upstream)	Reach ending point (downstream)
40.699985 N. Lat. UTM E _____ m	40.698873 N. Lat. UTM E _____ m
or	or
116.129868 W. Long. N _____ m	116.131356 W. Long. N _____ m

Positions by GPS? ☑ Yes ☐ No Photos taken? ☑ Yes ☐ No UTM Zone: _____

Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84 ☐ Other (specify): _____

Rationale for reach breaks: Upper end: Highway, management/land ownership change; lower end: delineated reach boundary for assessement area boundary

III. Description of potential and rationale (should include description of hydrologic regime, stream type(s), and riparian plant communities at potential; may include additional information such as valley type, gradient, entrenchment ratio, sinuosity, width/depth ratio, and bed and bank materials):

Currently entrenched Rosgen F5 (estimated) channel with potential to transition to more of a sinuous F4 channel with some point bar and floodplain development, as well as increased sinuosity. Potential riparian community is coyote willow dominated with EAW and mesic species for understory.

Humboldt River NV278-1

Extensive upstream modification of Humboldt River channel and surrounding watershed limit potential for natural channel evolution processes.

IV. Other assessment or monitoring data or information about the reach:

Comparison to upstream pasture above reach shows potential for willow community development and very early floodplain development. In assessment reach current grazing practices and channel type (Rosgen F channel) have the effect of arresting degradation in place. Difficult to start floodplain development process in entrenched E channel with minimal establishment of riparian vegetation, especially willow communities.

PFC Assessment Form (Lotic)

Riparian area/stream name: Humboldt River Reach ID: NV278-1 Date: 8-17-21

Yes	No	NA	HYDROLOGY
☐	☑	☐	1) Floodplain is inundated in "relatively frequent" events.
Rationale:			Floodplain lacking — Rosgen F5 channel - entrenched
☐	☐	☑	2) Beaver dams are stable.
Rationale:			should be here but insufficient willow community development to support.
☐	☑	☐	3) Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region).
Rationale:			Overstraightened, very high width to depth ratio, no floodplain. Entrenched channel -
☐	☑	☐	4) Riparian area is expanding or has achieved potential extent.
Rationale:			Very limited riparian vegetation present - no floodplain development
☐	☑	☐	5) Riparian impairment from the upstream or upland watershed is absent.
Rationale:			Upstream historic and on-going alteration of Humboldt River channel affects recovery potential and opportunities to develop floodplains and sinuosity within this overstraightened and entrenched reach.

Concrete riprap on south streambank may also prevent floodplain widening to some degree

Yes	No	NA	VEGETATION
☐	☑	☐	6) There is adequate diversity of stabilizing riparian vegetation for recovery/maintenance.
Rationale:			Some scattered amounts of JUAR2 and Eleocharis are present, but communities of stabilizers lacking, willows lacking.
☐	☑	☐	7) There are adequate age classes of stabilizing riparian vegetation for recovery/maintenance.
Rationale:			Only scattered amounts of herbaceous riparian vegetation present. Not expanding, willows lacking.
☐	☑	☐	8) Species present indicate maintenance of riparian soil-moisture characteristics.
Rationale:			FAC plant communities on point bars and mid channel bars
☐	☑	☐	9) Stabilizing plant communities capable of withstanding moderately high streamflow events are present along the streambank.
Rationale:			Streambanks cut and eroding - stabilizing plant communities not present on streambanks.
☐	☑	☐	10) Riparian plants exhibit high vigor.
Rationale:			Minimal evidence of establishment and expansion of riparian plant communities.
☐	☑	☐	11) An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.
Rationale:			Minimal evidence of stabilizing riparian plant communities along streambanks.

☐	☐	☑	12) Plant communities are an adequate source of woody material for maintenance/recovery.

Rationale: Energy dissipation mechanism is for increased sinuosity across larger, more functional floodplain.

Yes	No	NA	GEOMORPHOLOGY
☐	☑		13) Floodplain and channel characteristics (i.e., rocks, woody material, vegetation, floodplain size, overflow channels) are adequate to dissipate energy.

Rationale: - Entrenched Rosgen F channel energy concentrated - needs floodplain to dissipate energy.

☐	☑	☐	14) Point bars are revegetating with stabilizing riparian plants.

Rationale: Some scattered establishment of colonizers on transient, low flow point bars.

☐	☑	☐	15) Streambanks are laterally stable.

Rationale: Streambanks along majority of reach poorly vegetated, unstable and eroding.

☑	☐		16) Stream system is vertically stable (not incising).

Rationale: No longer actively downcutting.

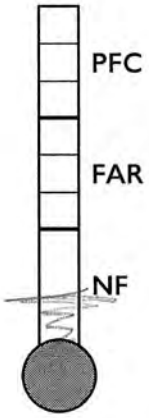
☐	☑		17) Stream is in balance with the water and sediment that is being supplied by the drainage basin (i.e., no excessive erosion or deposition).

Rationale: Excessive aggradation as evidenced by presence of unvegetated point and mid channel bars.

Summary Determination

Functional rating (check one)

- ☐ Proper functioning condition
- ☐ Functional–at risk
- ☑ Nonfunctional



Trend (check one)

Monitored trend	Apparent trend
☐ Upward	☐ Upward
☐ Downward	☐ Downward
☐ Static	☑ Not apparent

Rationale for rating:

Rosgen F channel - Degraded, lacking attributes for functionality. Minimal floodplain development, lacking riparian plant communities, unstable, unvegetated streambanks. Excessive aggradation - sediments not being used by system.

Rationale for trend:

Channel recovery processes arrested in degraded state. Current grazing practices and upstream influences preventing recovery towards more functional state.

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☑ Yes ☑ No

If yes, what are those factors? Check all that apply.

☐ Flow regulations	☐ Road encroachment
☐ Mining activities	☐ Oil field water discharge
☑ Upstream channel conditions	☐ Augmented flows
☐ Channelization	☑ Other (specify:) livestock grazing practices.

Explain factors preventing achievement of PFC. Explain factors both within and outside control of management:

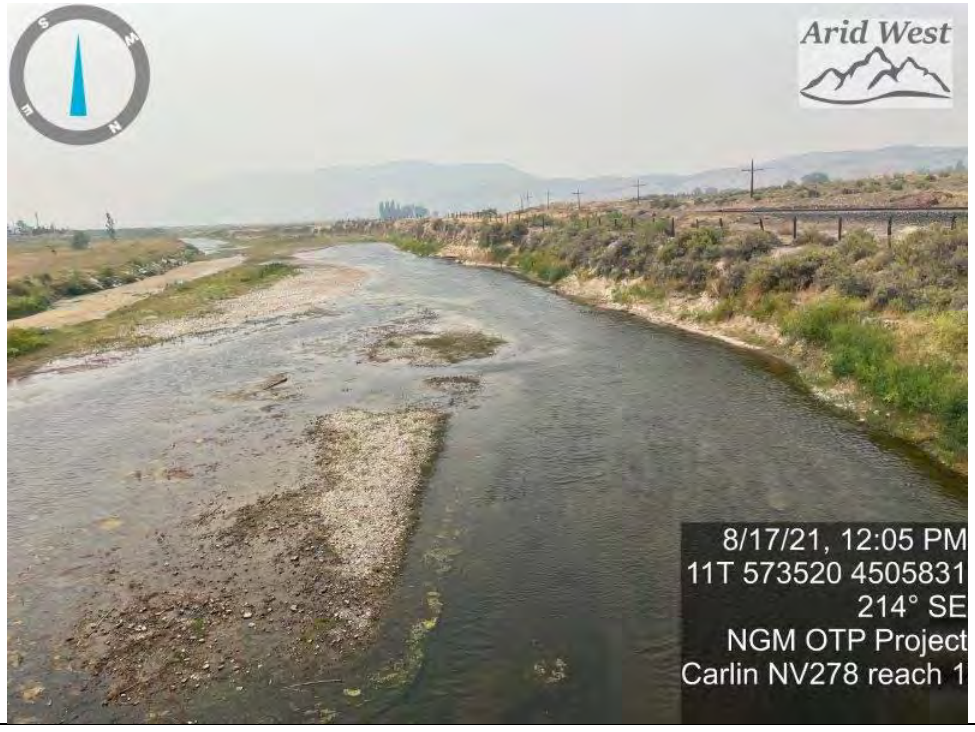
As evidenced by upstream pasture with similar channel conditions, better livestock grazing practices are allowing for some establishment of riparian plant communities and for some limited floodplain development within entrenched channel type.

A lotic riparian area is considered to be in PFC or "functioning properly when adequate vegetation, landform, or woody material is present to:

- Dissipate stream energy associated with high waterflow, thereby reducing erosion & improving water quality.
- Capture sediment and aid floodplain development.
- Improve floodwater retention and ground-water recharge.
- Develop root masses that stabilize streambanks against erosion.
- Maintain channel characteristics.

(Revised 2014)

APPENDIX – PFC PHOTO LOG

Humboldt River NV278_IMG_2945.jpg	
Humboldt River NV278_IMG_2946.jpg	

APPENDIX – PFC PHOTO LOG

Humboldt River NV278_IMG_2947.jpg	
Humboldt River NV278_IMG_2948.jpg	

APPENDIX – PFC PHOTO LOG

Humboldt River NV278_IMG_2949.jpg	
Humboldt River NV278_IMG_2950.jpg	

APPENDIX – PFC PHOTO LOG

Humboldt River NV278_IMG_2951.jpg	

Warm Springs Drainage

Reach Information Form (Lotic)

I. **Background information:** Date: 8-17-21

Riparian area/stream name: Carlin South Reach ID: 1

Management unit (allotment/pasture, other): BLM Grazing Allotment

Administrative unit/state: BLM - Public

ID team members: Barrett, Evans

Assessment method: Reach length (miles/km): 0.12 mi

- ☑ Complete reconnaissance
- ☐ Selective inspection of representative areas
- ☐ Remote imagery with selective ground inspection

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with reach breaks indicated.

II. **Reach break location:**

Reach starting point (upstream)	Reach ending point (downstream)
40.684488 N. Lat. UTM E _____ m	40.683661 N. Lat. UTM E _____ m
or	or
116.154393 W. Long. N _____ m	116.15247 W. Long. N _____ m

Positions by GPS? ☑ Yes ☐ No Photos taken? ☑ Yes ☐ No UTM Zone: _____

Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84 ☐ Other (specify): _____

Rationale for reach breaks: Upper end: Start of spring source, lower: fence line and ownership/management change. Area highly impacted by livestock grazing, below fence current impacts limited.

III. **Description of potential and rationale** (should include description of hydrologic regime, stream type(s), and riparian plant communities at potential; may include additional information such as valley type, gradient, entrenchment ratio, sinuosity, width/depth ratio, and bed and bank materials):

Area of source highly disturbed by historic water and grade control activities. Drainage fed by high volume flow originating from spring source. Flow at source completely captured and discharged by buried pipe. Flow is estimated to be in excess of 100 gal./min. Area just below pipe is well armored naturally by

rock as well as addition of boulders and possible iron grade control structure. Area near source also appears to have been excavated historically to create ponds. Area below reach (75% of reach) occurs as downcut gully confined by narrow canyon walls. Channel stabilized by high rock content in bed and streambanks.

-Potential is for Rosgen A a.. channel type (estimated) stabilized by high content of boulder and cobble. Relatively minimal floodplain development with limited potential for development and expansion of riparian plant communities. Grazing imparts heavy and currently supressing potential for limited increase in riparian zone.

IV. Other assessment or monitoring data or information about the reach:

Small snails found (shells open to (ext). We assume these represent previously known springsnail population documented for Warm Springs. "Scuds" freshwater shrimp also documented. Area heavily infested by ACRE3 and ONAC.
Dominant upland and riparian/aquatic species include POPR, Pomos, Rumex sp., Carex sp., Veronica sp., MAOF, ROWO.
Gradient found to be around 13%.

Snails abundant in most of reach. Scattered amounts CANE2. where small potential for limited floodplain development.

PFC Assessment Form (Lotic)

Riparian area/stream name: Carlin Soc4m (Warm Springs) Reach ID: 1 Date: 8-17-21

Yes	No	NA	HYDROLOGY
☐	☐	☑	1) Floodplain is inundated in "relatively frequent" events.
Rationale: Naturally does not support floodplain – Rosgen A4a channel – Rock controls			
☐	☐	☑	2) Beaver dams are stable.
Rationale: No evidence of beaver. Not a beaver site.			
☐	☑		3) Sinuosity, gradient, and width/depth ratio are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region).
Rationale: Weak no. Sinuosity and width to depth ratio naturally controlled by geomorphic setting. However lower portion of reach has some potential to decrease width to depth ratio with increase in establishment of riparian species.			
☐	☑	☐	4) Riparian area is expanding or has achieved potential extent.
Rationale: Limited potential for expansion. Pearl flatheads are in lower portion and has somewhat more potential for establishment of a very limited riparian zone. Heavy grazing impacts and high width to depth ratio in this area affect riparian zone development.			
☑	☐		5) Riparian impairment from the upstream or upland watershed is absent.
Rationale: Historic disturbance is extensive but not currently affecting functionality under condition of somewhat changed potential (modification of spring source).			

Yes	No	NA	VEGETATION
☐	☐	☑	6) There is adequate diversity of stabilizing riparian vegetation for recovery/maintenance.
Rationale: Dominant condition of reach is Rosgen Aa3 channel primarily controlled by high bank and bed rock content.			
☐	☐	☑	7) There are adequate age classes of stabilizing riparian vegetation for recovery/maintenance.
Rationale: Reach stabilized by rock controls.			
☐	☑	☐	8) Species present indicate maintenance of riparian soil-moisture characteristics.
Rationale: Weak na where potential for limited flood plain development in lower part of reach. FAC communities occupy areas that should support riparian species.			
☐	☐	☑	9) Stabilizing plant communities capable of withstanding moderately high streamflow events are present along the streambank.
Rationale: Majority of reach is Rosgen Aa 3/4 channel stabilized by rock controls, very lower end of reach has potential for small floodplain and development of stabilizing communities. Scattered units of CANE2 present where present. Overall, site controlled by high rock content. Very heavy and chronic grazing impacts affect vigor of limited riparian plant communities.			
☐	☑	☐	10) Riparian plants exhibit high vigor.
Rationale:			
☐	☐	☑	11) An adequate amount of stabilizing riparian vegetation is present to protect banks and dissipate energy during moderately high flows.
Rationale: Insufficient in limited areas where small floodplains present. Overall, stabilization provided by rock controls.			

☐	☐	☑	12) Plant communities are an adequate source of woody material for maintenance/recovery.

Rationale: Energy dissipation/control provided by rock.

Yes	No	NA	GEOMORPHOLOGY
☑	☐		13) Floodplain and channel characteristics (i.e., rocks, woody material, vegetation, floodplain size, overflow channels) are adequate to dissipate energy.

Rationale: Rock provides high degree stability, control.

☐	☐	☑	14) Point bars are revegetating with stabilizing riparian plants.

Rationale: Not a point bar system.

☑	☐	☐	15) Streambanks are laterally stable.

Rationale: Structurally controlled by geology and rock.

☑	☐		16) Stream system is vertically stable (not incising).

Rationale: Vertical stability controlled by rock.

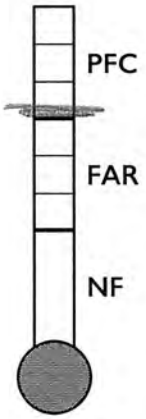
☑	☐		17) Stream is in balance with the water and sediment that is being supplied by the drainage basin (i.e., no excessive erosion or deposition).

Rationale: Historic and current disturbance but site currently stabilized. High rock content plays major role.

Summary Determination

Functional rating (check one)

- [x] Proper functioning condition
- [ ] Functional–at risk
- [ ] Nonfunctional



Trend (check one)

Monitored trend	Apparent trend
[ ] Upward	[ ] Upward
[ ] Downward	[ ] Downward
[ ] Static	[x] Not apparent

Rationale for rating:

Rosgen Aa3/4ch zones structurally controlled by geomorphology and rock represent dominant condition. Functionality issues present in very lower part of reach where slope flattens and potential exists for some limited floodplain development. Grazing practices prevent recovery in these planes.

Rationale for trend:

Stabilized by high bed and bank rock content.

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☐ Yes ☑ No

If yes, what are those factors? Check all that apply.

☐ Flow regulations	☐ Road encroachment
☐ Mining activities	☐ Oil field water discharge
☐ Upstream channel conditions	☐ Augmented flows
☐ Channelization	☐ Other (specify:)

Explain factors preventing achievement of PFC. Explain factors both within and outside control of management:

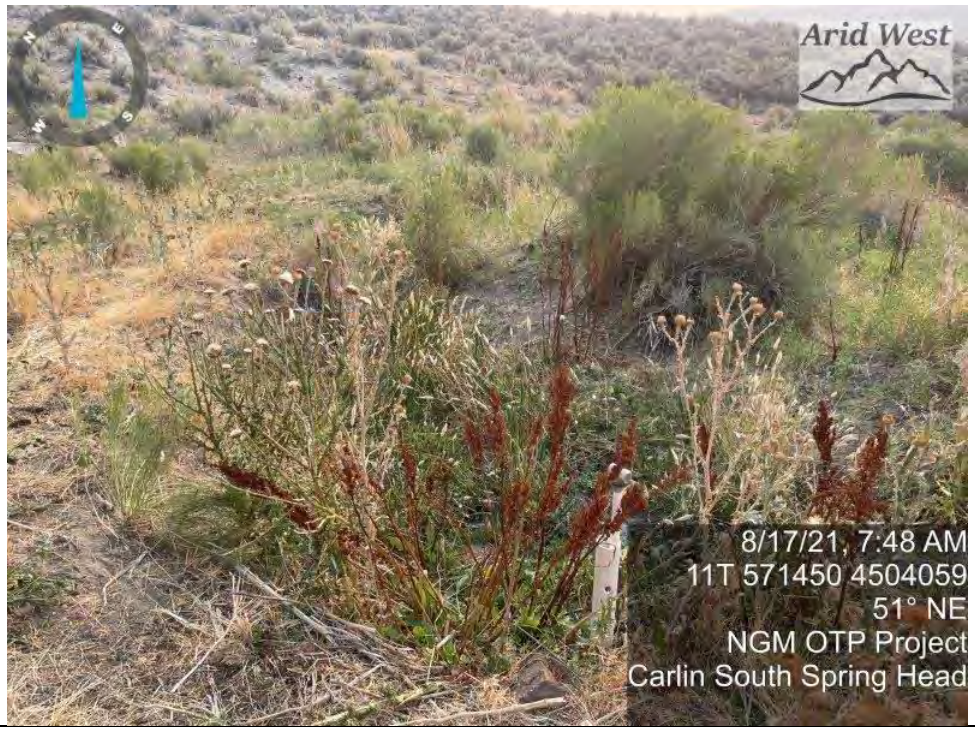
Historic disturbance but site has stabilized.

A lotic riparian area is considered to be in PFC or "functioning properly when adequate vegetation, landform, or woody material is present to:

- Dissipate stream energy associated with high waterflow, thereby reducing erosion & improving water quality.
- Capture sediment and aid floodplain development.
- Improve floodwater retention and ground-water recharge.
- Develop root masses that stabilize streambanks against erosion.
- Maintain channel characteristics.

(Revised 2014)

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2920.jpg	
Reach 1_IMG_2921.jpg	

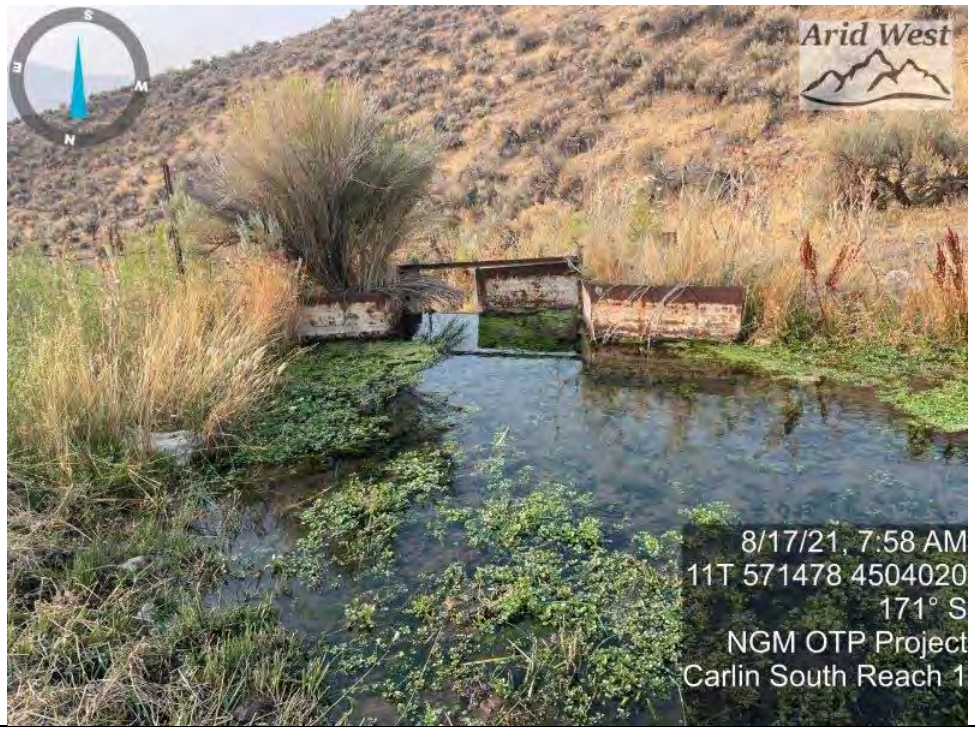
APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2922.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2923.jpg	
Reach 1_IMG_2924.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2925.jpg	
Reach 1_IMG_2926.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2927.jpg	
Reach 1_IMG_2928.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2929.jpg	
Reach 1_IMG_2930.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2931.jpg	
Reach 1_IMG_2932.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2933.jpg	
Reach 1_IMG_2934.jpg	

Reach Information Form (Lotic)

I. Background information: Warm Springs Date: 8-17-21

Riparian area/stream name: Carlin South Drainage Reach ID: 2

Management unit (allotment/pasture, other): Private Pasture

Administrative unit/state: Private

ID team members: Barrett, Evans

Assessment method: Reach length (miles/km): 0.08 mi

- ☑ Complete reconnaissance
- ☐ Selective inspection of representative areas
- ☐ Remote imagery with selective ground inspection

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with reach breaks indicated.

II. Reach break location:

Reach starting point (upstream)	Reach ending point (downstream)
40.683661 N. Lat. UTM E _____ m	40.682725 N. Lat. UTM E _____ m
or	or
116.154393 W. Long. N _____ m	116.151313 W. Long. N _____ m

Positions by GPS? ☑ Yes ☐ No Photos taken? ☑ Yes ☐ No UTM Zone: _____

Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84 ☐ Other (specify): _____

Rationale for reach breaks: Upper end: Fence landownership change channelized ditch Reach potential change Lower end: Natural lentic area, railroad/tracks, fence

III. Description of potential and rationale (should include description of hydrologic regime, stream type(s), and riparian plant communities at potential; may include additional information such as valley type, gradient, entrenchment ratio, sinuosity, width/depth ratio, and bed and bank materials):

See Altered Potential Attachment - Ditched Reach

Common plant species: Trifolium sp., Agropyron species, LETR5, CIMA2*, CIVU, ACRE3, LELA2, NAOF, and small amounts TYLA and SPAC3.

Heavy noxious weed infestations.

* may be CIDO (water hemlock rather than Poison water hemlock).

IV. Other assessment or monitoring data or information about the reach:

8-17-21 Lotic Warm Springs-ditched Area

~~Lentic~~ Riparian-Wetland Assessment Area Information Form – Altered Potential Attachment

South Curlew Reach 2

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

Lotic

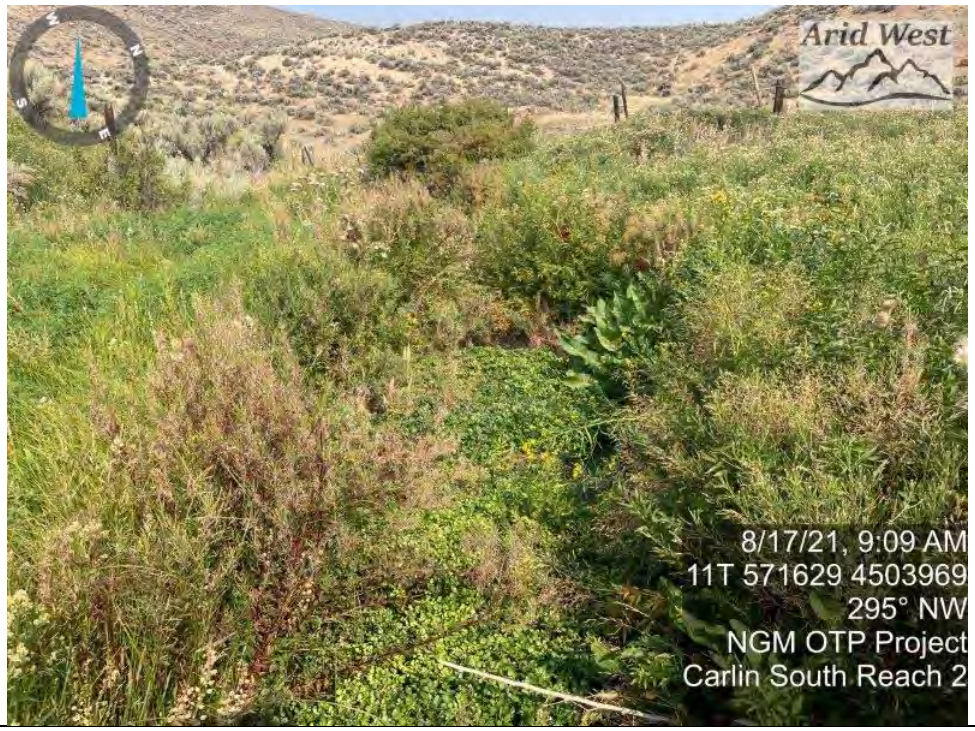
Yes- Spring flow channel emanating from Warm Springs channelized to create a ditch which directs flow through pasture towards Railroad. Flow continued to stabilized ditch. Limited riparian vegetation established on ditch banks. Flow supplies cattail wetland in lower part.

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_2935.jpg	
Reach 2_IMG_2936.jpg	

APPENDIX – PFC PHOTO LOG

Reach 2_IMG_2944.jpg	

Lentic Riparian-Wetland Assessment Area Information Form

I. Background information: Date: 8/17/21

Riparian-wetland area name: Carlin South - Reach 2 Area ID: _____

Management unit (allotment/pasture, other): Private Pasture

Administrative unit/state: _____

ID team members: Evans, Barrett

Areal extent of riparian-wetland assessment area: 17.8 (acres/hectares – circle one)

Assessment method:

- [x] Complete ground reconnaissance
- [ ] Ground inspection of selected representative areas
- [ ] Remote imagery with selective ground inspection of representative or other areas requiring closer inspection

II. Location of riparian-wetland assessment area:

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with the riparian-wetland assessment area delineated. Use GIS in the office or GPS in the field to obtain a representative location to affix a point to the riparian-wetland assessment area.

GIS/GPS point location of riparian-wetland assessment area

Latitude: 40.682189 N Longitude: 116.151403 W

or

UTM E _____ m UTM N _____ m

Datum: [ ] NAD27 [ ] NAD83 [ ] WGS84 [ ] Other (specify): _____

UTM Zone (required for UTM coordinates): _____

III. Description of potential and rationale: Should include description of hydrologic regime, geomorphic setting, important soil properties, and riparian-wetland plant communities at potential (if altered potential is present, use the "Altered Potential Attachment" below):

Lentic site is fed by warm springs and has perennial flows site has been altered in shape ~~and function~~ by channelization of Lotic Reach 2 and bisected by UPRR w/ culvert under tracks at East end of site. Typha dominant with small stands of Hordeum w/ in site. Site may also receive groundwater From Historic Humboldt River meander.

Potential of site is a ~~cat~~ Typha marsh
The shape of the site may have been changed
by UPRR. North side of site is wetter than
south because Rail Road may have created
dyke. Holding back water

IV. Other assessment or monitoring data or information about the riparian-wetland assessment area:

PFC Assessment Form (Lentic)

Riparian-wetland area name: Carlin South Warm Springs wetland Date: 8-17-21

Assessment ID team members: Barrett, Evans

Riparian-wetland area ID: Reach 1

Yes	No	NA	HYDROLOGY
X			1. Riparian-wetland area is saturated at or near the surface or inundated in "relatively frequent" events.
Rationale: Spring Fed lentic area supports Large Typha marsh Some groundwater may be present tied to Humboldt River Hardstem bulrush on perimeter - Marsh is dominated by Wetland obl. species and standing surface water present throughout site			
X			2. Fluctuation of water levels is within a range that maintains hydrologic functions and riparian-wetland vegetation.
Rationale: dominated by wetland obl. vegetation			
X			3. Riparian-wetland area is enlarging or has achieved potential extent.
Rationale: At potential extent			
X			4. Riparian-wetland impairment from the contributing area is absent.
Rationale: At potential - No signs of impairment from surrounding Environment			
X			5. Water quality is sufficient to support riparian-wetland plants.
Rationale: Dense community of wetland veg - Spring source present in contributing drainage.			

X			6. Disturbances or features that negatively affect surface- and subsurface- flow patterns are absent. These disturbances/features include but are not limited to hoof action, dams, dikes, levees, spring boxes, diversions, trails, roads, rills, gullies, drilling activities.
Rationale: Rail line has breached with creating a dike through Wetland area. Grazing impacts are at low level of management. Although changed - Site is functioning properly			
		X	7. Impoundment structure accommodates safe passage of flows (e.g., no headcut affecting dam or spillway).
Rationale:			

Yes	No	NA	VEGETATION
X			8. There is adequate diversity of stabilizing riparian-wetland vegetation for recovery/ maintenance.
Rationale: Dense Typha and bulrush			
X			9. There are adequate age classes of stabilizing riparian-wetland vegetation for recovery/maintenance.
Rationale: Dense Typha and bulrush			
X			10. Species present indicate maintenance of riparian-wetland soil-moisture characteristics.
Rationale: Site is dominated by Wetland obl. Vegetation			

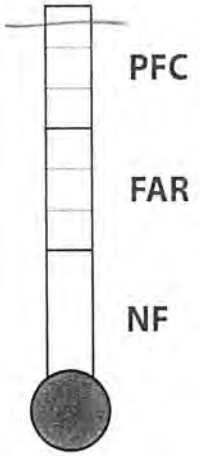
X			11. Stabilizing plant communities are present that are capable of withstanding overland flows (e.g., storm events, snowmelt), and wind and wave actions, and can resist physical alteration.
Rationale: Most of Typha provides deep roots capable of withstanding overland flow.			
X			12. Riparian-wetland plants exhibit high vigor.
Rationale: Large, dense, stand of typha covers entire extent of site.			
X			13. An adequate amount of stabilizing riparian-wetland vegetation is present to protect soil surfaces and shorelines, to dissipate energy from overland flows and wind and wave actions, and to resist physical alteration.
Rationale: dense Typha covers 100% of lentic site			
X			14. Abnormal frost or hydrologic heaving is absent.
Rationale: Dense vegetation - minimal grazing impacts			
		X	15. Favorable microsite condition (e.g., woody material, water temperature) is maintained by adjacent site characteristics.
Rationale:			

Yes	No	NA	SOILS/GEOMORPHOLOGY
X			16. Accumulation of chemicals affecting plant productivity/composition is absent.
Rationale: No Chemical accumulation present			
X			17. Saturation of soils (i.e., ponding, flooding frequency, and duration) is sufficient to compose and maintain hydric soils.
Rationale: Standing Surface water present on site - Spring Provides consistant inflow			
X			18. Underlying geologic material/soil material/permafrost is capable of restricting water percolation.
Rationale: Ponded surface water present - Building Hydric Soils on Site.			
X			19. Riparian-wetland area is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).
Rationale: Dense Wetland alb. vegetation present able to Resist erosion and trap Sediment			
X			20. Islands and shoreline characteristics (i.e., rocks, coarse and/or large woody material) are adequate to dissipate wind- and wave-event energies.
Rationale: Dense wetland alb. vegetation present throughout site able to dissipate wave energy.			

Summary Determination

Functional rating (check one)

- [x] Proper functioning condition
- [ ] Functional–at risk
- [ ] Nonfunctional



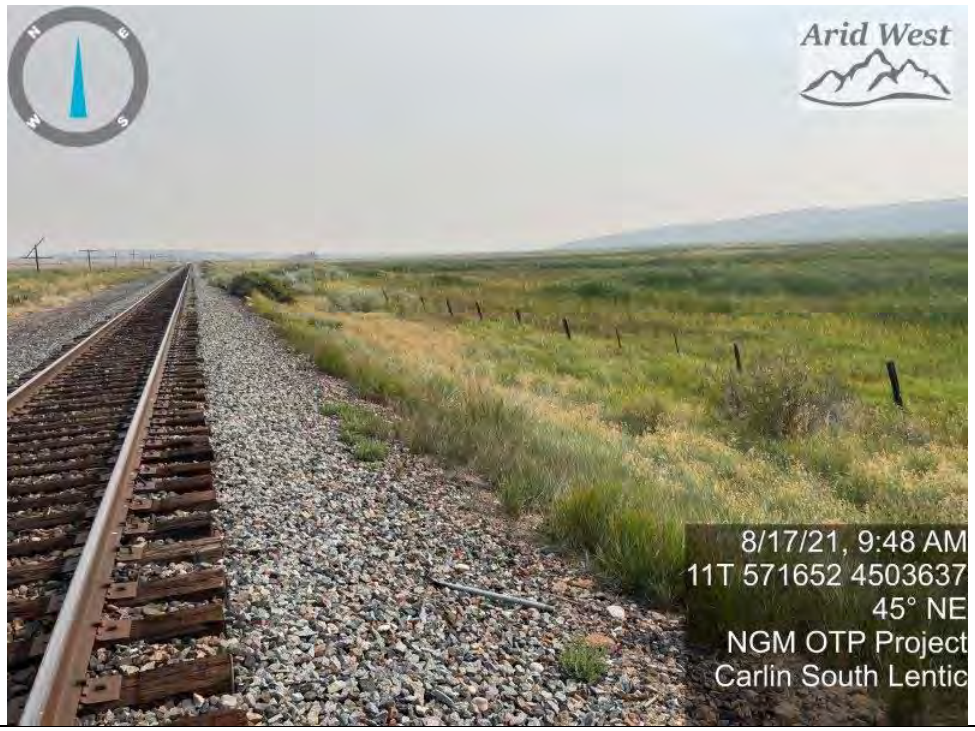
Trend for FAR rating (check one)

Monitored trend	Apparent trend
[ ] Upward	[ ] Upward
[ ] Downward	[ ] Downward
[ ] Static	[x] Not apparent

Rationale for rating: Stable Marsh dominated by typha and bulrush. Consistent water supplied by warm springs. South side of site may be drier than North because of UPRR, similar functional conditions exist on both sides of UPRR.

Rationale for trend (for FAR rating): Very stable site at potential

APPENDIX – PFC PHOTO LOG

Wetland Reach 1_IMG_2937.jpg	
Wetland Reach 1_IMG_2938.jpg	

APPENDIX – PFC PHOTO LOG

Wetland Reach 1_IMG_2939.jpg	
Wetland Reach 1_IMG_2940.jpg	

APPENDIX – PFC PHOTO LOG

Wetland Reach 1_IMG_2941.jpg	
Wetland Reach 1_IMG_2942.jpg	

APPENDIX – PFC PHOTO LOG

Wetland Reach 1_IMG_2943.jpg	

Lentic Riparian-Wetland Assessment Area Information Form

I. Background information: Date: 8-17-21

Riparian-wetland area name: UPRR Humboldt Area ID: Reach 1

Management unit (allotment/pasture, other): Private Pasture

Administrative unit/state: _____

ID team members: Evans, Barrett

_____

Areal extent of riparian-wetland assessment area: 11 acres (acres/hectares – circle one)

Assessment method:

- [X] Complete ground reconnaissance
- [ ] Ground inspection of selected representative areas
- [ ] Remote imagery with selective ground inspection of representative or other areas requiring closer inspection

II. Location of riparian-wetland assessment area:

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with the riparian-wetland assessment area delineated. Use GIS in the office or GPS in the field to obtain a representative location to affix a point to the riparian-wetland assessment area.

GIS/GPS point location of riparian-wetland assessment area

Latitude: 40.704376	N	Longitude: 116.121838	W
or			
UTM E _____	m	UTM N _____	m

Datum: [ ] NAD27 [ ] NAD83 [ ] WGS84 [ ] Other (specify): _____

UTM Zone (required for UTM coordinates): _____

III. Description of potential and rationale: Should include description of hydrologic regime, geomorphic setting, important soil properties, and riparian-wetland plant communities at potential (if altered potential is present, use the "Altered Potential Attachment" below):

Site is a historic meander of the Humboldt that was converted into a hay meadow - appears "up keep" of the meadow is no longer occurring and site is being taken over by Expanding Salt and bulrush communities

With a mix of meadow grasses and carex species where water is sufficient. The site appears to be supported by groundwater and rainy areas with bulrush did not have surface water present at the time of assessment.

IV. Other assessment or monitoring data or information about the riparian-wetland assessment area:

PFC Assessment Form (Lentic)

Riparian-wetland area name: UPRR Humboldt Date: 8-17-21

Assessment ID team members: Barrett, Evans

Riparian-wetland area ID: Reach 1

Yes	No	NA	HYDROLOGY
✓			1. Riparian-wetland area is saturated at or near the surface or inundated in "relatively frequent" events.
Rationale: Where appropriate. Wetland species occur along old river meanders and in depressions. Wetland species including SCAC3, CANE2, and Carex sp. are present over most of area indicating presence of persistent near surface water.			
✓			2. Fluctuation of water levels is within a range that maintains hydrologic functions and riparian-wetland vegetation.
Rationale: Wetland plant communities dominated by SCAC and Carex sp. are well established indicating consistent availability of water supplies.			
✓			3. Riparian-wetland area is enlarging or has achieved potential extent.
Rationale: Potential extent. Availability of persistent near surface soil moisture determines extent of riparian-wetland area. Suitable areas are completely colonized by wetland-riparian communities.			
✓			4. Riparian-wetland impairment from the contributing area is absent.
Rationale: Although area historically altered by agricultural practices as well as road/berm construction, site not currently being affected by past disturbance with exception of heavy weed infestations.			
✓			5. Water quality is sufficient to support riparian-wetland plants.
Rationale: No evidence of water quality impairment.			

✓			6. Disturbances or features that negatively affect surface- and subsurface- flow patterns are absent. These disturbances/features include but are not limited to hoof action, dams, dikes, levees, spring boxes, diversions, trails, roads, rills, gullies, drilling activities.
Rationale: Surface flows of wetland areas not currently being impacted by past agricultural disturbances.			
		✓	7. Impoundment structure accommodates safe passage of flows (e.g., no headcut affecting dam or spillway).
Rationale:			

Yes	No	NA	VEGETATION
✓			8. There is adequate diversity of stabilizing riparian-wetland vegetation for recovery/ maintenance.
Rationale: Primary stabilizing riparian-wetland communities include stands of SCAC3 and wet meadow dominated by CANEZ, Carex sp with lesser amounts of JUAR2. wet meadow areas include diversity of mesic forbs on perimeters.			
✓			9. There are adequate age classes of stabilizing riparian-wetland vegetation for recovery/maintenance.
Rationale: Dense, well established stands of wetland communities indicate adequate reproduction is available to occupy site.			
✓			10. Species present indicate maintenance of riparian-wetland soil-moisture characteristics.
Rationale: where applicable including historic river meander bends which interrept groundwater. These sites well colonized by wetland plant communities.			

✓			11. Stabilizing plant communities are present that are capable of withstanding overland flows (e.g., storm events, snowmelt), and wind and wave actions, and can resist physical alteration.

Rationale: site very well vegetated and stabilized.

✓			12. Riparian-wetland plants exhibit high vigor.

Rationale: Riparian-wetland plants show excellent vigor, this is especially evident for CAREX which is attaining heights of up to ≥ 20".

✓			13. An adequate amount of stabilizing riparian-wetland vegetation is present to protect soil surfaces and shorelines, to dissipate energy from overland flows and wind and wave actions, and to resist physical alteration.

Rationale: site very well vegetated and stabilized with no evidence of erosion.

✓			14. Abnormal frost or hydrologic heaving is absent.

Rationale: No evidence of abnormal frost or hydrologic heaving.

		✓	15. Favorable microsite condition (e.g., woody material, water temperature) is maintained by adjacent site characteristics.

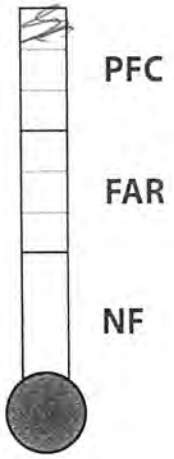
Rationale:

Yes	No	NA	SOILS/GEOMORPHOLOGY
✓			16. Accumulation of chemicals affecting plant productivity/composition is absent.
Rationale: No evidence of impairment from chemicals in soil or water.			
✓			17. Saturation of soils (i.e., ponding, flooding frequency, and duration) is sufficient to compose and maintain hydric soils.
Rationale: As evidenced by persisence of well established obligate wetland communities (i.e. SCAC3)			
✓			18. Underlying geologic material/soil material/permafrost is capable of restricting water percolation.
Rationale:			
✓			19. Riparian-wetland area is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).
Rationale: No evidence of erosion or deposition. Site very stable.			
		✓	20. Islands and shoreline characteristics (i.e., rocks, coarse and/or large woody material) are adequate to dissipate wind- and wave-event energies.
Rationale:			

Summary Determination

Functional rating (check one)

- [x] Proper functioning condition
- [ ] Functional–at risk
- [ ] Nonfunctional



Trend for FAR rating (check one)

Monitored trend	Apparent trend
[ ] Upward	[ ] Upward
[ ] Downward	[ ] Downward
[ ] Static	[x] Not apparent

Rationale for rating: Site very stable and well vegetated with no evidence of deterioration.

All available areas within site occupied by appropriate plant communities – SCAC3, Carex communities in wet areas FAC, FACW plant communities on drier margins. Note very heavy infestations of noxious weeds including LELA2, CIAR4.

Mesic species on fringes include Chenopodium.

Note that SAEX is expanding from rhizomes into previously hayed areas.

Rationale for trend (for FAR rating): NA – looks very stable in current condition.

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☐ Yes ☑ No

If yes, what are those factors? Check all that apply.

☐ Flow regulation ☐ Land ownership ☐ Road encroachment

☐ Mining activity ☐ Dewatering ☐ Oil field water discharge

☐ Watershed condition ☐ Dredging activity ☐ Augmented flows

☐ Other (specify): _____

Explain factors preventing achievement of PFC: _____

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2952.jpg	
Reach 1_IMG_2953.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2954.jpg	
Reach 1_IMG_2955.jpg	

APPENDIX – PFC PHOTO LOG

Reach 1_IMG_2956.jpg	
Reach 1_IMG_2962.jpg	

Lentic Riparian-Wetland Assessment Area Information Form

I. Background information: Date: 8-19-21

Riparian-wetland area name: Pivot wetland Area ID: 1

Management unit (allotment/pasture, other): BCM Allotment - public

Administrative unit/state: BCM

ID team members: Barrett / Evans

Areal extent of riparian-wetland assessment area: 1.1 AC (acres/hectares – circle one)

Assessment method:

- [x] Complete ground reconnaissance
- [ ] Ground inspection of selected representative areas
- [ ] Remote imagery with selective ground inspection of representative or other areas requiring closer inspection

II. Location of riparian-wetland assessment area:

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with the riparian-wetland assessment area delineated. Use GIS in the office or GPS in the field to obtain a representative location to affix a point to the riparian-wetland assessment area. Center pt.

GIS/GPS point location of riparian-wetland assessment area

Latitude: 40.324827	N	Longitude: 116.507608	W
	or		
UTM E	m	UTM N	m

Datum: [ ] NAD27 [ ] NAD83 [ ] WGS84 [ ] Other (specify):

UTM Zone (required for UTM coordinates):

III. Description of potential and rationale: Should include description of hydrologic regime, geomorphic setting, important soil properties, and riparian-wetland plant communities at potential (if altered potential is present, use the "Altered Potential Attachment" below):

The site is an artificial wetland that may be fed by ag runoff by nearby pivots. The site supports a large Typha community with bulrush communities along the edges

as well as minor components of other Wet and FAC(W) species. The area assessed is located within a grasseswood community that is adjacent to other playas and alkaline wetlands depending on elevation. The source of the water supporting this site is thought to be artfied but the site supports a large functioning community of emergent wetland veg. and possesses significant wetland function.

IV. Other assessment or monitoring data or information about the riparian-wetland assessment area:

PFC Assessment Form (Lentic)

Riparian-wetland area name: Pivot Wetland Date: 8-19-21

Assessment ID team members: Barrett/Evans

Riparian-wetland area ID: 1

Yes	No	NA	HYDROLOGY
X			1. Riparian-wetland area is saturated at or near the surface or inundated in "relatively frequent" events.
Rationale: Standing water throughout — Almost exclusively colonized by obligate wetland communities dominated by THLA and SCPU5			
X			2. Fluctuation of water levels is within a range that maintains hydrologic functions and riparian-wetland vegetation.
Rationale: Some fluctuation on margins of wetlands as a result of upstream agricultural practices; however, obligate wetlands communities being maintained throughout site.			
X			3. Riparian-wetland area is enlarging or has achieved potential extent.
Rationale: Potential extent, obligate wetland communities completely occupy site.			
X			4. Riparian-wetland impairment from the contributing area is absent.
Rationale: Although wetland is artificially created by agricultural practices, conditions outside immediate area of wetland are not currently affecting conditions offsite			
X			5. Water quality is sufficient to support riparian-wetland plants.
Rationale: Dense vigorous stands of cattail/rush communities present indicating water quality is adequate for growth of these species.			

X			6. Disturbances or features that negatively affect surface- and subsurface- flow patterns are absent. These disturbances/features include but are not limited to hoof action, dams, dikes, levees, spring boxes, diversions, trails, roads, rills, gullies, drilling activities.
Rationale: Although area may have been trenched historically as part of the pipeline construction. Surface and sub-surface flow patterns not affected. Standing water present in road cut side.			
		X	7. Impoundment structure accommodates safe passage of flows (e.g., no headcut affecting dam or spillway).
Rationale:			

Yes	No	NA	VEGETATION
X			8. There is adequate diversity of stabilizing riparian-wetland vegetation for recovery/ maintenance.
Rationale: THLA and SCPU10 provide adequate diversity of stabilizers for this site.			
X			9. There are adequate age classes of stabilizing riparian-wetland vegetation for recovery/maintenance.
Rationale: obligate wetland communities completely occupy all available area indicating successful reproduction and replacement of older age classes			
X			10. Species present indicate maintenance of riparian-wetland soil-moisture characteristics.
Rationale: obligate wetland communities completely occupy site indicating riparian-wetland soil moisture characteristics are being maintained.			

X			11. Stabilizing plant communities are present that are capable of withstanding overland flows (e.g., storm events, snowmelt), and wind and wave actions, and can resist physical alteration.

Rationale: Excellent stabilizers including THLA and SCPU10 dominate site.

X			12. Riparian-wetland plants exhibit high vigor.

Rationale: Stands of THLA and SCPU10 show excellent vigor

X			13. An adequate amount of stabilizing riparian-wetland vegetation is present to protect soil surfaces and shorelines, to dissipate energy from overland flows and wind and wave actions, and to resist physical alteration.

Rationale: Site completely vegetated by stabilizing wetland communities. No evidence of erosion or alteration from flow, wind or wave events.

X			14. Abnormal frost or hydrologic heaving is absent.

Rationale: No evidence of abnormal frost or hydrologic heaving

		X	15. Favorable microsite condition (e.g., woody material, water temperature) is maintained by adjacent site characteristics.

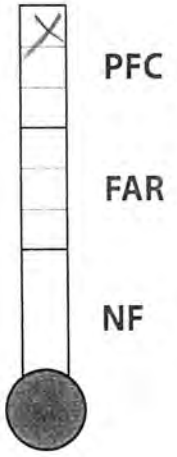
Rationale:

Yes	No	NA	SOILS/GEOMORPHOLOGY
X			16. Accumulation of chemicals affecting plant productivity/composition is absent.
Rationale: Although site is highly alkaline, riparian-wetland plant communities are adapted to these salt affected soil.			
X			17. Saturation of soils (i.e., ponding, flooding frequency, and duration) is sufficient to compose and maintain hydric soils.
Rationale: Obligate wetland plant communities completely dominate site indicating hydric soils are being maintained or are in process of developing.			
X			18. Underlying geologic material/soil material/permafrost is capable of restricting water percolation.
Rationale: No evidence of percolation or loss of surface flows to groundwater. Position of wetland in valley and proximity to natural wetlands indicates naturally high water.			
X			19. Riparian-wetland area is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).
Rationale: No evidence of erosion or deposition in wetland area.			
		X	20. Islands and shoreline characteristics (i.e., rocks, coarse and/or large woody material) are adequate to dissipate wind- and wave-event energies.
Rationale:			

Summary Determination

Functional rating (check one)

- [X] Proper functioning condition
- [ ] Functional–at risk
- [ ] Nonfunctional



Trend for FAR rating (check one)

Monitored trend	Apparent trend
[ ] Upward	[ ] Upward
[ ] Downward	[ ] Downward
[ ] Static	[X] Not apparent

Rationale for rating: Very stable well vegetated emergent wetland dominated by THLA and SCPU10 communities. No evidence of impairment. Saturated at surface, riparian-wetland communities completely occupy all available area.

Rationale for trend (for FAR rating): Site looks completely stable.

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☐ Yes ☑ No

If yes, what are those factors? Check all that apply.

☐ Flow regulation ☐ Land ownership ☐ Road encroachment

☐ Mining activity ☐ Dewatering ☐ Oil field water discharge

☐ Watershed condition ☐ Dredging activity ☐ Augmented flows

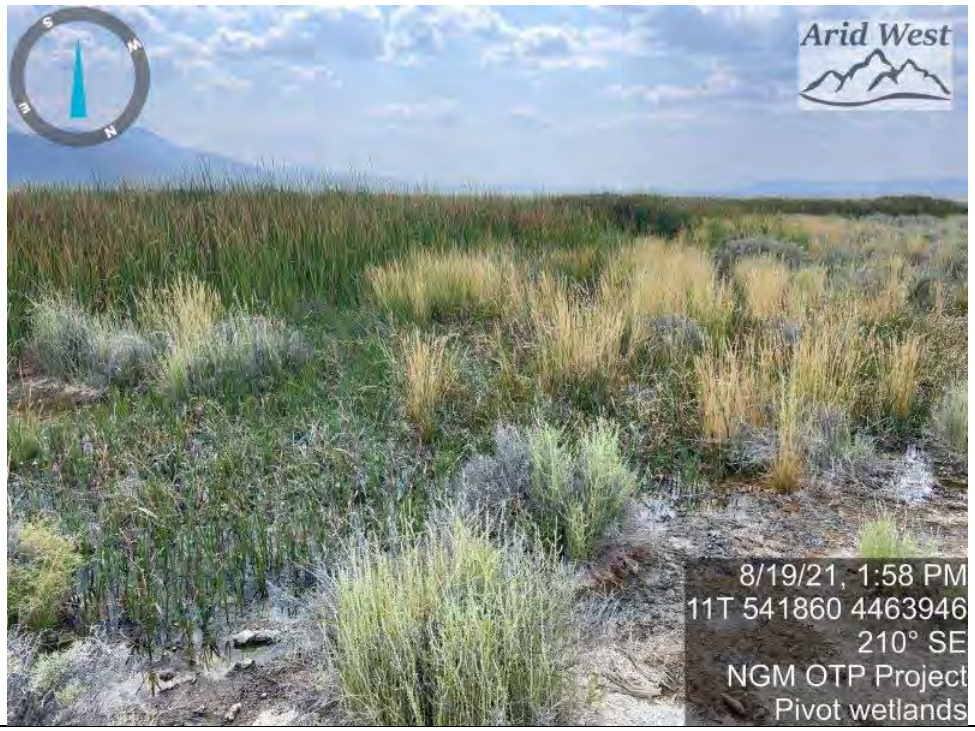
☐ Other (specify): _____

Explain factors preventing achievement of PFC: _____

APPENDIX – PFC PHOTO LOG

Pivot Wetlands_IMG_3090.jpg	
Pivot Wetlands_IMG_3091.jpg	

APPENDIX – PFC PHOTO LOG

Pivot Wetlands_IMG_3092.jpg	
Pivot Wetlands_IMG_3093.jpg	

APPENDIX – PFC PHOTO LOG

Pivot Wetlands_IMG_3094.jpg	

CO Honwood Creek Diversion Ditch 8-19-21

Lentic Riparian-Wetland Assessment Area Information Form – Altered Potential Attachment

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

Yes. Ny ditch. Flows from CO Honwood Canyon mouth diverted to provide water to pivots. No riparian vegetation or functions. Ditch heavily infested with ACRE3.
upstream end: 40.302296, 116.497552 Distance: 0.18 mi
Downstream end: 40.303465, 116.502185

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

APPENDIX – PFC PHOTO LOG

Cottonwood Creek Diversion_IMG_3086.jpg	
Cottonwood Creek Diversion_IMG_3087.jpg	

APPENDIX – PFC PHOTO LOG

Cottonwood Creek Diversion_IMG_3088.jpg	
Cottonwood Creek Diversion_IMG_3089.jpg	

8-19-21

Brock Creek Diversion

Barrett Evans

~~Lentic~~ Riparian-Wetland Assessment Area Information Form – Altered Potential Attachment

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

Yes. Dry ditch. Flow diverted from Brock Creek Canyon mouth for purposes of supplying water to pivots. Some flow in channel in July. No riparian vegetation or functions.
Upstream: 40.287807, 116.503483 Distance: 0.48 mi.
Downstream: 40.291438, 116.511269

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

APPENDIX – PFC PHOTO LOG

Brock Creek_IMG_3080.jpg	
Brock Creek_IMG_3081.jpg	

APPENDIX – PFC PHOTO LOG

Brock Creek_IMG_3082.jpg	
Brock Creek_IMG_3083.jpg	

APPENDIX – PFC PHOTO LOG

Brock Creek_IMG_3084.jpg	
Brock Creek_IMG_3085.jpg	

Lentic Riparian-Wetland Assessment Area Information Form

I. Background information: Date: 8-18-21

Riparian-wetland area name: Possible wetlands Area ID: Reach 1 and 2

Management unit (allotment/pasture, other): BLM pasture - Public

Administrative unit/state: BLM allotment

ID team members: Barrett / Evans

Areal extent of riparian-wetland assessment area: 2.1 AC (both reaches) very small (acres/hectares – circle one)

Assessment method:

- [x] Complete ground reconnaissance
- [ ] Ground inspection of selected representative areas
- [ ] Remote imagery with selective ground inspection of representative or other areas requiring closer inspection

II. Location of riparian-wetland assessment area:

Location: Attach aerial image, USGS 7.5-minute topographic map, or GIS map with the riparian-wetland assessment area delineated. Use GIS in the office or GPS in the field to obtain a representative location to affix a point to the riparian-wetland assessment area. Reach 2: 40.261715, 116.561660

GIS/GPS point location of riparian-wetland assessment area

Reach 1

Latitude: 40.261422 N Longitude: 116.561916 W

or

UTM E _____ m UTM N _____ m

Datum: [ ] NAD27 [ ] NAD83 [ ] WGS84 [ ] Other (specify): _____

UTM Zone (required for UTM coordinates): _____

III. Description of potential and rationale: Should include description of hydrologic regime, geomorphic setting, important soil properties, and riparian-wetland plant communities at potential (if altered potential is present, use the "Altered Potential Attachment" below):

Very small stable wetland sites in close proximity situated at lower ends of dry, alkaline meadow areas. At least one of the sites

appears to have been a spring which was escavated to creat a small pond. There is evidence of old fence posts in area. Both sites are completed filled and stabilized with obligate wetland plant communities. The larger site (Reach 1) is dominated by SCPU10 with lesser amounts of CANE2 JUAR2 Eleocharis sp. and Muehenbergia sp. Second, smaller site (Reach 2) is within 100 ft of Reach 1 and also appears to have been a spring or mesic site which was escavated to form a small stock pond. Reach 2 dominated by SCAC3 and JUAR2. Both sites at potential.

IV. Other assessment or monitoring data or information about the riparian-wetland assessment area:

Excellent condition. No recent evidence of livestock use. Yellow garden spiders abundant in webs around site perimeters.

Sites are located at lower end of dry alkaline meadow. Abundant insect life.

PFC Assessment Form (Lentic)

Riparian-wetland area name: Possible Lentic Date: 8/19/21

Assessment ID team members: Evans Barrett.

Riparian-wetland area ID: Reach 1 & 2

Yes	No	NA	HYDROLOGY
X			1. Riparian-wetland area is saturated at or near the surface or inundated in "relatively frequent" events.
Rationale: Standing surface water on site supporting a diversity of Wetland obl. Veg.			
X			2. Fluctuation of water levels is within a range that maintains hydrologic functions and riparian-wetland vegetation.
Rationale: Water levels appear relatively static, Site may have been dug out ~~and~~ in the past but is now rebuilding hydric soils and supporting a diversity of wetland vegetation			
X			3. Riparian-wetland area is enlarging or has achieved potential extent.
Rationale: Site is at potential and has filled the dug-out basin with Wetland Vegetation			
X			4. Riparian-wetland impairment from the contributing area is absent.
Rationale: Dry Meadow above the site is stable, Past disturbance may have made the East side of the site susceptible to [illegible] but is now stabilized and revegetated			
			5. Water quality is sufficient to support riparian-wetland plants.
Rationale: No indicators of vegetative impairment as a result of [illegible]			

X			6. Disturbances or features that negatively affect surface- and subsurface- flow patterns are absent. These disturbances/features include but are not limited to hoof action, dams, dikes, levees, spring boxes, diversions, trails, roads, rills, gullies, drilling activities.
Rationale: Site appears to have been dug-out in the past, but has since recovered and is rebuilding hydric soils.			
		X	7. Impoundment structure accommodates safe passage of flows (e.g., no headcut affecting dam or spillway).
Rationale:			

Yes	No	NA	VEGETATION
X			8. There is adequate diversity of stabilizing riparian-wetland vegetation for recovery/ maintenance.
Rationale: Site is occupied by a diverse mix of wetland obl veg including Carex, bulrush, spike rush, Juncus, Poa sp.			
X			9. There are adequate age classes of stabilizing riparian-wetland vegetation for recovery/maintenance.
Rationale: Entirety of site is covered with stabilizing wetland vegetation. No issue with recruitment of wetland veg			
X			10. Species present indicate maintenance of riparian-wetland soil-moisture characteristics.
Rationale: Site covered by wetland vegetation - no signs of water stress - soil surface saturated.			

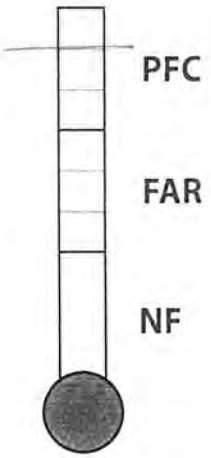
X			11. Stabilizing plant communities are present that are capable of withstanding overland flows (e.g., storm events, snowmelt), and wind and wave actions, and can resist physical alteration.
Rationale: Thick mat of stabilizing wetland vegetation covers and protects the surface of the site			
X			12. Riparian-wetland plants exhibit high vigor.
Rationale: No signs of water stress and good Recruitment of stabilizing wetland also seen			
X			13. An adequate amount of stabilizing riparian-wetland vegetation is present to protect soil surfaces and shorelines, to dissipate energy from overland flows and wind and wave actions, and to resist physical alteration.
Rationale: good Recruitment of wetland veg with No bare ground Present - site is well [illegible] to energy and [illegible]			
X			14. Abnormal frost or hydrologic heaving is absent.
Rationale: No abnormal frost or hydrologic heaving			
		X	15. Favorable microsite condition (e.g., woody material, water temperature) is maintained by adjacent site characteristics.
Rationale:			

Yes	No	NA	SOILS/GEOMORPHOLOGY
X			16. Accumulation of chemicals affecting plant productivity/composition is absent.
Rationale: No signs of chemical accumulation on site			
X			17. Saturation of soils (i.e., ponding, flooding frequency, and duration) is sufficient to compose and maintain hydric soils.
Rationale: Soils saturated at the surface and support vigorous community of wetland veg that is building and maintaining hydric soils			
X			18. Underlying geologic material/soil material/permafrost is capable of restricting water percolation.
Rationale: Site is saturated at the surface and does not show signs of fluctuation of water levels			
X			19. Riparian-wetland area is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).
Rationale: Site is well armored to resist erosion			
		X	20. Islands and shoreline characteristics (i.e., rocks, coarse and/or large woody material) are adequate to dissipate wind- and wave-event energies.
Rationale: No open water			

Summary Determination

Functional rating (check one)

- [x] Proper functioning condition
- [ ] Functional–at risk
- [ ] Nonfunctional



Trend for FAR rating (check one)

Monitored trend	Apparent trend
[ ] Upward	[ ] Upward
[ ] Downward	[ ] Downward
[ ] Static	[x] Not apparent

Rationale for rating: Site supports a diversity of wetland obl. veg and maintains saturated soils that continue to build and maintain hydric soils. Site is well vegetated and armored to resist erosion. No [illegible] and is supported by current grazing impacts.

Rationale for trend (for FAR rating): Site very stable, but small overgrazing would not take much.

Are there factors present preventing the achievement of PFC or affecting progress towards desired condition that are outside the control of the manager?

☐ Yes ☐ No NA

If yes, what are those factors? Check all that apply.

☐ Flow regulation ☐ Land ownership ☐ Road encroachment

☐ Mining activity ☐ Dewatering ☐ Oil field water discharge

☐ Watershed condition ☐ Dredging activity ☐ Augmented flows

☐ Other (specify): _____

Explain factors preventing achievement of PFC: Site may have been altered in the past but has recovered well and now supports a diverse community of wetland obligate vegetation

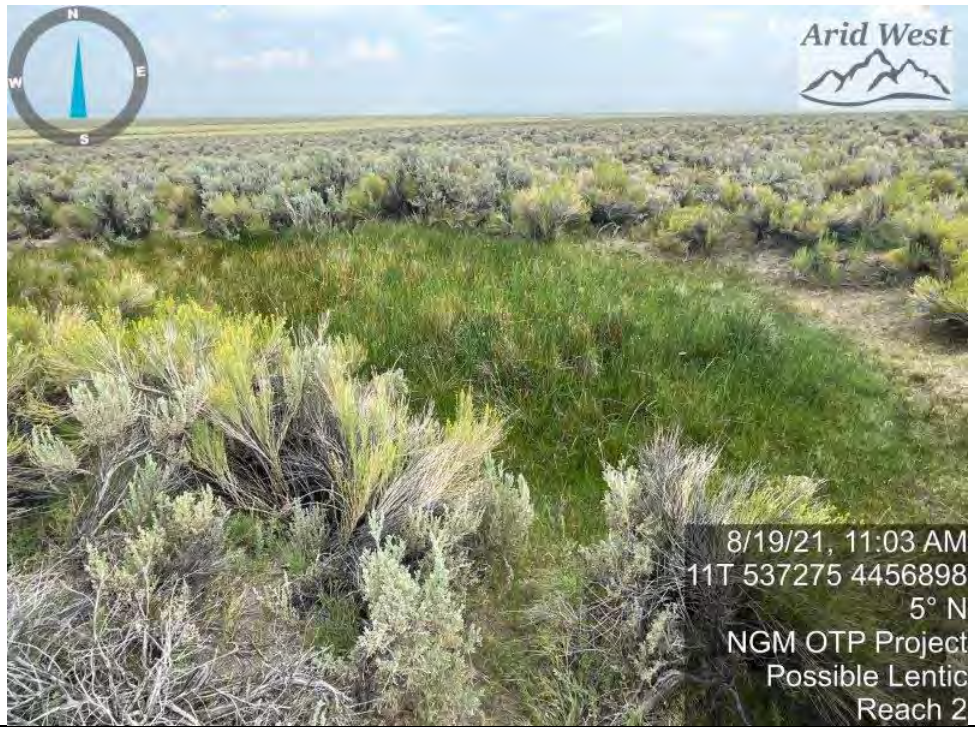
APPENDIX – PFC PHOTO LOG

Possible Wetlands_IMG_3067.jpg	
Possible Wetlands_IMG_3068.jpg	

APPENDIX – PFC PHOTO LOG

Possible Wetlands_IMG_3075.jpg	
Possible Wetlands_IMG_3076.jpg	

APPENDIX – PFC PHOTO LOG

Possible Wetlands_IMG_3077.jpg	
Possible Wetlands_IMG_3078.jpg	

APPENDIX – PFC PHOTO LOG

Possible Wetlands_IMG_3079.jpg	

Cortez POD Wetlands 1-4 8-19-21 Barrett, Evans

Lentic Riparian-Wetland Assessment Area Information Form – Altered Potential Attachment

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

Yes, Series of four ponds, excavated in alkaline flats presumably to provide livestock water sources. Riparian functions limited. Small scattered stands of THLA, SCAC3 and SCMA8 on margins. Some Tamarix present. Exposed shorelines indicate large fluctuations in water levels. Abundant wildlife use: dowitchers, sandpipers, American coots, marsh wrens, Brewer's blackbirds, several species ducks.

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

	Locations	Size
Pond 1:	40.207987, 116.635533	0.23 AC
Pond 2:	40.209173, 116.634326	4.30 AC
Pond 3:	40.205805, 116.635926	0.23 AC
Pond 4:	40.204544, 116.639030	0.86 AC

APPENDIX – PFC PHOTO LOG

Cortez POO Wetlands_IMG_3058.jpg	
Cortez POO Wetlands_IMG_3059.jpg	

APPENDIX – PFC PHOTO LOG

Cortez POO Wetlands_IMG_3060.jpg	
Cortez POO Wetlands_IMG_3061.jpg	

APPENDIX – PFC PHOTO LOG

Cortez POO Wetlands_IMG_3062.jpg	
Cortez POO Wetlands_IMG_3063.jpg	

APPENDIX – PFC PHOTO LOG

Cortez POO Wetlands_IMG_3064.jpg	
Cortez POO Wetlands_IMG_3065 (1).JPG	

APPENDIX – PFC PHOTO LOG

Cortez POO Wetlands_IMG_3065.jpg	
Cortez POO Wetlands_IMG_3066.jpg	

Indian Pivot 8-19-21

~~Lentic~~ Riparian-Wetland Assessment Area Information Form – Altered Potential Attachment

Barrett, Evans

See appendix D for instructions and examples for addressing these questions.

1. **Have the alterations created artificial conditions for a substantial part of the site (and riparian-wetland functions are not present or expected)?**

Yes. Flow: diversion from Indian Creek drainage. Ditch intercepted by and diverted around active pivots. Ditch also intercepted by road. Site dominated by Xanthium sp. and ACRE3. Mostly dry channel but low areas near pivot support mesic forb communities. May drain excess pivot water out onto valley floor.
Point: 40.304606, 116.609388

2. **Are alterations present, but the potential of the site remains unchanged?**

3. **Has a new lentic riparian-wetland area been created in a former upland area?**

4. **Are alterations present that have changed the potential of an existing lentic site (but have not created artificial site conditions described in question #1 for a substantial part of the site)?**

APPENDIX – PFC PHOTO LOG

Indian Creek_IMG_3095.jpg	
Indian Creek_IMG_3096.jpg	

APPENDIX C
VEGETATION

C-1. Special Status Plant Species

C-2. Non-Native and Invasive Plant Species

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C. VEGETATION

C.1. SPECIAL STATUS PLANT SPECIES

Table C-1: BLM Sensitive Status Plant Species within the Battle Mountain and Elko Districts

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Alkali ivesia	*Ivesia kingii var. Kingii*	Sagebrush Scrub, Alkali Sink, wetland-riparian; meadows, playas	NS-S (S3); NS (G4)	X	X	Native to California and limited areas in Nevada and Utah and may occur in the Project Area.
Amargosa niterwort	*Nitrophila mohavensis*	Limited to highly alkaline, moist, salt-encrusted clay soils within the southern Carson Slough	FWS (E); NAC (CE); NS-S (S1); NS (G1)	X		Unlikely to be present, as it is narrowly confined to limited soil within the southern portion of Carson Slough. Only known for five occurrences between Inyo County, CA and Nye County, NV.
Ash Meadows mousetail	*Ivesia kingii var. eremica*	A Nevada endemic that occurs in saline seep areas. Moist alkaline areas in openings of saltbrush scrub near springs. In alkali washes throughout Ash Meadows; moist, clay soils with prominent salt crust	FWS (T); NAC (CE); NS-S (S1S2); NS (G4T1T2Q)	X		Unlikely to be present, as it is narrowly confined to a single spring-fed desert wetland area with extremely saline soils.
Bashful beardtongue	*Penstemon pudicus*	Steep, rocky slopes in pinyon-juniper woodlands, especially along partially shaded washes. (7,500-9,000 ft.) Occurs in crevices, soil pockets, and coarse rocky soils of felsic volcanic outcrops, boulder piles, steep protected slopes, and drainage bottoms in the subalpine sagebrush, mountain mahogany, and upper pinyon-juniper zones.	USFS (S); NS-S (S1); NS (G1)			Unlikely to be present within the Project Area, as it tends to grow in higher elevations than present in the Project Area.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Barren Valley collomia	*Collomia renacta*	Rocky soils on south-facing slopes at elevations ranging from 4,900-7,500 feet and is associated with *Lomatium* spp., *Arabis* spp., and *Eriogonum* spp.	NS-S (S1); NS (G1)		X	Unlikely to be present in the Project Area, known only from the Pequop Range in Nevada.
Beatley buckwheat	*Eriogonum beatleyae*	Dry, volcanic outcrops, in the sagebrush/pinyon-juniper zone between 5,600 to 9,200 feet.	NS-S (S3); NS (G2Q)	X	X	Unlikely to be present in the Project Area, tends to grow in higher elevations than present at Project Area.
Blaine pincushion	*Sclerocactus blainei*	Alkaline calcareous and volcanic gravelly-clay soils in open valley bottom areas in the shadscale and lower sagebrush zones. Greasewood, galleta grass, shadscale, and sagebrush communities on limestone and igneous gravels with a clay matrix. 4,800 to 6,000 feet elevations.	NAC (CY); NS-S (S1); NS (G1G2Q)	X		Unlikely to be present in the Project Area. Species preference at higher elevations.
Broad fleabane	*Erigeron latus*	Shallow, relatively barren, vernally saturated, otherwise dry, gravelly to sandy soils or bedrock on flats and slopes of volcanic scablands or benches, mostly rhyolitic or basaltic in composition, in the sagebrush steppe and juniper zones. 5,200 to 6,500 feet elevations.	NS-S (S1); NS (G3)		X	Unlikely to be present in the Project Area due to lower elevations within the Project Area than preferred.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Cima milkvetch	*Astragalus cimae var. cimae*	Dry, open, relatively barren calcareous gravel slopes or clay hills, commonly among sagebrush. Include Great Basin scrub, Joshua tree "woodland", and pinyon and juniper woodlands. 4,700 to 6,600 feet elevations.	NS-S (S2); NS (G3T2)	X		Unlikely to be present in the Project Area. Species habitat requires higher elevations.
Clarke phacelia	*Phacelia filiae*	Light colored outcrops and soils of calcareous and sometimes gypsiferous sandstone, siltstone, tuffaceous claystone, or limestone, on foothills and valley floors above the playas, in the creosote-bursage, shadscale, mixed-shrub, and blackbrush zones	NS-S (S2); NS (G2)	X		Known from fewer than 20 occurrences in a small area of south-central Nevada making it unlikely to be present in the Project Area.
Cottam cinquefoil	*Potentilla cottamii*	A regional endemic known only from the Pilot Range in Elko County, Nevada, and from the Raft River, Deep Creek, and Stansbury Mountains in Box Elder, Juab, and Tooele Counties, Utah. Cracks and crevices and in crevasses of quartzite outcrops, often shaded from direct midday sunlight. 7,200-10,500 feet.	NS-S (S1); NS (G1)		X	Unlikely to be present in Project Area due to the limited endemic range and lower elevation ranges than preferred.
Currant milkvetch	*Astragalus uncialis*	Dry, open, sparsely-vegetated, calcareous sandy-clay soils on flats and gentle slopes of hillsides and alluvial fans. With sagebrush in gullied foothills at 5,250 – 6,000 feet elevation.	USFS (S); NS-S (S2); NS (G2)	X		Unlikely to be present in the Project Area due to limited endemic range in Nye County and higher elevation needs.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Davis peppercress	*Lepidium davisii*	Hard-bottomed clay playas on volcanic plains in the sagebrush zone	NS-S (S1); NS (G3)	X	X	May occur in the Project Area based on suitable habitat within the Project Area.
Deeth buckwheat	*Eriogonum nutans var. glabratum*	In sandy gravelly soil. This taxon occurs in sand on flats and slopes within saltbrush and sagebrush communities at elevations of 4,900 – 6,300 feet.	NS-S (S2S3); NS (G5T2T3)	X	X	May occur in the Project Area based on suitable habitat elevations.
Eastwood milkweed	*Asclepias eastwoodiana*	In open areas on a wide variety of basic soils, including calcareous clay knolls, sand, carbonate or basaltic gravels, or shale outcrops, generally barren and lacking competition, frequently in small washes or other moisture-accumulating microsites, in the shadscale, mixed-shrub, sagebrush, and lower pinyon-juniper zones at 3,500-7,000 feet.	USFS (S); NS-S (S2S3); NS (G2Q)	X	X	Based on suitable habitat and elevation needs, may occur in the Project Area.
Elko rockcress	*Boechera falcifructa*	Dry, densely vegetated, relatively undisturbed, light colored silty soils with a high cover of moss and other soil crust components on moderate to steep north-facing slopes in the sagebrush zone	NS-S (S1S2); NS (G1G2)	X	X	Endemic to Nevada, predominantly in Elko County so may occur in the Project Area.
Goodrich biscuitroot	*Cymopterus goodrichii*	Moderate to steep scree and talus slopes of dark angular slate or limestone at elevations of 6,500 – 11,150 feet in the upper subalpine and lower alpine zones	USFS (S); NS-S (S1); NS (G1)	X		Unlikely to be present in the Project Area based on higher elevation needs.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Goose Creek milkvetch	*Astragalus anserinus*	Although most occurrences are restricted to specific sandy rhyolitic ash deposits, some have been observed spreading into sandy soils of the adjacent zonal sagebrush vegetation with little apparent rhyolitic ash content. Locally endemic to a portion of the Goose Creek basin near where the borders of Nevada, Idaho and Utah join.	NS-S (S2); NS (G2)		X	Endemic to the Goose Creek basin, therefore, unlikely to be present in the Project Area.
Grimy mousetails	*Ivesia rhypara var. rhypara*	Mostly on dry, relatively barren, yellowish or light-colored outcrops or badlands of welded, sometimes hydrothermally altered and re-cemented, ash-fall tuff, and on shallow gravel grus derived therefrom, in one case on unsorted cobbly riverbed deposits mixed with underlying volcanic ash.	NS-S (S2); NS (G2T2)		X	Occurs in the western United States, in southeastern Oregon and northern Nevada, therefore, may occur in the Project Area.
Grimes vetchling	*Lathyrus grimesii*	Dry, open, shallow, silty clay soils usually overlain by a thin scree of reddish to yellowish brown gravel floated from an underlying cherty or partly quartzitized mudstone component of the Schoonover Formation, forming relatively barren patches on mostly steep slopes of all aspects, and supporting a sparse to moderately dense vegetation	USFS (S); NS-S (S2); NS (G2)		X	As a locally abundant Nevada endemic, found in the northern Independence Mountains, it may occur in the Project Area.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Holmgren lupine	*Lupinus holmgrenianus*	Dry desert slopes, sandy washes, and valleys, sometimes on volcanic substrates. Found within Artemisia tridentata - dominated communities to Pinyon-Juniper Woodlands 4500 - 8000 ft	NS-S (S2); NS (G2)	X		Unlikely to be present in the Project Area based on elevation needs.
Idaho beardtongue	*Penstemon idahoensis*	Restricted to tuffaceous outcrops of the Salt Lake Formation; these are silica-rich, Tertiary-age rocks formed from lake deposits. Soils tend to be dry, pale, fine-textured, and hard. Outcrops that weather to very sandy substrates or large, fractured rock are apparently unsuitable. Found on gentle to steep slopes of all aspects, but most frequently on south to southwest exposures. Most associated with Utah juniper (Juniperus osteosperma) communities from 4,900-5,700 ft.	NS-S (S1); NS (G2)		X	Unlikely to be present in the Project Area based on elevation needs and elevations within the Project Area.
Lahontan beardtongue	*Penstemon palmeri* var. *macranthus*	Along washes, roadsides, and canyon floors, particularly on carbonate-containing substrates, usually where subsurface moisture is available throughout most of the summer; unknown if restricted to calcareous substrates	NS-S (S2?); NS (G4G5T2?)	X		Endemic to western Nevada, unlikely to be present in the Project Area.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Least phacelia	*Phacelia minutissima*	Vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, at perimeters of Veratrum californicum (corn lily), Wyethia amplexicaulis , and/or Populus tremuloides (aspen) stands, in sagebrush swales, along creek bed high-water lines, or around springs, in flat to gently sloping areas; aquatic or wetland-dependent.	USFS (S); NS-S (S2); NS (G3)		X	May occur in the Project Area based on limited microsites in the Project Area where there is aquatic or wetland habitat.
Lewis buckwheat	*Eriogonum lewisii*	Dry, exposed, shallow, relatively barren and undisturbed, rocky residual soils on convex ridge-line knolls and crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes of all aspects, but with the densest stands on southerly aspects; occasionally found at lower elevations on clay hills derived from silty carbonate or calcium-rich siliceous rock	USFS (S); NS-S (S3); NS (G2G3Q)		X	Known only from Elko and Eureka Counties in Nevada, so may occur in the Project Area.
Lone Mountain goldenheads	*Tonestus graniticus*	Crevices of granitic cliffs and outcrops on protected exposures (north to east aspects, deep canyons, etc.) in the pinyon-juniper zone	NS-S (S1); NS (G1)	X		Known only from the Great Basin in the western United States, from the east side of Lone Mountain in Esmeralda County, Nevada, so unlikely to be present in the Project Area.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Low feverfew	*Parthenium ligulatum*	Relatively barren clay or sandy-clay knolls, slopes, and flats in the pinyon-juniper woodland zone	NS-S (S1); NS (G3)	X		Only known in Eureka County, Nevada and grows at higher elevations. Unlikely to be present in the Project Area.
Lunar Crater buckwheat	*Johanneshowellia crateriorum*	Three occurances in Nye Co	NS-S (S1); NS (G1)	X		Only 3 occurrences in Nye County, Nevada making it unlikely to occur within the project area
Meadow pussytoes	*Antennaria arcuata*	Bare, periodically disturbed soil in marginal, seasonally dry parts of moist, often hummocky, alkaline meadows, seeps, and springs, surrounded by sagebrush and grassland associations, aquatic or wetland dependent. 5,000 – 7,900 feet elevations.	USFS (S); NS-S (S1); NS (G3)		X	Unlikely to be present in the Project Area based on higher elevation needs and wetland dependent habitat criteria.
Monte Neva paintbrush	*Castilleja salsuginosa*	Damp, open, alkaline to saline clay soils of hummocks and drainages on travertine hot-spring mounds at elevations around 6,000 feet.	NAC (CE); NS-S (S1); NS (G1Q)	X		Unlikely to be present in the Project Area based on desired elevations.
Mojave thistle (Virgin River thistle)	*Cirsium mohavense (or C. virginense)*	Damp soils around desert springs, streams, and ditches; 1,500 to 9,000 feet elevation; Open, moist, alkaline clay soils of seep and spring areas or gypsum knolls. aquatic or wetland dependent in Nevada	NS-S (SNR); NS (G2G3)	X		Unlikely to be present in the Project Area based on elevation and water requirements.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Nachlinger catchfly	*Silene nachlingerae*	Generally dry, exposed or somewhat sheltered carbonate (rarely quartzite) crevices in ridgeline outcrops, talus, or very rocky soils on or at the bases of steep slopes or cliffs, on all aspects but predominantly on northwesterly to northeasterly exposures, mainly in the subalpine conifer zone at 9,500 – 10,0150 feet.	USFS (S); NS-S (S2); NS (G2)		X	Unlikely to be present in the Project Area based on much higher elevation habitat needs.
Nevada willowherb	*Epilobium nevadense*	Limestone soils, talus, cliffs, and rock outcrops with slopes of varying steepness from 5 to 45 percent.	USFS (S); NS-S (S2); NS (G3)	X		Nevada populations concentrated in the extreme southern part of the state, therefore, unlikely to be present in the Project Area.
Nye pincushion (Tonopah pincushion)	*Sclerocactus nyensis*	Dry rocky soils and low outcrops of rhyolite, tuff, and possibly other rock types, on gentle slopes in open areas or under shrubs in the upper salt desert and lower sagebrush zones	NAC (CY); NS-S (S1); NS (G1Q)	X		Unlikely to be present in the Project Area as it is endemic to Nye and Esmeralda Counties, Nevada and prefers higher elevations.
Obscure buttercup	*Ranunculus triternatus*	Meadow steppe habitat dominated by bunchgrasses and forbs; mostly found on north-facing upper slopes and crests of basalt ridges overlaid by loess deposits of varying depth	NS-S (S1?); NS (G5T2)		X	Endemic to the Columbia River Gorge and is found only in Oregon and Washington making it unlikely to be present in the Project Area.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
One-leaflet Torrey milkvetch	*Astragalus calycosus monophyllidius*	Open gravelly hillsides, in scattered juniper and pinyon forest, on limestone. Lower foothill and valley habitats at 5,200 – 6,600 ft.	NS-S (S3); NS (G5T2Q)		X	Known from Elko County and adjacent counties but unlikely to be present in the Project Area due to lower elevations than their desired habitat.
Owyhee prickly phlox	*Leptodactylon glabrum*	Occurs in crevices in steep to vertical, coarse-crumbling volcanic canyon walls, especially on rhyolitic cliffs. It is intolerant of water paths or seeps that may form in the rock crevices. It occurs at elevations of 2,790-5,200 feet elevation.	NS-S (S1); NS (G2)		X	Based on elevation requirements, this may occur in the Project Area.
Pahute Mesa beardtongue	*Penstemon pahutensis*	In loose soil and rock crevices among boulders in pinyon-juniper woodlands and sagebrush shrublands. 5,800 – 7,500 feet elevations.	NS-S (S3); NS (G3)	X		Unlikely to be present in the Project Area based on higher elevation needs.
Railroad Valley globemallow	*Sphaeralcea caespitosa var. williamsiae*	Occurs in the greasewood, shadscale, and mixed shrub zones on dry, open, flat to gently sloped, gravelly carbonate soils on alluvium and valley fill, often more abundant on recovering disturbances such as washes and roadsides.	USFS (S); NS-S (S2); NS (G2T2)	X		Endemic to Nye County, Nevada. It is a very localized variety, making it unlikely to be present in the Project Area.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Reese River phacelia	*Phacelia glaberrima*	Open, dry to moist, alkaline, nearly barren, sometimes scree covered, whitish to brownish shrink-swell clay soils derived from fluviolacustrine volcanic ash and tuff deposits, generally on the steeper slopes of low hills, bluffs, and badlands in the shadscale-greasewood, sagebrush, and lower pinyon-juniper zones at 4,000-6,000 feet elevations.	NS-S (S3?); NS (G3?)	X		Endemic to northcentral and northwestern Nevada, but unlikely to be present in the Project Area based on elevation limitations.
Rock violet	*Viola lithion*	In cracks and crevices and along narrow ledges of limestone and quartzite outcrops where moisture and shade are available. Seasonally wet crevices in steep carbonate or quartzite outcrops in shaded northeast-facing avalanche chutes and cirque headwalls at 7,800-10,480 feet elevation. Found in the subalpine conifer zone with Symphoricarpos oreophilus, Ribes montigenum, Heuchera rubescens, Aquilegia scopulorum, Thalictrum fendleri, Pinus flexilis, and Populus tremuloides	NS-S (S1); NS (G1)		X	Unlikely to be present in the Project Area due to preferred higher elevations than in the Project Area.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Sand cholla	*Grusonia pulchella*	Sand of dunes, dry-lake borders, river bottoms, washes, valleys, and plains in the desert." Dependent on sand dunes or deep sand in Nevada	NAC (CY); NS-S (S2S3); NS (G4)	X		Occurs in the Humboldt-Toiyabe National Forest and on BLM land, but unlikely to be present in the Project Area based on the dependency on deep sand.
Spring-loving centaury	*Centaurium namophilum*	Open, moist alkali areas, including seeps and meadows at elevations from 2,100 to 3,500 feet	FWS (T); NAC (CE); NS-S (S2); NS (G2Q)	X		Unlikely to occur in the Project Area based on moisture and soil preferences.
Tecopa birdbeak	*Cordylanthus tecopensis*	Open, moist to saturated, alkali-crusted clay soils of seeps, springs, outflow drainages, and meadows below 2,500 feet.	NS-S (S2); NS (G2)	X		Only known to Nye and Esmeralda Counties in Nevada so unlikely to be present in the Project Area based on elevation preferences.
Tiehm beardtongue	*Penstemon tiehmii*	Neutral sandy-loam soil pockets on steep, southerly-facing volcanic talus and scree slopes. Near mountain summit, on glacial cirque slopes and below decomposing rock outcrops at 7,200 to 10,000 feet elevations.	NS-S (S1); NS (G1)	X		Endemic in central Nevada, but unlikely to be present in the Project Area based on elevation preferences.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Tiehm blazingstar	*Mentzelia tiehmii*	Occurs on hill tops and knolls with white or calcareous soils, rich in gypsum that are sparsely vegetated. It occurs at elevations of 4,900 to 5,200 feet and is endemic to the White River Valley in Nevada, including areas of Lincoln and Nye Counties.	NS-S (S2); NS (G1G2)		X	Unlikely to be present in the Project Area based on elevation preferences.
Tiehm buckwheat	*Eriogonum tiehmii*	Dry, open, relatively barren, light-colored rocky clay soils derived from a formation of interbedded clay stones, shales, tuffaceous sandstones, and limestones, on all aspects with slopes up to about 50%, in pure stands or with a sparse cover	NS-S (S1); NS (G1)	X		Unlikely to be present in the Project Area since it's an edaphic endemic, known only from a tiny area in the Silver Peak Range of Esmeralda County, Nevada.
Tonopah milkvetch	*Astragalus pseudiodanthus*	Deep loose sandy soils of stabilized and active dune margins, old beaches, valley floors, or drainages, with Sarcobatus vermiculatus and other salt desert shrub taxa. Dependent on sand dunes or deep sand in Nevada at 5,500 feet.	NS-S (S2); NS (G3Q)	X		Unlikely to be present in the Project Area based on the need for higher elevation.
Toquima milkvetch	Astragalus toquimanus	Dry, stiff, sandy to gravelly, generally somewhat basic or calcareous soils; mostly on flats or gentle slopes, frequently growing under or up through shrubs	USFS (S); NS-S (S2); NS (G2)	X		Unlikely to be present in the Project Area as it is known only from the Monitor and Toquima ranges in Nye County, Nevada.

Species Common Name	Species Scientific Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project area
Whitebark Pine	*Pinus albicaulis*	Subalpine and timberline zones; grows in cold, snowy, and generally moist climates; on semiarid ranges it is most common on cold, moist sites, whereas it is most common on warm, dry sites on moist ranges; common on ridges and near timberline, where trees are exposed to strong, desiccating winds at 4,300 to 12,000 feet elevations.	FWS(C); USFS (S); NS-S (S3); NS (G3G4)	X	X	Unlikely to be present in the Project Area based on the need for much higher elevations than present in the Project Area.
Williams combleaf	*Polyctenium williamsiae*	Relatively barren sandy to sandy-clay or mud margins and bottoms of non-alkaline seasonal lakes perched over volcanic bedrock in the sagebrush, pinyon-juniper, and mountain sagebrush zones	USFS (S); NAC (CE); NS-S (S2); NS (G2Q)	X		The only known observation in Nevada is outside of Reno, making it unlikely to be present in the Project Area.
Windloving buckwheat	*Eriogonum anemophilum*	High elevations on dry, exposed, relatively barren and undisturbed, gravelly, limestone or volcanic ridges and ridgeline knolls, on outcrops or shallow rocky soils over bedrock. At low elevations on dry, relatively barren and undisturbed knolls and slopes of light-colored, platy volcanic tuff weathered to form stiff clay soils	NS-S (S3); NS (G2G3)	X		Restricted to high elevations in the mountains of northwestern Nevada, it is unlikely to be present in the Project Area.

Table C-2 Milkweed Species Native to Nevada

Species Common Name	*Species Scientific Name*	Habitat	Nevada Locations	Potential to Occur in Project Area
Spider milkweed	*Asclepias asperula ssp.asperula*	Gravelly and rocky soil or on exposed talus, in pinyon-juniper woodland and open ponderosa pine woods	Widely distributed in eastern Nevada including Elko County	Based on suitable habitat and elevation needs, not likely to occur in the Project Area.
Pallid milkweed	*Asclepias cryptoceras*	Dry, open, barren places in clay, sand, gypsum, and serpentine soils, from the sage-brush or shadscale zones to the pinyon-juniper and aspen zones.	Found in most of Nevada including Elko, Eureka, and Lander counties	Based on suitable habitat and elevation needs, may occur in the Project Area.
Eastwood milkweed	*Asclepias eastwoodiana*	In open areas on a wide variety of basic soils, including calcareous clay knolls, sand, carbonate or basaltic gravels, or shale outcrops, generally barren and lacking competition, frequently in small washes or other moisture-accumulating microsites, in the shadscale, mixed-shrub, sagebrush, and lower pinyon-juniper zones at 3,500-7,000 feet.	Endemic to central Nevada and historical record from Lander County in 1945.	Based on suitable habitat and elevation needs, may occur in the Project Area.
Desert milkweed	*Asclepias erosa*	Dry washes, gulches, canyons, and roadsides in open deserts; in creosote bush, shadscale, and sometimes sagebrush com-munities.	Found from north to south through the center of the state including Lander County.	Based on suitable habitat and elevation needs, may occur in the Project Area
Narrow-leaved milkweed or Mexican whorled milkweed	*Asclepias fascicularis*	Streambanks, roadsides, agricultural areas, and other moist to dry places, including irrigation ditches and fallowed fields	Scattered populations across north and central areas of Nevada including Elko and Lander counties.	Based on suitable habitat and elevation needs, may occur in the Project Area
Showy milkweed	*Asclepias speciosa*	Moist or moderately moist soil in open, sunny areas including wetlands, meadows, cultivated fields, pastures, forest clearings, and along roadsides, railways and waterways. Widely tolerant of alkaline soils.	May be found in almost every county including Elko, Eureka, and Lander counties.	Based on suitable habitat and elevation needs, may occur in the Project Area

Species Common Name	*Species Scientific Name*	Habitat	Nevada Locations	Potential to Occur in Project Area
Halls's milkweed	*Asclepias hallii*	Sandy, gravelly soil; prairies, wash-bottoms, sagebrush, woodlands. (pinyon-juniper, cottonwood, ponderosa pine, aspen) at elevations from 9,400 to 9,900 feet.	Found in Elko and Lander counties.	Unlikely to occur in Project Area as the Project Area's elevations is below 5,000 feet.
Heartleaf milkweed or purple milkweed	*Ascelepias cordifolia*	Milkweed grows in clumps beside roadways and on abandoned farmlands and other open areas,	Found in Washoe, Carson City, and Douglas counties	Unlikely to occur in Project Area as the nearest records are for locations several hundred miles west.
Horsetail milkweed	*Ascelpias subverticillata*	Found in open woodlands and grasslands, edges of streams and cienegas but can also be found in disturbed areas like roadsides and pastures at elevations from 3,000 to 8,000 feet.	Found in Lincoln County, Nevada, Washington County Utah, and Mohave County Arizona	Unlikely to occur in Project Area as the nearest records are for locations several hundred miles south.
Mojave milkweed	*Ascelepias nyctaginifolia*	Washes, slopes, roadsides of deserts, grasslands, and open woodlands and at springs between 1,600 to 6,500 feet elevation.	Found in Clark County, Nevada, San Bernardino County California, and Mohave County Arizona.	Unlikely to occur in Project Area as the nearest records are for locations several hundred miles south.
Rusby's milkweed	*Asclepias rusbyi*	Riparian corridors in piñon-juniper woodlands, high semi-arid steppe, and ponderosa pine forests and mixed pine-fir forests at elevations from 3,500 to 7,000 feet elevation.	Found in Lincoln County, Nevada, Washington County Utah, and Mohave County Arizona.	Unlikely to occur in Project Area as the piñon-juniper woodlands, ponderosa pine forests and mixed pine-fir forests vegetation communities is not present
Ruth's milkweed	*Asclepias uncialis*	Grasslands, found on sandy to rocky soils at elevations between 5,000 to 7,000 feet.	Found in Lander, Nye, Lincoln, and Esmerelda counties.	Unlikely to occur in Project Area as the Project Area's elevations is below 5,000 feet.

Species Common Name	*Species Scientific Name*	Habitat	Nevada Locations	Potential to Occur in Project Area
Swamp milkweed	*Ascelpias incarnata*	In swamps, marshes and cienega edges, low fields and pastures, along rocky stream beds and openings in pine to pine-oak woodlands at elevations between 500 to 5,000 feet.	Found in Lincoln, County, Nevada and Juab and Box Elder counties in Utah.	Unlikely to occur in Project Area as the nearest records are for locations several hundred miles south or east.

Decker 2006, Nabhan et al. 2015.

C.2. NON-NATIVE AND INVASIVE PLANT SPECIES

Table C.2-1: Nevada Department of Agriculture's February 2, 2021, Noxious Weed List by Category

Common Name	Scientific Name
Category A Weeds: Category A noxious weeds are weeds that are generally not found or that are limited in distribution throughout the state.	
African rue	*Peganum harmala*
Austrian fieldcress	*Rorippa austriaca*
Austrian peaweed	*Sphaerophysa salsula*
Barbed goatgrass	*Aegilops triuncialis*
Bufflegrass	*Pennisetum ciliare*
Camelthorn	*Alhagi pseudalhagi*
Common crupina	*Crupina vulgaris*
Curly-leaf pondweed	*Potamogton crispus*
Desert knapweed	*Volutaria tubuliflora*
Dyer's woad	*Isatis tinctoria*
Eurasian water-milfoil	*Myriophyllum spicatum*
Flowering rush	*Butomus umbellatus*
Giant salvinia	*Salvinia molesta*
Goats rue	*Galega officinalis*
Green foutain grass	*Pennisetum setaceum*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Iberian starthistle	*Centaurea iberica*
Jointed goatgrass	*Aegilops cylindrical*
Klamath weed	*Hypericum peerforatum*
Malta starthistle	*Centaurea melitensis*
Mediterranean sage	*Salvia aethiopis*
Purple loosestrife	*Lythrum salicaria*
Purple starthistle	*Centaurea calcitrapa*
Rush skeletonweed	*Chondrilla juncea*
Squarrose knapweed	*Centaurea virgata*
Sulfur cinquefoil	*Potentilla recta*
Syrian bean caper	*Zygophyllum fabago*
Ventenata	*Ventenata dubia*
Yellow starthistle	*Centaurea solstitialis*
Yellow toadflax	*Linaria vulgaris*
Category B Weeds: Category B listed noxious weeds are weeds that are generally established in scattered populations in some counties of the btate.	
Black henbane	*Hysocyamus niger*
Carolina horse nettle	*Solanum carolinense*
Dalmation toadflax	*Linaria dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Giant reed	*Arundo donax*
Leafy spurge	*Euphorbia esula*
Medusahead	*Taeniatherum caput-medusae*
Mayweed chamomile	*Anthemis cotula*
Perennial sowthistle	*Sonchus arvensis*
Sahara mustard	*Brassica tournefortii*

Common Name	Scientific Name
Silverleaf nightshade	*Solanum elaeagnifolium*
Spotted knapweed	*Centaurea maculosa*
Category C Weeds: Category C listed noxious weeds are weeds that are generally established and generally widespread in many counties of the state.	
Canada thistle	*Cirsium arvense*
Hoary cress or white top	*Cardaria draba*
Johnson grass	*Sorghum halepense*
Musk thistle	*Caduus nutans*
Perennial pepperweed	*Lepdium latifolium*
Poison hemlock	*Conium maculatum*
Puncture vine	*Tribulus terrestris*
Russian knapweed	*Acroptilon repens*
Salt cedar	*Tamarix spp.*
Scotch thistle	*Onopordum acanthium*
Water hemlock	*Cicuta maculata*

Table C.2-2: Noxious Weeds and Non-native Invasive Plant Species Observed in Survey Areas

Name	Common Name	Code	Class (NDA)	Tuscarora Field Office			Mount Lewis Field Office
				Carlin	Crescent Valley	Goldstrike	Crescent Valley
Anthemis cotula	stinking chamomile	ANCO2	B	Y			
Aroptilon repens	Hardheads or Russian Knapweed	ACRE3	C	Y	Y	Y	Y
Avena fatua	wild oat	AVFA	NNIW	Y	Y		
Bassia scoparia	Burning bush	BASC5	NNIW	Y	Y	Y	Y
Bromus tectorum L.	Cheatgrass	BRTE	NNIW	Y	Y	Y	Y
Cardaria draba	whitetop	CADR	C	Y	Y	Y	Y
Carduus acanthoides							
Carduus nutans	nodding plumeless thistle	CANU4	C	Y			Y
Centaurea stobe	Spotted knapweed	CEST8	B	Y	Y	Y	Y
Chenopodium album	lambsquarters	CHAL7	NNIW	Y	Y	Y	Y
Chorispora tenella	crossflower	CHTE2	NNIW	Y	Y	Y	Y
Cirsium vulgare	Bull thistle	CIVU	NNIW	Y	Y	Y	Y
Cirsium arvense	Canada thistle	CIAR4	C	Y			
Conium maculatum	poison hemlock	COMA2	C	Y			
Convolvulus arvensis	field bindweed	COAR4	NNIW	Y	Y	Y	Y
Eremopyrum triticeum	annual wheatgrass	ERTR13	NNIW	Y	Y	Y	Y
Halogeton glomeratus	Saltlover	HAGL	NNIW	Y	Y	Y	Y
Lactuca serriola	Prickly lettuce	LASE	NNIW	Y	Y	Y	Y
Lepidium perfoliatum	Clasping pepperweed	LEPE2	NNIW	Y	Y	Y	Y
Lepidium latifolium	broadleaved pepperweed	LELA2	C	Y	Y	Y	Y

Name	Common Name	Code	Class (NDA)	Tuscarora Field Office			Mount Lewis Field Office
				Carlin	Crescent Valley	Goldstrike	Crescent Valley
Onopordum acanthium	Scotch cottonthistle	ONAC	C	Y	Y	Y	Y
Rumex	Dock	RUMEX	NNIW	Y	Y	Y	Y
Salsola kali	Russian thistle	SAKA	NNIW	Y	Y	Y	Y
Sisymbrium altissimum	Tumblemustard	SIAL2	NNIW	Y	Y	Y	Y
Sonchus arvensis	field sowthistle	SOAR2	B	Y			Y
Tamarix spp	Tamarisk Saltcedar	TARA	C	Y	Y	Y	Y
Tragopogon dubius	yellow salsify	TRDU	NNIW	Y		Y	
Elaeagnus angustifolia	Russian olive	ELAN	NNIW	Y			
Verbascum thapsus	Common mullein	VETH	NNIW	Y	Y	Y	
Bromus arvensis	field brome, Japanese brome	RAR5	NNIW			Y	

APPENDIX D
WILDLIFE

D.1. General Wildlife

D.2. Migratory Bird Species

D.3. Eagles and Other Raptors

D.4. Burrowing Owls

D.5. Pygmy Rabbit

D.6. Kangaroo Mouse

D.7. Bats

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D. WILDLIFE

D.1. GENERAL WILDLIFE

Table D.1-1: 2012 Nevada Wildlife Action Plan Species of Conservation Priority

Common Name	Scientific Name
Mollusks	
California floater	*Anodonta californiensis*
Gastropods	
Amargosa tryonia	*Tryonia variegata*
Antelope Valley pyrg	*Pyrgulopsis pellita*
Ash Meadows pebblesnail	*Pyrgulopsis erythropoma*
bifid duct pyrg	*Pyrgulopsis peculiaris*
Big Warm Spring pyrg	*Pyrgulopsis papillata*
Blue Point pyrg	*Pyrgulopsis coloradensis*
Butterfield pyrg	*Pyrgulopsis lata*
Camp Valley pyrg	*Pyrgulopsis montana*
Corn Creek pyrg	*Pyrgulopsis fausta*
Crystal Spring pyrg	*Pyrgulopsis crystalis*
Distal-gland pyrg	*Pyrgulopsis nanus*
Dixie Valley pyrg	*Pyrgulopsis dixensis*
Duckwater pyrg	*Pyrgulopsis aloba*
Duckwater Warm Springs pyrg	*Pyrgulopsis villacampae*
Elko pyrg	*Pyrgulopsis leporina*
elongate Cain Spring pyrg	*Pyrgulopsis augustae*
elongate Mud Meadows pyrg	*Pyrgulopsis notidicola*
elongate-gland pyrg	*Pyrgulopsis isolata*
Emigrant pyrg	*Pyrgulopsis gracilis*
Fairbanks pyrg	*Pyrgulopsis fairbanksensis*
Flag pyrg	*Pyrgulopsis breviloba*
flat-topped Steptoe pyrg	*Pyrgulopsis planulata*
Fly Ranch pyrg	*Pyrgulopsis bruesi*
grated tryonia	*Tryonia clathrata*
Hardy pyrg	*Pyrgulopsis marcida*
Hubbs pyrg	*Pyrgulopsis hubbsi*
Humboldt pyrg	*Pyrgulopsis humboldtensis*
Kings River pyrg	*Pyrgulopsis imperialis*
Lake Valley pyrg	*Pyrgulopsis sublata*
Landyes pyrg	*Pyrgulopsis landyei*
large gland Carico pyrg	*Pyrgulopsis basiglans*
Lockes pyrg	*Pyrgulopsis lockensis*
longitudinal gland pyrg	*Pyrgulopsis anguina*
median-gland Nevada pyrg	*Pyrgulopsis pisteri*
minute tryonia	*Tryonia ericae*
Moapa pebblesnail	*Pyrgulopsis avernalis*
Moapa Valley pyrg	*Pyrgulopsis carinifera*
monitor tryonia	*Tryonia monitorae*
neritiform Steptoe Ranch pyrg	*Pyrgulopsis neritella*
northern Soldier Meadow pyrg	*Pyrgulopsis militaris*
northern Steptoe pyrg	*Pyrgulopsis serrata*
northwest Bonneville pyrg	*Pyrgulopsis variegata*
Oasis Valley pyrg	*Pyrgulopsis micrococcus*

Common Name	Scientific Name
ovate Cain Spring pyrg	*Pyrgulopsis pictilis*
Pahranagat pebblesnail	*Pyrgulopsis merriami*
Pleasant Valley pyrg	*Pyrgulopsis aurata*
Point of Rocks tryonia	*Tryonia elata*
Pyramid Lake pebblesnail	*Fluminicola dalli*
Sada's pyrg	*Pyrgulopsis sadai*
small gland Carico pyrg	*Pyrgulopsis bifurcata*
smooth juga	*Juga interioris*
southeast Nevada pyrg	*Pyrgulopsis turbatrix*
southern Duckwater pyrg	*Pyrgulopsis anatina*
southern Soldier Meadow pyrg	*Pyrgulopsis umbilicata*
southern Steptoe pyrg	*Pyrgulopsis sulcata*
sportinggoods tryonia	*Tryonia angulata*
Spring Mountains pyrg	*Pyrgulopsis deaconi*
squat Mud Meadows pyrg	*Pyrgulopsis limaria*
Steptoe hydrobe	*Eremopyrgus eganensis*
sterile basin pyrg	*Pyrgulopsis sterilis*
sub-globose Steptoe Ranch pyrg	*Pyrgulopsis orbiculata*
transverse gland pyrg	*Pyrgulopsis cruciglans*
turban pebblesnail	*Fluminicola turbiniformis*
Twentyone Mile pyrg	*Pyrgulopsis millenaria*
Upper Thousand Spring pyrg	*Pyrgulopsis hovinghi*
Vinyards pyrg	*Pyrgulopsis vinyardi*
Virginia Mountains pebblesnail	*Fluminicola virginius*
White River Valley pyrg	*Pyrgulopsis sathos*
Wong's pyrg	*Pyrgulopsis wongi*
Fishes	
Alvord chub	*Gila alvordensis*
Ash Meadows Amargosa pupfish	*Cyprinodon nevadensis mionectes*
Ash Meadows speckled dace	*Rhinichthys osculus nevadensis*
Big Smoky Valley speckled dace	*Rhinichthys osculus lariversi*
Big Smoky Valley tui chub	*Gila bicolor ssp. (unnamed)*
Big Spring spinedace	*Lepidomeda mollispinis pratensis*
bonytail chub	*Gila elegans*
bull trout (Jarbidge River basin pop)	*Salvelinus confluentus* pop. 4
Clover Valley speckled dace	*Rhinichthys osculus oligoporus*
Cui-ui	*Chasmistes cujus*
desert dace	*Eremichthys acros*
Devils Hole pupfish	*Cyprinodon diabolis*
Diamond Valley speckled dace	*Rhinichthys osculus* ssp. (unnamed)
Fish Lake Valley tui chub	*Gila bicolor* ssp. (unnamed)
flannelmouth sucker	*Catostomus latipinnis*
Hiko White River springfish	*Crenichthys baileyi grandis*
Independence Valley speckled dace	*Rhinichthys osculus lethoporus*
Independence Valley tui chub	*Gila bicolor isolata*
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*
Little Fish Lake Valley tui chub	*Gila bicolor* ssp. (unnamed)
Meadow Valley speckled dace	*Rhinichthys osculus* ssp. (unnamed)
Meadow Valley Wash desert sucker	*Catostomus clarkii* ssp. (unnamed)
Moapa dace	*Moapa coriacea*
Moapa speckled dace	*Rhinichthys osculus moapae*
Moapa White River springfish	*Crenichthys baileyi moapae*

Common Name	Scientific Name
Monitor Valley speckled dace	*Rhinichthys osculus* ssp. (unnamed)
Moorman White River springfish	*Crenichthys baileyi thermophilus*
mountain whitefish	*Prosopium williamsoni*
Oasis Valley speckled dace	*Rhinichthys osculus* ssp. (unnamed)
Pahranagat roundtail chub	*Gila robusta jordani*
Pahranagat speckled dace	*Rhinichthys osculus velifer*
Pahrump poolfish	*Empetrichthys latos latos*
Preston White River springfish	*Crenichthys baileyi albivallis*
Railroad Valley springfish	*Crenichthys nevadae*
Railroad Valley tui chub	*Gila bicolor* ssp. (unnamed)
razorback sucker	*Xyrauchen texanus*
relict dace	*Relictus solitarius*
Sheldon tui chub	*Gila bicolor eurysoma*
tui chub of Dixie Valley	*Gila bicolor* ssp. 9
Virgin River chub	*Gila seminuda*
Virgin River chub (Muddy River pop.)	*Gila seminuda* pop. 2
Virgin River spinedace	*Lepidomeda mollispinis mollispinis*
Wall Canyon sucker	*Catostomus* sp.
Warm Springs Amargosa pupfish	*Cyprinodon nevadensis pectoralis*
Warner Valley redband trout	*Oncorhynchus mykiss* pop. 4
White River desert sucker	*Catostomus clarkii intermedius*
White River speckled dace	*Rhinichthys osculus* ssp. 7
White River spinedace	*Lepidomeda albivallis*
White River springfish	*Crenichthys baileyi baileyi*
woundfin	*Plagopterus argentissimus*
Yellowstone cutthroat trout	*Oncorhynchus clarkii bouvieri*
Amphibians	
Amargosa toad	*Anaxyrus nelsoni*
Arizona toad	*Anaxyrus microscaphus*
Columbia spotted frog (Great Basin pop.)	*Rana luteiventris* pop. 3
Great Basin spadefoot	*Spea intermontana*
Great Plains toad	*Anaxyrus cognatus*
northern leopard frog	*Lithobates pipiens*
relict leopard frog	*Lithobates onca*
Sierra Nevada yellow-legged frog	*Rana sierra*
western toad	*Anaxyrus boreas*
Reptiles	
chuckwalla	*Sauromalus ater*
desert night lizard	*Xantusia vigilis*
desert horned lizard	*Phrynosoma platyrhinos*
desert iguana	*Dipsosaurus dorsalis*
desert tortoise (Mojave Desert pop.)	*Gopherus agassizii*
Gila monster	*Heloderma suspectum*
long-nosed leopard lizard	*Gambelia wislizenii*
Great Basin collared lizard	*Crotaphytus bicinctores*
greater short-horned lizard	*Phrynosoma hernandesi*
northwestern pond turtle	*Actinemys marmorata marmorata*
northern rubber boa	*Charina bottae*
pygmy short-horned lizard	*Phrynosoma douglasii*
Panamint alligator lizard	*Elgaria panamintina*
ring-necked snake	*Diadophis punctatus*
rosy boa	*Lichanura trivirgata*

Common Name	Scientific Name
Shasta alligator lizard	*Elgaria coerulea shastensis*
sidewinder	*Crotalus cerastes*
Sierra alligator lizard	*Elgaria coerulea palmeri*
Smith's black-headed snake	*Tantilla hobartsmithi*
Sonoran mountain kingsnake	*Lampropeltis pyromelana*
spotted leaf-nosed snake	*Phyllorhynchus decurtatus*
western banded gecko	*Coleonyx variegatus*
western brush lizard	*Urosaurus graciosus*
western red-tailed skink	*Plestiodon gilberti rubricaudatus*
Mojave shovel-nosed snake	*Chionactis occipitalis*
western threadsnake	*Rena humilis*
Birds	
American Avocet	*Recurvirostra americana*
American Bittern	*Botaurus lentiginosus*
American White Pelican	*Pelecanus erythrorhynchos*
Bell's Vireo	*Vireo bellii*
Bald Eagle (Contiguous US Pop)	*Haliaeetus leucocephalus*
Bank Swallow	*Riparia riparia*
Bendire's Thrasher	*Toxostoma bendirei*
Black Rosy-Finch	*Leucosticte atrata*
Black Tern	*Chlidonias niger*
Black-chinned Sparrow	*Spizella atrogularis*
Bobolink	*Dolichonyx oryzivorus*
Brewer's Sparrow	*Spizella breweri*
California Spotted Owl	*Strix occidentalis occidentalis*
Canvasback	*Aythya valisineria*
Cassin's Finch	*Carpodacus cassinii*
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*
Common Loon	*Gavia immer*
Common Nighthawk	*Chordeiles minor*
Dusky Grouse	*Dendragapus obscurus*
Ferruginous Hawk	*Buteo regalis*
Flammulated Owl	*Otus flammeolus*
Gilded Flicker	*Colaptes chrysoides*
Golden Eagle	*Aquila chrysaetos*
Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*
Great Basin Willow Flycatcher	*Empidonax traillii adastus*
Greater Sage-Grouse	*Centrocercus urophasianus*
Greater Sandhill Crane	*Grus canadensis tabida*
Le Conte's Thrasher	*Toxostoma lecontei*
Lewis's Woodpecker	*Melanerpes lewis*
Loggerhead Shrike	*Lanius ludovicianus*
Long-billed Curlew	*Numenius americanus*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Mountain Quail	*Oreortyx pictus*
Northern Goshawk	*Accipiter gentilis*
Northern Pintail	*Anas acuta*
Olive-sided Flycatcher	*Contopus cooperi*
Peregrine Falcon	*Falco peregrinus*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Prairie Falcon	*Falco mexicanus*
Redhead	*Aythya americana*

Common Name	Scientific Name
Red-necked Phalarope	*Phalaropus lobatus*
Rufous Hummingbird	*Selasphorus rufus*
Sage Sparrow	*Amphispiza belli*
Sage Thrasher	*Oreoscoptes montanus*
Scott's Oriole	*Icterus parisorum*
Short-eared Owl	*Asio flammeus*
Sierra Nevada Mountain Willow Flycatcher	*Empidonax traillii brewsteri*
Sooty Grouse	*Dendragapus fuliginosus*
Southwestern Willow Flycatcher	*Empidonax traillii extimus*
Tricolored Blackbird	*Agelaius tricolor*
Virginia's Warbler	*Vermivora virginiae*
Western Burrowing Owl	*Athene cunicularia hypugaea*
Western Least Bittern	*Ixobrychus exilis hesperis*
Western Sandpiper	*Calidris mauri*
Western Snowy Plover	*Charadrius alexandrinus nivosus*
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*
White-faced Ibis	*Plegadis chihi*
White-headed Woodpecker	*Picoides albolarvatus*
Wilson's Phalarope	*Phalaropus tricolor*
Yuma Clapper Rail	*Rallus longirostris yumanensis*
Mammals	
Allen's big-eared bat	*Idionycteris phyllotis*
American marten	*Martes americana*
American pika	*Ochotona princeps*
American water shrew	*Sorex palustris*
bighorn sheep	*Ovis canadensis*
Botta's pocket gopher	*Thomomys bottae*
California leaf-nosed bat	*Macrotus californicus*
cave myotis	*Myotis velifer*
dark kangaroo mouse	*Microdipodops megacephalus*
desert kangaroo rat	*Dipodomys deserti*
desert pocket mouse	*Chaetodipus penicillatus*
fringed myotis	*Myotis thysanodes*
hoary bat	*Lasiurus cinereus*
Humboldt yellow-pine chipmunk	*Neotamias amoenus celeris*
Inyo shrew	*Sorex tenellus*
little brown myotis	*Myotis lucifugus*
long-eared myotis	*Myotis evotis*
Merriam's shrew	*Sorex merriami*
Mexican free-tailed bat	*Tadarida brasiliensis*
Mono Basin mountain beaver	*Aplodontia rufa californica*
montane shrew	*Sorex monticolus*
mountain pocket gopher	*Thomomys monticola*
mule deer	*Odocoileus hemionus*
northern flying squirrel	*Glaucomys sabrinus*
northern river otter	*Lontra canadensis*
Pahranagat Valley montane vole	*Microtus montanus fucosus*
pale kangaroo mouse	*Microdipodops pallidus*
Palmer's chipmunk	*Neotamias palmeri*
Preble's shrew	*Sorex preblei*
pygmy rabbit	*Brachylagus idahoensis*
sagebrush vole	*Lemmiscus curtatus*

Common Name	Scientific Name
shadow (Allen's) chipmunk	*Neotamias senex*
Sierra Nevada snowshoe hare	*Lepus americanus tahoensis*
silver-haired bat	*Lasionycteris noctivagans*
spotted bat	*Euderma maculatum*
Townsend's big-eared bat	*Corynorhinus townsendii*
western jumping mouse	*Zapus princeps*
western red bat	*Lasiurus blossevillii*
western small-footed myotis	*Myotis ciliolabrum*
Wyoming ground squirrel	*Spermophilus elegans nevadensis*

Table D.1-2: BLM Sensitive Status Species within the Battle Mountain and Elko Districts

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Amphibians					
Amargosa Toad *(Anaxyrus nelson)*	Open, ponded, or flowing water, with riparian vegetative cover in an early-to-intermediate successional stage to form a partial canopy for shade with minimal emergent vegetation at the water's edges; adults also require adjacent vegetated uplands for nocturnal foraging No critical habitat designated or recovery plans for this species	NDOW (SP); NS-S (S2); NS (G2)	x		No; The Amargosa toad occurs only in Oasis Valley, Nevada, specifically along a 10-mile stretch of the Amargosa River and upland springs. (NatureServe 2021)
Boreal toad *(Anaxyrus boreas ssp.)*	Wide variety of habitats including desert springs and streams	No rankings		x	No; Recently described new species of Anaxyrus limited to Nye County, genetic analysis of specimens from the Project vicinity group with western toad (see below)
Columbia spotted frog (including Toiyabe spotted frog subpopulation) (Rana luteiventris)	Meadows, marshes, woodland, mountain wetlands and agricultural land. It is also known from around ponds, lakes, reservoirs, and slow-moving rivers and streams; undertake seasonal migrations to and from breeding sites; newly metamorphosed young form large aggregations and migrate en masse to upland foraging areas.This species exhibits breeding site fidelity	NDOW (SP); USFS (S); NS-S (S2S3); NS (G4T2T3Q)	x	x	Yes; Known northwest of Carlin

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Northern leopard frog *(Lithobates pipiens)*	Permanent ponds, swamps, marshes, and slow-moving streams throughout forest, open, and urban areas; normally inhabit water bodies with abundant aquatic vegetation.	NDOW (SP); NS-S (S2S3); NS (G5)	x	x	Yes; Historic records, none recent
Western toad *(Anaxyrus boreas)*	Wide variety of habitats ranging from desert springs to mountain wetlands; various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams; sometimes they move up to a few kilometers through uplands; egg laying sites include shallow areas of ponds, lakes, or reservoirs, or pools of slow-moving streams	NS-S (S4); NS (G4)	x		Yes
Arachnids					
Nevada water mite *(Thermacarus nevadensis)*	Hot springs; distribution and ecology are incomplete	NDOW (EB); NS-S (SH); NS (GH)		x	Yes
Birds					
Bald Eagle *(Haliaeetus leucocephalus)*	Near lakes, reservoirs, rivers, marshes, and coasts; scattered breeding occurances in Northern Nevada	FWS (DELISTED 2009); NDOW (SE); NS-S (S1B, S3N); NS (G5)	x	x	Yes
Black Rosy-finch *(Leucosticte atrata)*	Breeds in alpine areas, usually near rock piles, and cliffs; winters in open country, including mountain meadows, high deserts, valleys, and plains	NS-S (S3); NS (G4)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Brewer's Sparrow *(Spizella breweri)*	Arid sagebrush steppe; winter, occupy sagebrush shrublands similar to the breeding grounds, as well as a range of desert scrub habitats consisting mainly of saltbush and creosote	NDOW (SB); NS-S (S4B); NS (G5)	x	x	Yes
Burrowing Owl *(includes Western Burrowing Owl) (Athene cunicularia (A. c. hypugaea Western Burrowing Owl))*	Live in open habitats with sparse vegetation such as prairie, pastures, desert or shrubsteppe, and airports. In parts of their range they are closely associated with prairie dogs and ground squirrels, whose burrows they use for nests; Western Burrowing Owls breed throughout Nevada in salt desert scrub, Mojave shrub, and some sagebrush habitat, as well as in agricultural landscapes; winters most frequently in the southern half of Nevada, but has been recorded throughout the state during all months	NS-S (S3B); NS (G4); Western Burrowing Owl NS-S (S3B); NS (G4T4)	x	x	Yes
Columbian Sharp-tailed Grouse *(Tymanuchus phasianellus columbianus)*	Sagebrush-grassland and mountain shrub habitats during summer; use areas dominated by perennial bunchgrasses like luebunch wheatgrass or Idaho fescue and the shrub layer, if present is dominated by big sagebrush and/or antelope bitterbrush; tall, broad-leaved mountain shrub and riparian	NDOW (GB); NS-S (G4T3); NS (G4)		x	No; Small, introduced population in northeastern NV (WAP 2012).

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	cover types are critical components of winter habitat for sharp- tailed grouse; often move to higher elevations to get into moister sites that support greater amounts of these types of shrubs.				
Crissal Thrasher *(Toxostoma crissale)*	Uncommon in Nevada during all seasons; dense brush along desert streams, mesquite thickets; habitat varies; may be found in the densest mesquite thickets along washes, but also in sparse brush in open areas; occurs in dense chaparral, among manzanita and other scrub, in the southwestern mountains.	NS-S (S3); NS (G5)	x		No; Restricted to the southernmost part of Nevada (Audubon 2021).
Ferruginous hawk *(Buteo regalis)*	Preferred habitat arid and semiarid grassland regions; open, level, or rolling prairies; foothills or middle elevation plateaus largely devoid of trees; and cultivated shelterbelts or riparian corridors	NS-S (S2); NS (G4)	x	x	Yes
Flammulated Owl *(Psiloscops flammeolus)*	Open pine forest in mountains	NS-S (S4B); NS (G4)	x	x	No; Breeds in scattered ranges across the state with coniferous forest, including the Carson Range, Spring Mountains, Schell Creek Range, Ruby Mountains, and Snake Range, among others (WAP 2012)
Golden Eagle *(Aquila chrysaetos)*	Open country, especially around mountains, hills, and cliffs; use a variety of habitats	NS-S (S4); NS (G5)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	ranging from arctic to desert, including tundra, shrublands, grasslands, coniferous forests, farmland, and areas along rivers and streams				
Gray-crowned Rosy-Finch *(Leucostcte tephrocots)*	Breeds in alpine areas, usually near snow fields or glaciers, talus, rockpiles, and cliffs; winters in open country, including mountain meadows, shrublands, roadsides, towns, cultivated areas, rocky hillsides, and margins of dry ditches	NS-S (S3N); NS (G5)	x	x	Yes
Great Basin Willow Flycatcher *(Empidonax traillii adastus)*	Montane riparian habitat, with some spilloverinto lowland riparian areas; found in both lowland and montane riparian habitats, and occasionally in other inundated areas such as aspen stands or wet meadows; uses the lower Colorado River corridor during migration.	USFS (S); NS-S (S1S2); NS (G5T5)	x	x	Yes
Greater Sage-grouse (including Bi-State DPS) *(Centrocercus urophasianus)*	Sagebrush steppe; nest in areas with relatively dense cover from big sagebrush; may use areas with rabbitbrush, greasewood, and grassy areas; leks are located in clear areas such as broad ridgetops, grassy swales, dry lakebeds, and sometimes recently burned areas. chick rearing areas include irrigated pastures,	NDOW (GB); NS-S (S3); NS (G3G4)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	wet meadows, and alfalfa fields, in addition to sagebrush.				
Le Conte's Thrasher *(Taososstoma leconte)*	desert scrub, mesquite, tall riparian brush and, locally, chaparral	NS-S (S2); NS (G4)	x		No; Restricted to the southernmost part of Nevada (WAP 2012).
Least Bittern (includes Western Least Bittern) *(Ixobrychus exilis; includes Ixobrychus exilis hesperi)*	Habitat consists of tall emergent vegetaton in marshes, primarily freshwater. Prefers marshes with scattered bushes or other woody growth. Forages in shallow water or along banks. Heavy growths of cattail, bulrush, wild rice, burreed, water smartweed, and reeds are favored feeding sites.	NS-S (S2B); NS (G5T3T4)	x		Yes
Lewis's Woodpecker *(Melanerpes lewis)*	Open pine woodlands, and other areas with scattered trees and snags; unlike other American woodpeckers, it enjoys sitting in the open as opposed to sitting in heavy tree cover	NS-S (S3); NS (G4)	x	x	No; Restricted to woodlands (WAP 2012).
Loggerhead Shrike *(Lanius ludovicianus)*	Open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns; frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries; are often seen along mowed roadsides with	NDOW (SB); NS-S (S4); NS (G4)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	access to fence lines and utility poles.				
Long-billed Curlew *(Numenius americanus)*	High plains, rangeland; Breeds in Nevada but does not overwinter; breeding habitat is mostly native dry grassland and sagebrush prairie; may favor areas with some damp low spots nearby, to provide better feeding area for the young; may nest in pastures that are not too heavily grazed, rarely in agricultural fields; in migration and winter often in farm fields, marshes, coastal mudflats, in addition to grasslands; on mostly featureless terrain, often chooses site close to conspicuous rock, shrub, or other object; nest is shallow scrape in ground, usually with sparse lining of grass, weeds; may have slight rim built up around edge.	NS-S (S2S3B); NS (G5)	x	x	Yes
Mountain Quail *(Oreortyx pictus)*	Dense brush in wooded foothills and mountains; most common in pine-oak woodland, coniferous forest, and chaparral; sometimes in pinyon-juniper woods or in scrub at lower elevations; may be common in areas of second-growth brush after fires or clearcuts; requires dense low thickets for cover;	NDOW (GB); NS-S(S3); NS (G5)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	during hot weather, rarely found more than a mile from water.				
Northern Goshawk *(Accipiter gentilis)*	Nest in mature and old-growth forests with more than 60% closed canopy; often build nests near breaks in the canopy, such as a forest trail, jeep road, or opening created by a downed tree, and prefer sites with a creek, pond, or lake nearby; hunt in the forest, along riparian corridors, and in more open habitat, such as the sagebrush steppes	USFS(S); NDOW (SB); NS-S (S2); NS (G5)	x	x	Yes
Peregrine Falcon *(Falco peregrinus)*	Breed in open landscapes with cliffs (or skyscrapers) for nest sites; nesting at elevations up to about 12,000 feet, as well as along rivers and coastlines or in cities, ; migration and winter in nearly any open habitat, but with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains.	USFS (S); FWS (delisted 1999); NDOW (EB); NS-S (S2); NS (G4)	x	x	Yes
Phainopepla (*Phainopepla nitens)*	Desert, riparian woodlands, and chaparral; it is territorial, actively defending nesting and foraging sites, while in the woodlands it is colonial, with as many as four nesting pairs sharing one large tree; particularly notable for its enigmatic pattern of breeding	NS-S (S2B); NS (G5)	x		No; Restricted to the southernmost part of Nevada (Audubon 2021).

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	twice each year, in two different habitats.				
Pinyon Jay *(Gymnorhinus cyanocephalu)*	Pinyon-juniper woodland, sagebrush, scrub oak, and chaparral communities, and sometimes in pine forests; specialized for feeding on pine seeds.	NS-S (S3S4); NS (G5)	x	x	Yes
Ridgway's rail (Yuma Clapper Rail)	Freshwater marshes containing dense stands of cattails and bulrushes; mature stands along margins of shallow ponds with stable water levels ; generally in freshwater and alkali marshes dominated by stands of emergent vegetation interspersed with areas of open water and drier, upland benches; Nests probably on dry hummocks or in small shrubs among dense cattails or bulrushes along the edges of shallow ponds in freshwater marshes with stable water levels.	FWS (E); NVDOW (EB); NS-S (S1); NS (G5T3)	x		No; Restricted to the southernmost part of Nevada (WAP 2012).
Sage Thrasher *(Oreoscoptes montanus)*	Breeds exclusively in shrubsteppe habitats; require relatively dense ground cover for concealment, but also some bare ground for foraging and for getting around on their feet, which they often do in preference to flying; use arid or semiarid open country with scattered bushes, grasslands, and	NDOW (SB); NS-S (S5B); NS (G4)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	open pinyon- juniper woodlands.				
Sandhill Crane (both Greater and Lesser) *(Antigone Canadensis)*	Breed in open wetland habitats surrounded by shrubs or trees; nest in marshes, bogs, wet meadows, prairies, burned-over aspen stands, and other moist habitats, preferring those with standing water; breeders gravitate toward the edges between wetland and upland habitats, while nonbreeders may prefer open, grassy sites; winter roosting on shallow lakes or rivers at night and spending the day in irrigated croplands, pastures, grasslands, or wetlands.	NS-S (S2B, S3M); NS (G5T5)	x	x	Yes
Short-eared Owl *(Asio flammeus)*	Live in large, open areas with low vegetation, including prairie and coastal grasslands, heathlands, meadows, shrubsteppe, savanna, tundra, marshes, dunes, and agricultural areas; winter habitat is similar, but is more likely to include large open areas within woodlots, stubble fields, fresh and saltwater marshes, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets.; if food is plentiful, winter areas often become breeding areas.	NS-S (S4); NS (G5)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Southwestern Willow Flycatcher *(Empidonax trailii extimus)*	Found along the Virgin River, lower Muddy River, Colorado River, and Pahranagat Valley; breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands including lakes and reservoirs; habitat patches must be at least 0.25 ac in size and at least 30 feet wide; historically the southwestern willow flycatcher nested in native vegetation including willows, seepwillow, boxelder, buttonbush, and cottonwood; subspecies still nests in native vegetation, but also uses thickets dominated by non-native tamarisk and Russian olive, or in mixed native non-native stands.	FWS (E); USFS (E); NDOW (EB); NS-S (S1B); NS (G5T2)	x		No; Restricted to the southernmost part of Nevada (WAP 2012).
Swainson's Hawk *(Buteo swainsoni)*	Favor open habitats for foraging; hay and alfalfa fields, pastures, grain crops, and row crops, or perched atop adjacent fence posts and overhead sprinkler systems; they rely on scattered stands of trees near agricultural fields and grasslands for nesting sites.	NS-S (S2B); NS (G5)	x	x	Yes
Western Snowy Plover (does not include the protected DPS found along the Pacific Coast)	Barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat, levees and flats at	NS-S (S3B); NS (G3T3)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
(Charadrius nivosus nivosus)	salt-evaporation ponds, river bars, along alkaline or saline lakes, reservoirs, and ponds				
Western Yellow-billed Cuckoo *(Coccyzus americanus oxidentalis)*	Use wooded habitat with dense cover and water nearby, including woodlands with low, scrubby, vegetation, overgrown orchards, abandoned farmland, and dense thickets along streams and marshes	USFWS (T); FWS (T); NDOW (SB); NS- S (S1B); NS (G5)	x		No; Restricted to the southernmost part of Nevada (WAP 2012).
Fish					
Big Smoky Valley speckled dace *(Rhinichthys osculus lariversi)*	Endemic to Big Smoky Valley	NDOW (SF); NS-S (S1); NS (G5T1)	x		No; Endemic to Big Smoky Valley in Nye County, NV (BLM 2017 and BLM 2019)
Big Smoky Valley tui chub *(Siphateles bicolor ssp. 8)*	Endemic to Big Smoky Valley	NDOW (SF); NS-S (S1); NS (G4T1)	x		No; Endemic to Big Smoky Valley in Nye County, NV (BLM 2017 and BLM 2019)
bull trout (Jarbidge River Basin) *Salvelinus confluentus pop 4)*	Cold-water fish of relatively pristine stream and lake habitats; most specific habitat requirements of salmonids, including the "Four	USFS (T); FWS (T); NDOW (GF); NS-S (S1); NS (G4T1Q)		x	No; Distribution is believed to consist of a single population in the East Fork, West Fork, and mainstem Jarbidge River and headwater tributaries (WAP 2021)
Charnock Ranch tui chub (Charnock Springs tui chub) (*Siphateles bicolor ssp. 10)*	C's": Cold, Clean, Complex and Connected habitat.	NS-S (S1); NS (T1)	x		No; Narrow endemic outside of Project Area (NatureServe 2021)
Clover Valley speckled dace *(Rhinichthys osculus oligoporus)*	Confined to three springs and outflows in the Clover Valley in Elko County	FWS (E); NDOW (EF); NS-S (S1); NS (G5T1)		x	No; Endemic to three spring systems in Clover Valley, Elko Co., NV (WAP 2021)
Fish Lake Valleyx tui chub	Occupies sub-montane (valley floor) isolated	NDOW (SF); NS-S (S1); NS (G4T1Q)	x		No; Narrow endemic outside of Project Area (NatureServe 2021)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
(Siphateles bicolor ssp. 4)	spring/pool and wetland habitats				
Hot Creek Valley tui chub (*Siphateles bicolor ssp. 5)*	Ralston-Stone Cabin Valleys	NS-S (S1); NS (G4T1Q)	x		No; Narrow endemic outside of Project Area (NatureServe 2021)
Independence Valley speckled dace *(Rhinichthys osculus)*	Known only in Independence Valley Springs system in Elko County NV	FWS (E); NDOW (EF); NS-S (S1); NS (G5T1)		x	No; Isolated spring and marsh/outflow system in Independence Valley, Elko Co., NV (WAP 2012)
Independence Valley tui chub (*Siphateles bicolor isolate)*	Known only from Ralph's Warm Spring complex in Independence Valley, Elko County, Nevada, USA	NS-S (S1); NS (G4T1)		x	No; This species is known only from Ralph's Warm Spring complex in Independence Valley, Elko County, Nevada, USA (NatureServe 2021).
inland Columbia Basin redband trout (*Oncorhynchus mykiss gairdneri)*	Strongly correlated with riparian cover components, including undercut banks, large woody debris, and overhanging vegetation; higher gradient channels, often in riffles or with substrates dominated by boulders, cobbles, and pocket water; also occupy lower gradient streams; pools, which provide important holding and rearing habitat, resting places, over-wintering areas, and refuges from floods, drought, and extreme temperatures for juvenile and adult salmonids should be available, and requirements for spawning include loose gravelly substrates to provide for	NS-S (S2); NS (G5T4)		x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	oxygenation of eggs and embryos in redds in streams.				
Lahontan cutthroat trout (*Oncorhynchus clarki henshawi)*	Found in a wide variety of cold-water habitats including large, terminal, alkaline lakes; alpine lakes; slow, meandering rivers; mountain rivers; and small headwater tributary streams : spawning occurs in streams, generally in riffle areas over gravel substrate; spawning and nursery habitat is characterized by cool water, approximate 1:1 pool-riffle ratio, well-vegetated and stable stream banks, and relatively silt-free rocky substrate in riffle-run areas: fry may move out of spawning tributaries shortly after emergence or may remain in nursery streams for 1- 2 years ; Humboldt cutthroat trout does well in streams with relatively unstable flow and can be found in summer in isolated pools in streambeds; evidently these trout are tolerant of relatively warm water temperatures, and they apparently do well also in relatively turbid, eutrophic reservoirs; introduced populations exist outside of native range.	USFS (T); FWS (T); NDOW (GF); NS-S (S3); NS (G4T3)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Little Fish Lake Valley tui chub (*Siphateles bicolor ssp. 6)*	only in springs at northern end of Little Fish Lake	NS-S (S1); NS (G4T1)	x		No; Endemic to springs at northern end of Little Fish Lake in Nye County, NV (BLM 2017 and BLM 2019)
Monitor Valley speckled dace (*Rhinichthys osculus ssp 5)*	Monitor Valley NV	NDOW (SF); NS-S (S1); NS (G5T1)	x		No; Endemic to Monitor Valley in Nye County, NV (BLM 2017 and BLM 2019)
Northern leatherside chub (*Lepidomeda copei)*	Sluggish pools and backwaters, usually over mud or sand, of creeks and small to medium rivers; adults occur in rocky flowing pools, sometimes riffles, of cold creeks and small to medium rivers; young occupy brushy areas or in quiet pockets near shore; occupied habitat: current usually moderate; vegetation frequently sparse; water depths usually 60-90 cm or less; substrate with low percentage of sand-silt or gravel.	NS-S (S1); NS (G3)		x	No; Narrow endemic outside of Project Area (NatureServe 2021)
Oasis Valley speckled dace *(Rhinichthys osculus ssp. 6)*	Endemic to Oasis Valley; occurs in flowing water, desert springs, and shallow desert streams	NDOW (SF); NS-S (S1); NS (G5T1)	x		No; Limited populations exist in a few springs and outflows including portions of the Amargosa River within Oasis Valley (WAP 2012)
Railroad Valley springfish (*Crenichthys nevadae)*	Endemic to Railroad Valley; warm spring pools, outflow streams, and adjacent marshes; able to tolerate high temperatures and low dissolved oxygen.	USFS (T); FWS (T); NDOW (SF); NS-S (S2); NS (G2)	x		No; Endemic to thermal springs and outflows in Railroad Valley, Nye County, NV (WAP 2012)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Railroad Valley tui chub (*Siphateles bicolor* ssp. 7)	Cold springs in the Railroad Valley Basin	NDOW (SF); NS-S (S1); NS (G4T1Q)	x		No; endemic to Railroad Valley in Nye County, NV (BLM 2017 and BLM 2019)
relict dace (*Relictus solitaries*)	Occupies isolated spring, springbrook and wetland habitats.	NDOW (SF); NS-S(S2S3); NS (G2G3)		x	No; Scattered locations in Spring, Steptoe, Ruby, Bute, and Goshute valleys, east-central Nevada (WAP 2012)
Yellowsstone cutthroat trout (*Oncorhynchus clarki bouvieri*)	Upper northeast part of Goose Creek; restricted in range; southern most population.	NDOW (GF); NS-S (S1); NS (G4T4)		x	No; Found only in extreme northeast NV, in Goose Creek and its tributaries, including Litle Goose, Trout, Piney, and Coon creeks (WAP 2012)
Bats					
Allen's big-eared bat (Allen's lappet-browned bat) (*Idionycteris phylloti*)	In southern Nevada; records limited to Clark County, primarily in the Spring Mountains; may be in southern Lincoln and Nye counties as well; in summer, generally occupies high elevation pine and oak woodland but also uses a variety of riparian woodland across a wide elevational gradient; winter found at lower elevations from creosote bush to pinyon-juniper habitats; current Nevada records indicate this species is distributed between 1,670- 6,000 ft; ROOST HABITAT: Generally prefers to day roosts in trees (large dead snags) but mines and caves are also used. RESIDENT STATUS:	NDOW (P); NS-S (S1); NS (G4); WBWG (high)	x		No; Restricted to Clark County although there is speculation this species could occur in some areas of Nye and Lincoln counties (WAP 2012)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	probably year round resident, but shifts elevation from summer to winter; WINTER STATUS: hibernates but periodically arouses to actively forage and drink in the winter				
big brown bat (*Eptesicus fuscus*)	Found throughout the state, from low to high elevations (720 to > 9,800 ft); occurs in a variety of habitats, including pinyon- juniper, blackbrush, creosote, sagebrush, agriculture, and urban habitats; better adapted to human habitation than most species; ROOST HABITAT: Selects a variety of day roosts including caves, trees (e.g., Ponderosa pine, quaking aspen and oaks), mines, buildings and bridges; often night roosts in more open settings in buildings, mines and bridges; roosts in groups up to several hundred; RESIDENT STATUS: year round resident; WINTER STATUS: Hibernates but periodically arouses to actively forage and drink in the winter; characteristics and locations of winter hibernacula in Nevada are completely unknown, and poorly	NS-S (S4); NS (G5); WBWG (low)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	understood throughout this species range.				
big free-tailed bat (*Nyctinomops macrotis*)	In the southern portion of Nevada, from one location in the Las Vegas area and the other a historical unspecified locality; detected acoustically in moderate numbers within the Muddy River drainage from September through October; during July through September 2003, detected acoustically in Meadow Valley Wash, Eagle Valley, and Clover Creek in Lincoln County; associated primarily with very rocky country (canyon lands); found in arroyo, scrub desert, riparian areas, woodland habitats, although generally a floodplain-arroyo association; typically low elevation, although has been found 8,000 ft and higher outside of Nevada; ROOST HABITAT: Day roosts primarily in crevices in cliff faces, although occasionally in buildings and caves; generally roost in groups less than 100; RESIDENT STATUS: transient but possible summer resident; recors for this species are sparse and scattered;	NS-S (S1S2M); NS (G5); WBWG (low to high)	x		No; Restricted to the southernmost part of Nevada (BLM 2017 and BLM 2019)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	WINTER STATUS: probably does not hibernate.				
Brazilian (or Mexican) free- tailed bat (*Tadarida brasiliensis*)	Found through most of the state, ranging from low desert to high mountain habitats; found in a wide variety of habitats; although predominantly a lower elevation species has been found from 720 to > 11,480 ft in the Sierra Nevada; recent acoustic surveys reveal it is more widespread and common, at least in southern Nevada, than previously thought; current Nevada records indicate this species is distributed between 690-8,370 ft; ROOST HABITAT: selects a variety of day roosts including cliff faces, mines, caves, buildings, bridges, and hollow trees; although colonies number in the millions in some areas, colonies in Nevada are generally several hundred to several thousand (largest known colonies have been estimated at ca. 70,000-100,000); some caves may be used as long term transient stopover roosts during migration; some evidence suggests that the colony at Rose Cave arrives in July and departs in mid	NDOW (PM); NS-S (S3S4B); NS (G5): WBWG (low to medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	October; RESIDENT STATUS: summer resident; recent observations susggest pockets of year-round residents in southern Nevada; WINTER STATUS: Migrations of 1140 mi are documented for this species; migrates away from colder regions and winters in areas with predominantly non-freezing temperatures but has been found to hibernate in northern California; migratory animals appear to be active in the winter range; winter activity has been observed recently in the low desert of southern Nevada				
California myotis (*Myotis californicus*)	Found throughout Nevada, primarily at the low and middle elevations (to 6,000 ft), although occasionally found at higher elevations; more common in the southern half of the state; found in a variety of habitats from Lower Sonoran desert scrub to forests; current Nevada records indicate this species is distributed between 680-9,000 ft; ROOST HABITAT: crevice roosting; selects a variety of day roosts including mines, caves, buildings, rock crevices, hollow trees, and	NS-S (S4); NS (G5); WBWG (low to medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	under exfoliating bark; night roosts in a wider variety of structures; generally roost singly or in small groups, although some mines in the Mojave Desert shelter colonies of over 100 in both the summer and winter; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates but periodically arouses to actively forage and drink in the winter				
Canyon bat (formerly western pipestrelle) (*Parastrellus Hesperus*)	Found througout most of the state, primarily in the souther and western protions; most common n low and middle elevation (6,000 ft), although occasionally found at higher elevations (>8,000 ft); lower and upper Sonoran desert habitats of blackbrush, creosote, salt desert shrub and sagebrush, with occasional occurrence in Ponderosa pine and pinyon-juniper, usually in association with rock features such as ganite boulders and canyons; current nevada recores indicate this species is distrubted between 690-8,400 ft; ROOST HABITAT: day roosts primarily in rock crevices but may include mines, caves, or occasionally	NS-S (S4); NS (G5): WBWG (low to medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	in buildings and vegetation; generally roost singly or in small groups; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates but periodically arouses to actively forage and drink in water.				
Cave myotis (*Myotis velifer*)	Single historical record (1964) from the southern portion of the Lake Mead National Recreation Area west of Lake Mojave; this mine was recently relocated and verified to still contain the species, although apparently numbers not high as what was previously reported; found primarily at lower elevations in arid habitat dominated by creosote bush, palo verde, brittlebush, cactus, and desert riparian; ROOST HABITAT: day roosts in caves and mines, and occasionally buildings and bridges;olerates summer roost temperatures as high as 37° C; night roosts may be same structures used for day roosts, but locations nearest the entrance are preferred; found repeatedly in swallow nests, particularly in nonreproductive season; hibernacula elsewhere are generally mines or caves;	NS-S (S1B); NS (G4G5); WBWG (low to medium)	x		No; Restricted to the southernmost part of Nevada (BLM 2017 and BLM 2019)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	RESIDENT STATUS: summer resident; WINTER STATUS: hibernates, but a few individuals have been found active in mines in winter.				
fringed myotis (*Myotis thysanodes*)	Found throughout central and southern Nevada; probably occurs in northern Nevada, as well; found in a wide range of habitats from low desert scrub habitats to high elevation coniferous forests; found from upper elevation creosote bush desert to pinyon-juniper and white fir (7,000 ft) in the White Pine Range; current Nevada records indicate this species is distributed between 1,400-7,000 ft; ROOST HABITAT: day and night roosts in mines, caves, trees, and buildings; maternity colony of approximately 200 individuals was found in a mine in creosote bush scrub in the Mojave Desert; two maternity colonies have recently been found in mine adits on the Nevada Test Site in blackbrush habitat; has been radio tracked to tree hollows, particularly large conifer snags in Oregon and Arizona, and rock crevices in cliff faces in southern California;	USFS (S); NDOW (PM); NS-S (S2); NS (G4): WBWG (medium to high)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	known hibernacula are generally mines or caves; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates but capable of periodic winter activity.				
greater western mastiff bat (*Eumops perotis*)	Multiple acoustic records collected from the Spring Mtns, Las Vegas Wash, Meadow Valley Wash, and along the Colorado river near Laughlin; found in a variety of habitats from desert scrub to chaparral to montane coniferous forest; have been detected in montane meadows above 8,000 ft; distribution is tied to availability of suitable roosting habitat and can sometimes be predicated based on presence of signifcant rock features (e.g. large granite or basalt formations); ROOST HABITAT: day roosts primarily in crevices in cliff faces and cracks in boulders, occasionally buildings; generally roost in groups less than 100; RESIDENT STATUS: probable transient; WINTER STATUS: active all winter at lower elevations.	NDOW (SM); NS-S (S1); NS (G5G4); WBWG (medium to high)	x		No; Restricted to the southernmost part of Nevada (BLM 2017 and BLM 2019)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
hoary bat (*Lasiurus cinereus*)	Distribution patchy known mostly from the capture of single animals while foraging or acoustic records; **roosting locations are not well known**; tree-associated species; found primarily in forested upland habitats, as well as in gallery-forest riparian zones and agriculture habitats; in valley basins in pure stands of Rocky Mountain juniper (Juniperus scopulorum); may occur in park and garden settings in urban areas; current records indicate distributed between 1,870-8,270 ft; ROOST HABITAT: solitary; day roosts in trees, within foliage 10-40 ft above the ground in both coniferous and deciduous trees; unusual roosting situations have been reported in caves, beneath a rock ledge, in a woodpecker hole, and in a squirrel's nest; RESIDENT STATUS: summer resident; been captured at 5,900 ft in Spring Valley, east-central Nevada in Rocky Mtn juniper habitat; captured near Yucca Mountain at 3,250 ft; captured over a well pond (3,250 ft) in Mojave Desert scrub vegetation; captured in	NS-S (S3N); NS (G3G4); WBWG (medium)	x	x	Maybe; Although widely distributed across the state where appropriate forested or riparian habitat is available, populations are patchy and mostly known from the capture of single animals while foraging. Roosting locations are not well known (WAP 2012).

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	a dry wash; recent acoustic and capture surveys in the Muddy River and Meadow Valley Wash drainages documented arrival and continued presence from early April through late May; prolonged presence from March through June was recorded in the upper Moapa Valley; until recently, records from southern Nevada were from the spring; however, two localities at the Nevada Test Site and the Spring Mountains have yielded records in the fall ; records from the northeast span 15 July to 21 August; documented in July at Key Pittman Reservoir and in September in Eagle Valley, Lincoln County; WINTER STATUS: migrates but probably hibernates in parts of its winter range; records are primarily from the spring and fall but migratory patterns in Nevada are not known.				
little brown bat (*Myotis lucifugus*)	Found primarily throughout the northern part of the state, but little is known of its distribution and abundance.Found primarily at higher elevations and higher latitudes, often associated with coniferous forest;	NS-S (S3); NS (G3); WBWG (low to medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	requires a nearby water source; occurrence in Dixie Valley, (4,400) has been documented acoustically: ROOST HABITAT: day roosts in hollow trees, rock outcrops, buildings, and occasionally mines and caves; one of the species most commonly found in human structures; night roosts may be same structures used for day roost but locations nearest the entrance are preferred; hibernacula elsewhere are generally mines or caves; often found in the same roost sites with *Myotis yumanensis.* RESIDENT STATUS: probably a year round resident; WINTER STATUS: hibernates but no hibernating colonies have been found in Nevada. It is suspected that there are elevational movements between summer and winter roosts; no large aggregations of this species, like those known in the eastern U.S. have been found.				
long-eared myotis (*Myotis evotis*)	Found throughout the state, primarily at the higher elevations associated with coniferous forest; more widespread and common in the northern half of the state;	NS-S (S4); NS (G5): WBWG (low to medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	primarily a forest- associated species. In southern Nevada, only found in Ponderosa pine or above; found in pinyon-juniper in the northern portion of Nevada Test Site; in northern Nevada common in pinyon-juniper and above, but also found in sagebrush and desert scrub habitats; current Nevada records indicate this species is distributed between 2,300-10,100 ft; ROOST HABITAT: Day roosts in hollow trees, under exfoliating bark, crevices in small rock outcrops, and occasionally in mines, caves, and buildings; night roosts have been found in caves, mines, and under bridges. Generally roost singly or in small groups; RESIDENT STATUS: year round resident; WINTER STATUS; presumed to be non-migratory and to hibernate locally.				
long-legged myotis (*Myotis Volans*)	Found throughout the state but more widespread and common in the northern half; occurs from mid to high elevations. Absent from the low desert; found in pinyon-juniper, Joshua tree woodland, and montane coniferous forest habitats;	NS-S (S4); NS (G4G5); WBWG (low to medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	occasionally found in Mojave and salt desert scrub, and blackbrush, mountainshrub, and sagebrush. Current Nevada records indicate this species is distributed between 930-3,420 m; ROOST HABITAT: day roosts primarily in hollow trees, particularly large diameter snags or live trees with lightning scars; uses rock crevices, caves, mines, and buildings when available; caves and mines may be used for night roosts; hibernacula elsewhere are generally mines or caves; RESIDENT STATUS: probably a year round resident; WINTER STATUS: hibernates but has the capability of winter activity; it is suspected that there are elevational and latitudinal movements between summer and winter roosts; transient colonies in the spring on the east side of the Sierra Nevada.				
pallid bat (*Antrozous pallidus*)	Found throughout the state, primarily in the low and middle elevations (5,900 ft), although has been found at over 10,200 ft; variety of habitats from low desert to brushy terrain to coniferous	USFS (S); NDOW (PM); NS-S (S3); NS (G4); WBWG (medium to low)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	forest and non-coniferous woodlands; in pinyon- juniper, blackbrush, creosote, sagebrush, and salt desert scrub habitats; ROOST SITES: Selects a variety of day roosts including rock outcrops, mines (maternity colonies have been found in geothermally-influenced adits), caves, hollow trees, buildings, and bridges. Night roosts very commonly under bridges, but also caves and mines. Intolerant of roosts in excess of 40° C; RESIDENT STATUS: year round resident WINTER STATUS: hibernates but periodically arouses to actively forage and drink in winter.				
silver-haired bat (*Lasionycteris noctivagans*)	Widely distributed in the state, but confined primarily to forested habitats; found in riparian habitats in the south and in woodland and riparian habitats in the central and northern portions of the state;forest-associated species, more common in mature forests; found primarily at higher latitudes and altitudes; found in coniferous and mixed deciduous/coniferous forests of pinyon juniper, subalpine fir, white fir, limber pine,	NS-S (S3B); NS (G3G4); WBWG (medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	aspen, cottonwood and willow; usually found at lower elevations in southern Nevada associated with riparian corridors; current Nevada records indicate this species is distributed between 1,570-8,200 ft. ROOST HABITAT: Roosts almost exclusively in trees in summer; maternity roosts are generally in woodpecker hollows and under the loose bark of large diameter snags. They are generally located at least 50 ft above ground; uses multiple roost sites, switching them frequently; small groups and single animals will roost under exfoliating bark; winter roosts include hollow trees, rock crevices, mines, caves, and houses; also has been found roosting under leaf litter; RESIDENT STATUS: Poorly understood; recent August records of seven post-lactating females and fourjuveniles in mixed subalpine fir/limber pine/aspen habitat (Bradley, 2000b) and four lactating females in mixed coniferous/deciduous forest indicates maternity activity in northeast Nevada; WINTER				

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	STATUS: Migrates but probably hibernates in some parts of its winter range; migratory patterns not well understood; recent October records of migrating individuals				
spotted bat (*Euderma maculatum*)	Known from only twelve localities, but scattered distribution throughout Nevada; distribution is patchy and linked to availability of cliff roosting-habitat. Recent studies have documented significant activity throughout the summer months in the Muddy River drainage; there are recent high elevation records from the Sierra Nevada in California; found in a wide variety of habitats from low elevation desert scrub to high elevation coniferous forest habitats, including pinyon- juniper, sagebrush, riparian and on urban high-rise (cliff analog) habitats; closely associated with rocky cliffs; current Nevada records indicate this species is distributed between 1770-7,000 ft; ROOST HABITAT: Day roosts primarily in crevices in cliff faces but some indication that mines and caves may occasionally be used,	USFS (S); NDOW (TM); NS-S (S2); NS (G4); WBWG (medium to high)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	primarily in winter; sas been found roosting on/in buildings but reliance on such roosts is unclear. Likely roosts singly; RESIDENT STATUS: year round resident; WINTER STATUS: Hibernates but periodically arouses to actively forage and drink in the winter; **characteristics and locations of winter hibernacula in Nevada are completely unknown, and poorly understood throughout this species range**				
Townsend's big-eared bat	Found throughout the state, from low desert to high mountain habitats. Observed foraging in krumholz bristlecone pine as high as 11,500 ft in the Snake Range of eastern White Pine County; distribution is strongly correlated with the availability of caves and abandoned mines; highly associated with caves and mines; found primarily in rural settings from deserts to lower, mid to high-elevation mixed coniferous-deciduous forest. Current Nevada records indicate this species is distributed between 690-11,500 ft primarily in pinyonjuniper- mahogany,	USFS (S); NDOW (SM); NS-S (S2); NS (G4); WBWG (high)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	white fir, blackbrush, sagebrush, salt desert scrub, agricultural, and occasionally in urban habitats. ROOST SITES: A cavern-dwelling species that uses mines, caves, trees and buildings; very dependent on mines and caves; trees and buildings must offer "cave-like" spaces in order to be suitable.; will night roost in more open settings, including under bridges; **recent studies indicate that use of roosts is variable within seasons and among years, and multiple surveys may be required before use can be documented**.RESIDENT STATUS: year round resident; WINTER STATUS: hibernates in mixed sex aggregations of a few to many hundred; periodically arouses to move to alternate roosts and to actively forage and drink in the winter; hibernation prolonged in colder areas, and intermittent where climate is predominantly non-freezing.				
western red bat (*Lasiurus blossevillii*)	Historically known from only two locations, one of which (Fallon area) yielded additional specimens in 1958; third location near Dyer was	NDOW (SM); NS-S (S1M); NS (G4); WBWG (high)	x	x	Maybe; Thought to be restricted to riparian habitats along the western and southern edges of Nevada, so range is probably not extensive; Confirmed

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	documented in September 1999; recent acoustic sampling in the Muddy River drainage in Clark County have yielded records of occurrence in late spring and early summer 2000, and three females and two males were captured between July and September in the same drainage; been detected acoustically in the northern portion of the Nevada Test Site during the summers of 1999 and 2000; two acoustic records were obtained near the Truckee River west of Fernley; aoustic records from two localities in Lincoln County were documented in 2003; found primarily in wooded habitats, including mesquite bosque and cottonwood/willow riparian areas; Current Nevada records indicate this species is distributed between 1,380-6,600 ft; ROOST HABITAT:solitary rooster; day roosts in trees, within the foliage and presumably in leaf litter on the ground; RESIDENT STATUS: thought to be a migrant but may be a summer resident in the Fallon and Muddy River areas; WINTER STATUS: **winter**				breeding in Fallon in 2009 (WAP 2012); Potential habitat may exist

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	behavior poorly understood; thought to be migratory in NV, although migratory patterns are not well documented. This species is reported to be highly migratory throughout most of its range.				
western small-footed myotis (*Myotis ciliolabrum)*	Found throughout the state; in the south, primarily found at the middle and higher elevations (> 5,900 ft), although occasionally found at lower elevations; in central and northern part of the State it is more common at valley bottoms (3,400-5,900 ft); inhabits a variety of habitats including desert scrub, grasslands, sagebrush steppe, and blackbrush, greasewood, pinyon-juniper woodlands, pine-fir forests, agriculture, and urban areas; current Nevada records indicate distribution between1,600- 9,000 ft; ROOST HABITAT: roosts have been found in caves, mines, and trees; roosting preferences expected to be similar to those for *Myotis californicus* ; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates; in some areas may tolerate drier and colder	NS-S (S3); NS (G5): WBWG (low to medium)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	hibernacula than some other species; hibernates individually or in large colonies. A large colony (>100 individuals) was found at a depth of 450 ft in an abandoned mine near Eureka				
Yuma myotis (*Myotis yumanensis)*	Found at least in the southern and western half of the state, primarily at low to middle elevations; recent collection in east central Nevada and a large colony near Rye Patch Reservoir suggests a wider distribution in the state; found in a wide variety of habitats from low to mid-elevations, including sagebrush, salt desert scrub, agriculture, playa, and riparian habitats; one of the species that is most tolerant of human habitation and one of the few that thrives in a relatively urbanized environment; often considered to be a "building" bat, it is also found in heavily forested settings elsewhere; current Nevada records indicate this species is distributed between 1,500-10,900 ft; ROOST HABITAT: day roosts in buildings, trees, mines, caves, bridges, and rock crevices; night roosts usually associated with buildings, bridges, or other	NS-S (S3S4); NS (G5); WBWG (low to medium)	x	x	Maybe; Found mostly in the southern and western half of Nevada (BLM 2017 and BLM 2019) but may have a wider distribution than known; Potential habitat may exist

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	man- made structures; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates; no large winter aggregations have been found in Nevada.				
Big Game					
bighorn sheep (California, desert, Rocky Mountain) (*Ovis canadensis* spp.)	In alpine meadows, mountain slopes, and foothills. They like areas with rocky slopes that they can climb to evade predators	For desert bighorn sheep USFS (S); NDOW (GM); NS-S (S4); NS (G4T4)	x	x	Yes
Small Mammals					
American water shrew (*Sorex palustris)*	Most abundant along small cold streams with thick overhanging riparian growth; around lakes, ponds, marshes, bogs, and other lentic habitats; normally associated with water, may disperse long distances away from water to establish new territories; nest sites are near water in underground burrows, rafted logs, beaver lodges, and other areas providing shelter	NS-S (S2); NS (G5)		x	Yes
dark kangaroo mouse (includes Desert Valley kangaroo mouse and Fletcher dark kangaroo mouse *M.m.albiventer* and *nasutus*) *(Microdipodops megacephalus* ssp.)	Dark kangaroo mice prefer loose sands and gravel; found in shadscale scrub, sagebrush scrub, and alkali sink plant communities; may occur in sand dunes near the margins of their range	NSOW (PM); NS-S (S2); NS (G4T2)	x	x	Yes
Inyo shrew *(Sorex tenellus)*	Habitats include riparian zones and canyon bottoms;	NS-S (S2); NS (G4)		x	No; Formerly only known from western and southwestern NV

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	rocky mountain habitat in areas with logs, boulders, or sagebrush scrub; and red fir communities; species may be more tolerant of dry habitat than are closely related shrews. In Great Basin National Park, this shrew was found at 3,000 m elevation in habitat dominated by Engelmann spruce				and one isolated spot in northwestern Nevada (WAP 2012)
Merriam's shrew (*Sorex merriami)*	Primarily in various grassland habitats, including grasses in sagebrush scrub/pinyon-juniper habitat, and also in mountain- mahogany and mixed woodlands	NS-S (S3); NS (G4)		x	Yes
northern river otter (*Lontra canadensis pacific)*	Prefer bog lakes with banked shores containing semi-aquatic mammal burrows and lakes with beaver (Castor canadensis) lodges, and they avoid water bodies with gradually sloping shorelines of sand or gravel; during the dry season, will retreat from marshland and move to permanent ponds where water is available and food is more concentrated; habitat features preferred for latrine sites include large conifers, points of land, beaver bank dens and lodges, isthmuses, mouths of permanent streams, or any object that protrudes from the water	NDOW (FM); NS-S (S2); NS (G5TNRQ)		x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Pahranagat Valley montane vole (*Microtus montanus fucosus)*	Alpine meadows in the south and mountain valleys in the north. They are found in wet meadows, cropland, especially fields and pastures of grass and legumes along fence rows; grassy areas by streams and lakes. They occupy shallow burrows and surface runways	NDOW (SM); NS-S (S1S2); NS (G5T2)	x		No**;** range is less than 40 square miles in the White River Valley, NV (WAP 2012)
pale kangaroo mouse (*Microdipodops pallidus)*	Nearly restricted to fine sands in alkali sink and desert scrub dominated by *Atriplex confertifolia* (shadscale) or *Artemisia tridentata* (big sagebrush); often burrows in areas of soft, windblown sand piled at the bases of shrubs	NDOW (PM); NS-S (S2); NS (G3)	x		Maybe; mostly found in west and west-central NV and extreme eastern CA, although studies are incomplete (WAP 2012); Potential habitat may exist
Preble's shrew (*Sorex preblei)*	Include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush, willow- fringed creeks, marshes, bunchgrass associations, sagebrush-aspen associations, sagebrush-grass associations, alkaline shrubland	NS-S (S1S2); NS (G4)		x	Maybe; Found in Elko Co, near Sheep Creek in the Independence Mountains, and along Mary's River (WAP 2012); Potential habitat may exist
pocket gopher (includes Botta's (*Thomomys botae*); **Fish Spring pocket gopher** (*T. b. abstrusus*) and **San Antonio pocket gopher** (*T. b. curatus*)	Associated with a wide range of vegetation and soil types. Residents of open habitats and meadows, where soils are deep enough to maintain permanent burrow systems. Two subspecies of priority interest are isolated to two	Botta's NS-S (SNR); NS (G5); Fish Springs and San Antonio (NS-S (SH); NS (G5TH);	x		Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
(*Thomomys bottae)*	valleys, T. b. abstrusus in Fish Spring valley (also known as Litle Fish Lake Valley) in Nye County, and T. b. curtatus in Big Smoky Valley. A third isolate occurs near Eastgate.				
pygmy rabbit *(Brachylagus idahoensis)*		USFS (S); NDOW (GM); NS-S (S3); NS (G4)	x	x	Yes
		Reptiles			
desert horned lizard (inlcuding nothern and southern subspecies) (*Phrynosoma platyrhinos (includes P.p. platyrhinos* and *P.p. calidiarum*))	Typically found in open sandy areas in deserts, chaparral, grassland, often near ant hills. Often seen basking on asphalt roads or low rocks in the morning or afternoon.	NS-S (S4); NS (G5)	x	x	Yes
Great Basin collared lizard *(Crotaphytus bicinctores)*	Occurs mainly in xeric, sparsely vegetated rocky areas, on alluvial fans, lava flows, hillsides, rocky plains, and in canyons; perches atop rocks and hides under rocks and be found from sea level to about 7,500 ft.	NS-S (S4); NS (G5)	x	x	Yes
greater short-horned lizard (*Phrynosoma hernandesi)*	Ranges from semiarid plains to high mountains (2,000 - 10,500 ft above sea level); occupies a variety of habitats, including sagebrush, and open PJ, pine-spruce and spruce-fir forests; substrate may be stony, sandy, or firm but some fin loose soil is usually present.	NS-S (S2); NS (G5)	x	x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
long-nosed leopard lizard (*Gambelia wislizenii)*	Found in sandy and gravelly desert and semidesert areas with scattered shrubs or other low plants (e.g. bunch grass, alkali bush, sagebrush, creosote bush) especially areas with abundant rodent burrows; occurs from sea level to approximately 6,000 ft	NS-S (S4); NS (G5)	x	x	Yes
Mojave desert tortoise (*Gopherus agassizii)*	Live in creosote bush scrub habitat at elevations ranging from 1,000 to 3,000 feet above sea level, although they are known to occur in suitable habitats up to about 5,000 feet in elevation; within suitable habitat they occur over a relatively large region including the Mojave and Sonoran Deserts of California, Nevada, Utah and portions of Arizona	USFS (T); FWS (T); NDOW (TR); NS-S (S2S3); NS (G3)	x		No; Found in the Mojave Desert, southern NV (WAP 2012)
Northern rubber boa (*Charina bottae)*	Rubber boa habitat includes woodlands, forest clearings, patchy chaparral, meadows, and grassy savannas, generally not far from water; also riparian zones in arid canyons and sagebrush in some areas (Nussbaum et al. 1983, Brown et al. 1995, St. John 2002, Stebbins 2003). Generally this snake is found in or under rotting logs or stumps, under rocks or in	NS-S (S3S4), NS (G5)		x	Yes

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
	crevices, or under the bark of dead fallen trees (WAP 2012)				
pygmy short-horned lizard (*Phrynosoma douglassii)*	Habitats of this lizard range from semiarid plains to high mountains; usually the species is in open, shrubby, or openly wooded areas with sparse vegetation at ground level	NS-S (SNR); NS (G5)	x		No; Occurs in extreme northwestern portion of the state WAP 2012)
Western red-tailed skink *(Plestiodon (Eumeces) gilberti rubricaudatus)*	Found in a variety of habitats, this lizard is most common in early successional stages or open areas of late successional stages. Heavy brush and densely forested areas are generally avoided	NS-S (S2S3); NS (G5T4Q)	x		No; Restricted to Southern NV (WAP 2012)
Insects					
aegialian scarab beetle (*Aegialia knighti)*	Known only from low, red sand hills and sand blow-outs in an area of ca. 12 km sq that extends South of Mormon Mesa ridge and North and East of the Meadow Valley Wash - Weiser Wash - Muddy River drainage system from the Longandale - Overton exchange on Interstate 90 southward ca. six km to Longandale, Nevada. Site is comprised by typical Mojave Desert vegetation characterized by creosote bush, Mojave yucca, white bur sage, brittlebush, *Opuntia* cactus, and *Atriplex sp* .	NS-S (S1); NS (G1?)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Big Smoky wood nymph (*Cercyonis oetus alkalorum)*	Grassy, alkaline flats; known only from the Big Smoky Valley between the Toiyabe and Toquima ranges in central Nevada	NS-S (S1); NS (G5T1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019); Known only from central Nevada
Crescent Dunes aegialian scarab *(Aegialia crescent)*	Crescent Dunes complex in Nye County, near Tonopah NV	NS-S (S1); NS (G1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Crescent Dunes aphodius scarab (*Aphodius sp. 2)*	Crescent Dunes complex in Nye County, near Tonopah NV	NS-S (S1?); NS (G1?Q)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Crescent Dunes serican scarab *(Serica ammomenisco)*	Crescent Dunes complex in Nye County, near Tonopah NV	NS-S (S1); NS (G1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Great Basin small blue (*Philotiella speciosa septentrionalis)*	Distribution unknown but type locality is from Fort Churchill Road in Lyon County. Trend unknown considered critically imperiled in Nevada	NS-S (S1); NS (G3G4T1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019); Known from a single locality in Lyon County
Mattoni's blue (*Euphilotes pallescens mattonii*)	Found primarily in the upper and lower Sonaran Zones, praires, and sand dunes; found in pinyon-juniper wodlands and rolling prairie grasslands; host plant for the larvae is the buckwheat (Eriogonum microthecum nutt. Var. laxiflorum).	NS-S (S1); NS (G3G4T1)		x	Yes
Mojave gypsum bee (*Andrena balsamorhizae)*	School Springs all within 1.2 miles of each other	NS-S (S2); NS (G2)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Mojave poppy bee (*Perdita meconis)*	Restricted to habitat of its associated plant species - large- flowered plants of the poppy family *Arctomecon* and *Argemone*	NS-S (S2); NS (G2)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Monarch butterfly (*Danaus plexippus plexippus)*	Widespread and scattered; requires milkweed (*Asclepiaecae*) or dogbane (*Apocynaceae*) as host plants for larvae; migratory in southern part of state	FWS (PETITIONED 2014); NS-S (SNR); NS (G4T3)	x	x	Yes
Nevada viceroy *(Limenitis archippus lahontani)*	Apparently restricted to Nevada (see Austin in Emmel, 1998). Known from along the Humboldt River and lower tributaries with additional colonies near Fallon and Fernely (WAP 2012)	NS-S (S1S2); NS (G5T1T2)		x	Yes
Pahranagat naucorid bug (*Pelocoris shoshone Shoshone)*	White River and Amargosa River systems; quiet waters under overhanging turf banks	NS-S (S1); NS (G1G3T1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Railroad Valley skipper (*Hesperia uncas fulvapalla)*	From alkali meadows on the floor of Railroad Valley in Nye County	NS-S (S1); NS (G5T1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019); Known only from Nye County
White Mountains skipper (*Hesperia miriamae longaevicola)*	Above tree line (over 10,500 ft) on highest peaks of White Mountains in western NV	NS-S (S1); NS (G2G3T1T2)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019); known only above treeline in the White Mountains
White River Valley skipper (*Hesperia uncas grandiose)*	Alkaline meadows and saltgrass flats in early summer in the White River Valley. Austin and Leary (2008) also documented the subspecies using its apparent hostplant, Juncus mexicanus (Mexican rush), in Big Smoky Valley in Nye County	NS-S (S1); NS (G5T1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019); Known only from Nye County
White River wood nymph	Occurs in bottomland habitats along the White River near	NS-S (S2); NS (G5T2)	x		No; Endemic to area outside of Project Area (BLM 2017 and

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
(*Cercyonis pegala pluvialis)*	the White Pine and Nye county line and in the Steptoe Valley southeast of Ely				BLM 2019); known only near White Pine / Nye County line
Mollusks					
California floater (*Anodonta californiensis)*	Shallow areas of clean, clear lakes, ponds and large rivers. They prefer lower elevations and a soft, silty substrate in which to burrow	NS-S (S1); NS (G3Q)	x		Yes
carinate Duckwater pyrg *(Pyrgulopsis carinata)*	Nye Co	NS-S (S1); NS (G1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Cortez hills pebblesnail (*Pyrgulopsis bryantwalkeri)*	Endemic to a single state or province (NatureServe 2021)	NS-S (S1); NS (G1)		x	No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Duckwater pyrg (*Pygulopsis aloba)*	Two unmaned springs northwest and southeast of Duckwater	NS-S (S1); NS (G1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Duckwater Warm Springs pyrg (*Pyrgulopsis villacampae)*	Big Warm Springs complex in Nye Co NV	NS-S (S1); NS (G1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Goshute mountain snail (*Oreohelix loisae)*	Restricted to limestone features; mining in areas	NS-S (S2); NS (G1G3)		x	No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Humboldt pyrg (*Pyrgulopsis humboldtensis)*	Restricted to the Lahontan Basin	NS-S (S1); NS (G1)		x	No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
large-gland Carico pyrg (*Pyrgulopsis basiglans)*	Insufficient surveys to delineate habitat requirements	NS-S (S1); NS (G1)	x		Yes
Median-gland Nevada pyrg (*Pyrgulopsis pisteri)*	Located at Marsh Spring, North Scruggs Springs, and below	NS-S (S1); NS (G1)		x	No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)

Species Name	Habitat	Designation and Ranking of Others	Battle Mountain District	Elko District	Potential to Occur in Project Area [1]
Oasis Valley pyrg (*Pyrgulopsis micrococcus)*	Springs in the Oasis Valley	NS-S (S1); NS (GNR)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
ovate Cain Spring pyrg (*Pyrgulopsis pictilis)*	Spring pools within the Reese River valley	NS-S (S1); NS (G1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Sada's pyrg (*Pyrgulopsis sadai)*	Only in two locations in Elko north of Carlin	NS-S (S1S2); NS (G1G2)		x	Yes
southern duckwater pyrg (*Pyrgulopsis anatine)*	Ocurs at a single spirng southeast of Old Collins Spirng	NS-S (S1); NS (G1)	x		No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Vinyards pyrg (*Pyrgulopsis vinyardi)*	Restricted to the Lahontan Basin	NS-S (S1); NS (G1)		x	No; Endemic to area outside of Project Area (BLM 2017 and BLM 2019)
Western pearlshell	This species prefers cold clean creeks and rivers that support salmonid populations. It can inhabit headwater streams less than a few feet wide, but is more common in larger rivers.Gravel, and cobble are preferred substrates (NatureServe 2021)	NS-S (S1); NS (G5)		x	Yes
Western ridged mussel (*Gonidea angulate)*	Found in abundance in Humboldt River Basin.	NS-S (S1); NS (G3)	x	x	Yes

[1] Yes/Maybe indicates potential suitable habitat within the Project Area based on habitat characteristics listed in the table. No includes specific information on why the species is not present within the Project Area.

Source: Audubon 2021, BLM 2017; BLM 2019; NatureServe 2021; WAP 2012

Table D.1-3: Comprehensive List of Species Observed During Field Surveys

Species	Survey Area		
	Goldstrike	Carlin	Crescent Valley
American bullfrog (*Lithobates catesbeianus)*		X	
Belted kingfisher *(Megaceryle alcyon)*		X	X
Big brown bat *(Eptesicus fuscus)*			X
Black throated sparrow (*Amphispiza bilineata)*	X	X	X
Brazilian free-tailed bat (*T. brasiliensis)*		X	X
Brewers blackbird *(Euphagus cyanocephalus)*		X	X
Brewers sparrow *(Spizella breweri)*	X	X	X
Burrowing owl *(Athene cunicularia)*	X	X	X
California myotis *(Myotis californicus)*			X
Canyon bat *(Parastrellus hesperus)*	X	X	X
Chipping Sparrow *(Spizella passerina)*	X		X
Cliff swallow *(Petrochelidon pyrrhonota)*		X	
Common nighthawk *(Chordeiles minor)*		X	
Common raven *(Corvus corax)*	X	X	X
Ferruginous hawk *(Buteo regalis)*	X		
Fringed myotis *(Myotis thysanodes)*	X		
Goldfinch *(Spinus tristis)*		X	
Greater sage-grouse *(Centrocerus urophasianus)*		X	X
Green-tailed towhee *(Pipilo chlorurus)*		X	
Grey flycatcher *(Empidonax wrightii)*	X		
Hoary bat *(Lasiurus cinereus)*	X	X	X
Horned lark *(Eremophila alpestris)*	X	X	X
Lark sparrow *(Chondestes grammacus)*	X		X
Little brown bat *(Myotis lucifugus)*	X	X	X
Loggerhead shrike *(Lanius ludovicianus)*	X	X	X
Long-billed curlew *(Numenius americanus)*	X		X
Long-eared myotis *(Myotis evotis)*	X	X	X
Long-legged myotis *(Myotis volans)*			X
Mourning dove *(Zenaida macroura)*	X		
Nevada viceroy butterfly *(Limenitis archippus)*		X	
Northern mockingbird *(Mimus polyglottos)*		X	X
Pallid bat *(Antrozous pallidus)*			X
Prairie falcon *(Falco mexicanus)*	X	X	
Red-tailed hawk *(Buteo jamaicensis)*	X	X	
Red-winged blackbird *(Agelaius phoeniceus)*		X	X
Sagebrush sparrow *(Artemisiospiza nevadensis)*	X	X	X

Species	Survey Area		
	Goldstrike	Carlin	Crescent Valley
Say's phoebe *(Sayornis saya)*			X
Savannah sparrow *(Passerculus sandwichensis)*			X
Silver-haired bat *(Lasionycteris noctivagans)*	X	X	X
Song sparrow *(Melospiza melodia)*	X		X
Swainson's hawk *(Buteo swainsoni)*	X		
Townsend's big-eared bat *(Corynorhinus townsendii)*			X
Turkey vulture *(Cathartes aura)*	X		
Western kingbird *(Tyrannus verticalis)*		X	
Western meadowlark *(Sturnella neglecta)*	X	X	X
Western red bat *(Lasirurs blossevillii)*			X
Western small-footed myotis *(Myotis ciliolabrum)*	X	X	X
White-crowned sparrow *(Zonotrichia leucophrys)*		X	
Woodhouse's toad *(Anaxyrus woodhousii)*		X	
Yellow headed blackbird *(Xanthocephalus xanthocephalus)*	X		
Yuma myotis *(Myotis yumanensis)*		X	X

D.2. MIGRATORY BIRD SPECIES

D.2.1. Tables

Table D.2-1 lists the total counts of migratory and other bird species observed during surveys as recorded on the Great Basin Bird Observation datasheets. Survey sites and Southwest Regional GAP (SWReGAP) land cover types are shown on Figure D.2-1.

Table D.2-1: Migratory Bird Species in Survey Sites and Southwest Regional GAP Land Cover Type

Survey Site	Southwest Regional GAP Land Cover Type	Species	Count of Species
Goldstrike Project Area Migratory Bird Survey Sites			
MBS-GS-001	Inter-Mountain Basins Greasewood Flat	Horned Lark	2
MBS-GS-002	Inter-Mountain Basins Big Sagebrush Shrubland	Common Raven	1
		Western Meadowlark	1
MBS-GS-003	Inter-Mountain Basins Big Sagebrush Shrubland	American Goldfinch	1
		Black-throated Sparrow	3
		Lark Sparrow	1
		Loggerhead Shrike	1
		Sagebrush Sparrow	1
		Western Meadowlark	4
		Yellow-headed Blackbird	1
MBS-GS-004	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	2
		Brewers Sparrow	1
		Common Raven	1
		Horned Lark	1
		Lark Sparrow	1
		Western Meadowlark	4
MBS-GS-005	Inter-Mountain Basins Semi-Desert Grassland	Common Raven	1
		Western Meadowlark	2
MBS-GS-006	Invasive Perennial Grassland	Chukar Partridge	1
		Common Raven	2
		Loggerhead Shrike	1
		Western Meadowlark	5
MBS-GS-007	Great Basin Xeric Mixed Sagebrush Shrubland	Chukar Partridge	1
		Common Raven	1
		Western Meadowlark	5
MBS-GS-008	Invasive Annual Grassland	Horned Lark	3
		Western Meadowlark	2

Survey Site	Southwest Regional GAP Land Cover Type	Species	Count of Species
MBS-GS-009	Inter-Mountain Basins Big Sagebrush Steppe	Common Raven	3
		Horned Lark	4
		Prairie Falcon	1
		Swainsons Hawk	1
		Turkey Vulture	2
MBS-GS-010	Invasive Annual and Biennial Forbland	Common Raven	1
MBS-GS-011	Invasive Annual and Biennial Forbland	Black-throated Sparrow	1
		Common Raven	5
MBS-GS-013	Agriculture	Common Raven	2
MBS-GS-014	Invasive Annual and Biennial Forbland	Chipping Sparrow	1
		Common Raven	2
		Horned Lark	1
		Lark Sparrow	1
		Long-billed Curlew	1
		Red-tailed Hawk	1
		Western Meadowlark	2
MBS-GS-015	Inter-Mountain Basins Mixed Salt Desert Scrub	Black-throated Sparrow	1
		Common Raven	1
		Horned Lark	2
		Mourning Dove	1
		Western Meadowlark	2
MBS-GS-016	Invasive Annual and Biennial Forbland	Black-throated Sparrow	1
		Common Raven	2
		Horned Lark	1
		Long-billed Curlew	1
MBS-GS-018	Agriculture	Common Raven	2
		Horned Lark	1
		Long-billed Curlew	2
		Western Meadowlark	2
MBS-GS-019	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	1
		Common Raven	1
		Ferruginous Hawk	1
		Song Sparrow	1
		Western Meadowlark	5
MBS-GS-020	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	3
		Lark Sparrow	1
		Western Meadowlark	4
MBS-GS-021	Inter-Mountain Basins Big Sagebrush Shrubland	Long-billed Curlew	2

Survey Site	Southwest Regional GAP Land Cover Type	Species	Count of Species
		Western Meadowlark	2
MBS-GS-022	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	1
		Western Meadowlark	2
MBS-GS-023	Inter-Mountain Basins Big Sagebrush Shrubland	Common Raven	1
MBS-GS-024	Inter-Mountain Basins Big Sagebrush Shrubland		1
		Long-billed Curlew	1
MBS-GS-025	Inter-Mountain Basins Big Sagebrush Shrubland	Lark Sparrow	1
		Long-billed Curlew	1
		Sagebrush Sparrow	5
MBS-GS-026	Inter-Mountain Basins Greasewood Flat	Black-throated Sparrow	1
		Long-billed Curlew	1
		Mourning Dove	1
		Sagebrush Sparrow	1
		Western Meadowlark	2
Carlin Project Area Migratory Bird Survey Sites			
MBS-Carlin-002	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	Brewers Blackbird	1
		Cliff Swallow	3
		Red-winged Blackbird	2
MBS-Carlin-005	Inter-Mountain Basins Mixed Salt Desert Scrub	Brewers Blackbird	1
		Cliff Swallow	6
MBS-Carlin-001	Inter-Mountain Basins Cliff and Canyon	Belted Kingfisher	1
		Brewers Blackbird	1
		Mallard	1
		Red-winged Blackbird	4
		Western Meadowlark	1
MBS-Carlin-003	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	Common Raven	2
		Red-winged Blackbird	6
MBS-Carlin-004	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	1
		Brewers Sparrow	1
		Western Meadowlark	4
MBS-Carlin-006	Inter-Mountain Basins Big Sagebrush Shrubland	Common Raven	2
		Horned Lark	1
		Western Meadowlark	1
MBS-Carlin-007	Barren Lands, Non-specific	Cliff Swallow	1

Survey Site	Southwest Regional GAP Land Cover Type	Species	Count of Species
		Horned Lark	1
		Western Meadowlark	1
MBS-Carlin-008	Inter-Mountain Basins Greasewood Flat	Black-throated Sparrow	1
		Cliff Swallow	3
		Horned Lark	2
		Red-tailed Hawk	1
		Western Meadowlark	2
MBS-Carlin-009	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	2
		Green-tailed Towhee	1
		Horned Lark	1
		Sagebrush Sparrow	1
		Western Meadowlark	2
MBS-Carlin-010	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	2
		Common Nighthawk	1
		Sagebrush Sparrow	2
		Western Meadowlark	3
		White-crowned Sparrow	2
MBS-Carlin-011	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	1
		Loggerhead Shrike	1
		Northern Mockingbird	1
		Prairie Falcon	1
		Red-tailed Hawk	1
		Western Kingbird	1
		Western Meadowlark	1
Crescent Valley Project Areas Migratory Bird Survey Sites			
MBS-CV-001	Inter-Mountain Basins Big Sagebrush Shrubland	Common Raven	2
		Sagebrush Sparrow	1
MBS-CV-002	Inter-Mountain Basins Big Sagebrush Shrubland	Sagebrush Sparrow	1
		Western Meadowlark	2
MBS-CV-003	Inter-Mountain Basins Greasewood Flat	Black-throated Sparrow	2
		Burrowing Owl	1
		Common Raven	2
MBS-CV-004	Inter-Mountain Basins Big Sagebrush Shrubland	Black-throated Sparrow	1
		Common Raven	4
		Western Meadowlark	1
MBS-CV-005	Inter-Mountain Basins Mixed Salt Desert Scrub	Black-throated Sparrow	4

Survey Site	Southwest Regional GAP Land Cover Type	Species	Count of Species
		Common Raven	3
		Long-billed Curlew	1
		Western Meadowlark	2
MBS-CV-006	Inter-Mountain Basins Big Sagebrush Shrubland	Brewers Sparrow	1
		Sagebrush Sparrow	2
		Western Meadowlark	3
MBS-CV-007	Inter-Mountain Basins Greasewood Flat	Common Raven	1
		Gray Flycatcher	1
		Horned Lark	2
		Sagebrush Sparrow	1
		Western Meadowlark	1
MBS-CV-008	Inter-Mountain Basins Mixed Salt Desert Scrub	Chipping Sparrow	1
		Horned Lark	1
		Lark Sparrow	1
		Long-billed Curlew	1
		Sagebrush Sparrow	6
		Western Meadowlark	2
MBS-CV-009	Inter-Mountain Basins Mixed Salt Desert Scrub	Black-throated Sparrow	1
		Common Raven	1
		Horned Lark	2
		Western Meadowlark	1
MBS-CV-010	Inter-Mountain Basins Greasewood Flat	Brewers Blackbird	2
		Brewers Sparrow	1
		Common Raven	1
		Western Meadowlark	2
MBS-CV-011	Inter-Mountain Basins Greasewood Flat	Common Raven	1
		Lark Sparrow	2
		Loggerhead Shrike	1
		Sagebrush Sparrow	2
		Western Meadowlark	1
MBS-CV-012	Inter-Mountain Basins Greasewood Flat	Gray Flycatcher	1
		Horned Lark	2
		Savannah Sparrow	1
		Says Phoebe	1
		Song Sparrow	1
MBS-CV-013	Inter-Mountain Basins Playa	Black-throated Sparrow	1
		Horned Lark	2
		Lark Sparrow	1
MBS-CV-015	Invasive Annual Grassland	Black-throated Sparrow	1
		Western Meadowlark	3

Survey Site	Southwest Regional GAP Land Cover Type	Species	Count of Species
MBS-CV-016	Invasive Annual and Biennial Forbland	Horned Lark	5
		Western Meadowlark	1
MBS-CV-017	Invasive Annual Grassland	Horned Lark	1
		Long-billed Curlew	1
		Sagebrush Sparrow	1
		Western Meadowlark	2
MBS-CV-018	Inter-Mountain Basins Big Sagebrush Shrubland	Common Raven	1
		Common Starling	1
		Horned Lark	1
		Western Meadowlark	3
MBS-CV-019	Inter-Mountain Basins Greasewood Flat	Belted Kingfisher	2
		Common Starling	6
		Horned Lark	1
		House Sparrow	2
		Northern Mockingbird	1
		Red-winged Blackbird	2
		Western Meadowlark	6

D.2.2. Figures

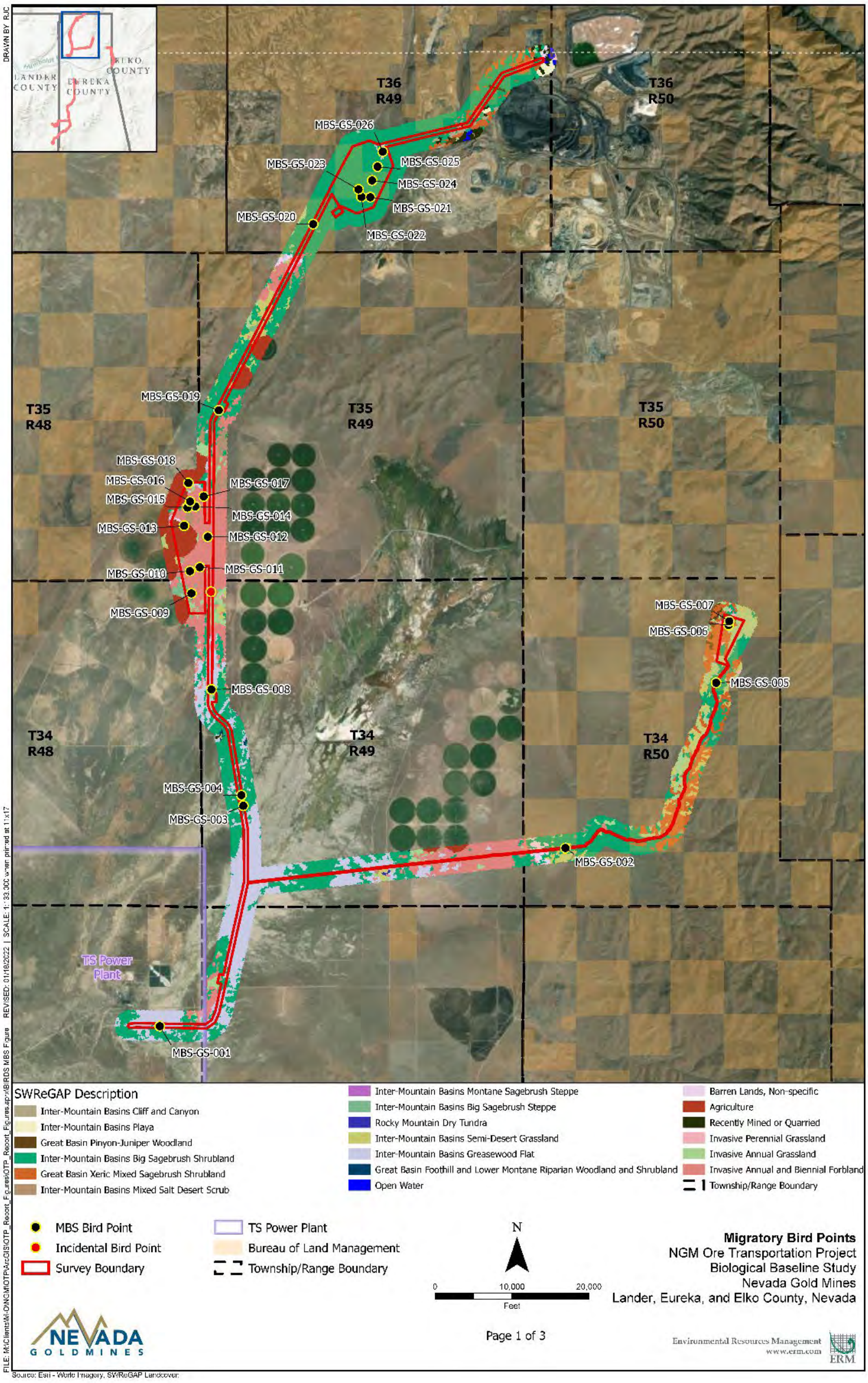


Figure D.2-1: Migratory Bird Survey Points Goldstrike Survey Area

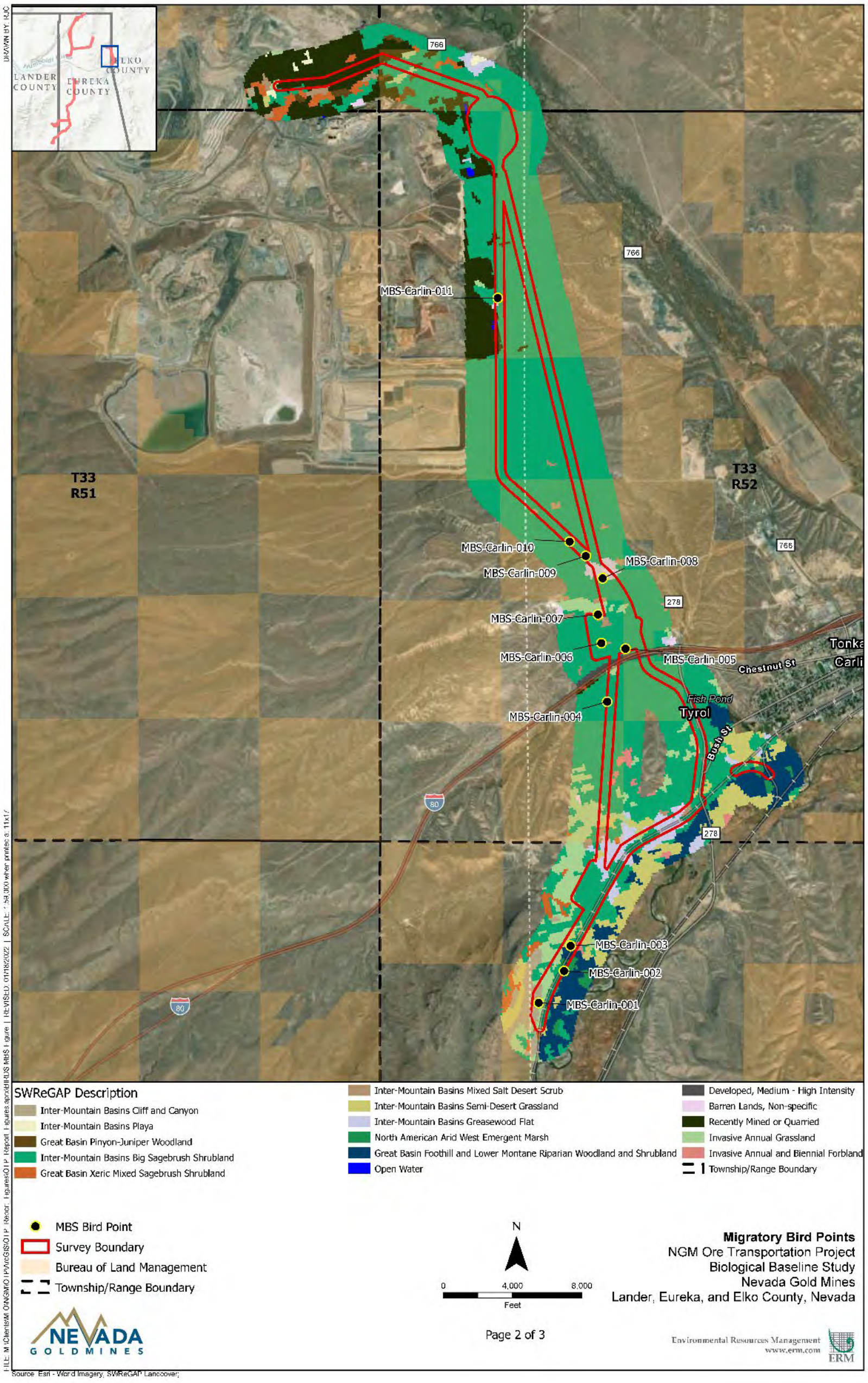


Figure D.2-2: Migratory Bird Survey Points Carlin Survey Area

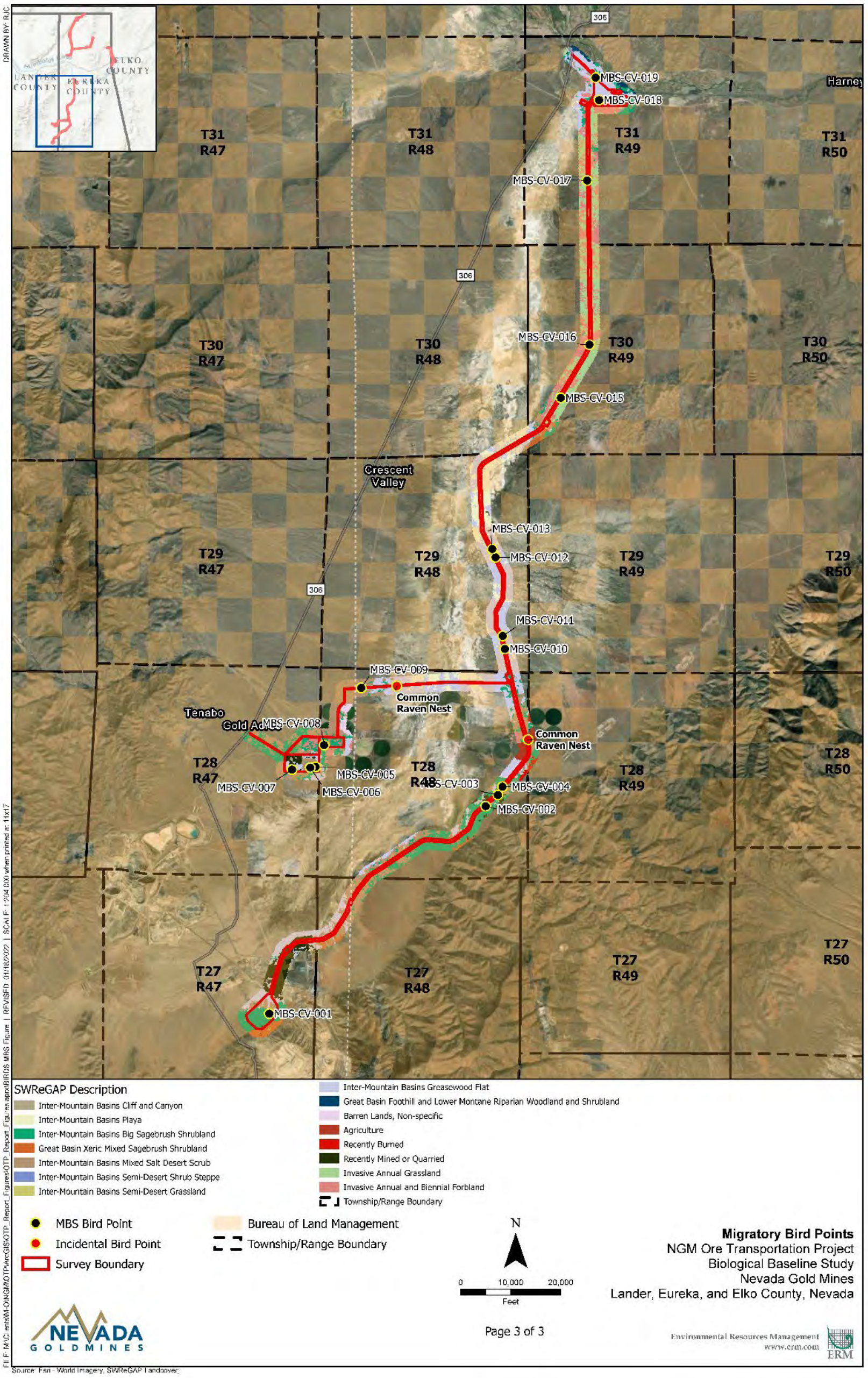


Figure D.2-3: Migratory Bird Survey Points Crescent Valley Survey Area

D.2.3. Forms

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-001	Surveyor:	Luke Barrett	Date:	07/02/2021
UTMx:	571349	UTMy:	4503182.9	Start Time:	07:31
Sky Code:	0	Wind Code:	1	Temp(°F):	64

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	RWBL	Red-winged Blackbird			1		No
0-3	MALL	Mallard				1	No
0-3	WEME	Western Meadowlark			1		No
3-5	RWBL	Red-winged Blackbird			1		No
5-10	BRBL	Brewer's Blackbird				1	No
5-10	RWBL	Red-winged Blackbird			1		No
5-10	BEKI	Belted Kingfisher			1		No
5-10	RWBL	Red-winged Blackbird			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 8

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-002	Surveyor:	Luke Barrett	Date:	07/02/2021
UTMx:	571683.8	UTMy:	4503609.7	Start Time:	08:02
Sky Code:	0	Wind Code:	1	Temp(°F):	68

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	RWBL	Red-winged Blackbird	1				No
0-3	CLSW	Cliff Swallow				1	No
0-3	CLSW	Cliff Swallow				1	No
3-5	RWBL	Red-winged Blackbird	1				No
3-5	BRBL	Brewer's Blackbird				1	No
3-5	CLSW	Cliff Swallow				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-003	Surveyor:	Luke Barrett	Date:	07/02/2021
UTMx:	571768.1	UTMy:	4503944.1	Start Time:	08:38
Sky Code:	0	Wind Code:	2	Temp(°F):	72

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	RWBL	Red-winged Blackbird	1				No
0-3	RWBL	Red-winged Blackbird		1			No
0-3	RWBL	Red-winged Blackbird		1			No
0-3	CORA	Common Raven				1	No
3-5	RWBL	Red-winged Blackbird		1			No
3-5	RWBL	Red-winged Blackbird		1			No
3-5	CORA	Common Raven				1	No
3-5	RWBL	Red-winged Blackbird			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 8

Incidental Sightings

(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-004	Surveyor:	Luke Barrett	Date:	07/02/2021
UTMx:	572224.3	UTMy:	4507190.3	Start Time:	05:58
Sky Code:	1	Wind Code:	0	Temp(°F):	61

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark		1			No
0-3	WEME	Western Meadowlark		1			No
0-3	BTSP	Black-throated Sparrow	1				No
3-5	BRBL	Brewer's Sparrow		1			Yes
5-10	WEME	Western Meadowlark		1			No
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-005	Surveyor:	Luke Barrett	Date:	07/01/2021
UTMx:	572462.1	UTMy:	4507894.4	Start Time:	09:37
Sky Code:	2	Wind Code:	1	Temp(°F):	77

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CLSW	Cliff Swallow				1	No
0-3	CLSW	Cliff Swallow				1	No
3-5	CLSW	Cliff Swallow				1	No
3-5	CLSW	Cliff Swallow				1	No
3-5	CLSW	Cliff Swallow				1	No
3-5	CLSW	Cliff Swallow				1	No
5-10	BRBL	Brewer's Blackbird				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 7

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-006	Surveyor:	Luke Barrett	Date:	07/01/2021
UTMx:	572140	UTMy:	4507965.8	Start Time:	09:20
Sky Code:	2	Wind Code:	1	Temp(°F):	77

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	HOLA	Horned Lark		1			No
0-3	CORA	Common Raven				1	No
5-10	CORA	Common Raven				1	No
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 4

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-007	Surveyor:	Luke Barrett	Date:	07/01/2021
UTMx:	572090.2	UTMy:	4508344.4	Start Time:	09:01
Sky Code:	2	Wind Code:	1	Temp(°F):	74

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CLSW	Cliff Swallow				1	No
3-5	HOLA	Horned Lark				1	No
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	Breeding Confirmed (Y/N)*

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-008	Surveyor:	Luke Barrett	Date:	07/01/2021
UTMx:	572149.3	UTMy:	4508826.1	Start Time:	08:42
Sky Code:	2	Wind Code:	1	Temp(°F):	72

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark		1			No
0-3	BTSP	Black-throated Sparrow	1				No
0-3	WEME	Western Meadowlark			1		No
3-5	HOLA	Horned Lark				1	No
5-10	RTHA	Red-tailed Hawk				1	No
5-10	CLSW	Cliff Swallow				1	No
5-10	HOLA	Horned Lark				1	No
5-10	CLSW	Cliff Swallow				1	No
5-10	CLSW	Cliff Swallow				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 9

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-009	Surveyor:	Luke Barrett	Date:	07/01/2021
UTMx:	571920.6	UTMy:	4509120.7	Start Time:	08:24
Sky Code:	2	Wind Code:	1	Temp(°F):	70

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	HOLA	Horned Lark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	BTSP	Black-throated Sparrow		1			No
3-5	BTSP	Black-throated Sparrow		1			No
5-10	WEME	Western Meadowlark		1			No
3-5	GTTO	Green-tailed Towhee		1			No
5-10	SABS	Sagebrush Sparrow		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 7

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-010	Surveyor:	Luke Barrett	Date:	07/01/2021
UTMx:	571703.3	UTMy:	4509309.5	Start Time:	08:08
Sky Code:	3	Wind Code:	1	Temp(°F):	68

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	SABS	Sagebrush Sparrow		1			No
0-3	BTSP	Black-throated Sparrow		1			No
0-3	CONI	Common Nighthawk				1	No
3-5	BTSP	Black-throated Sparrow				1	No
3-5	WEME	Western Meadowlark				1	No
3-5	WCSP	White-crowned Sparrow		1			No
5-10	SABS	Sagebrush Sparrow		1			No
5-10	WCSP	White-crowned Sparrow		1			No
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 10

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-Carlin-011	Surveyor:	Luke Barrett	Date:	07/01/2021
UTMx:	570713.6	UTMy:	4512532.3	Start Time:	06:32
Sky Code:	2	Wind Code:	1	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
3-5	WEME	Western Meadowlark		1			No
0-3	RTHA	Red-tailed Hawk	1				No
0-3	LOSH	Loggerhead Shrike		1			No
0-3	PRFA	Prairie Falcon				1	No
3-5	NOMO	Northern Mockingbird		1			No
5-10	WEKI	Western Kingbird		1			No
5-10	BTSP	Black-throated Sparrow		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 7

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-001	Surveyor:	Mike Meany	Date:	07/05/2021
UTMx:	530539.6	UTMy:	4448820.3	Start Time:	06:58
Sky Code:	0	Wind Code:	0	Temp(°F):	62

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven			1		No
3-5	SABS	Sagebrush Sparrow	1				No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-002	Surveyor:	Luke Barrett	Date:	06/29/2021
UTMx:	540568.3	UTMy:	4458483.3	Start Time:	08:44
Sky Code:	0	Wind Code:	1	Temp(°F):	79

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark		1			No
0-3	WEME	Western Meadowlark			1		No
5-10	SABS	Sagebrush Sparrow		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-003	Surveyor:	Luke Barrett	Date:	06/29/2021
UTMx:	541129.3	UTMy:	4459004.8	Start Time:	09:22
Sky Code:	0	Wind Code:	1	Temp(°F):	87

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	BUOW	Burrowing Owl	1				Yes
0-3	BTSP	Black-throated Sparrow		1			No
0-3	CORA	Common Raven				1	No
3-5	BTSP	Black-throated Sparrow		1			No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 5

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-004	Surveyor:	Luke Barrett	Date:	06/29/2021
UTMx:	541343.9	UTMy:	4459390.8	Start Time:	09:41
Sky Code:	0	Wind Code:	1	Temp(°F):	88

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	BTSP	Black-throated Sparrow	1				No
0-3	CORA	Common Raven				1	No
0-3	CORA	Common Raven				1	No
0-3	WEME	Western Meadowlark			1		No
5-10	CORA	Common Raven				1	No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-005	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	532651.4	UTMy:	4460267.5	Start Time:	05:46
Sky Code:	2	Wind Code:	0	Temp(°F):	56

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark		1			No
0-3	LBCU	Long-billed Curlew		1			No
0-3	CORA	Common Raven				1	No
0-3	CORA	Common Raven				1	No
0-3	CORA	Common Raven				1	No
0-3	BTSP	Black-throated Sparrow		1			Yes
3-5	WEME	Western Meadowlark		1			No
5-10	BTSP	Black-throated Sparrow				1	No
5-10	BTSP	Black-throated Sparrow				1	No
5-10	BTSP	Black-throated Sparrow				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 10

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-006	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	532398.6	UTMy:	4460233	Start Time:	06:01
Sky Code:	2	Wind Code:	1	Temp(°F):	57

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	SABS	Sagebrush Sparrow	1				No
0-3	BRBL	Brewer's Sparrow	1				No
0-3	SABS	Sagebrush Sparrow		1			No
0-3	WEME	Western Meadowlark		1			No
0-3	WEME	Western Meadowlark		1			No
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-007	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	531553.6	UTMy:	4460134.5	Start Time:	07:15
Sky Code:	2	Wind Code:	1	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark		1			No
0-3	SABS	Sagebrush Sparrow		1			No
0-3	HOLA	Horned Lark	1				No
0-3	HOLA	Horned Lark	1				No
3-5	GRFL	Gray Flycatcher		1			No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-008	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	533039.6	UTMy:	4461278	Start Time:	06:30
Sky Code:	2	Wind Code:	1	Temp(°F):	60

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark			1		No
0-3	CHSP	Chipping Sparrow		1			No
0-3	LBCU	Long-billed Curlew			1		No
3-5	SABS	Sagebrush Sparrow				1	No
3-5	SABS	Sagebrush Sparrow				1	No
3-5	SABS	Sagebrush Sparrow				1	No
5-10	WEME	Western Meadowlark			1		No
5-10	LASP	Lark Sparrow			1		No
5-10	HOLA	Horned Lark		1			No
5-10	SABS	Sagebrush Sparrow				1	No
5-10	SABS	Sagebrush Sparrow				1	No
5-10	SABS	Sagebrush Sparrow				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 12

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-009	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	534752.1	UTMy:	4463936.7	Start Time:	07:50
Sky Code:	2	Wind Code:	2	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	BTSP	Black-throated Sparrow		1			No
0-3	HOLA	Horned Lark				1	No
0-3	CORA	Common Raven				1	No
3-5	WEME	Western Meadowlark			1		No
3-5	HOLA	Horned Lark	1				No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 5

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-010	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	541423.9	UTMy:	4465766.5	Start Time:	08:14
Sky Code:	2	Wind Code:	1	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	BRBL	Brewer's Sparrow					No
3-5	CORA	Common Raven				1	No
5-10	BRBL	Brewer's Blackbird				1	No
5-10	BRBL	Brewer's Blackbird				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-011	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	541316.5	UTMy:	4466367.2	Start Time:	08:29
Sky Code:	2	Wind Code:	0	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark			1		No
0-3	LASP	Lark Sparrow		1			No
0-3	LOSH	Loggerhead Shrike	1				No
0-3	SABS	Sagebrush Sparrow		1			No
3-5	LASP	Lark Sparrow		1			No
5-10	SABS	Sagebrush Sparrow		1			No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 7

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-012	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	540967.2	UTMy:	4470008.2	Start Time:	09:00
Sky Code:	2	Wind Code:	1	Temp(°F):	67

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	SOSP	Song Sparrow		1			No
0-3	HOLA	Horned Lark		1			No
3-5	SAVS	Savannah Sparrow		1			No
3-5	GRFL	Gray Flycatcher		1			No
5-10	HOLA	Horned Lark			1		No
5-10	SAPH	Say's Phoebe		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-013	Surveyor:	Luke Barrett	Date:	06/24/2021
UTMx:	540808.7	UTMy:	4470390.5	Start Time:	09:37
Sky Code:	2	Wind Code:	1	Temp(°F):	67

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	HOLA	Horned Lark				1	No
3-5	BTSP	Black-throated Sparrow		1			No
5-10	LASP	Lark Sparrow		1			No
5-10	HOLA	Horned Lark		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 4

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-015	Surveyor:	Luke Barrett	Date:	06/25/2021
UTMx:	543951.3	UTMy:	4477398.6	Start Time:	08:53
Sky Code:	0	Wind Code:	1	Temp(°F):	68

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark			1		No
3-5	BTSP	Black-throated Sparrow		1			No
3-5	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 4

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-016	Surveyor:	Luke Barrett	Date:	06/25/2021
UTMx:	545263.2	UTMy:	4479863.7	Start Time:	08:25
Sky Code:	0	Wind Code:	2	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	HOLA	Horned Lark	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	WEME	Western Meadowlark			1		No
3-5	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 5

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-017	Surveyor:	Luke Barrett	Date:	06/25/2021
UTMx:	545113.4	UTMy:	4487442.2	Start Time:	07:15
Sky Code:	0	Wind Code:	0	Temp(°F):	64

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	LBCU	Long-billed Curlew			1		Yes
0-3	WEME	Western Meadowlark		1			No
0-3	SABS	Sagebrush Sparrow		1			No
3-5	WEME	Western Meadowlark			1		No
5-10	HOLA	Horned Lark		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 5

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-018	Surveyor:	Luke Barrett	Date:	06/25/2021
UTMx:	545645.2	UTMy:	4491150	Start Time:	05:44
Sky Code:	1	Wind Code:	0	Temp(°F):	56

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	EUST	Common Starling	1				No
5-10	HOLA	Horned Lark	1				No
3-5	CORA	Common Raven			1		Yes

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-CV-019	Surveyor:	Luke Barrett	Date:	06/25/2021
UTMx:	545479.6	UTMy:	4492184.5	Start Time:	05:18
Sky Code:	0	Wind Code:	0	Temp(°F):	55

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	NOMO	Northern Mockingbird	1				No
0-3	HOSP	House Sparrow	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	RWBL	Red-winged Blackbird		1			No
0-3	EUST	Common Starling	1				No
0-3	EUST	Common Starling	1				No
0-3	EUST	Common Starling	1				No
0-3	EUST	Common Starling	1				No
0-3	EUST	Common Starling					No
0-3	EUST	Common Starling	1				No
3-5	WEME	Western Meadowlark		1			No
3-5	RWBL	Red-winged Blackbird	1				No
3-5	BEKI	Belted Kingfisher			1		No
5-10	BEKI	Belted Kingfisher			1		No
5-10	HOSP	House Sparrow			1		No
5-10	HOLA	Horned Lark	1				No
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 20

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-001	Surveyor:	Luke Barrett	Date:	06/28/2021
UTMx:	540896.2	UTMy:	4509852.5	Start Time:	09:15
Sky Code:	0	Wind Code:	1	Temp(°F):	85

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	HOLA	Horned Lark			1		No
5-10	HOLA	Horned Lark		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 2

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-002	Surveyor:	Luke Barrett	Date:	06/28/2021
UTMx:	553042.8	UTMy:	4515254.3	Start Time:	08:24
Sky Code:	0	Wind Code:	3	Temp(°F):	72

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark		1			No
0-3	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 2

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-003	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	543368.2	UTMy:	4516453.1	Start Time:	06:23
Sky Code:	0	Wind Code:	0	Temp(°F):	63

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	BTSP	Black-throated Sparrow		1			No
0-3	WEME	Western Meadowlark			1		No
0-3	WEME	Western Meadowlark			1		No
0-3	LASP	Lark Sparrow		1			No
3-5	BTSP	Black-throated Sparrow		1			No
3-5	SABS	Sagebrush Sparrow		1			No
5-10	LOSH	Loggerhead Shrike		1			No
5-10	BTSP	Black-throated Sparrow			1		No
5-10	AMGO	American Goldfinch		1			No
5-10	YHBL	Yellow-headed Blackbird				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 12

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-004	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	543307.6	UTMy:	4516769	Start Time:	06:01
Sky Code:	0	Wind Code:	0	Temp(°F):	57

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	BTSP	Black-throated Sparrow	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	CORA	Common Raven			1		No
0-3	BRBL	Brewer's Sparrow		1			No
0-3	LASP	Lark Sparrow	1				No
3-5	HOLA	Horned Lark		1			No
3-5	WEME	Western Meadowlark				1	No
5-10	BTSP	Black-throated Sparrow		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 10

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-005	Surveyor:	Luke Barrett	Date:	06/28/2021
UTMx:	557528.8	UTMy:	4520223.6	Start Time:	07:49
Sky Code:	0	Wind Code:	2	Temp(°F):	68

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark			1		No
3-5	WEME	Western Meadowlark			1		No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings

(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	Breeding Confirmed (Y/N)*

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-006	Surveyor:	Luke Barrett	Date:	06/28/2021
UTMx:	557887.1	UTMy:	4521948.9	Start Time:	07:06
Sky Code:	0	Wind Code:	2	Temp(°F):	68

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven				1	No
0-3	WEME	Western Meadowlark		1			No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
3-5	WEME	Western Meadowlark		1			No
3-5	CORA	Common Raven				1	No
3-5	LOSH	Loggerhead Shrike			1		No
5-10	CHUK	Chukar Partridge			1		No
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 9

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-007	Surveyor:	Luke Barrett	Date:	06/28/2021
UTMx:	557905.4	UTMy:	4522062.8	Start Time:	07:21
Sky Code:	0	Wind Code:	2	Temp(°F):	

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	CORA	Common Raven				1	No
3-5	CHUK	Chukar Partridge			1		Yes
5-10	WEME	Western Meadowlark			1		No
5-10	WEME	Western Meadowlark				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 7

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-008	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	542389.4	UTMy:	4519922.8	Start Time:	07:10
Sky Code:	0	Wind Code:	1	Temp(°F):	64

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark			1		No
0-3	WEME	Western Meadowlark			1		No
5-10	HOLA	Horned Lark		1			No
5-10	HOLA	Horned Lark				1	No
5-10	HOLA	Horned Lark				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 5

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	Breeding Confirmed (Y/N)*

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-009	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	541773.6	UTMy:	4522785.3	Start Time:	07:55
Sky Code:	0	Wind Code:	0	Temp(°F):	70

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven	1				Yes
0-3	CORA	Common Raven			1		Yes
0-3	CORA	Common Raven			1		Yes
0-3	PRFA	Prairie Falcon				1	No
0-3	SWHA	Swainson's Hawk				1	Yes
0-3	TUVU	Turkey Vulture			1		No
0-3	TUVU	Turkey Vulture				1	No
3-5	HOLA	Horned Lark		1			No
5-10	HOLA	Horned Lark		1			No
5-10	HOLA	Horned Lark		1			No
5-10	HOLA	Horned Lark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 11

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-010	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	541725.2	UTMy:	4523449.6	Start Time:	08:35
Sky Code:	0	Wind Code:	0	Temp(°F):	76

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 1

Incidental Sightings

(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	Breeding Confirmed (Y/N)*

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-011	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	542020.5	UTMy:	4523566.9	Start Time:	08:19
Sky Code:	0	Wind Code:	1	Temp(°F):	72

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven			1		No
0-3	CORA	Common Raven	1				No
3-5	CORA	Common Raven			1		No
5-10	BTSP	Black-throated Sparrow		1			No
5-10	CORA	Common Raven				1	No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-012	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	542255.2	UTMy:	4524476.6	Start Time:	08:57
Sky Code:	0	Wind Code:	0	Temp(°F):	77

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3		None					
3-5		None					
5-10		None					

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-013	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	541543	UTMy:	4524802.9	Start Time:	09:24
Sky Code:	0	Wind Code:	1	Temp(°F):	77

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven				1	No
3-5	CORA	Common Raven				1	No
5-10		None					

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-014	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	541873.5	UTMy:	4525383.7	Start Time:	05:43
Sky Code:	0	Wind Code:	1	Temp(°F):	57

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	LBCU	Long-billed Curlew			1		Yes
0-3	CORA	Common Raven				1	Yes
0-3	HOLA	Horned Lark		1			No
0-3	RTHA	Red-tailed Hawk			1		No
0-3	CORA	Common Raven				1	No
3-5	WEME	Western Meadowlark			1		No
3-5	CHSP	Chipping Sparrow		1			No
5-10	WEME	Western Meadowlark		1			No
5-10	LASP	Lark Sparrow		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 9

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-015	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	541639.5	UTMy:	4525346.4	Start Time:	05:56
Sky Code:	0	Wind Code:	1	Temp(°F):	58

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	BTSP	Black-throated Sparrow	1				No
0-3	HOLA	Horned Lark		1			No
0-3	WEME	Western Meadowlark		1			No
3-5	HOLA	Horned Lark		1			No
3-5	CORA	Common Raven				1	No
5-10	WEME	Western Meadowlark		1			No
5-10	MODO	Mourning Dove				1	No
				1			

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 8

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-016	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	541719.8	UTMy:	4525526.4	Start Time:	06:09
Sky Code:	0	Wind Code:	1	Temp(°F):	60

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	BTSP	Black-throated Sparrow	1				No
0-3	LBCU	Long-billed Curlew			1		No
0-3	CORA	Common Raven				1	Yes
5-10	HOLA	Horned Lark		1			No
5-10	CORA	Common Raven				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 5

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-017	Surveyor:	Luke Barrett	Date:	06/21/2021
UTMx:	542125.2	UTMy:	4525681.4	Start Time:	09:45
Sky Code:	0	Wind Code:	1	Temp(°F):	82

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3		None					
3-5		None					
5-10		None					

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-018	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	541662.7	UTMy:	4526079.8	Start Time:	06:29
Sky Code:	0	Wind Code:	0	Temp(°F):	62

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven			1		Yes
0-3	CORA	Common Raven	1				Yes
0-3	WEME	Western Meadowlark		1			No
0-3	HOLA	Horned Lark	1				No
0-3	WEME	Western Meadowlark		1			No
3-5	LBCU	Long-billed Curlew		1			Yes
5-10	LBCU	Long-billed Curlew			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 7

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-019	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	542562.4	UTMy:	4528254.9	Start Time:	07:01
Sky Code:	0	Wind Code:	0	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				Yes
0-3	BTSP	Black-throated Sparrow	1				No
0-3	WEME	Western Meadowlark			1		No
3-5	SOSP	Song Sparrow	1				No
3-5	CORA	Common Raven				1	No
3-5	WEME	Western Meadowlark			1		No
5-10	WEME	Western Meadowlark				1	No
5-10	FEHA	Ferruginous Hawk				1	No
5-10	WEME	Western Meadowlark				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 9

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-020	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	545355.7	UTMy:	4533820.4	Start Time:	07:27
Sky Code:	0	Wind Code:	1	Temp(°F):	65

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	WEME	Western Meadowlark		1			No
0-3	WEME	Western Meadowlark		1			No
0-3	BTSP	Black-throated Sparrow	1				No
0-3	LASP	Lark Sparrow		1			No
3-5	BTSP	Black-throated Sparrow	1				No
5-10	BTSP	Black-throated Sparrow		1			No
5-10	WEME	Western Meadowlark				1	No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 8

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-021	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	547062.1	UTMy:	4534633.6	Start Time:	08:12
Sky Code:	0	Wind Code:	0	Temp(°F):	72

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark			1		No
3-5	LBCU	Long-billed Curlew			1		No
3-5	WEME	Western Meadowlark				1	No
5-10	LBCU	Long-billed Curlew			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 4

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-022	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	546797.7	UTMy:	4534639.3	Start Time:	07:57
Sky Code:	0	Wind Code:	1	Temp(°F):	70

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark			1		No
0-3	BTSP	Black-throated Sparrow		1			No
3-5		None					
5-10	WEME	Western Meadowlark			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 4

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	Breeding Confirmed (Y/N)*

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-023	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	546709.2	UTMy:	4534862.5	Start Time:	09:46
Sky Code:	0	Wind Code:	1	Temp(°F):	87

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	CORA	Common Raven				1	Yes
3-5		None					
5-10		None					

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-024	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	547112.5	UTMy:	4535133	Start Time:	08:36
Sky Code:	0	Wind Code:	1	Temp(°F):	73

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	LBCU	Long-billed Curlew	1				Yes
3-5		None					
5-10		None					

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 3

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	Breeding Confirmed (Y/N)*

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-025	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	547273.9	UTMy:	4535545.1	Start Time:	08:57
Sky Code:	0	Wind Code:	1	Temp(°F):	76

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	SABS	Sagebrush Sparrow	1				No
0-3	SABS	Sagebrush Sparrow	1				No
0-3	SABS	Sagebrush Sparrow	1				No
0-3	SABS	Sagebrush Sparrow	1				No
0-3	SABS	Sagebrush Sparrow	1				No
0-3	LBCU	Long-billed Curlew			1		Yes
5-10	LASP	Lark Sparrow			1		No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 7

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

NEVADA BIRD COUNT 2005 – Point Count Form

Great Basin Bird Observatory, 1755 E. Plumb Ln., Ste. 256, Reno, NV 89502
Phone (775) 323-4226; Email ammon@gbbo.org

Site #:	MBS-GS-026	Surveyor:	Luke Barrett	Date:	06/23/2021
UTMx:	547424.8	UTMy:	4535995.7	Start Time:	09:16
Sky Code:	0	Wind Code:	1	Temp(°F):	77

Time (0-3,3-5,5-10)	Species Code	Species Full Name	Distance (enter # individuals)				Breeding Confirmed (Y/N)*
			0-50 m	50-100 m	> 100 m	Flyover	
0-3	WEME	Western Meadowlark	1				No
0-3	SABS	Sagebrush Sparrow	1				No
0-3	BTSP	Black-throated Sparrow	1				No
0-3	LBCU	Long-billed Curlew				1	No
3-5	MODO	Mourning Dove				1	No
5-10	WEME	Western Meadowlark		1			No

* Nest, nesting material, copulating, carrying food, fledgling

TOTAL number of birds observed: 6

Incidental Sightings
(Seen/heard on the way to the point, after pointcount time limit, etc.)

Species Full Name	**Breeding Confirmed (Y/N)***

ADDITIONAL COMMENTS

D.2.4. Photographs

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-Carlin-001	Project Area: Carlin Survey Area
Date: 07/02/2021	

Site ID: MBS-Carlin-002	Project Area: Carlin Survey Area
Date: 07/02/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-Carlin-003	Project Area: Carlin Survey Area
Date: 07/02/2021	

Site ID: MBS-Carlin-004	Project Area: Carlin Survey Area
Date: 07/02/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-Carlin-005	Project Area: Carlin Survey Area
Date: 07/01/2021	

Site ID: MBS-Carlin-006	Project Area: Carlin Survey Area
Date: 07/01/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-Carlin-007	Project Area: Carlin Survey Area
Date: 07/01/2021	

Site ID: MBS-Carlin-008	Project Area: Carlin Survey Area
Date: 07/01/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-Carlin-009	Project Area: Carlin Survey Area
Date: 07/01/2021	

Site ID: MBS-Carlin-010	Project Area: Carlin Survey Area
Date: 07/01/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-Carlin-011	Project Area: Carlin Survey Area
Date: 07/01/2021	

Site ID: MBS-CV-001	Project Area: Crescent Valley Survey Area
Date: 07/05/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-CV-002	Project Area: Crescent Valley Survey Area
Date: 06/29/2021	

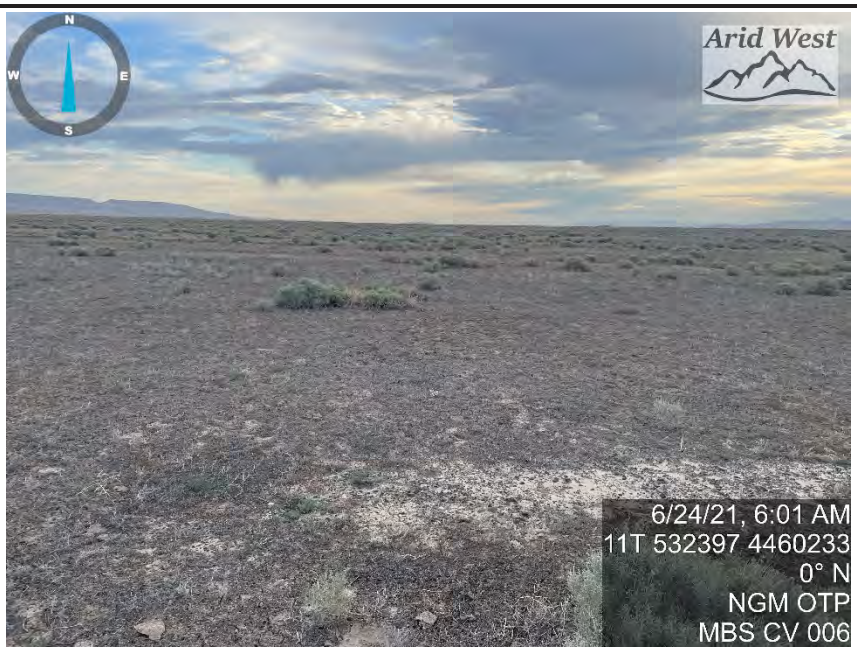
Site ID: MBS-CV-003	Project Area: Crescent Valley Survey Area
Date: 06/29/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-CV-004	Project Area: Crescent Valley Survey Area
Date: 06/29/2021	

Site ID: MBS-CV-005	Project Area: Crescent Valley Survey Area
Date: 06/24/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-CV-006	Project Area: Crescent Valley Survey Area
Date: 06/24/2021	

Site ID: MBS-CV-007	Project Area: Crescent Valley Survey Area
Date: 06/24/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-CV-010	Project Area: Crescent Valley Survey Area
Date: 06/24/2021	

Site ID: MBS-CV-012	Project Area: Crescent Valley Survey Area
Date: 06/24/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-CV-013	Project Area: Crescent Valley Survey Area
Date: 06/24/2021	

Site ID: MBS-CV-015	Project Area: Crescent Valley Survey Area
Date: 06/25/2021	

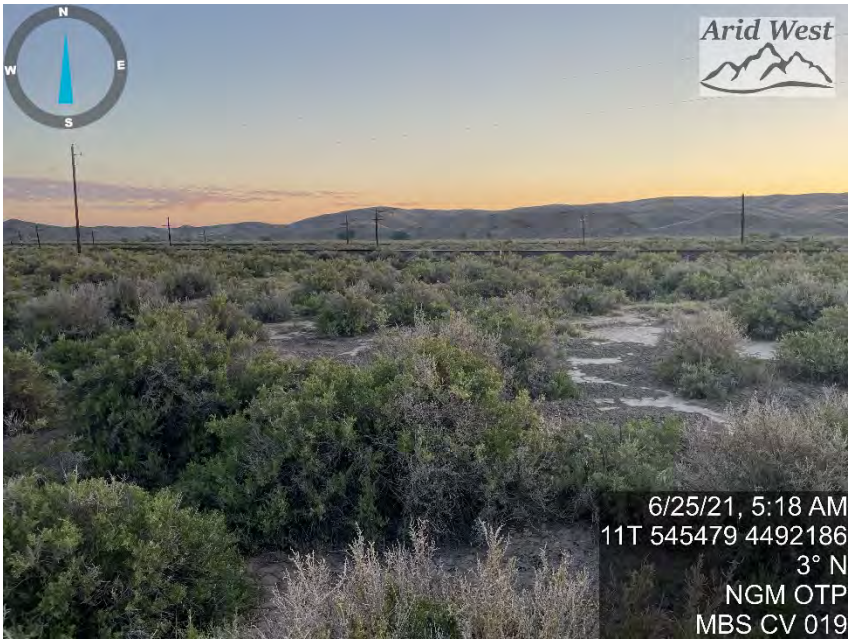
Great Basin Bird Observatory Point Count Photographs

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Date: 06/25/2021	

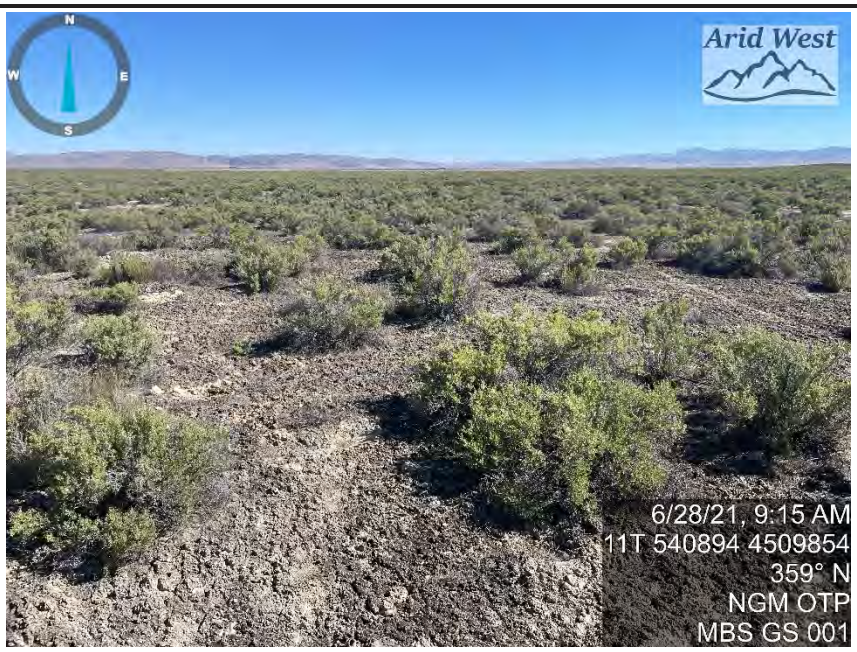
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Date: 06/25/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-CV-018	Project Area: Crescent Valley Survey Area
Date: 06/25/2021	

Site ID: MBS-CV-019	Project Area: Crescent Valley Survey Area
Date: 06/25/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-001	Project Area: Goldstrike Survey Area
Date: 06/28/2021	

Site ID: MBS-GS-002	Project Area: Goldstrike Survey Area
Date: 06/28/2021	

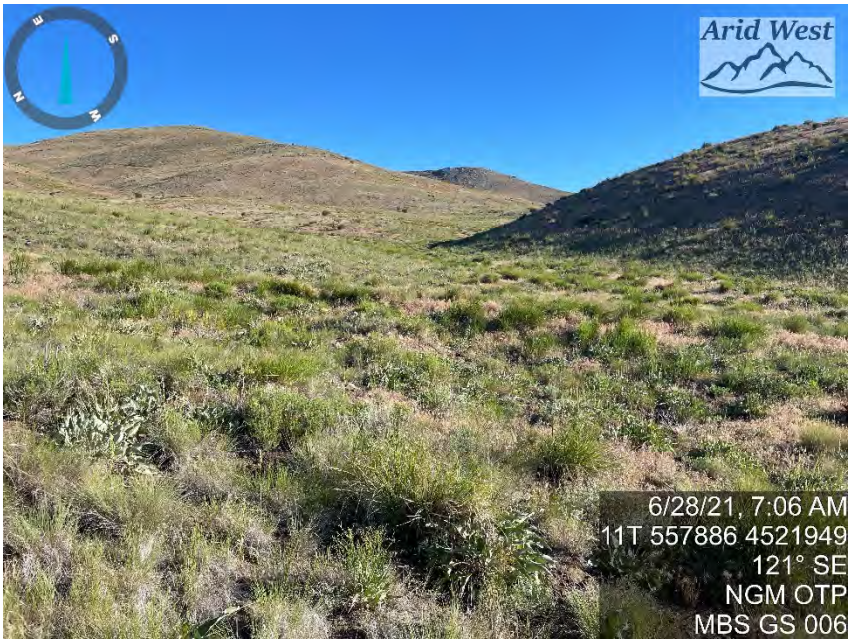
Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-003	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

Site ID: MBS-GS-004	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

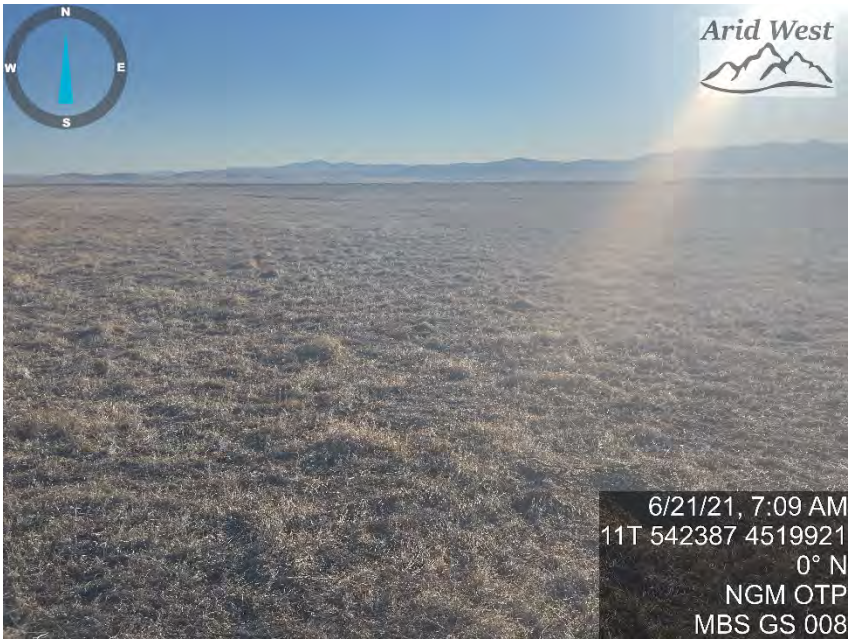
Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-005	Project Area: Goldstrike Survey Area
Date: 06/28/2021	

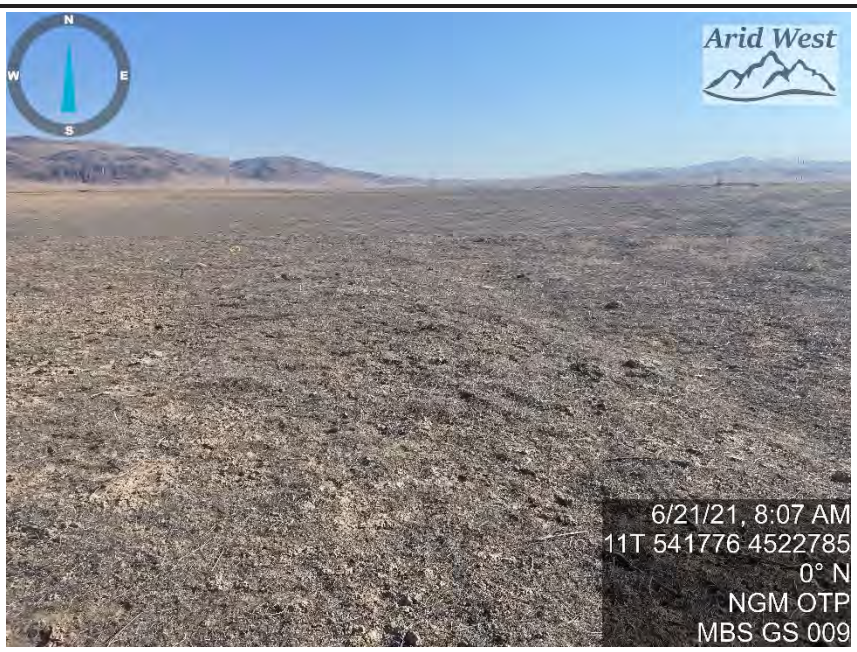
Site ID: MBS-GS-006	Project Area: Goldstrike Survey Area
Date: 06/28/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-007	Project Area: Goldstrike Survey Area
Date: 06/28/2021	

Site ID: MBS-GS-008	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-009	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

Site ID: MBS-GS-010	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-011	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

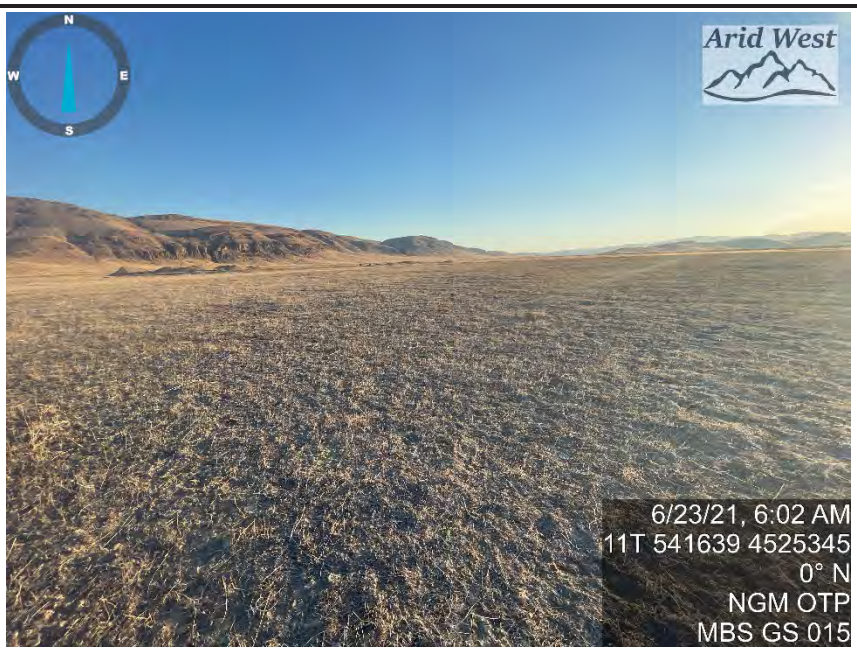
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Date: 06/21/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-013	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

Site ID: MBS-GS-014	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-015	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Site ID: MBS-GS-016	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-017	Project Area: Goldstrike Survey Area
Date: 06/21/2021	

Site ID: MBS-GS-018	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-019	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

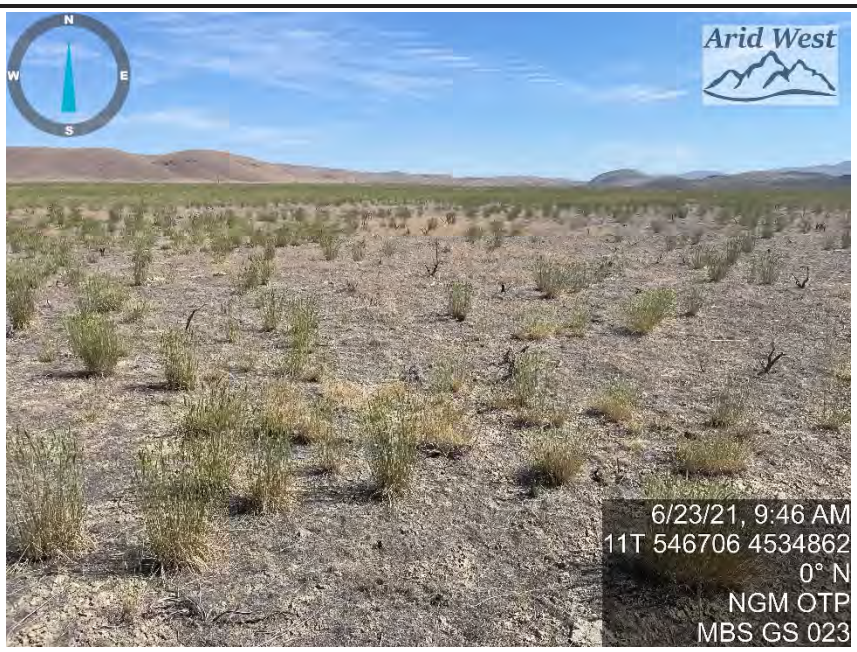
Site ID: MBS-GS-020	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-021	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

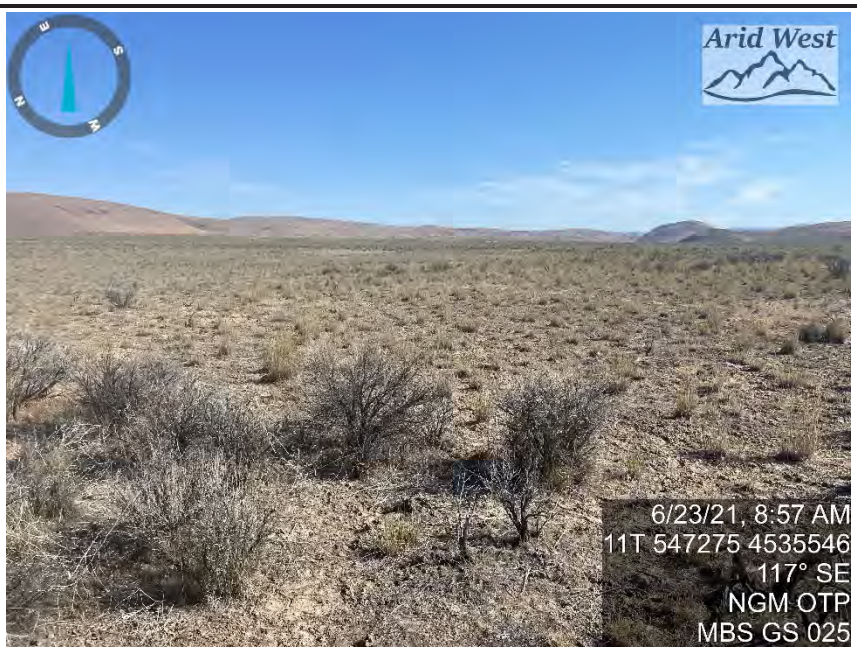
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Date: 06/23/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-023	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Site ID: MBS-GS-024	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Great Basin Bird Observatory Point Count Photographs

Site ID: MBS-GS-025	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

Site ID: MBS-GS-026	Project Area: Goldstrike Survey Area
Date: 06/23/2021	

D.5. PYGMY RABBIT

D.5.1. Figures

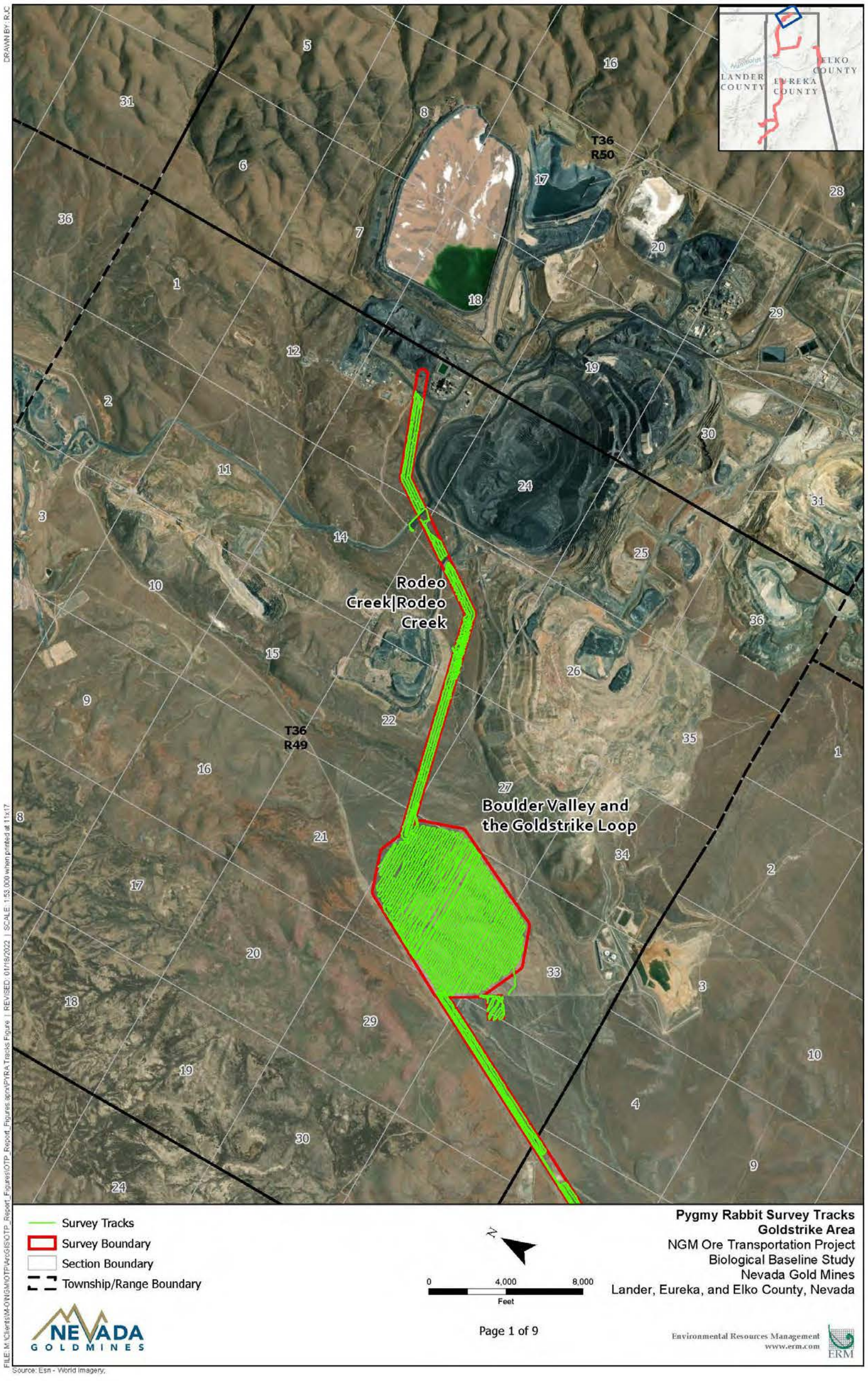


Figure D.5-1: Pygmy Rabbit Survey Tracks – Goldstrike Area

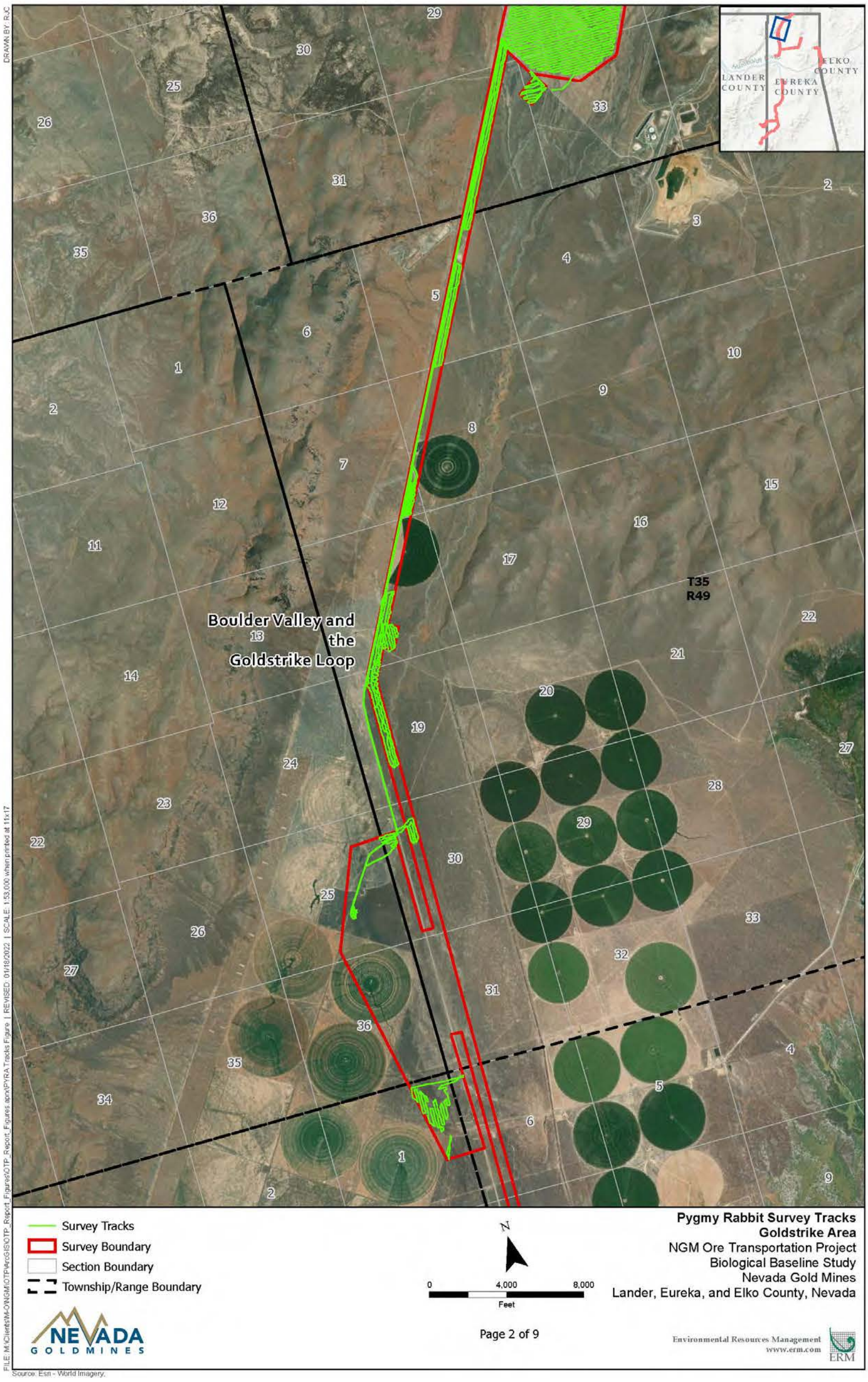


Figure D.5-1: Pygmy Rabbit Survey Tracks – Goldstrike Area (Continued)

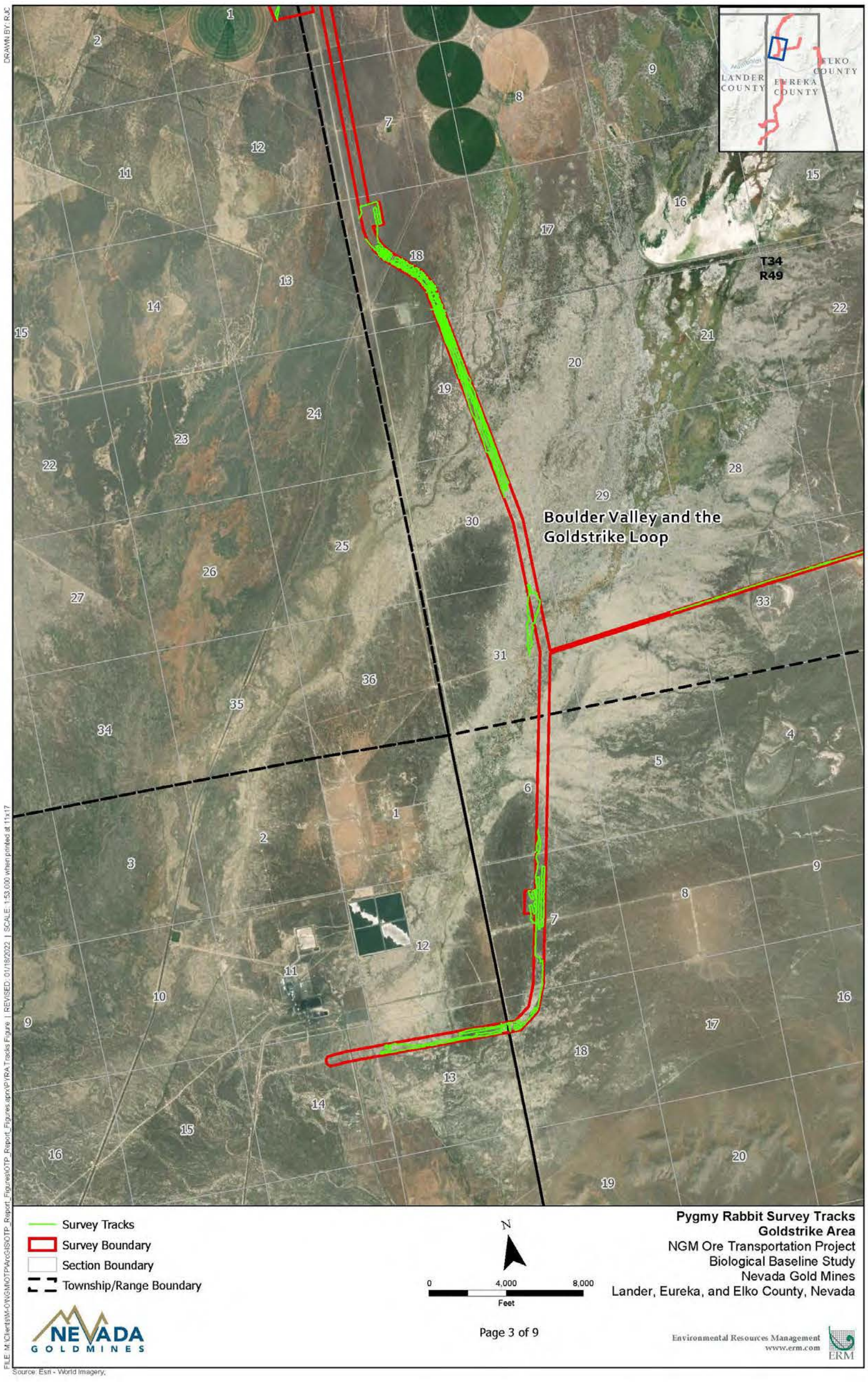


Figure D.5-1: Pygmy Rabbit Survey Tracks Goldstrike Area – (Continued)

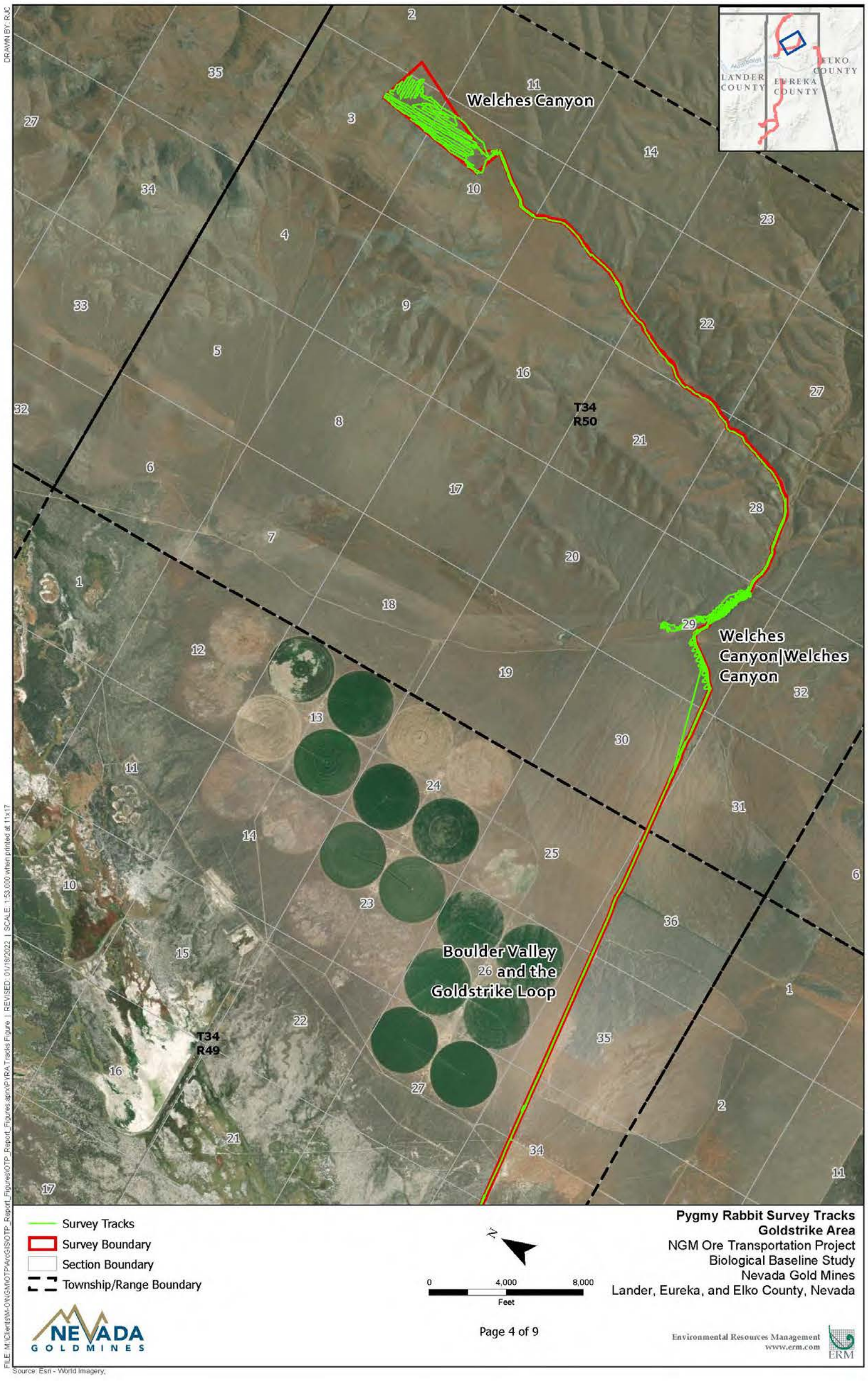


Figure D.5-1: Pygmy Rabbit Survey Tracks – Goldstrike Area (Continued)

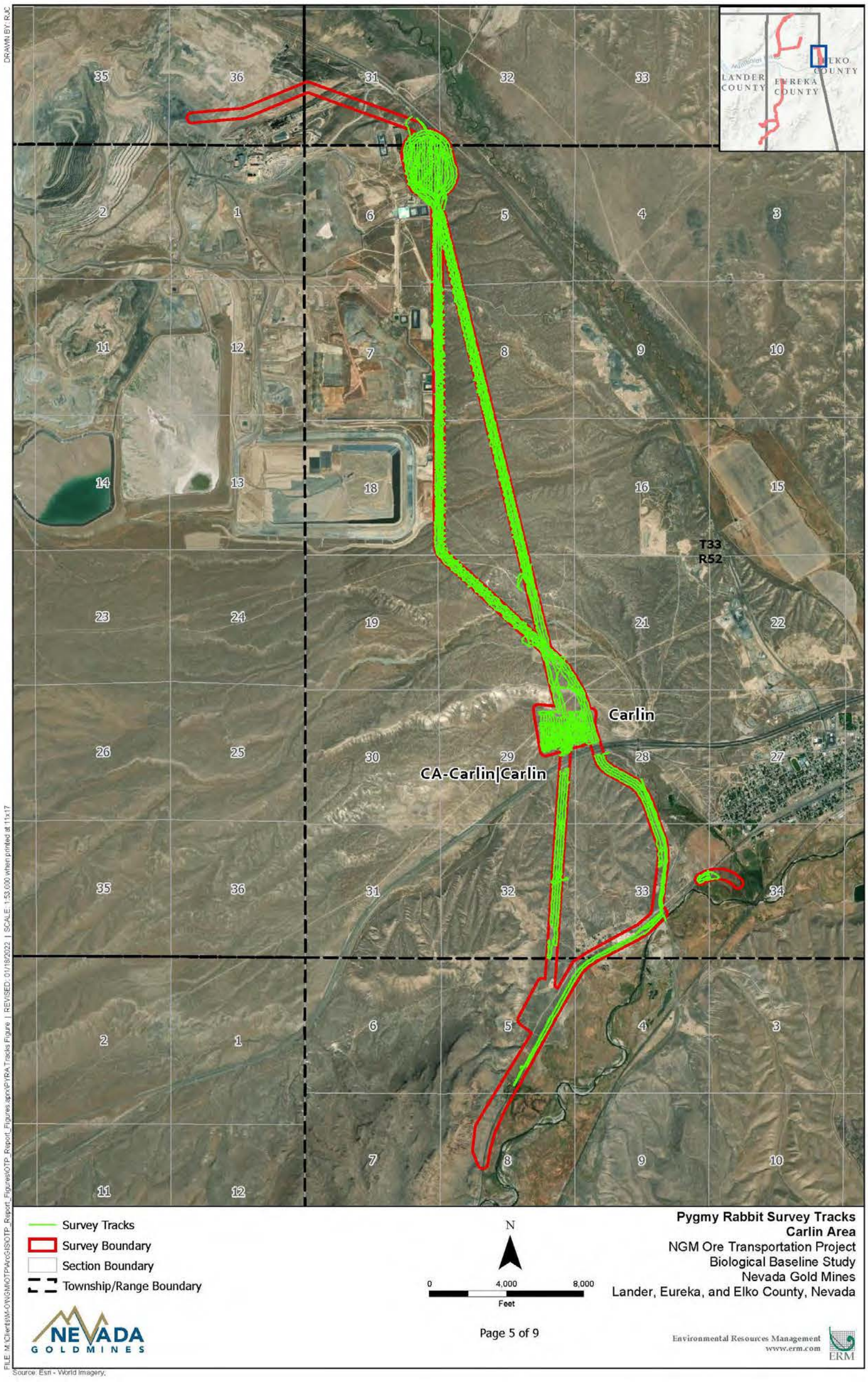


Figure D.5-2: Pygmy Rabbit Survey Tracks – Carlin Area

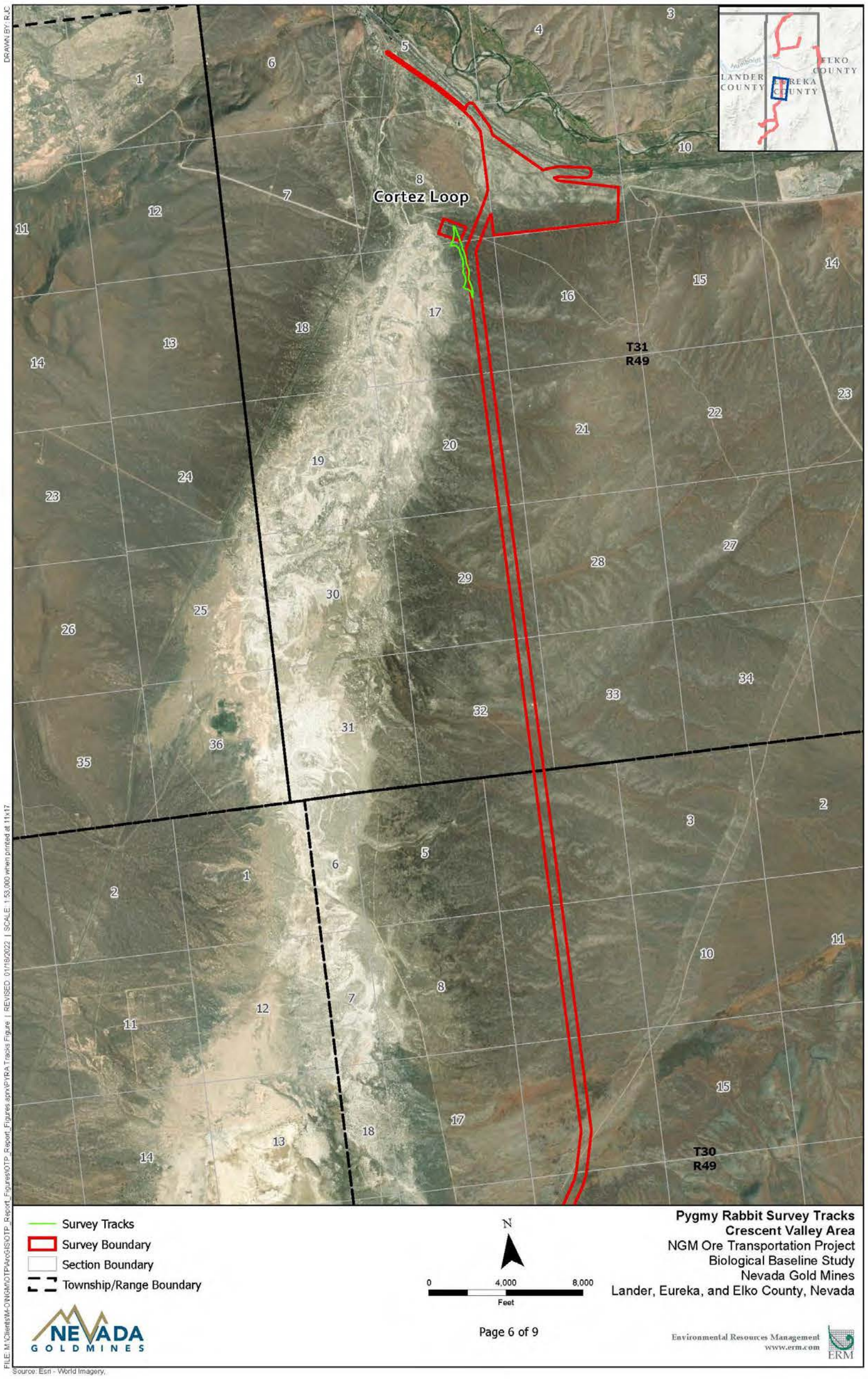


Figure D.5-3: Pygmy Rabbit Survey Tracks – Crescent Valley Area

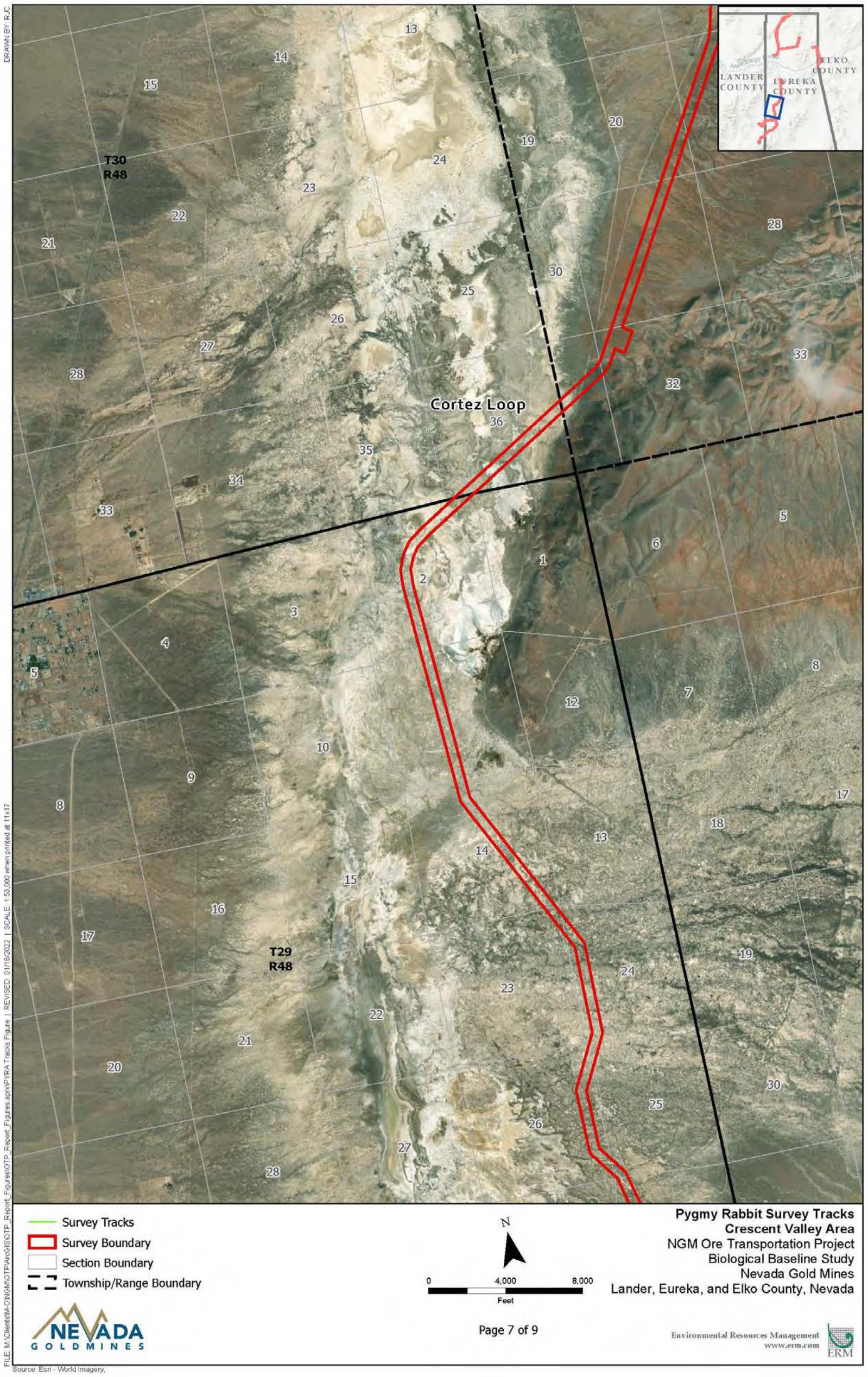


Figure D.5-3: Pygmy Rabbit Survey Tracks – Crescent Valley Area (Continued)

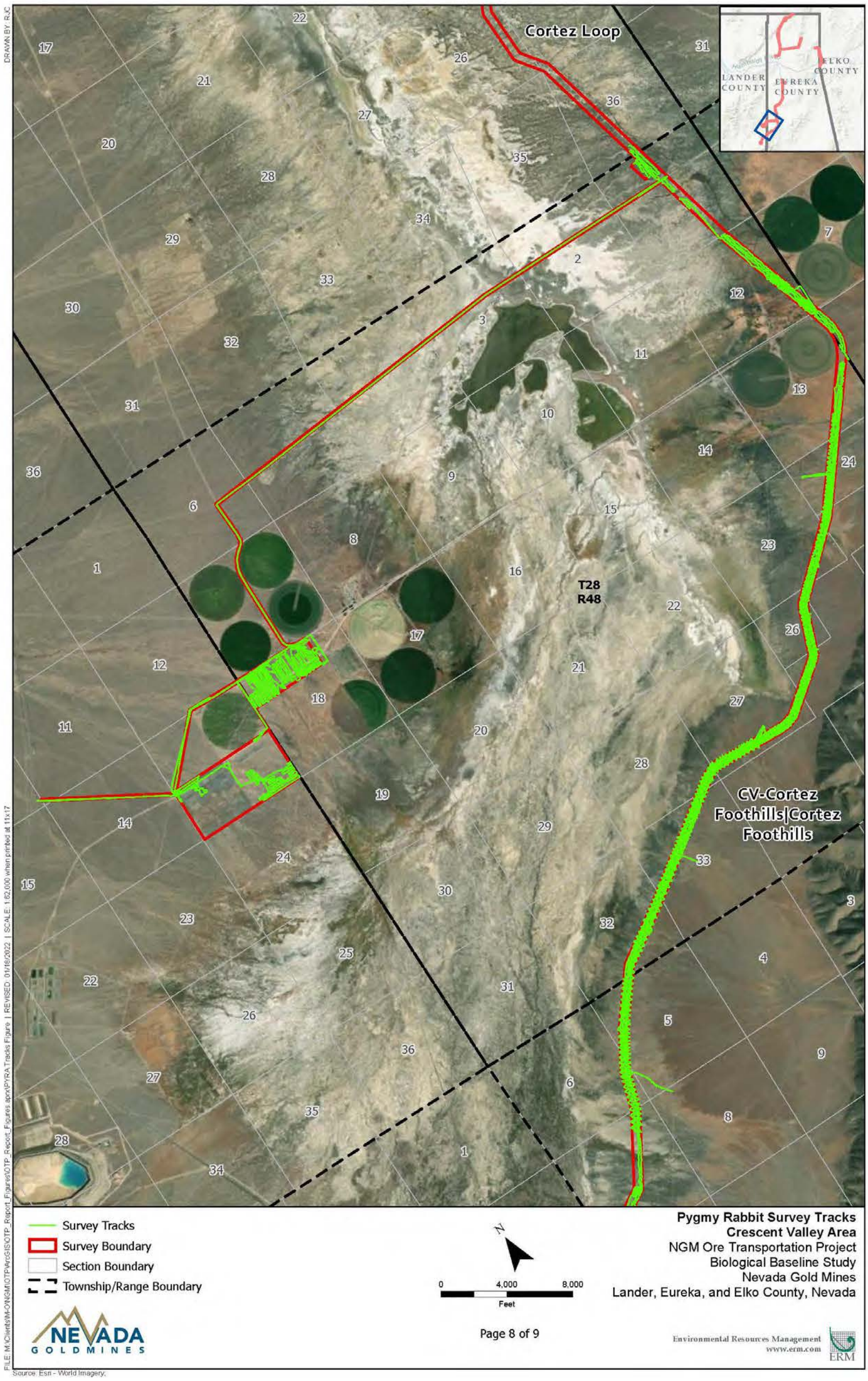


Figure D.5-3: Pygmy Rabbit Survey Tracks – Crescent Valley Area (Continued)

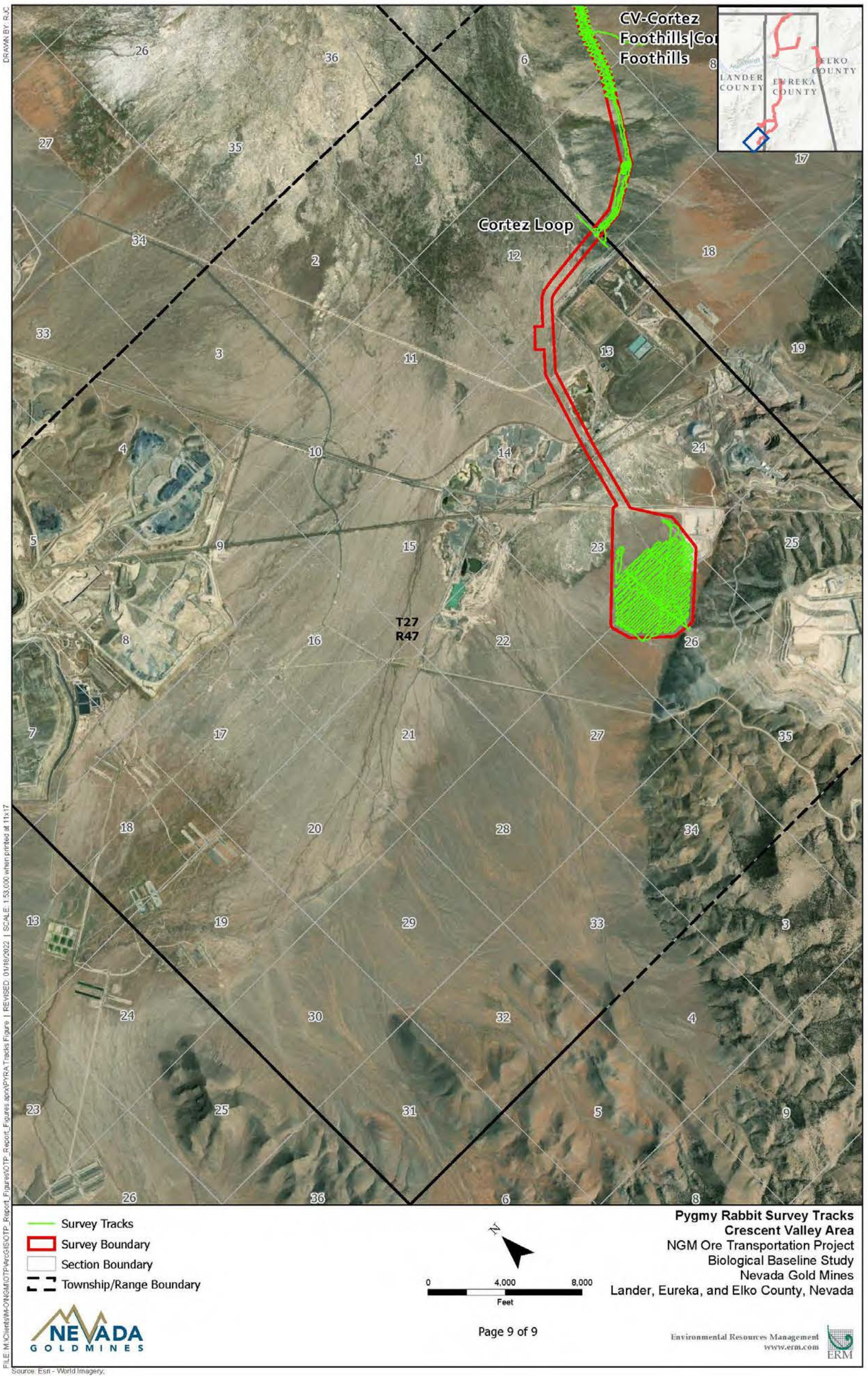


Figure D.5-3: Pygmy Rabbit Survey Tracks – Crescent Valley Area (Continued)

D.5.2. Photographs

Pygmy Rabbit Survey Photos – Carlin Area

Site ID: Carlin (SM) **Photo: CA-01**	**Project Area: Carlin Area**
Date: 07/16/2021	**Direction: S**



Site ID: Carlin (SM) **Photo: CA-02**	**Project Area: Carlin Area**
Date: 07/16/2021	**Direction: N**



Pygmy Rabbit Survey Photos – Carlin Area

Site ID: Carlin (GHP) **Photo: CA-03**	**Project Area: Carlin Area**
Date: 07/16/2021	**Direction: NE**



Site ID: Carlin (SM) **Photo: CA-04**	**Project Area: Carlin Area**
Date: 07/17/2021	**Direction: S**



Pygmy Rabbit Survey Photos – Carlin Area

Site ID: Carlin (SM) **Photo: CA-05**	**Project Area: Carlin Area**
Date: 07/17/2021	**Direction: N**



Site ID: Carlin (SM) **Photo: CA-06**	**Project Area: Carlin Area**
Date: 07/17/2021	**Direction: W**

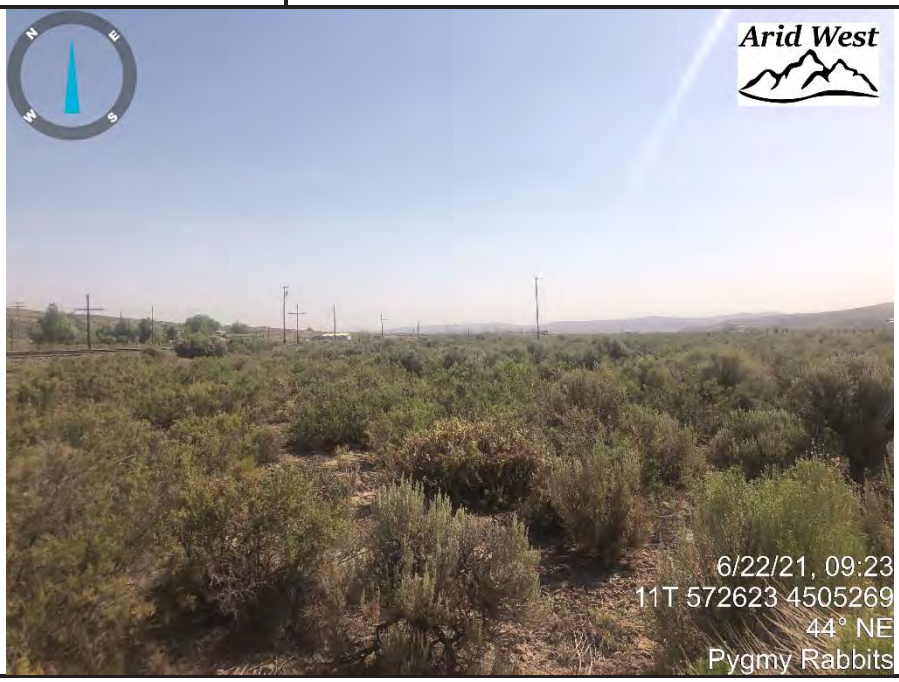


Pygmy Rabbit Survey Photos – Carlin Area

Site ID: Carlin (SM) **Photo: CA-07**	**Project Area: Carlin Area**
Date: 06/06/2021	**Direction: NE**



Site ID: Carlin (SM) **Photo: CA-08**	**Project Area: Carlin Area**
Date: 06/22/2021	**Direction: NE**



Pygmy Rabbit Survey Photos – Carlin Area

Site ID: Carlin (SM) **Photo: CA-09**	**Project Area: Carlin Area**
Date: 06/22/2021	**Direction: ENE**



Site ID: Carlin (SM) **Photo: CA-10**	**Project Area: Carlin Area**
Date: 07/06/2021	**Direction: N**



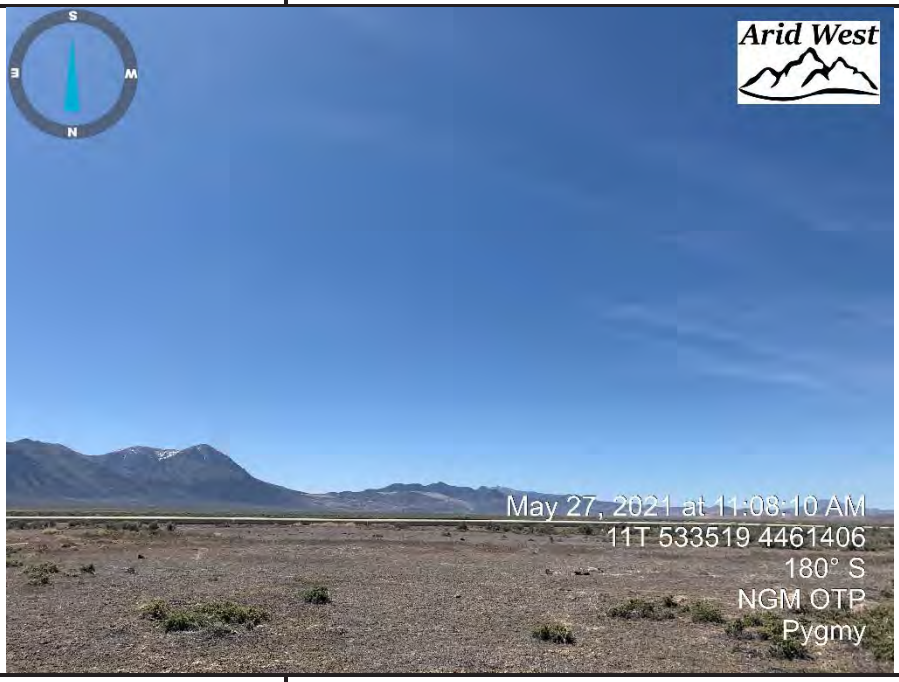
Pygmy Rabbit Survey Photos – Carlin Area

Site ID: Carlin (SM) **Photo: CA-11**	**Project Area: Carlin Area**
Date: 07/13/2021	**Direction: N**

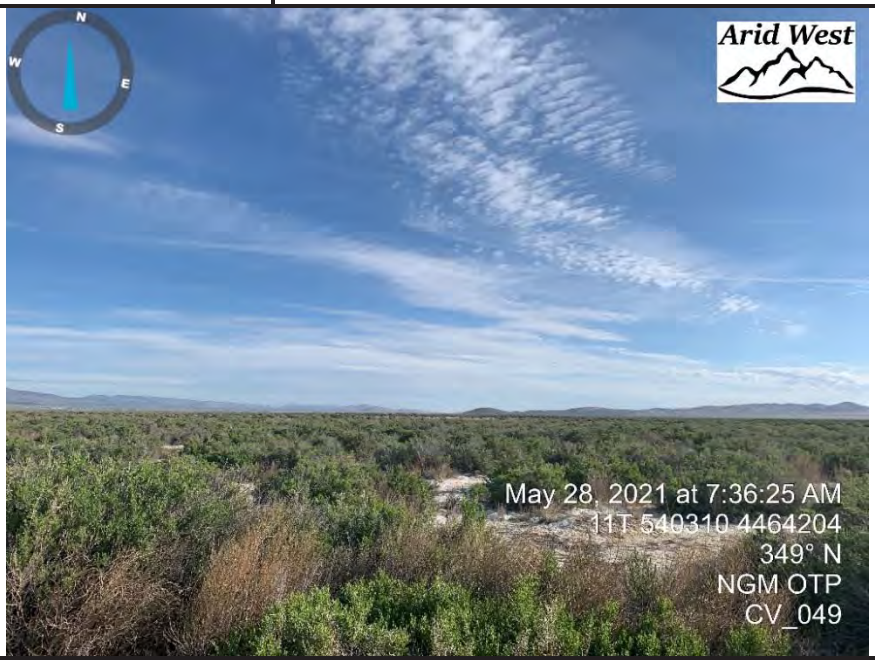


Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Loop (SM) **Photo: CV-01**	**Project Area: Crescent Valley Area**
Date: 05/27/2021	**Direction: S**

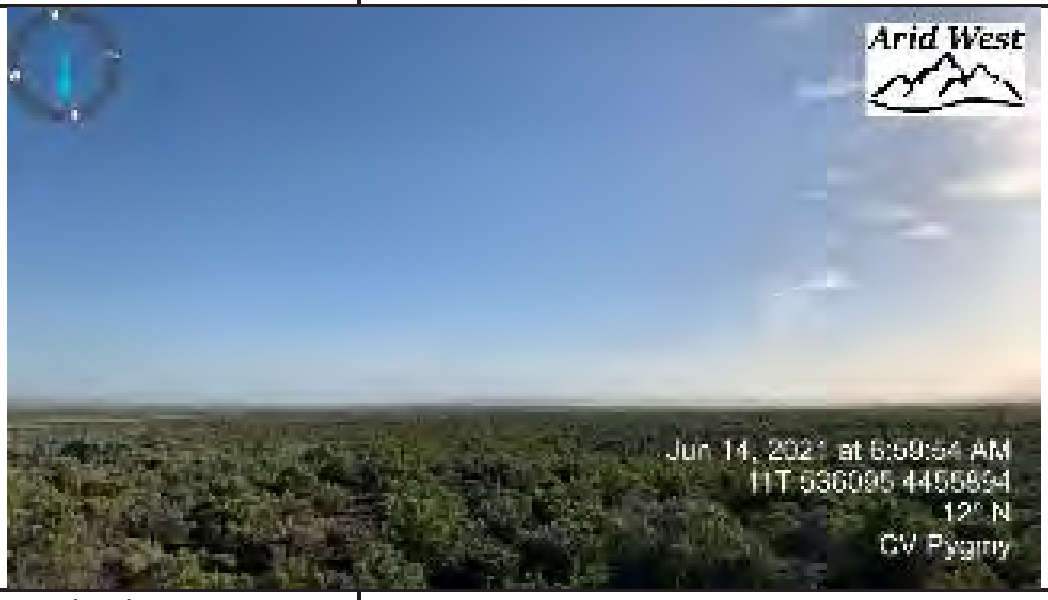


Site ID: Cortez Loop (SM) **Photo: CV-02**	**Project Area: Crescent Valley Area**
Date: 05/28/2021	**Direction: N**



Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Loop (SM) **Photo: CV-03**	**Project Area: Crescent Valley Area**
Date: 06/14/2021	**Direction: N**



Site ID: Cortez Foothills (GHP) **Photo: CV-04**	**Project Area: Crescent Valley Area**
Date: 06/14/2021	**Direction: S**



Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills (GHP) **Photo: CV-05**	**Project Area: Crescent Valley Area**
Date: 05/24/2021	**Direction: SW**



Site ID: Cortez Foothills (GHP) **Photo: CV-06**	**Project Area: Crescent Valley Area**
Date: 07/24/2021	**Direction: NE**



Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Loop (SM) **Photo: CV-07**	**Project Area: Crescent Valley Area**
Date: 07/07/2021	**Direction: E**



Site ID: Cortez Foothills (GHP) **Photo: CV-08**	**Project Area: Crescent Valley Area**
Date: 06/03/2021	**Direction: SE**



Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Loop (SM) **Photo: CV-09**	**Project Area: Crescent Valley Area**
Date: 06/07/2021	**Direction: S**



Site ID: Cortez Loop (SM) **Photo: CV-10**	**Project Area: Crescent Valley Area**
Date: 06/07/2021	**Direction: E**



Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Loop (SM) **Photo: CV-11**	**Project Area: Crescent Valley Area**
Date: 07/22/2021	**Direction: S**



Site ID: Cortez Loop (SM) **Photo: CV-12**	**Project Area: Crescent Valley Area**
Date: 06/02/2021	**Direction: S**



Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Loop (SM) **Photo: CV-13**	**Project Area: Crescent Valley Area**
Date: 07/05/2021	**Direction: N**



Site ID: Cortez Loop (SM) **Photo: CV-14**	**Project Area: Crescent Valley Area**
Date: 07/09/2021	**Direction: N**



Pygmy Rabbit Survey Photos – Crescent Valley Area

Site ID: Cortez Loop (SM) **Photo: CV-15**	**Project Area: Crescent Valley Area**
Date: 07/09/2021	**Direction: N**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-01**	**Project Area: Goldstrike Area**
Date: 05/25/2021	**Direction: S**



Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-02**	**Project Area: Goldstrike Area**
Date: 05/25/2021	**Direction: SSE**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-03**	**Project Area: Goldstrike Area**
Date: 07/05/2021	**Direction: NNW**



Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-04**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: NE**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-05**	**Project Area: Goldstrike Area**
Date: 05/25/2021	**Direction: S**



Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-06**	**Project Area: Goldstrike Area**
Date: 06/23/2021	**Direction: SW**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-07**	**Project Area: Goldstrike Area**
Date: 06/24/2021	**Direction: N**



Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-08**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: NNE**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-09**	**Project Area: Goldstrike Area**
Date: 07/12/2021	**Direction: N**



Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-10**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: N**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Boulder Valley and the Goldstrike Loop (SM) **Photo: GS-11**	**Project Area: Goldstrike Area**
Date: 07/25/2021	**Direction: N**



Site ID: Rodeo Creek (GHP) **Photo: GS-12**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: SW**

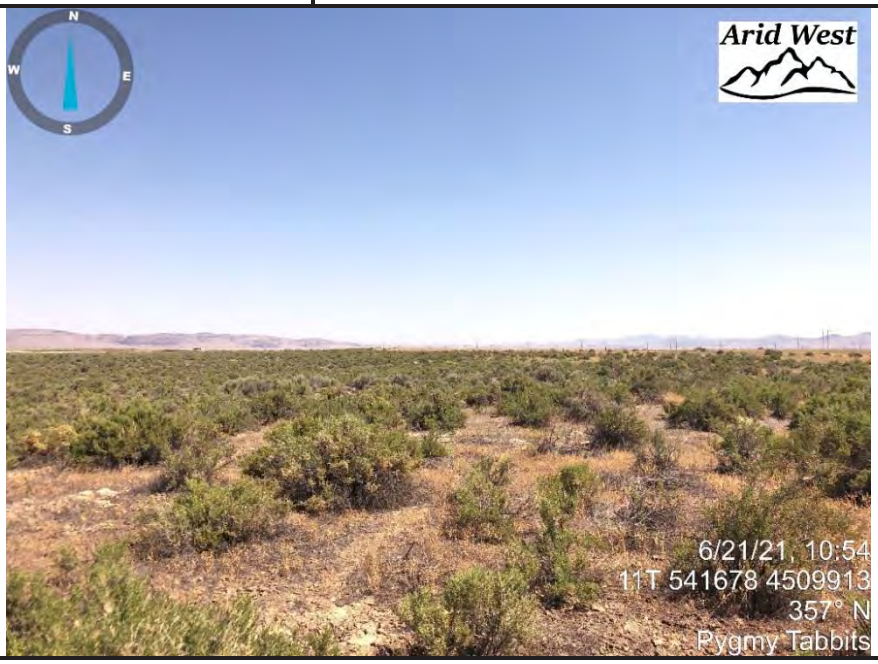


Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Rodeo Creek (GHP) **Photo: GS-13**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: WNW**



Site ID: Rodeo Creek (GHP) **Photo: GS-14**	**Project Area: Goldstrike Area**
Date: 06/21/2021	**Direction: N**

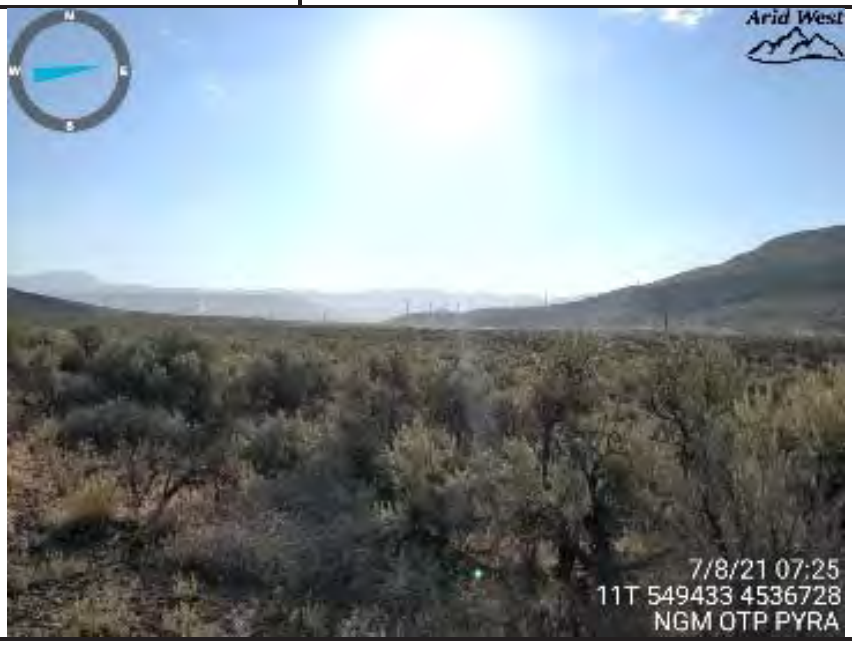


Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Rodeo Creek (GHP) **Photo: GS-15**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: N**



Site ID: Rodeo Creek (GHP) **Photo: GS-16**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: E**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Rodeo Creek (GHP) **Photo: GS-17**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: S**



Site ID: Rodeo Creek (GHP) **Photo: GS-18**	**Project Area: Goldstrike Area**
Date: 07/08/2021	**Direction: W**

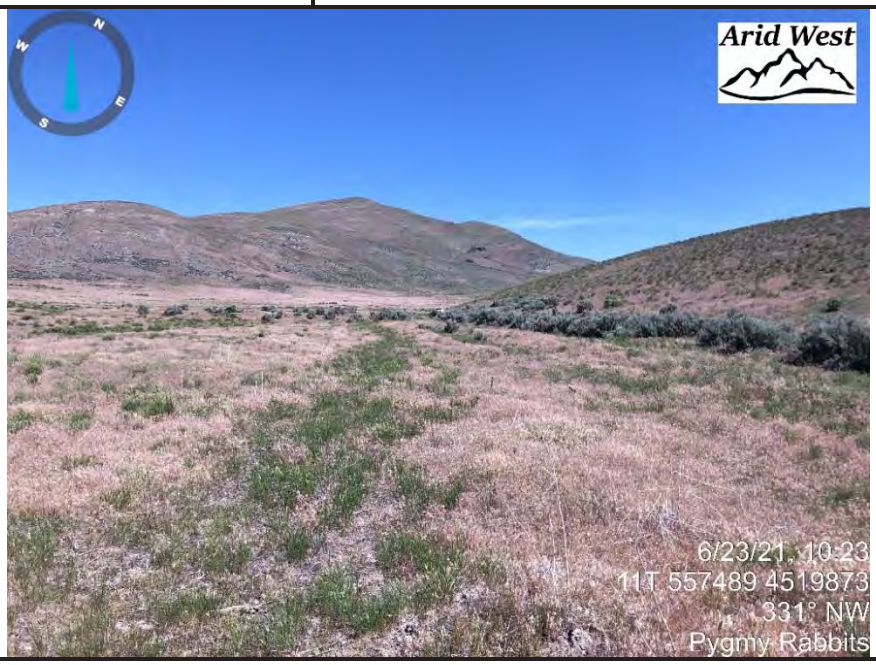


Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Welches Canyon (SM) **Photo: GS-19**	**Project Area: Goldstrike Area**
Date: 06/23/2021	**Direction: N**



Site ID: Welches Canyon (SM) **Photo: GS-20**	**Project Area: Goldstrike Area**
Date: 06/23/2021	**Direction: NNW**



Pygmy Rabbit Survey Photos – Goldstrike Area

Site ID: Welches Canyon (SM) **Photo: GS-21**	**Project Area: Goldstrike Area**
Date: 07/25/2021	**Direction: N**



Site ID: Welches Canyon (SM) **Photo: GS-22**	**Project Area: Goldstrike Area**
Date: 07/25/2021	**Direction: N**



D.6. KANGAROO MOUSE

D.6.1. Figures

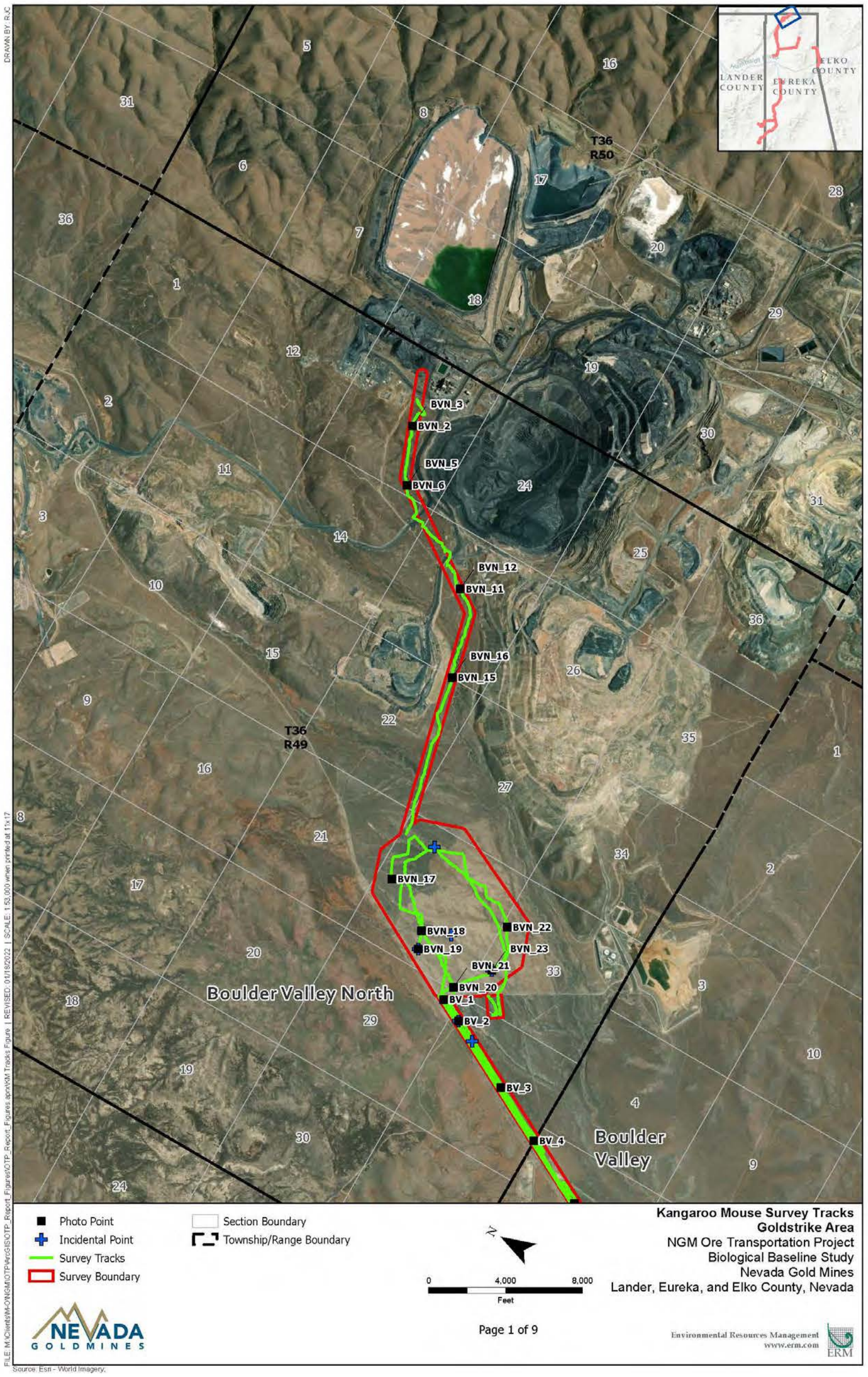


Figure D.6-1: Kangaroo Mouse Survey Tracks – Goldstrike Area

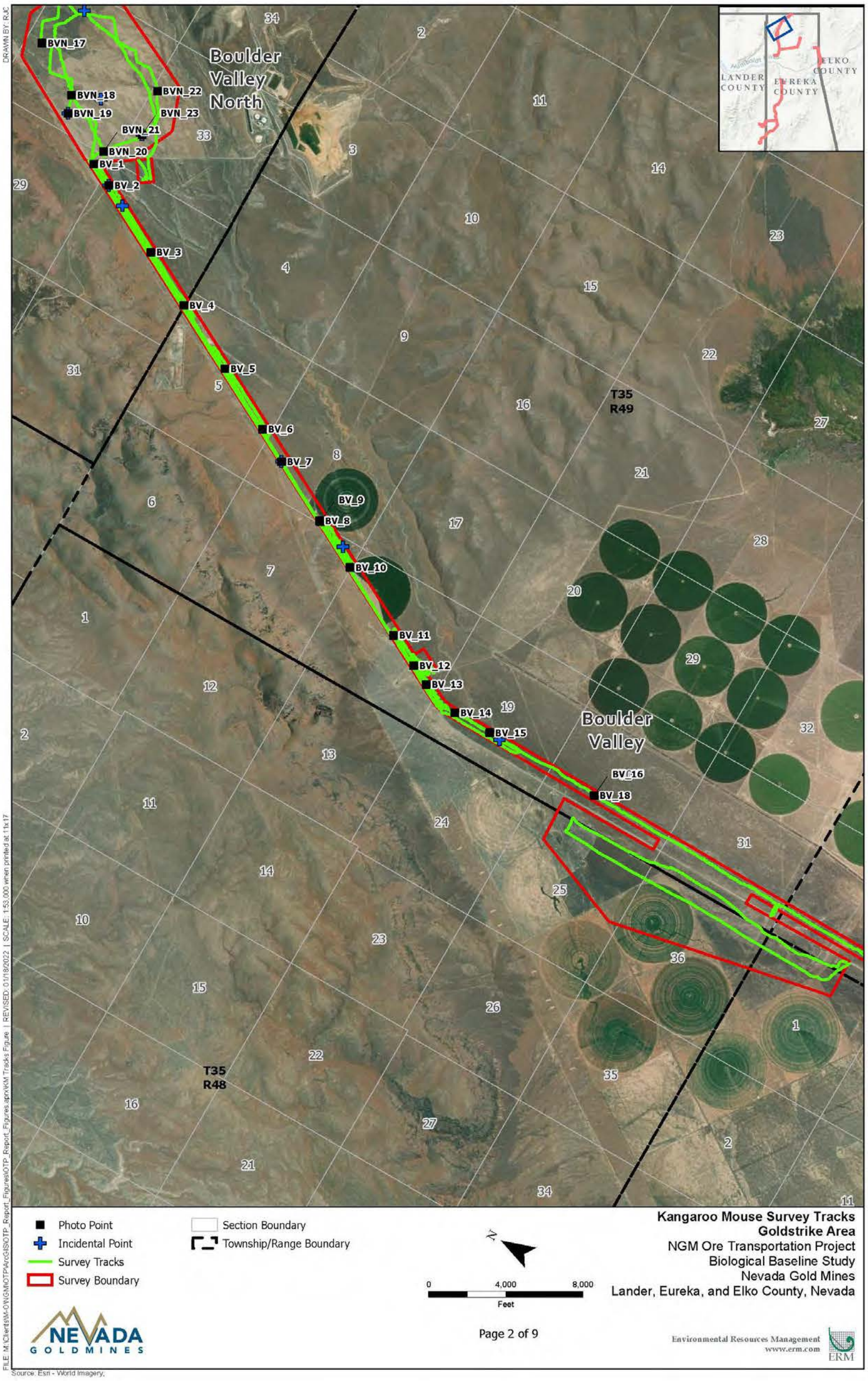


Figure D.6-1: Kangaroo Mouse Survey Tracks – Goldstrike Area (Continued)

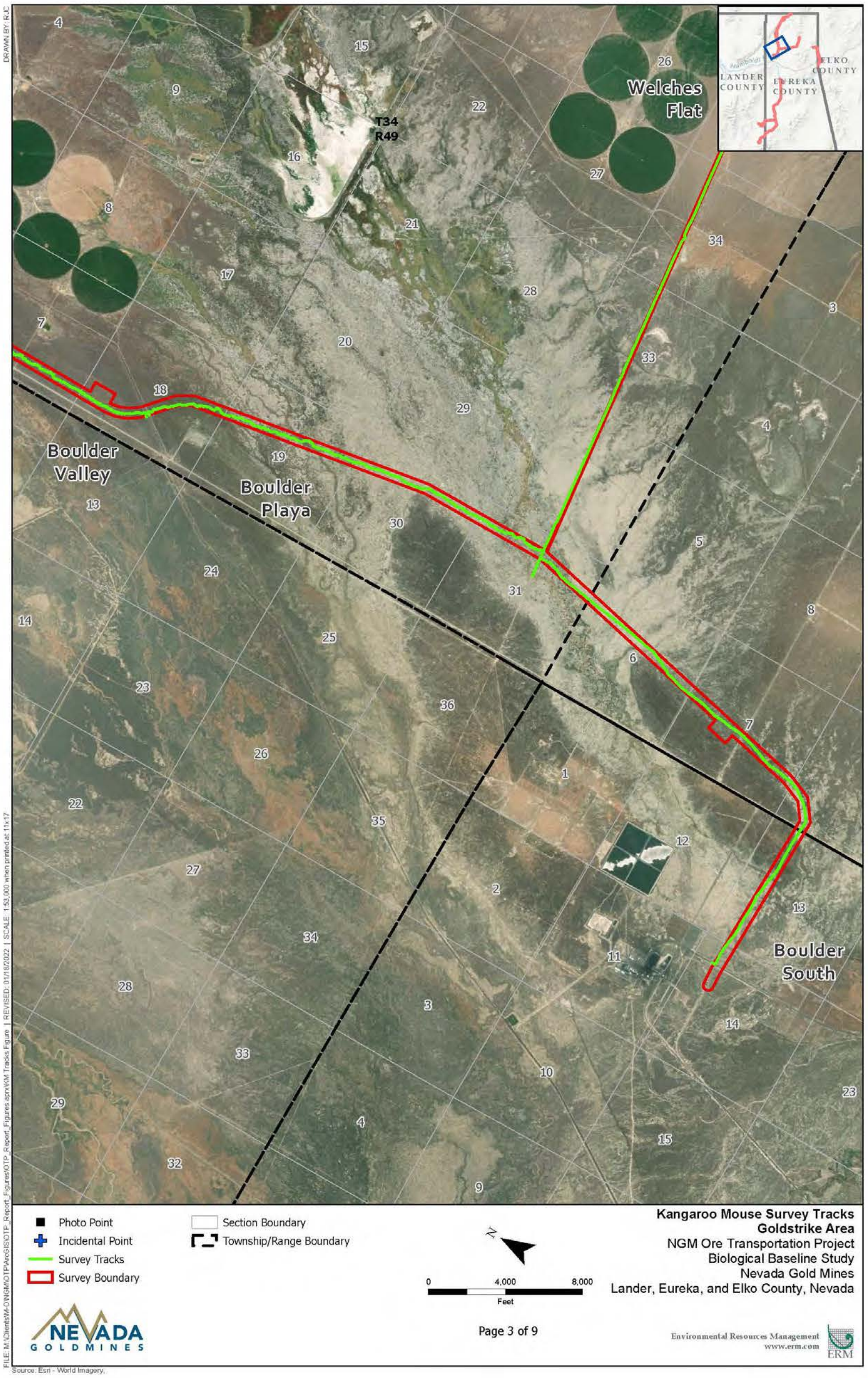


Figure D.6-1: Kangaroo Mouse Survey Tracks – Goldstrike Area (Continued)

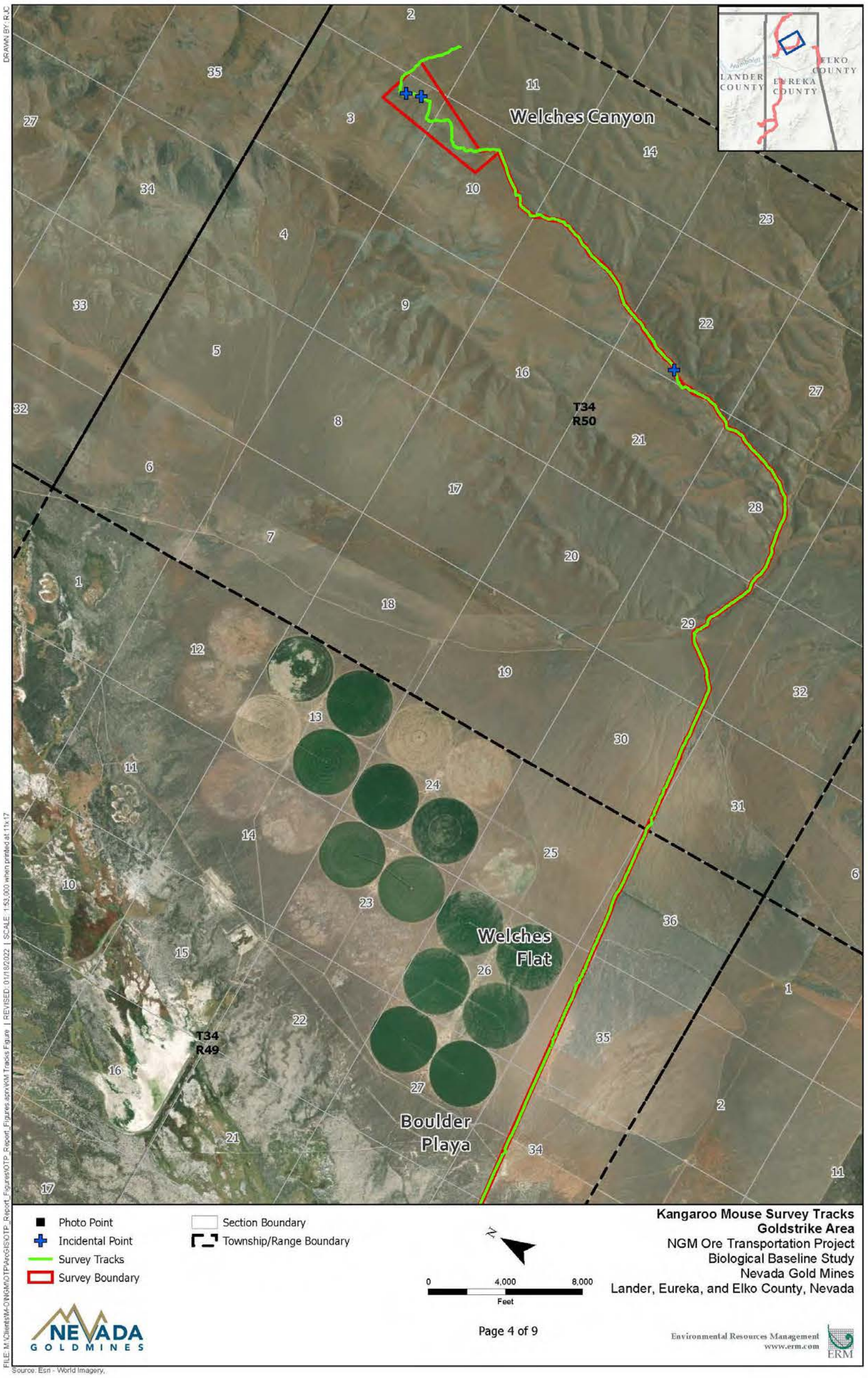


Figure D.6-1: Kangaroo Mouse Survey Tracks – Goldstrike Area (Continued)



Figure D.6-2: Kangaroo Mouse Survey Tracks – Carlin Area

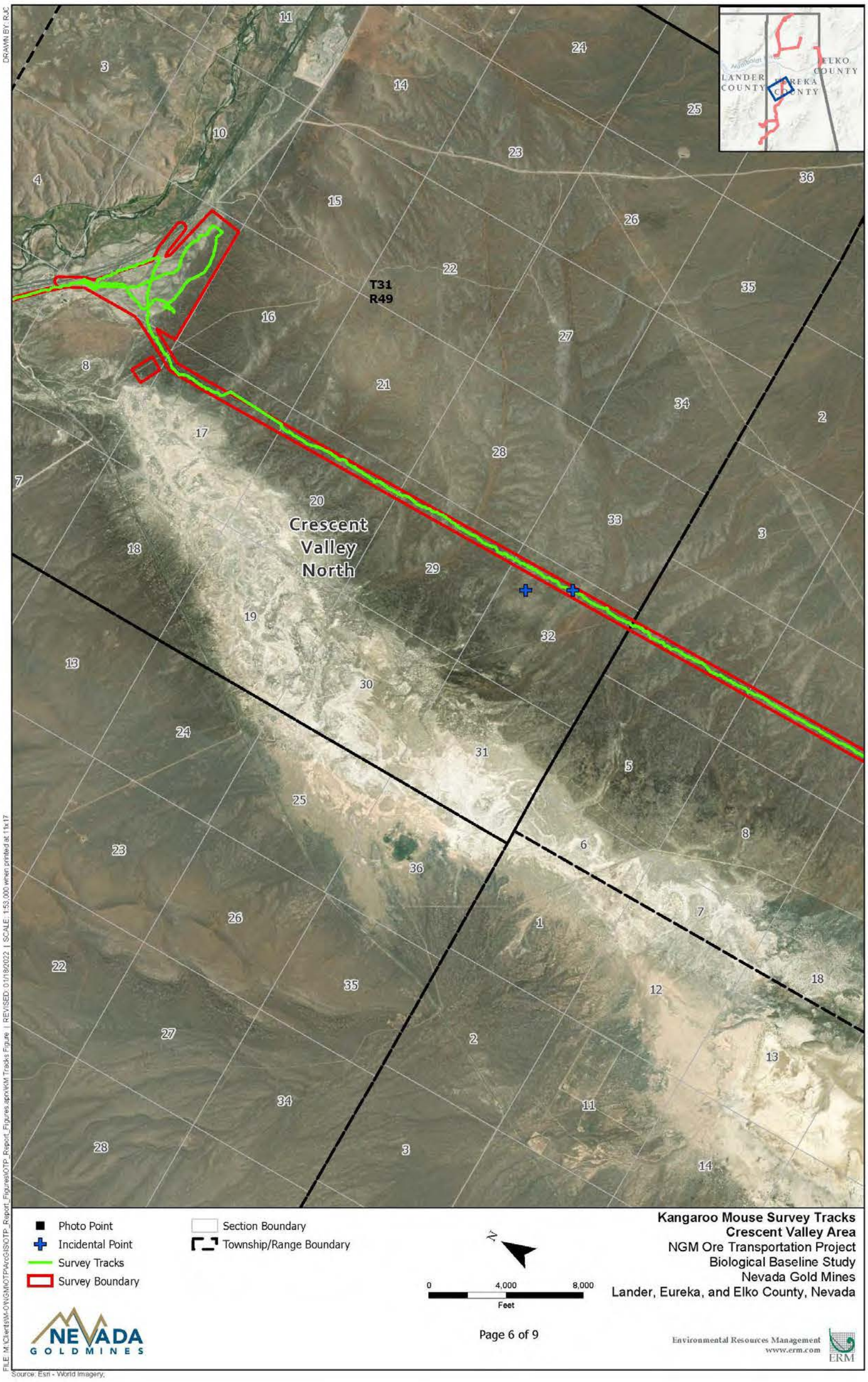


Figure D.6-3: Kangaroo Mouse Survey Tracks – Crescent Valley Area

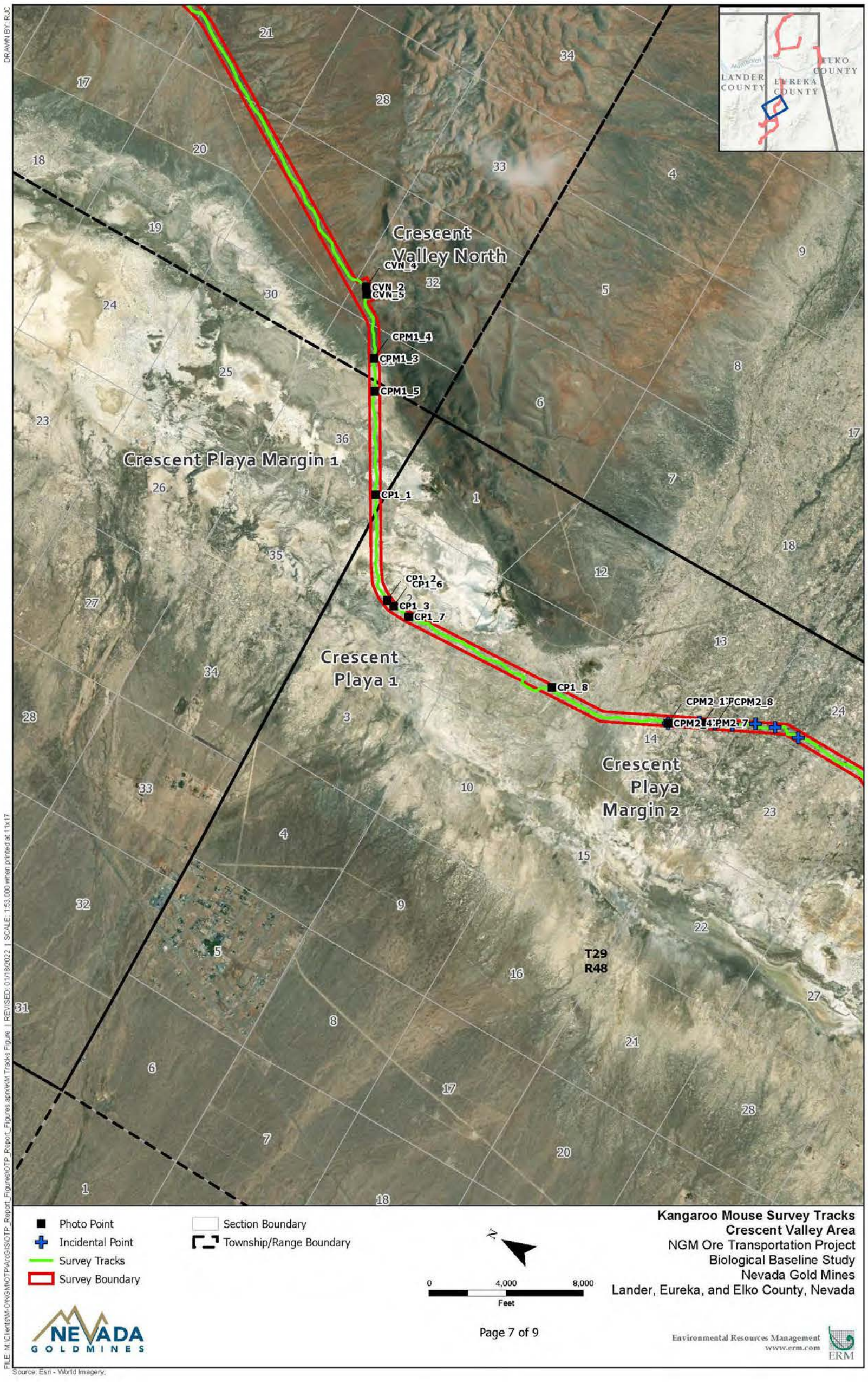


Figure D.6-3: Kangaroo Mouse Survey Tracks – Crescent Valley Area (Continued)

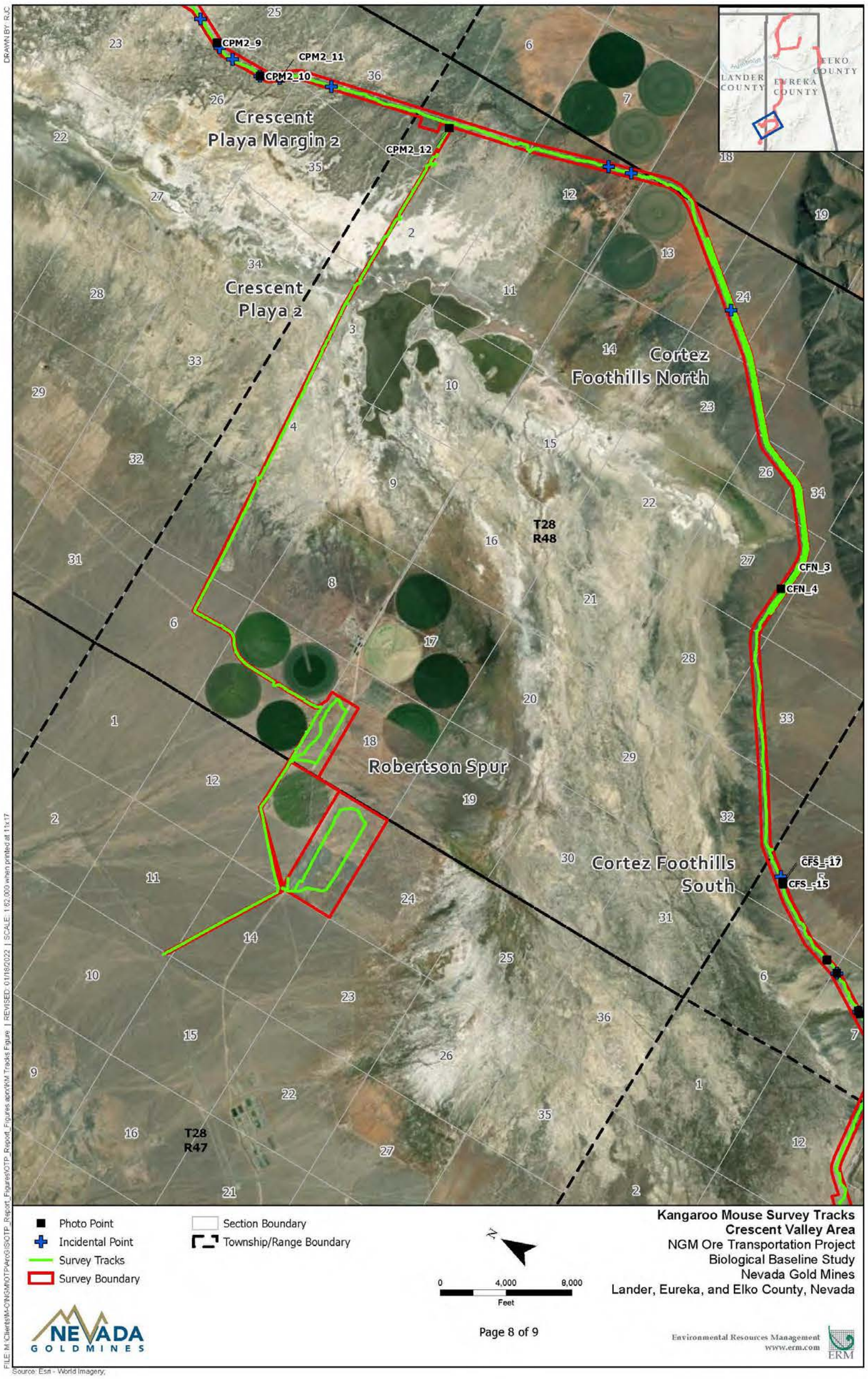


Figure D.6-3: Kangaroo Mouse Survey Tracks – Crescent Valley Area (Continued)

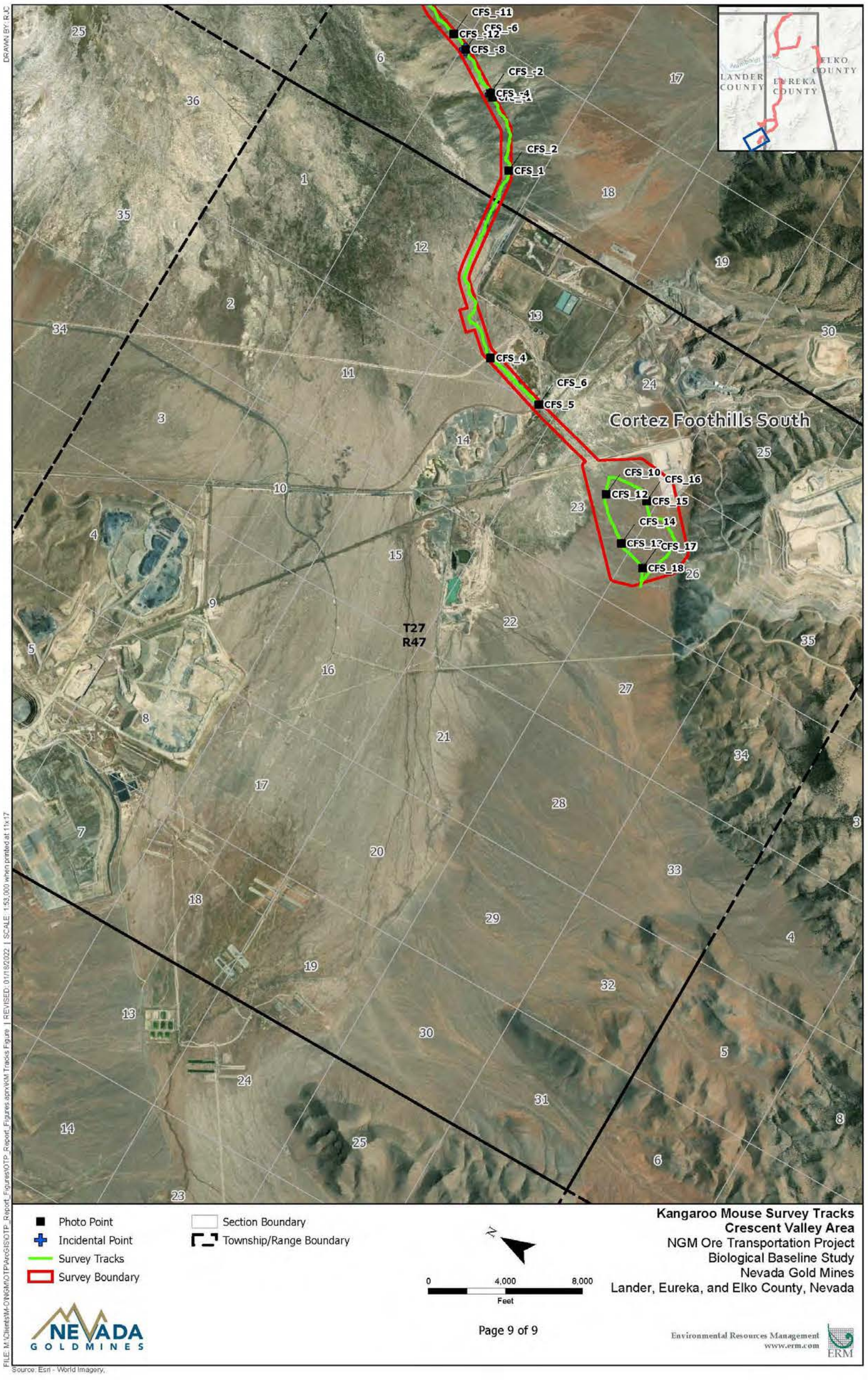


Figure D.6-3: Kangaroo Mouse Survey Tracks – Crescent Valley Area (Continued)

D.6.2. Photographs

Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North Loop **Photo: CA-01**	**Project Area: Carlin Area**
Date: 07/28/2021	**Direction: ESE**



Site ID: Carlin North Loop **Photo: CA-02**	**Project Area: Carlin Area**
Date: 07/28/2021	**Direction: SE**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North Loop **Photo: CA-03**	**Project Area: Carlin Area**
Date: 07/28/2021	**Direction: SW**



Site ID: Carlin North Loop **Photo: CA-04**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: NW**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North Loop **Photo: CA-05**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: N**



Site ID: Carlin North Loop **Photo: CA-06**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: NNW**

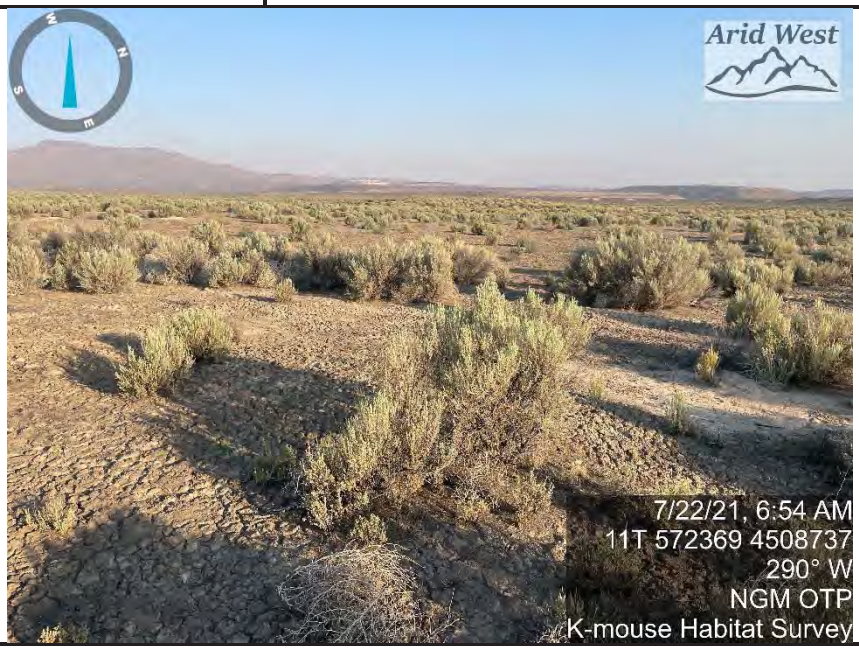


Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 1 **Photo: CA-07**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SE**



Site ID: Carlin North 1 **Photo: CA-08**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: WNW**

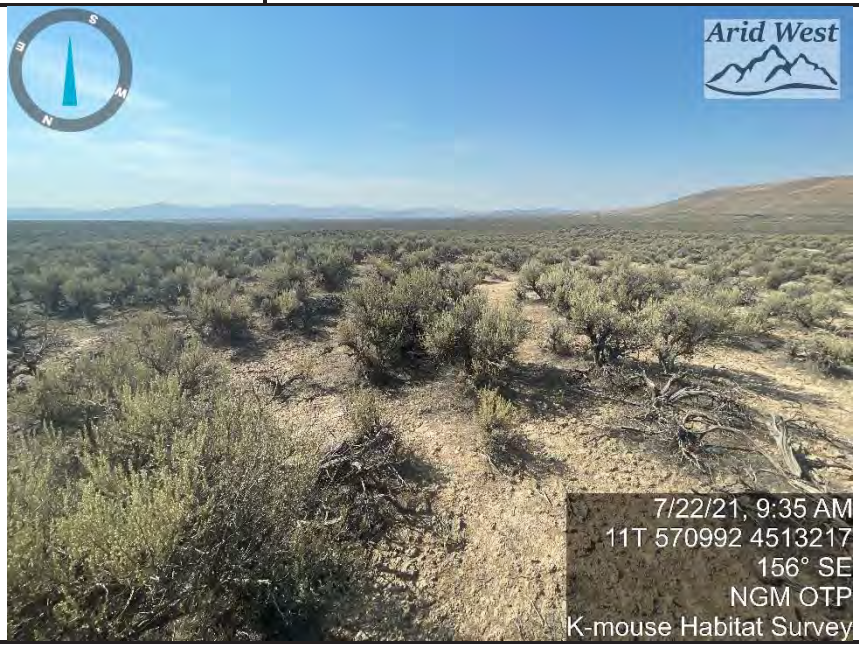


Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 1 **Photo: CA-09**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SSE**



Site ID: Carlin North 2 **Photo: CA-10**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SSE**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 2 **Photo: CA-11**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: NNW**



Site ID: Carlin North 2 **Photo: CA-12**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: NE**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 2 **Photo: CA-13**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: N**



Site ID: Carlin North 2 **Photo: CA-14**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SSE**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 2 **Photo: CA-15**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: N**



Site ID: Carlin North 2 **Photo: CA-16**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: N**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 2 **Photo: CA-17**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SSE**

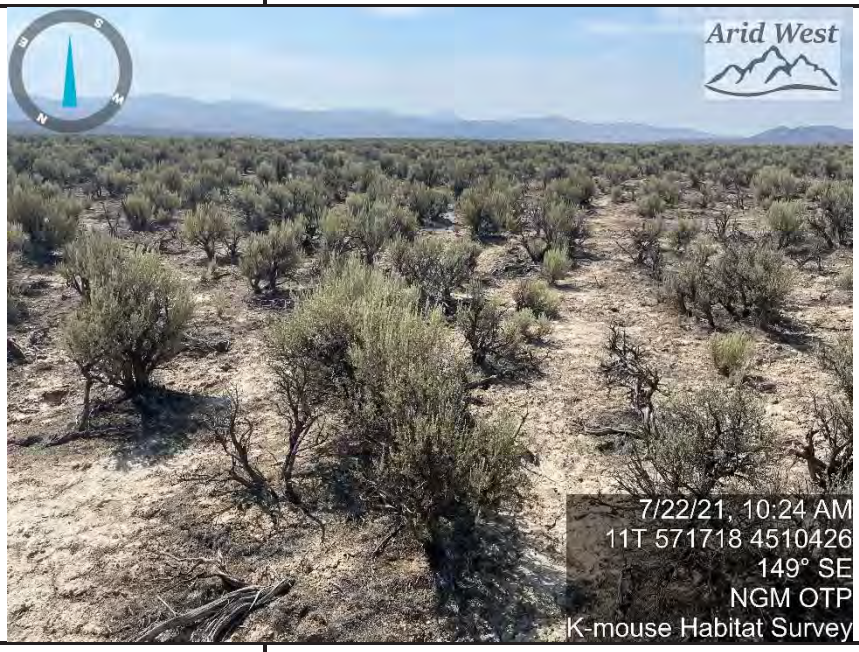


Site ID: Carlin North 2 **Photo: CA-18**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: ESE**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 2 **Photo: CA-19**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SSE**



Site ID: Carlin North 2 **Photo: CA-20**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: NNW**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 2 **Photo: CA-21**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SE**



Site ID: Carlin North 2 **Photo: CA-22**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: WNW**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North 2 **Photo: CA-23**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: ESE**



Site ID: Carlin North 2 **Photo: CA-24**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SSE**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North Washes **Photo: CA-25**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: E**



Site ID: Carlin North Washes **Photo: CA-26**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: SSW**

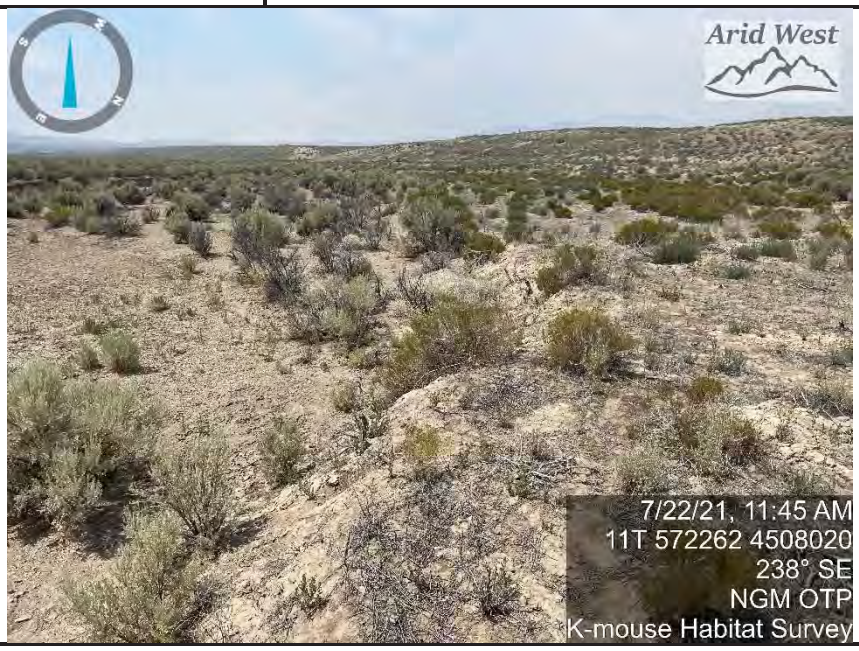


Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North Washes **Photo: CA-27**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: ESE**



Site ID: Carlin North Washes **Photo: CA-28**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: WSW**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North Washes **Photo: CA-29**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: NE**



Site ID: Carlin North Washes **Photo: CA-30**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: WSW**



Kangaroo Mouse Survey Photos – Carlin Area

Site ID: Carlin North Washes **Photo: CA-31**	**Project Area: Carlin Area**
Date: 07/22/2021	**Direction: E**

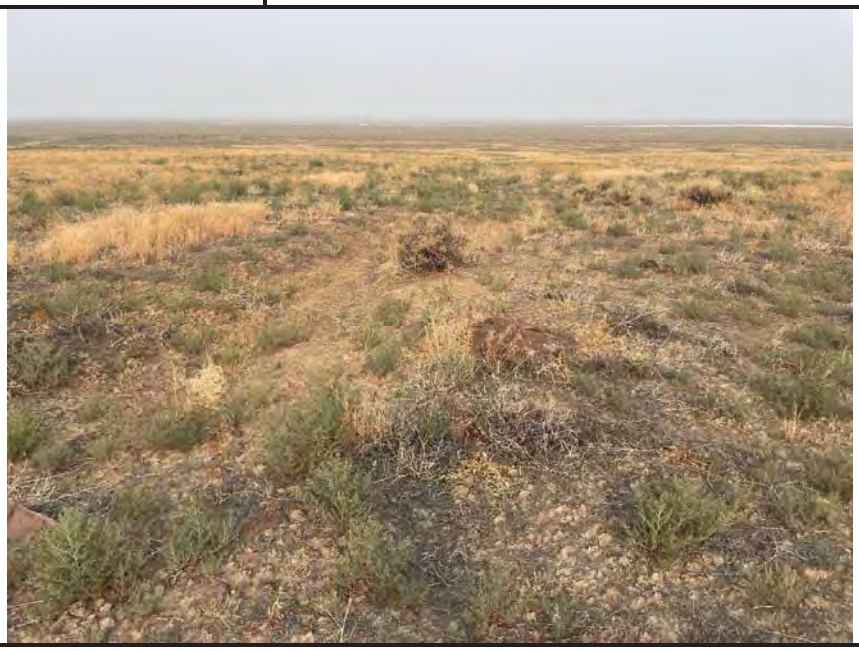


Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Valley North **Photo: CV-01**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: N**



Site ID: Crescent Valley North **Photo: CV-02**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: S**

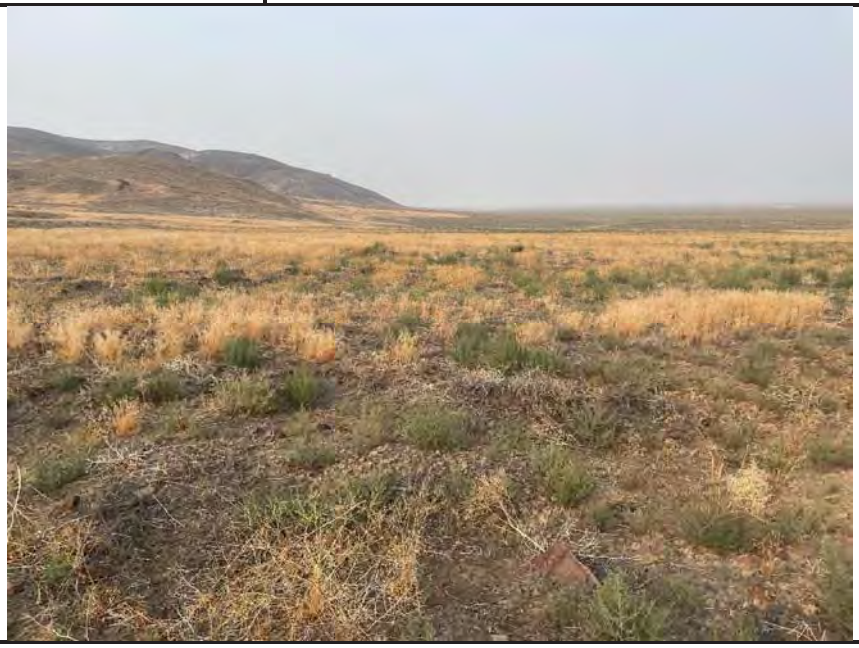


Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Valley North **Photo: CV-03**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: WNW**



Site ID: Crescent Valley North **Photo: CV-04**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: ESE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Valley North **Photo: CV-05**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: NNE**

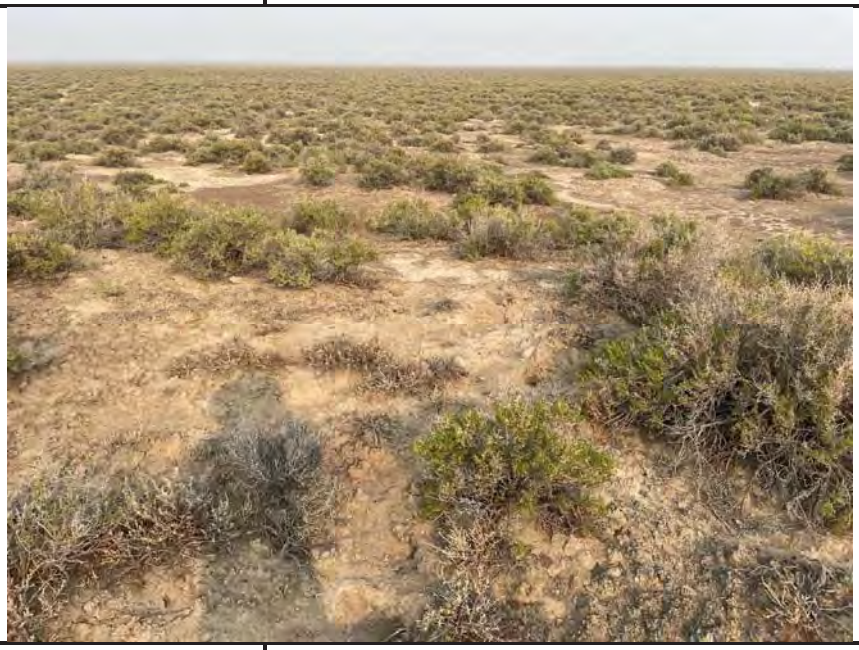


Site ID: Crescent Playa Margin 1 **Photo: CV-06**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: E**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 1 **Photo: CV-07**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: S**



Site ID: Crescent Playa Margin 1 **Photo: CV-08**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 1 **Photo: CV-09**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: NNE**

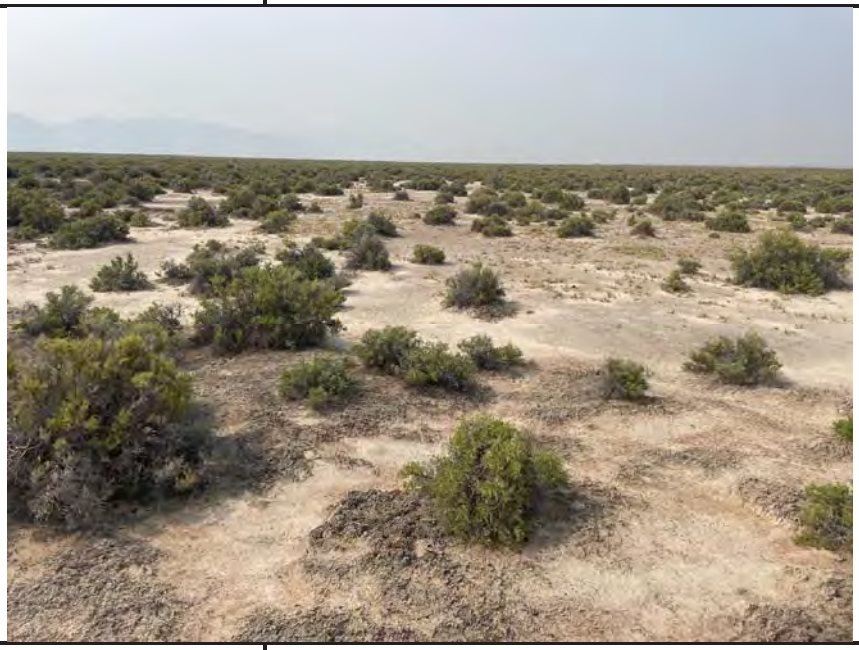


Site ID: Crescent Playa Margin 1 **Photo: CV-10**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: SW**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 2 **Photo: CV-11**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: E**



Site ID: Crescent Playa Margin 2 **Photo: CV-12**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: NNW**

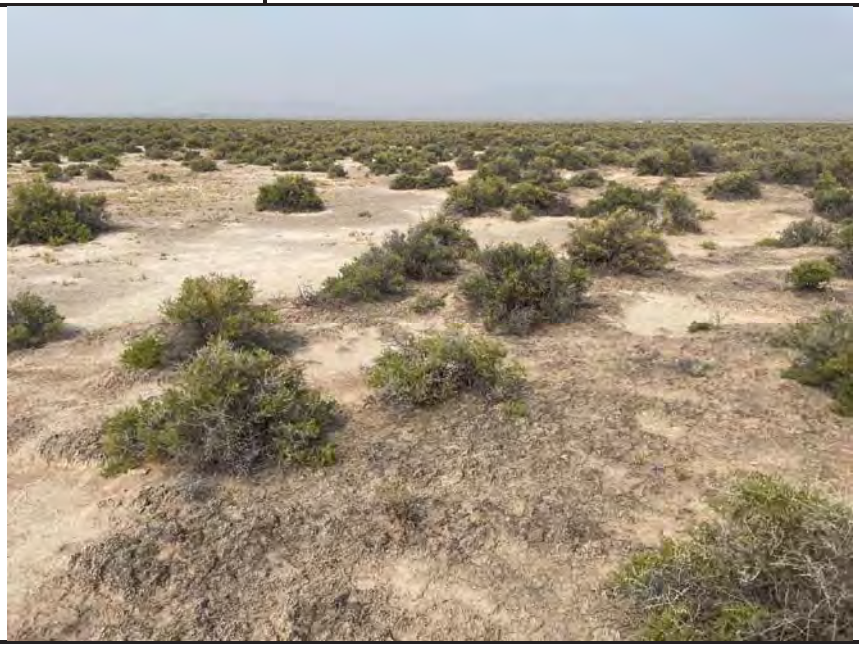


Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 2 **Photo: CV-13**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: WSW**

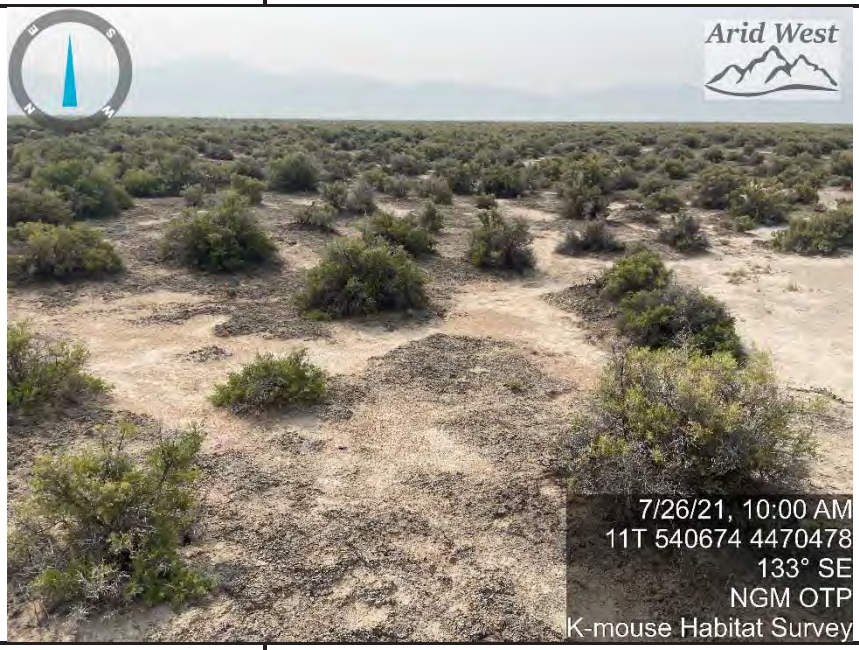


Site ID: Crescent Playa Margin 2 **Photo: CV-14**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: SSE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 2 **Photo: CV-15**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: SE**



Site ID: Crescent Playa Margin 2 **Photo: CV-16**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: ENE**

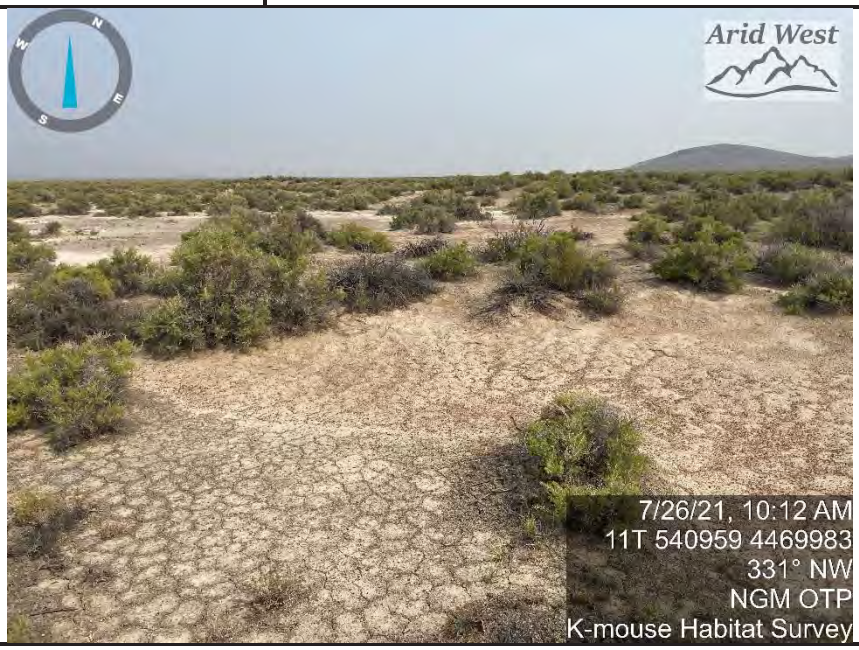


Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 2 **Photo: CV-17**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: ENE**



Site ID: Crescent Playa Margin 2 **Photo: CV-18**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: NNW**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 2 **Photo: CV-19**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: SSW**



Site ID: Crescent Playa Margin 2 **Photo: CV-20**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: NW**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa Margin 2 **Photo: CV-21**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: NW**



Site ID: Crescent Playa Margin 2 **Photo: CV-22**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa 1 **Photo: CV-23**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: SSW**



Site ID: Crescent Playa 1 **Photo: CV-24**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa 1 **Photo: CV-25**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: W**

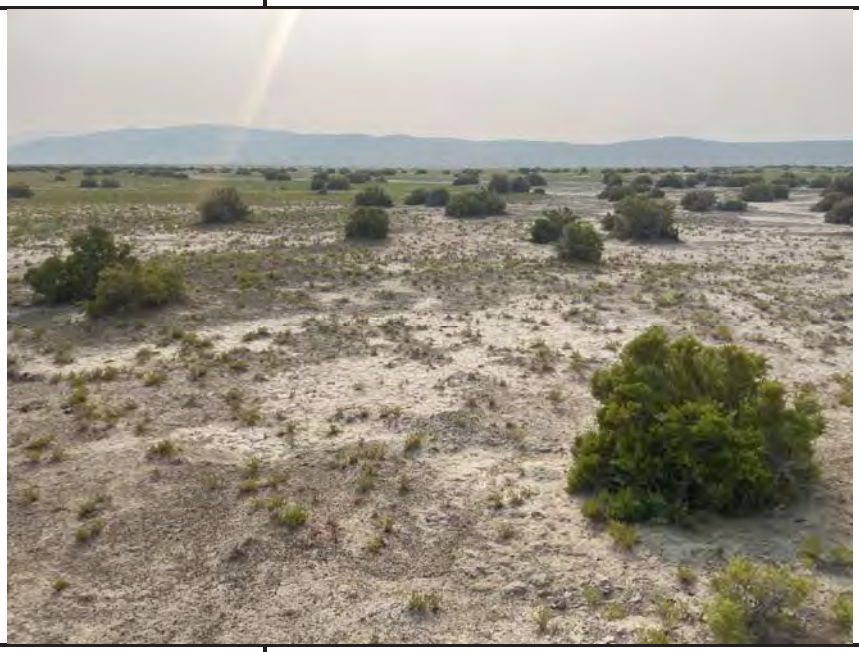


Site ID: Crescent Playa 1 **Photo: CV-26**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: E**

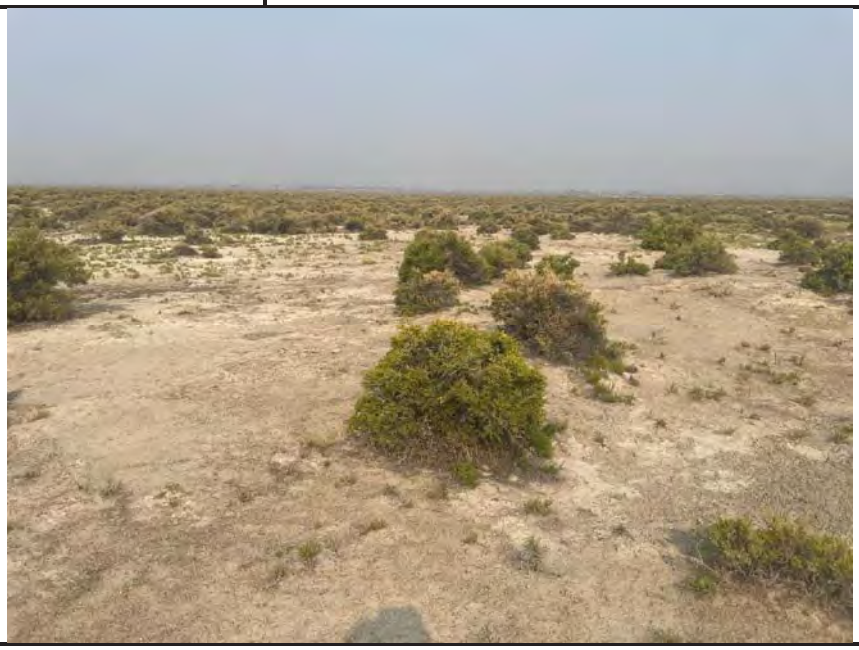


Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa 1 **Photo: CV-27**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: N**



Site ID: Crescent Playa 1 **Photo: CV-28**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Crescent Playa 1 **Photo: CV-29**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: E**



Site ID: Crescent Playa 1 **Photo: CV-30**	**Project Area: Crescent Valley Area**
Date: 07/26/2021	**Direction: SSE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills North **Photo: CV-31**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: SSE**



Site ID: Cortez Foothills North **Photo: CV-32**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills North **Photo: CV-33**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NE**



Site ID: Cortez Foothills North **Photo: CV-34**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-35**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: N**

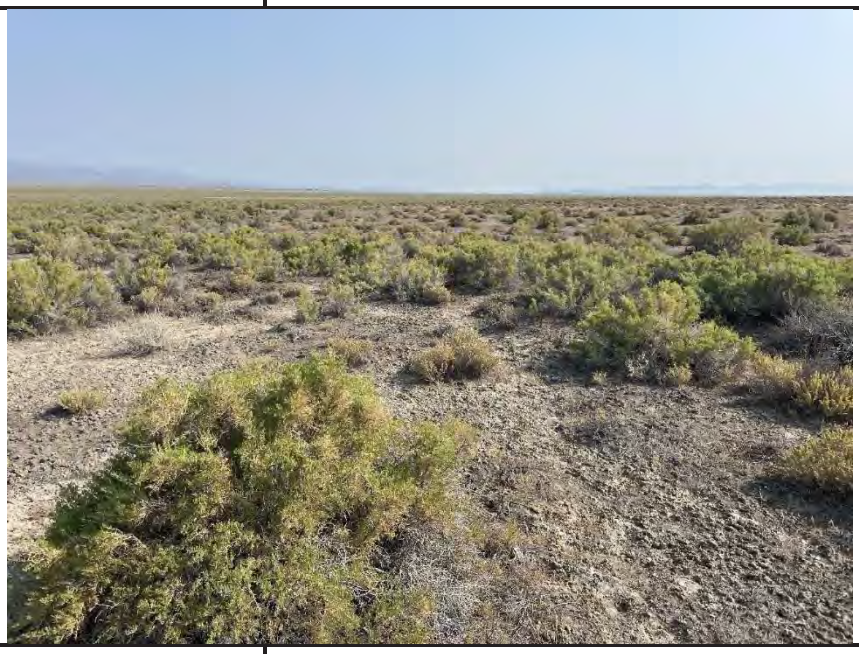


Site ID: Cortez Foothills South **Photo: CV-36**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: E**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-37**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Site ID: Cortez Foothills North **Photo: CV-38**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-39**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NW**



Site ID: Cortez Foothills North **Photo: CV-40**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-41**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: S**



Site ID: Cortez Foothills South **Photo: CV-42**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: ESE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-43**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: N**

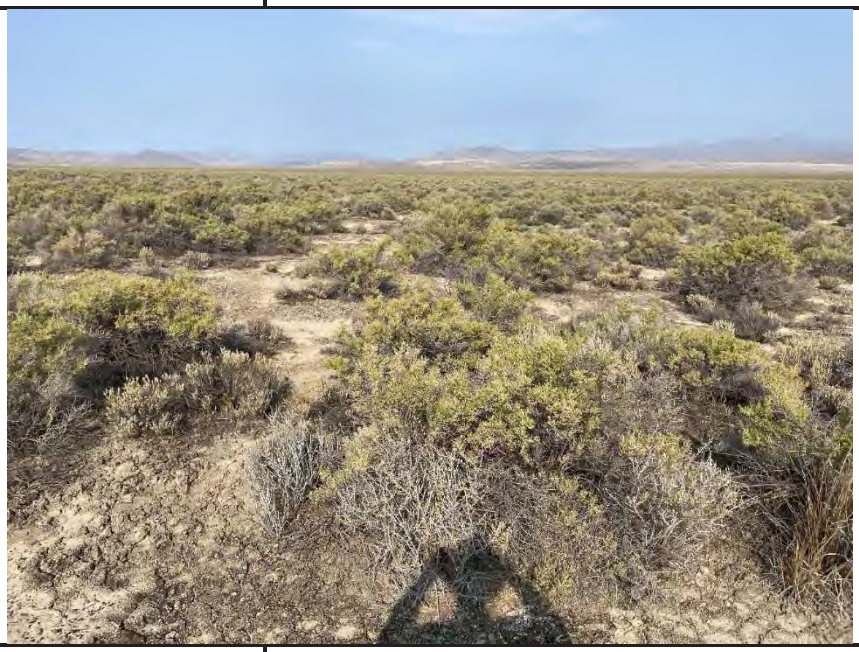


Site ID: Cortez Foothills South **Photo: CV-44**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-45**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: S**



Site ID: Cortez Foothills South **Photo: CV-46**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: N**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-47**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: ESE**



Site ID: Cortez Foothills South **Photo: CV-48**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: WSW**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-49**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: ENE**

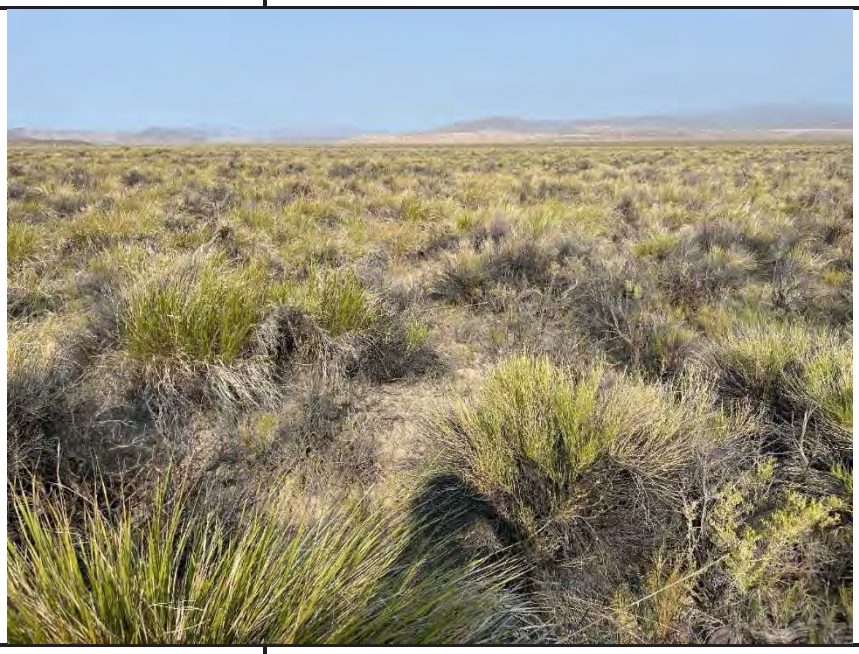


Site ID: Cortez Foothills South **Photo: CV-50**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NNW**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-51**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: SSE**

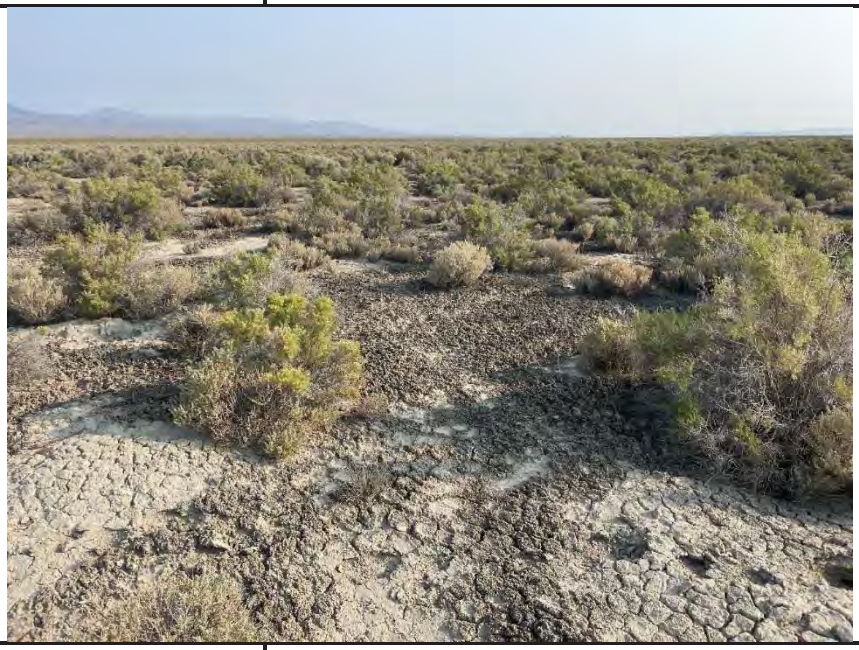


Site ID: Cortez Foothills South **Photo: CV-52**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NNE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-53**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Site ID: Cortez Foothills South **Photo: CV-54**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NNW**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-55**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: SSE**



Site ID: Cortez Foothills South **Photo: CV-56**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: ESE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-57**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: S**



Site ID: Cortez Foothills South **Photo: CV-58**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: N**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-59**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: S**



Site ID: Cortez Foothills South **Photo: CV-60**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-61**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: SE**



Site ID: Cortez Foothills South **Photo: CV-62**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: N**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-63**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: E**



Site ID: Cortez Foothills South **Photo: CV-64**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-65**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: S**



Site ID: Cortez Foothills South **Photo: CV-66**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-67**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NNE**



Site ID: Cortez Foothills South **Photo: CV-68**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NNE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-69**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: W**



Site ID: Cortez Foothills South **Photo: CV-70**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: SSW**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-71**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: N**



Site ID: Cortez Foothills South **Photo: CV-72**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: ESE**



Kangaroo Mouse Survey Photos – Crescent Valley Area

Site ID: Cortez Foothills South **Photo: CV-73**	**Project Area: Crescent Valley Area**
Date: 07/27/2021	**Direction: NW**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-01**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: N**



Site ID: Boulder Valley North **Photo: GS-02**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: E**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-03**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: SSE**



Site ID: Boulder Valley North **Photo: GS-04**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: SW**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-05**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: SSE**



Site ID: Boulder Valley North **Photo: GS-06**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: N**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-07**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: SE**



Site ID: Boulder Valley North **Photo: GS-08**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: WSW**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-09**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: WSW**



Site ID: Boulder Valley North **Photo: GS-10**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: ESE**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-11**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: NW**



Site ID: Boulder Valley North **Photo: GS-12**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-13**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: SW**



Site ID: Boulder Valley North **Photo: GS-14**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: NE**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-15**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: N**



Site ID: Boulder Valley North **Photo: GS-16**	**Project Area: Goldstrike Area**
Date: 07/29/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-17**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley North **Photo: GS-18**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: SSW**

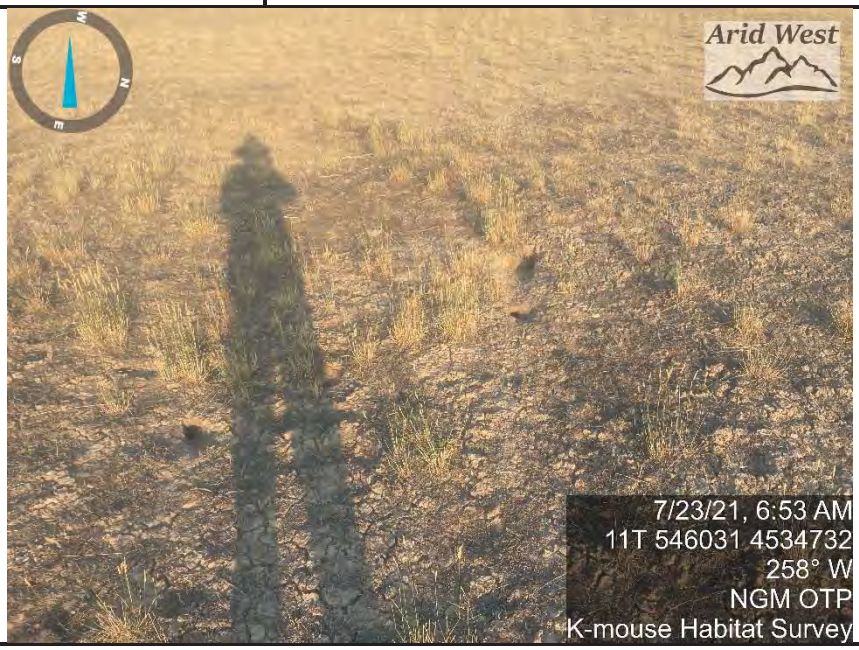


Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-19**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: W**



Site ID: Boulder Valley North **Photo: GS-20**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: W**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-21**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: N**



Site ID: Boulder Valley North **Photo: GS-22**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: N**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley North **Photo: GS-23**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley **Photo: GS-24**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-25**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley **Photo: GS-26**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: SSW**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-27**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley **Photo: GS-28**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: SSW**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-29**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley **Photo: GS-30**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: NNE**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-31**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley **Photo: GS-32**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-33**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: NNE**



Site ID: Boulder Valley **Photo: GS-34**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: SSW**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-35**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley **Photo: GS-36**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-37**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: S**



Site ID: Boulder Valley **Photo: GS-38**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: SSE**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-39**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: SSE**



Site ID: Boulder Valley **Photo: GS-40**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: E**



Kangaroo Mouse Survey Photos – Goldstrike Area

Site ID: Boulder Valley **Photo: GS-41**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: N**



Site ID: Boulder Valley **Photo: GS-42**	**Project Area: Goldstrike Area**
Date: 07/23/2021	**Direction: W**



APPENDIX E
LCT TECHNICAL MEMORANDUM

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ERM

1200 17th Street
Floor 10
Denver, Colorado 80202

Telephone: +1 303 968 2787

www.erm.com

Memo

To	Steve Grosz, Nevada Gold Mines
From	Morriah Fickes, Fisheries Biologist
Date	29 April 2022
Reference	Ore Transportation Project Baseline Studies
Subject	Indian Creek Aquatic Habitat Evaluation

Summary

At the request of Nevada Gold Mines (NGM), ERM biologists conducted a field habitat assessment of Indian Creek and evaluated aquatic habitat conditions in reference to suitability for Lahonton Cutthroat Trout (*Oncorhynchus clarki henshawi*). Findings from this evaluation indicate there is a low likelihood of Lahonton Cutthroat Trout (LCT) occurring in the segment of Indian Creek within the Ore Transportation Project (Project) Area, or in the immediate vicinity upstream and downstream of the Project.

Project Location

The section of Indian Creek evaluated in this field assessment is located in the Crescent Valley Survey Area, approximately a half mile south of Hilltop Road (SR 304) and approximately 2 miles east of State Route 306. ERM biologists surveyed approximately 4 linear miles of Indian Creek, extending from Photo Site 22 downstream to Photo Site 1 (Figure 1).

Habitat Characterization and Suitability for Lahonton Cutthroat Trout

Subsequent to a desktop review of the Indian Creek drainage in the Project and immediate vicinity, ERM conducted a field habitat characterization of Indian Creek on 15 April 2022. The habitat assessment documented current surface hydrology, including depth and temperature if water was present, presence/absence of aquatic life, bank stability/vegetation, grazing disturbance, instream habitat, and substrate composition. The field assessment confirmed that there is no distinguishable connection to any other stream or waterbody at the most downstream point of Indian Creek (Photo Sites 1 and 2). At the time of the field assessment, all segments of Indian Creek in the Project Area were dry, with flowing water limited to one section approximately 1 mile in length located 1 mile upstream of the northern survey boundary (Photo Site 20 and 22). The depth of water in this section averaged 5 inches, and the average wetted width of stream approximately 2 feet. Cattle and livestock use of this area was prominent. Fish were not observed at any location on Indian Creek during the habitat assessment.

Active and historical agricultural activities have altered the landscape surrounding Indian Creek in and around the Project, causing disturbance to soils, vegetative riparian buffer and species, and the natural water flow (Photo Site 10 and 19). Evidence of livestock grazing and cattle activity (e.g., trampling, stream crossings) was common throughout the areas evaluated, and appears to have adversely impacted bank stability, structure, and vegetative cover in

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many locations (Photo Site 8 and 16). Riparian vegetation along Indian Creek was minimal or absent in most areas at the time of survey and, when present, was comprised predominantly of upland vegetative species (Photo Sites 13 and 21). A small number of willows were documented only in the area with flowing water (Photo Site 22). Although visual evidence of historical flows was observed within the Project survey area, including distinct channels, larger instream substrates, cracked ground, and human-made diversion structures and dams (Photo Site 4, 9, and 17), no evidence of recent flow was documented, and the significant disturbance of the streambanks from livestock, lack of vegetative cover/instream habitat, and eroding banks would indicate that Indian Creek provides very limited habitat to LCT, even if adequate flows were present (Photo Site 2, 13, and 19).

Conclusion

The observations made during the habitat assessment suggest that typical connectivity and habitat conditions in this segment of Indian Creek do not support resident LCT. Further, the absence of a downstream connection to more perennial waters—or habitat that could provide refugia to stranded fish after a period of peak flow and increased connectivity—suggest that LCT are unable to enter the Project from any source water downstream. If LCT historically occurred in this segment of Indian Creek, it likely originated from a location upstream where flows are less seasonally dependent and physical habitat features are supportive to self-sustaining populations of LCT.

LCT Habitat Analysis Photo Log

Photo ID: 001	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.282529, -116.611440)**



Photo ID: 002	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.282529, -116.611440)**



LCT Habitat Analysis Photo Log

Photo ID: 003	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40,290513, -116.609208)**



Photo ID: 004	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.301049, -116.608408)**



LCT Habitat Analysis Photo Log

Photo ID: 005	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.301049, -116.608408)**



Photo ID: 006	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S**



LCT Habitat Analysis Photo Log

Photo ID: 007	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S**



Photo ID: 008	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.302160, -116.608756)**



LCT Habitat Analysis Photo Log

Photo ID: 009	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.302610, -116.608875)**



Photo ID: 010	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S**



LCT Habitat Analysis Photo Log

Photo ID: 011	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.303265, -116.609050)**



Photo ID: 012	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S**

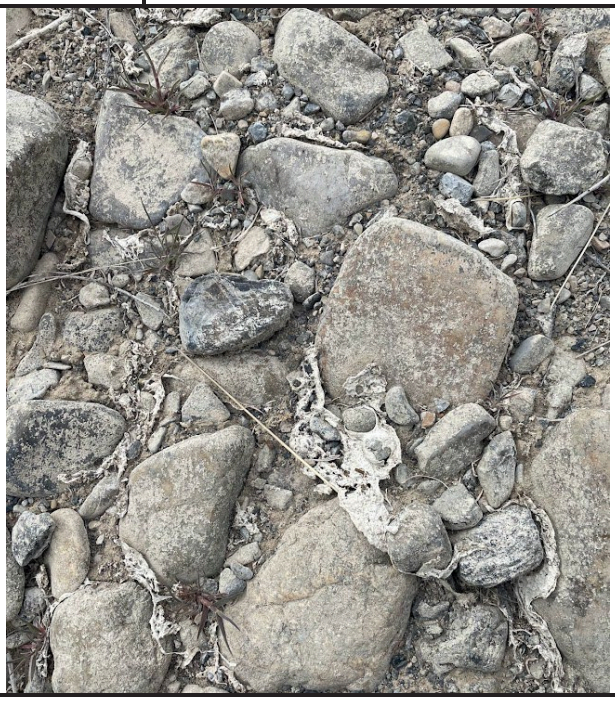


LCT Habitat Analysis Photo Log

Photo ID: 013	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.303829, -116.609230)**



Photo ID: 014	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.303829, -116.609230)**



LCT Habitat Analysis Photo Log

Photo ID: 015	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S**

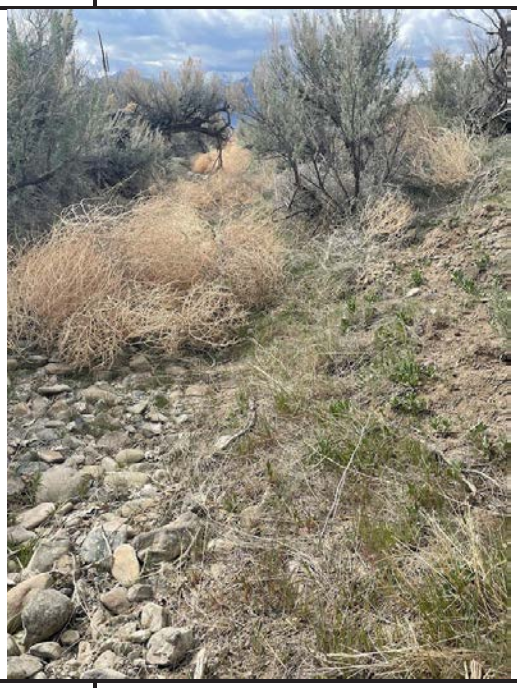


Photo ID: 016	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S**



LCT Habitat Analysis Photo Log

Photo ID: 017	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: : N (40.304627, -116.609357)**



Photo ID: 018	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.304627, -116.609357)**



LCT Habitat Analysis Photo Log

Photo ID: 019	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.309246, -116.613525)**



Photo ID: 020	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.313997, -116.622569)**



LCT Habitat Analysis Photo Log

Photo ID: 021	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40,315636, -116.625720)**



Photo ID: 022	**Project Area: Crescent Valley**
Date: 04/15/2022	**Direction: S (40.322388, -116.641364)**





Year 2 Biological Baseline Report

Ore Transportation Project

December 2022

Project No.: 0642316

The business of sustainability

ERM

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Signature Page

December 2022

Year 2 Biological Baseline Report

Ore Transportation Project



Wes Leavitt
Partner



Amberly Moon
Principal Consultant – Project Management

ERM-West, Inc.
136 East South Temple
Suite 2150
Salt Lake City, Utah 84111

T: +1 801 204 4300
F: +1 801 595 8484

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AIM	Assessment, Inventory, and Monitoring
ARMPA	Approved Resource Management Plan Amendment
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
ECBC	Elko County Board of Commissioners
ERM	ERM-West, Inc.
GHMA	General Habitat Management Area
ID	identification
IM	Instruction Memorandum
N/A	data not available
NAC	Nevada Administrative Code
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NGM	Nevada Gold Mines, LLC
NRCS	Natural Resources Conservation Services
NRMAC	Natural Resource Management Advisory Commission
NRS	Nevada Revised Statute
OHMA	Other Habitat Management Area
PHMA	Priority Habitat Management Area
Project	Ore Transportation Project
RMP	Resource Management Plan
SWReGAP	Southwest Regional Gap Analysis Project
UPRR	Union Pacific Railroad
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAP	Wildlife Action Plan

1. INTRODUCTION

Nevada Gold Mines, LLC (NGM) contracted ERM-West, Inc. (ERM) to conduct biological and noise baseline studies for the proposed Ore Transportation Project (Project). The purpose of the baseline studies was to inventory and characterize water, wildlife, and vegetation resources for the Project to support future National Environmental Policy Act (NEPA) analysis. Surveys, inventories, and monitoring were completed over 2 years using protocols approved by the Bureau of Land Management (BLM) and the Nevada Department of Wildlife (NDOW).

The Year 1 biological baseline studies were completed May through September 2021 and focused on water resources, vegetation and soil types, habitat assessments, and wildlife surveys (ERM 2022a). The Year 2 biological baseline studies presented in this report were completed March through July 2022 and focused on additional taxa-specific surveys and/or trapping. The information from both years of baseline studies will be used to support future permitting needs, including compliance with NEPA.

A noise monitoring study was also completed to assess baseline ambient noise levels along the proposed Project route, and a cumulative report providing the detailed methodology and results of the noise assessment was submitted under separate cover (ERM 2022b). Results regarding the noise monitoring study are not discussed in this report.

1.1. PROJECT LOCATION

The Project is within Elko, Eureka, and Lander counties, Nevada, and includes approximately 2,660 acres of public lands administered by the Elko and Battle Mountain BLM Nevada District Offices, and approximately 3,962 acres of privately owned lands (Table 1.1-1 and Figure 1.1-1). The Project is located within the U.S. Environmental Protection Agency Central Basin and Range Level III Ecoregion. This ecoregion is characterized by mid- to high-elevation ranges interspersed with rolling hills, alluvial fans, and valleys. Valleys and lower elevation slopes are dominated by Great Basin sagebrush or saltbush-greasewood vegetation communities, while pinyon-juniper woodland and mountain-mahogany occur at higher elevations. The Central Basin and Range Ecoregion hydrology is internally drained, and most streams are intermittent and ephemeral (Wiken et al. 2011).

The Project is separated into three distinct survey areas: Goldstrike, Carlin, and Crescent Valley. Biological resource surveys were conducted in these survey areas within the Project footprint plus varying species-specific buffer distances from the centerline of the proposed railway, borrow source areas, access roads, and the proposed construction depots (herein referred to as the “Project Area”).

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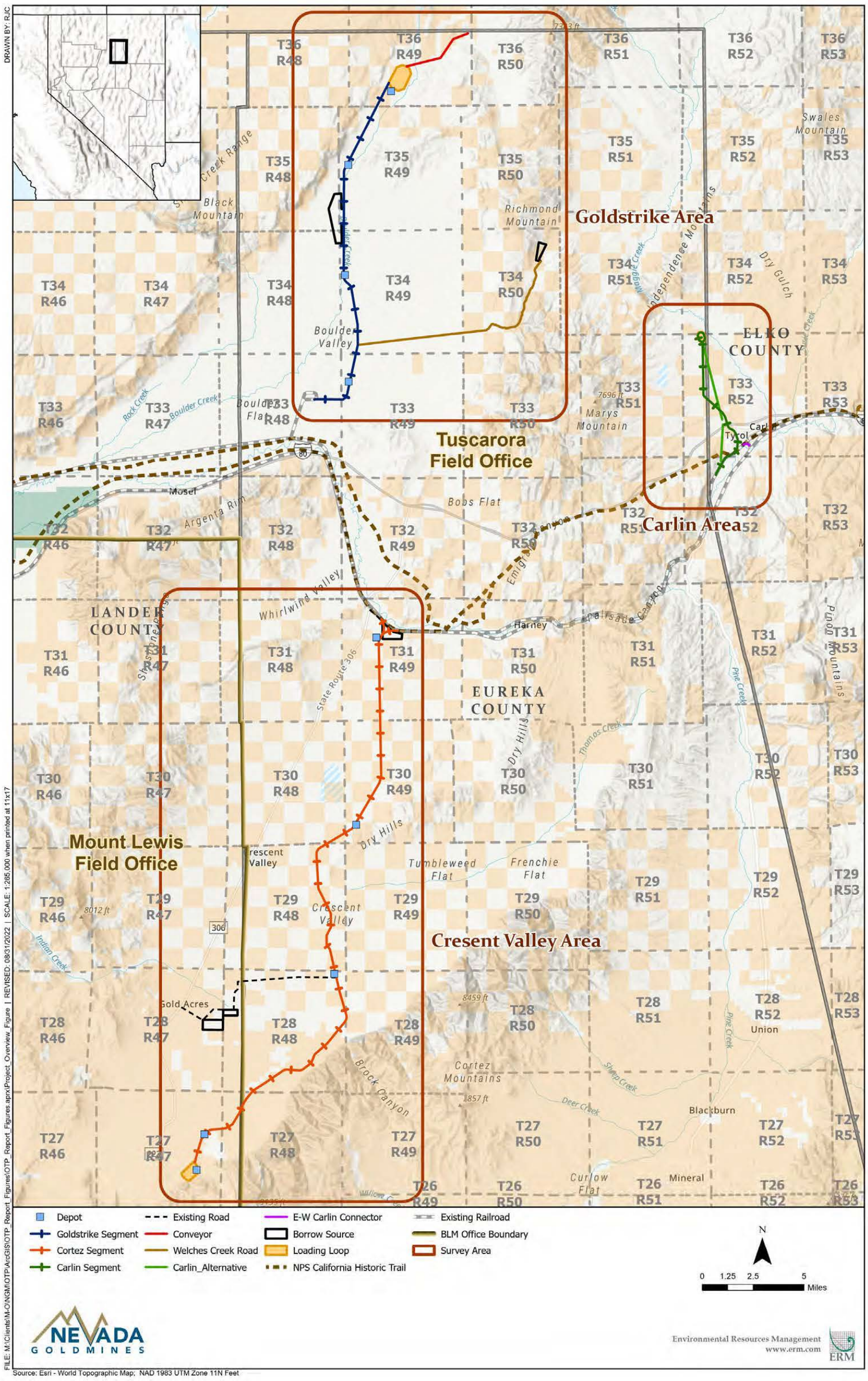


Figure 1.1-1: Project Overview

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Table 1.1-1: Land Jurisdiction within the Project Area

Ownership	BLM Field Office	Acres
BLM Elko District Office	Tuscarora Field Office	2,076.9
BLM Battle Mountain District Office	Mount Lewis Field Office	583.8
Private	-	3,961.5
Total	**-**	**6,622.2**

Source: BLM 2020

1.1.1. Landscape Setting and Land Use

Land use in northeastern Nevada includes mining, mine exploration, livestock grazing, agricultural use, and off-highway vehicle recreation, which occur throughout the Project Area (Wiken et al. 2011). Elevations within the Project Area range from approximately 9,135 feet above mean sea level at the summit of Mount Tenabo in the northern Cortez Mountains, to approximately 4,600 feet above mean sea level northwest of the Dunphy rail siding.

1.1.2. Climate

The climate in northeastern Nevada is characterized by a dry, mid-latitude desert climate, with hot summers, cold winters, and wet springs. Precipitation in this area regularly falls in winter as snow, and most rainfall occurs during spring and summer thunderstorms, which is typical of the Central Basin and Range Ecoregion (USGS 2012; Wiken et al. 2011). Annual precipitation in Elko, Eureka, and Lander counties ranges from just over 9 inches to almost 11 inches. Temperatures during January range from a low of 12.8 degrees Fahrenheit (°F) to a high of 46.2 °F. During the summer (July through September), temperatures range from a low of 39.9 °F to a high of 99.5 °F. Table 1.1-2 presents historic monthly climate normals for precipitation, as well as mean high and low temperatures for Elko, Eureka, and Lander counties. Historic precipitation and temperatures from the National Oceanic and Atmospheric Administration includes data from 1991 to 2020 (NOAA 2022a).

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Table 1.1-2: Monthly Precipitation and Temperatures for Elko, Eureka, and Lander Counties

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Elko County, Nevada [a]													
Precipitation (inches)													Total
Mean	1.19	0.89	0.97	1.05	1.22	0.57	0.36	0.33	0.59	0.74	0.88	1.20	9.99
Temperature (ºF)													Average
High	37.9	42.8	53.1	59.6	70.0	81.5	91.8	90.0	80.1	65.5	49.9	38.0	63.4
Low	16.0	20.5	26.8	31.5	38.5	44.9	52.0	49.2	40.5	29.4	21.9	15.4	32.2
Mean	27.0	31.6	39.9	45.6	54.2	63.2	71.9	69.6	60.3	47.4	35.9	26.7	47.8
Eureka County, Nevada [b]													
Precipitation (inches)													Total
Mean	0.80	0.78	0.97	1.08	1.16	0.63	0.58	0.54	0.57	0.61	0.64	0.74	10.86
Temperature (ºF)													Average
High	39.0	43.0	52.4	58.7	68.8	81.1	90.4	88.2	78.4	64.6	50.3	38.9	59.5
Low	12.8	16.0	23.5	28.2	35.2	42.4	49.6	48.2	39.9	29.0	19.8	12.1	33.0
Mean	25.9	29.5	38.0	43.5	52.0	61.7	70.0	68.2	59.1	46.8	35.1	25.5	46.2
Lander County, Nevada [c]													
Precipitation (inches)													Total
Mean	0.98	0.78	0.91	1.12	1.44	0.65	0.20	0.29	0.47	0.56	0.77	1.02	9.19
Temperature (ºF)													Average
High	46.2	51.9	61.8	67.8	78.2	89.5	99.5	97.6	87.4	73.1	56.8	45.9	71.3
Low	22.1	26.3	31.2	35.7	43.5	49.9	56.4	53.5	44.7	34.4	27.2	22.1	34.0
Mean	34.2	39.1	46.5	51.7	60.8	69.7	78.0	75.6	66.0	53.7	42.0	34.0	54.3

ºF = degrees Fahrenheit
[a] Source: NOAA 2022a, Elko Area location
[b] Source: NOAA 2022a, Eureka Area location
[c] Source: NOAA 2022a, Battle Mountain location

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1.2. PROJECT DESCRIPTION

The Project would consist of a newly constructed railway and conveyor system to haul ore from the Cortez Mine District north to the Gold Quarry and Goldstrike mines for processing. The purpose of the Project is to allow for optimized processing, which would improve safety by reducing over-the-road haulage on public highways and would reduce air and greenhouse gas emissions. Project specifics include the following:

- New private rail line would be constructed from Cortez to Beowawe, where it would connect to the existing Union Pacific Railroad to travel east or west;
- New siding and private rail line would be constructed near Carlin to travel north to Gold Quarry;
- A new private railway would be built from the T.S. Power Plant to the east and extend north through Boulder Valley to Goldstrike; and
- Loading/unloading facilities such as stockpiles, rail loops, and conveyors.

This rail system includes temporary borrow source areas and temporary depots (construction laydown yards). The depots and borrow sources will be reclaimed after construction is complete. As shown on Figure 1.1-1, the Project is separated into three distinct surveyed areas: Goldstrike, Carlin, and Crescent Valley. This report will discuss the results based on the three defined areas.

1.3. LAWS, REGULATIONS, AND PLANS

A detailed list and description of the federal, state, and county regulations and permits pertaining to biological resources and land use management that guided the information collected for the 2022 baseline studies are described below. Land and resource management plans applicable to this *Year 2 Biological Baseline Report* include BLM Resource Management Plans (RMPs), a comprehensive plan prepared by the National Park Service, and county management and master plans.

1.3.1. Federal

The Council on Environmental Quality regulations discuss “human environment” in the Code of Federal Regulations, Title 40, Section 1508.14 (40 CFR 1508.14). This term broadly relates to the biological, physical, social, and economic elements of the environment. It includes the wildlife resources category. Relevant data is to be used in describing the affected environment as the basis for determining the effects (direct and indirect) of a proposed action. The *BLM National Environmental Policy Act Handbook H-1790-1* (BLM 2008) describes potential NEPA-related federal requirements.

Other federal requirements such as critical habitat procedural requirements must be followed. The following sections provide a list of relevant federal regulations.

1.3.1.1. Bureau of Land Management

The applicable BLM RMPs are the 1987 Elko RMP, the 1987 Shoshone-Eureka RMP, and amendments to those plans. These two RMPs guide BLM management decisions and actions based on multiple-use and sustained yield, unless otherwise specified by law.

BLM finalized an Approved Resource Management Plan Amendment (ARMPA) to address Greater Sage-grouse (*Centrocercus urophasianus*; hereafter referred to as "sage-grouse") habitat protection measures in Nevada and California (BLM 2015). The 2015 ARMPA provides guidance on measures to avoid and/or minimize potential impacts resulting from proposed projects in addition to providing appropriate measures to compensate for impacts that are unavoidable to sage-grouse.

habitat resulting from development projects.

BLM Nevada Special status species are species that occur on BLM-administered lands in Nevada consistent with Manual Section 6840 and current WO-230 guidance (NV Instruction Memorandum [IM]-2018-003) (BLM 2018, 2019a). This IM officially updates the list, which includes federally designated threatened, endangered, and proposed species as well as Nevada BLM sensitive species. In addition to the species listed in the IM, the BLM Elko District Office also maintains a sensitive species list (BLM 2019a). BLM's list of special status species includes the following three categories: 1) federally listed as Threatened or Endangered, Proposed, and Candidate species; 2) Nevada State-Protected species; and 3) Nevada BLM Sensitive species. BLM sensitive species are species for which population viability is a concern; they are managed by the BLM to, "ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed." These species are afforded the same level of protection as federal candidate species.

1.3.1.2. National Park Service

In 1992, Congress established the California National Historic Trail (National Trails System Act, Section 5(a)(18)). As required by the National Trails System Act, a Comprehensive Management and Use Plan was completed for the California National Historic Trail and three other national historic trails (i.e., Oregon, Mormon Pioneer, and Pony Express National Historic Trails) in 1999 (NPS 1999). This plan provides broad-based policies, guidelines, and standards for administering the four trails to ensure the protection of trail resources, their interpretation, and their continued use. The purposes of the California National Historic Trail are to 1) enable all people to envision and experience—in a coherent and convenient way—the heritage and impacts of the western overland migration; and 2) encourage preservation of its history and physical remains.

1.3.2. State

Under Nevada law and regulation, any wildlife receiving the distinction of fully protected species may not be captured, removed, or destroyed at any time except with special permit as provided under Nevada Revised Statutes (NRSs) 503.584-503.589 and Nevada Administrative Code (NAC) 503.093. NAC Chapters 501 and 503 provide information on the protection of threatened,

endangered, protected, and sensitive plant and animal species. NAC Chapter 501 establishes broad policies for the protection, propagation, restoration, transplanting, introduction, and management of wildlife in Nevada, while Chapter 503 defines the criteria for classification of species as protected and identifies those species that require protection.

The NDOW manages fish and wildlife populations through objectives specified in various management plans. NDOW has direct responsibility for wildlife protection. NDOW's Wildlife Action Plan (WAP) (Wildlife Action Plan Team 2013) was completed and approved by the U.S. Fish and Wildlife Service (USFWS) in 2005.

Nevada's WAP has served as a plan of action for state wildlife conservation and funding by targeting the species of greatest conservation need and the Key Habitats on which they depend. The WAP serves as a comprehensive, landscape level plan, identifying the species of greatest conservation need and the Key Habitats on which they depend, with the intent to prevent wildlife species from becoming threatened or endangered. The WAP contains conservation actions to provide guidance to successfully conserve Nevada's Key Habitats and priority species.

Many of the conservation actions within the WAP are strategies identified in other existing conservation plans. The WAP's recommended conservation actions do not represent a mandate or expectation for a given party to carry out or implement these actions. During WAP implementation, conservation actions developed at the state or local level would be used to provide guidance to address site-specific conditions as appropriate. Some of these actions may be applicable at the land use plan level, and some more appropriately applied at an activity plan or site-specific plan level.

1.3.3. County Management Plans

1.3.3.1. Elko County

Per the planning directives in the *Elko County Public Land Use & Natural Resource Management Plan* (Elko County 2010), all proposed actions on public lands are to be brought to the attention of the Elko County Natural Resource Management Advisory Commission (NRMAC) or the Elko County Board of Commissioners (ECBC) for purposes of review to determine if the federal program is in conformance with Elko County policies pursuant to NEPA requirements and allows the county to cooperate and coordinate with the federal land management agencies. Elko County will coordinate and cooperate with federal agencies on actions that affect public lands within the county.

The Elko County NRMAC will serve in an advisory capacity as liaison to the ECBC. The Elko County NRMAC and ECBC requires consistency between its RMP (Elko County 2010) and all federal land use management, resource management, travel management, and any other federal management plans and actions that apply to Elko County.

1.3.3.2. Eureka County

In 1993, the Eureka County Commissioners created the Eureka County Natural Resources Advisory Commission and appointed a nine-member board to serve on that commission. The

Natural Resources Advisory Commission makes recommendations to the Eureka County Commission on issues regarding the goals and policies established in the *Eureka County Master Plan 2010* related to public lands issues, including air space, wild horses, wildlife, grazing allotments, mining and recreation (Eureka County 2010).

1.3.3.3. Lander County

The Conservation and Natural Resource Element of the *Lander County Master Plan 2010* (Lander County 2010) outlines policies and action programs for protecting Lander County's land, water, and air resources as growth and development occurs. The Conservation and Natural Resource Element provides guidelines for conserving the county's important natural resources while satisfying the requirement for a conservation plan as outlined by the NRSs. As defined in the Conservation and Natural Resource Element, land resources include soils, topography, agricultural lands, minerals, public lands, and geothermal resources (Lander County 2010).

Specific goals of the Conservation and Natural Resources Element include protecting important agricultural lands that provide economically productive acreage, important flood management areas, prime or unique farmland, or farmlands of statewide importance; limiting conflicts and encroachment from developing lands on agricultural lands; promoting the development of renewable energy projects; and protecting important environmental resources and open space (Lander County 2010).

2. BIOLOGICAL BASELINE REPORT APPROACH

ERM developed this biological basesline report consistent with the 2022 Work Plan (ERM 2021a) approved by the BLM. The Year 2 baseline studies included field surveys for sage-grouse, amphibians (egg mass survey and call baiting), and springsnail species (Superfamilies *Truncatelloidea* and *Cerithioidea*); trapping for pale (*Microdipodops pallidus*) and dark kangaroo mice (*Microdipodops megacephalus*), and shrews (*Sorex* spp). The appendices for each of these sections contain detailed information, figures, and datasheets from the field surveys conducted during the 2022 field surveys. Wildlife resources were surveyed within suitable habitat identified during the 2021 field studies within a 200-foot buffer of the centerline (400-foot survey area) for small mammals, a 400-foot buffer of the centerline (800-foot survey area) for amphibians and springsnails, and a 4-mile buffer for sage-grouse as shown on Figure 2-1 through Figure 2-9. These survey areas included the borrow source areas, access roads that include a 50-foot buffer of the centerline (100-foot survey area), and the proposed construction depots.

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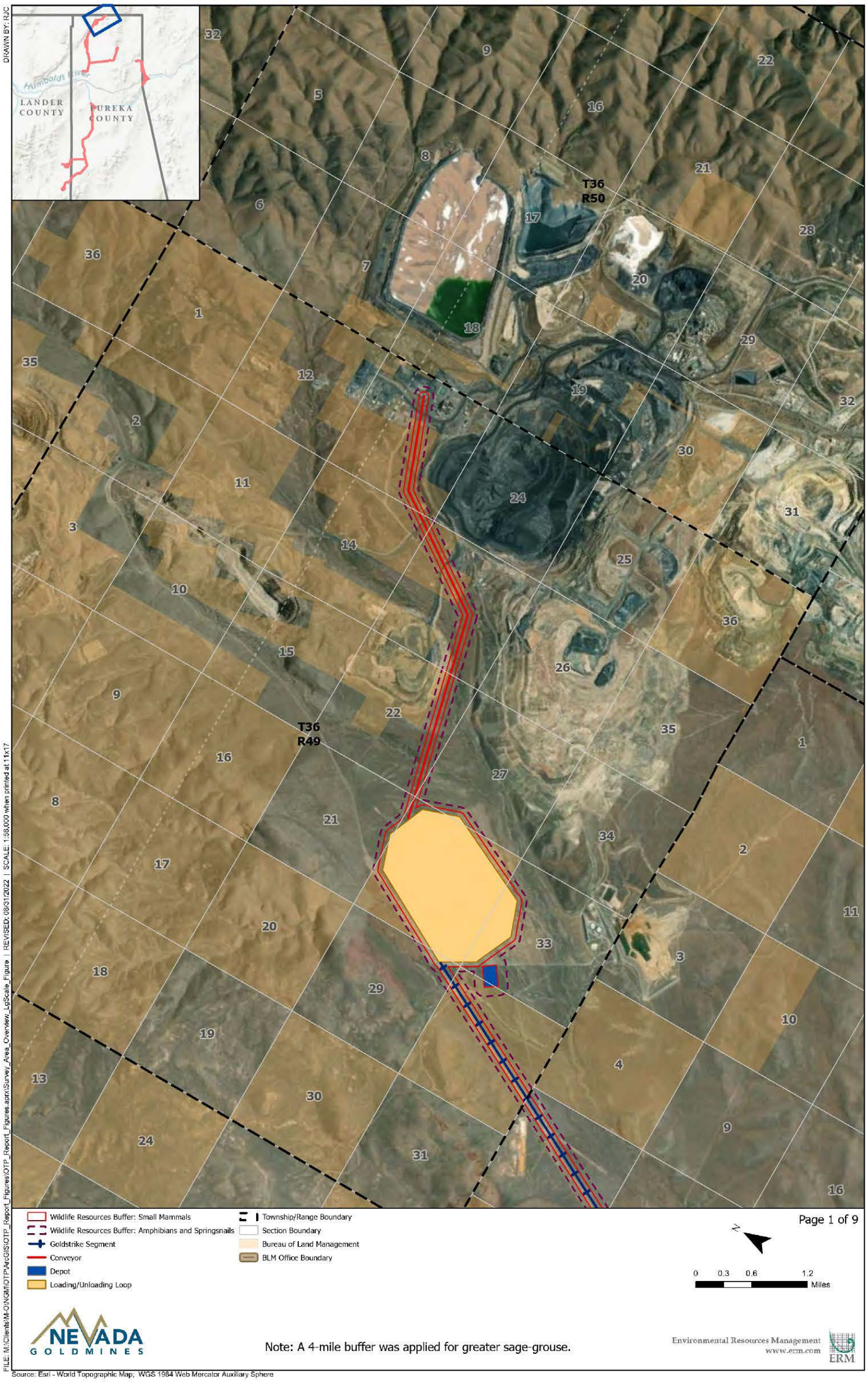


Figure 2-1: Survey Area Overview—Goldstrike (1)

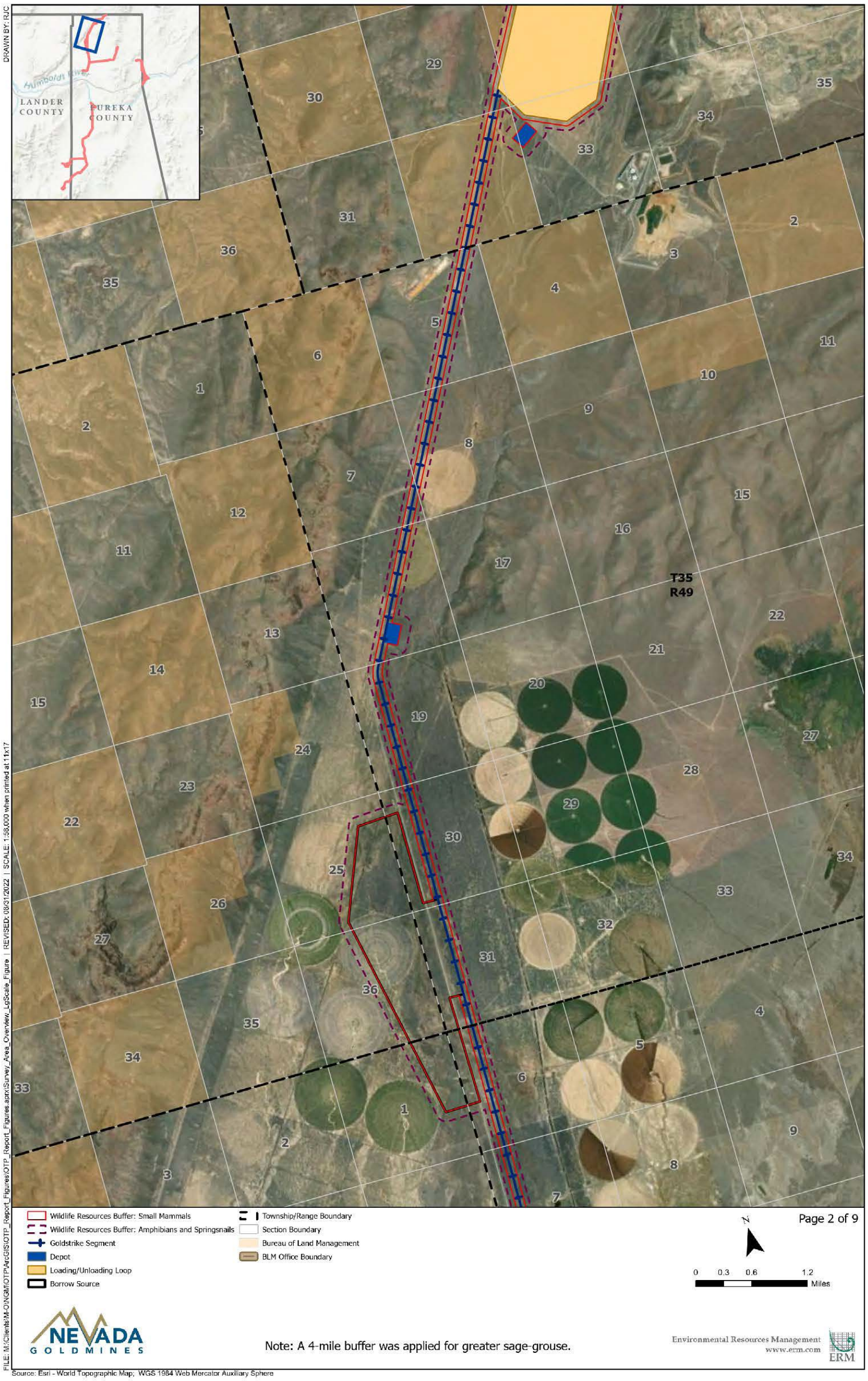


Figure 2-2: Survey Area Overview—Goldstrike (2)

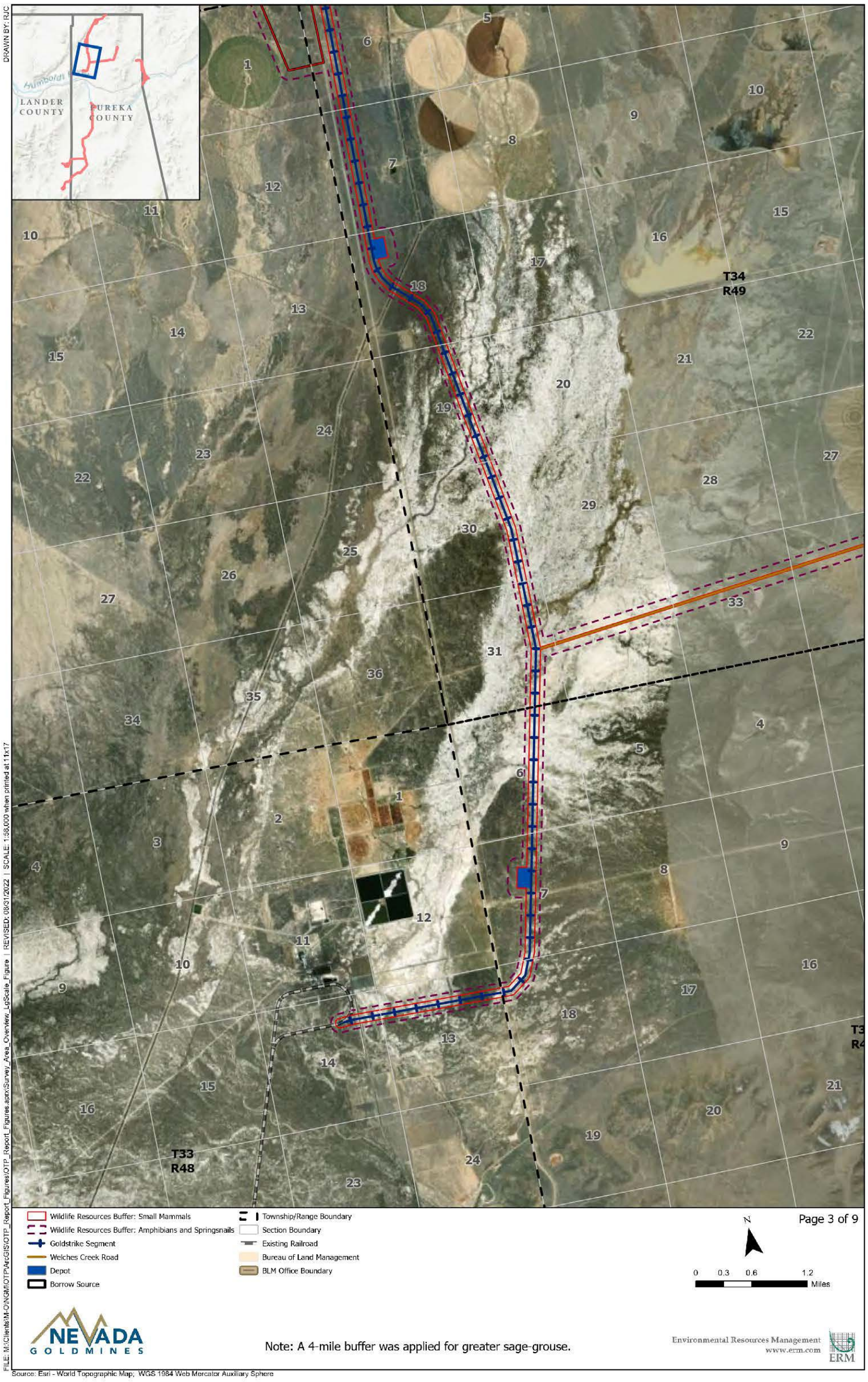


Figure 2-3: Survey Area Overview—Goldstrike (3)

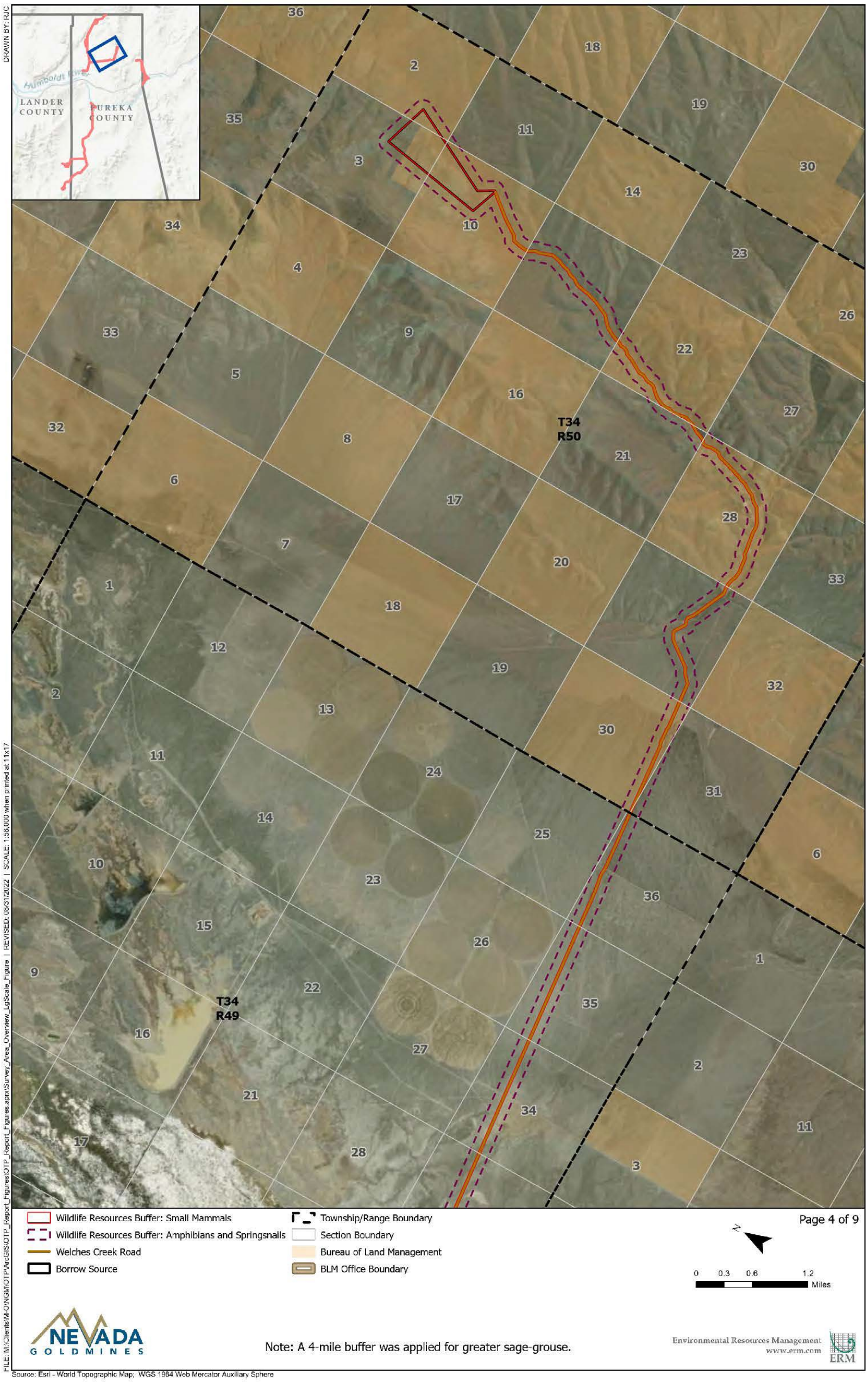


Figure 2-4: Survey Area Overview—Goldstrike (4)

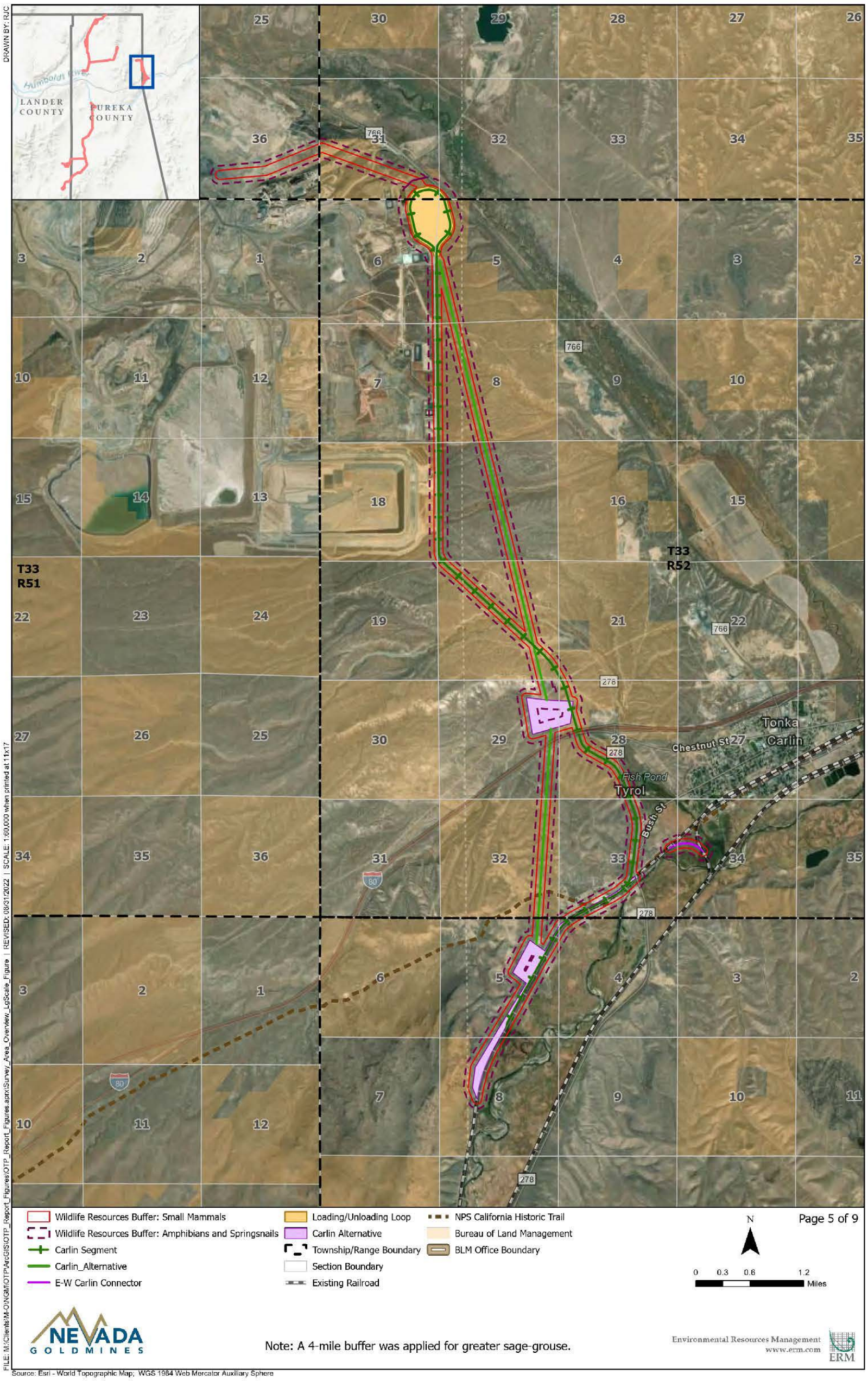


Figure 2-5: Survey Area Overview—Carlin (5)

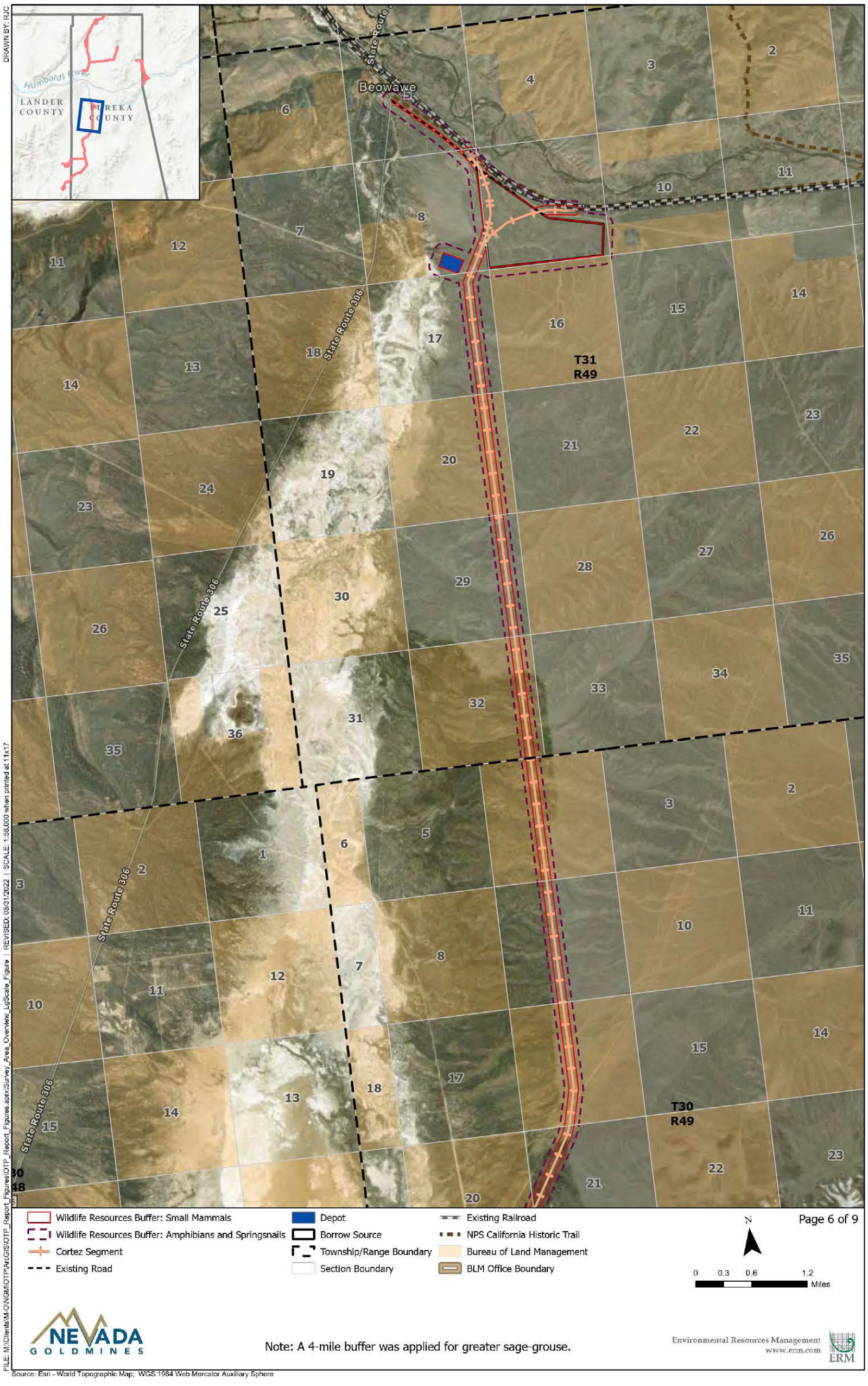


Figure 2-6: Survey Area Overview—Crescent Valley (6)



Figure 2-7: Survey Area Overview—Crescent Valley (7)

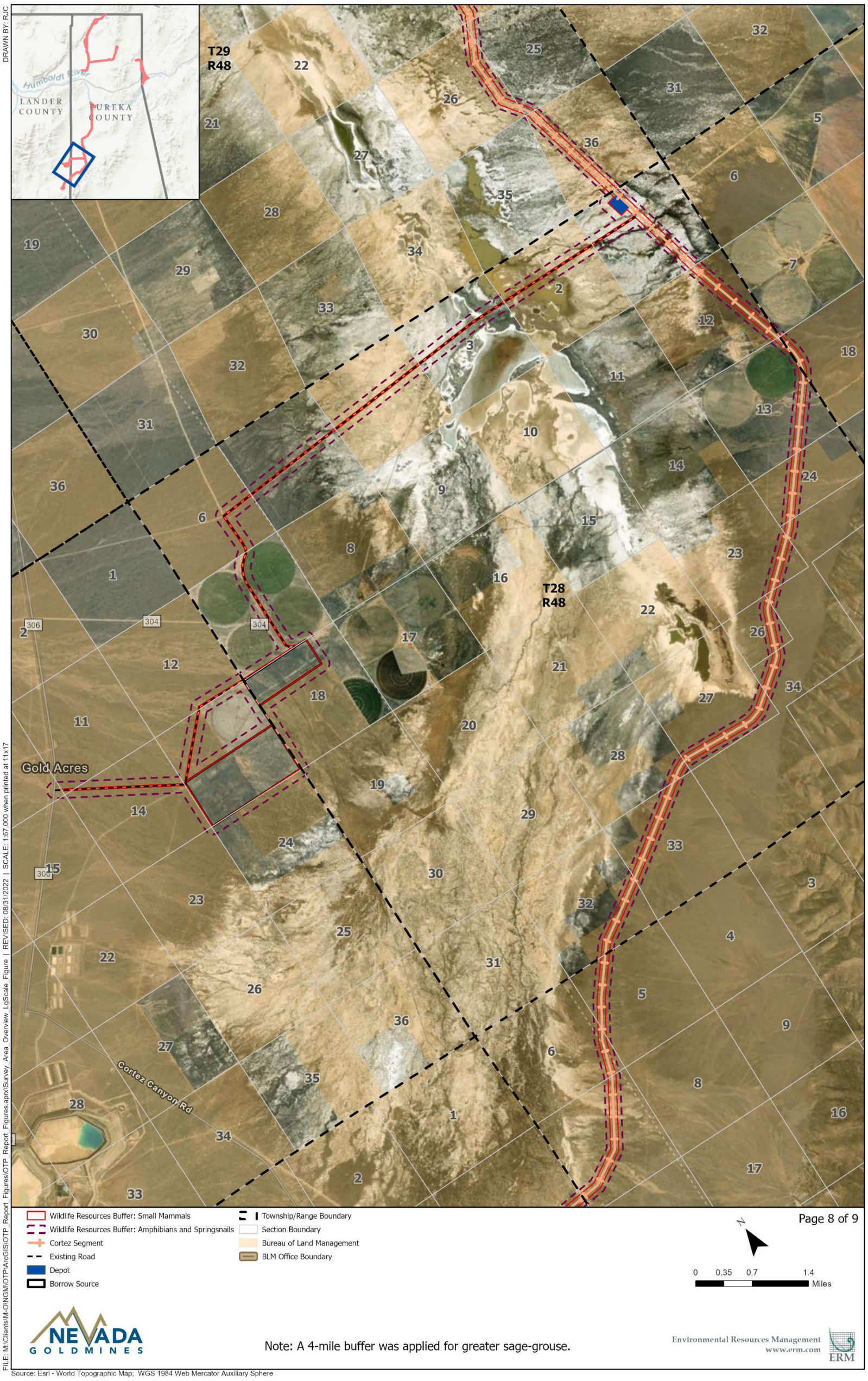


Figure 2-8: Survey Area Overview—Crescent Valley (8)



Figure 2-9: Survey Area Overview—Crescent Valley (9)

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3. BIOLOGICAL BASELINE STUDIES—YEAR 2

The survey area for obtaining biological baseline data for Year 2 included targeted areas of suitable habitat identified during the 2021 surveys within the Project footprint plus a varying buffer distance dependent on the wildlife species as described in Section 2, Biological Baseline Report Approach (Figure 2-1 through Figure 2-9). Resource sections provided in this report include sage-grouse, dark and pale kangaroo mouse, shrews, amphibians, and springsnails.

As described in the Year 1 report (ERM 2022a), wildlife habitat within the Project Area consists of shrubland and grassland communities with some forblands and riparian areas. Within the majority of the Project Area, these habitats are dominated by invasive vegetation. Agricultural, developed, and recently mined areas make up a lesser component of the Project Area. Agricultural activities, historical mining activities, livestock rotation, wild horses, and wildfire have altered the landscape by disturbing native soils, vegetation, and local hydrology throughout portions of the survey area. These habitats within the survey areas support a variety of general wildlife species including big game, fish, birds, mammals, bats, reptiles, amphibians, and butterflies.

The NDOW WAP describes wildlife conservation strategies based on 22 “Key Habitats” that occur in the state (Wildlife Action Plan Team 2013). The WAP also identifies Species of Conservation Priority and groups them into species assemblages. Conservation strategies are directed towards these species' assemblages and addresses conservation issues related to Key Habitats. A complete discussion of the 12 WAP Key Habitats within the Project Area is provided in the Year 1 report (ERM 2022a).

Habitat within the Project Area has the potential to support a variety of flora and fauna. General wildlife, threatened and endangered wildlife, BLM special status species, and big game species of the Project Area are described in detail in the Year 1 report (ERM 2022a). The sections below describe taxa-specific evaluations conducted based on information collected during the Year 1 studies and provide detailed information on the status of these species in the Project Area.

3.1. GREATER SAGE-GROUSE

3.1.1. Background

The sage-grouse is a BLM special status species and a state-managed game bird under NAC 503. The sage-grouse was listed as a candidate species under the Endangered Species Act until October 2, 2015, when the USFWS determined that listing was unwarranted (80 Fed. Reg. 59858–59942). After this determination was made, BLM and U.S. Forest Service land use plans were updated to focus on the conservation of important sage-grouse habitat across the 11 states this species can be found. Sage-grouse for the Project are managed under the BLM Nevada and Northern California ARMPA (BLM 2015, 2019b).

Sage-grouse are a sagebrush-obligate species, dependent on multiple shrub-steppe habitats for food, shelter, and rearing (Braun et al. 1976; Connelly et al. 2000). The various sagebrush-steppe communities that sage-grouse rely on are managed by federal, state, and local

authorities (BLM 2019b). Sagebrush is a primary food source for sage-grouse throughout the year and is often the only available food source during the late fall and winter (Connelly et al. 2004). Although sage-grouse display variable seasonal migratory behavior, they demonstrate high fidelity to seasonal ranges, returning to the same areas for foraging, courtship, and nesting (Connelly et al. 2000). Productive nesting habitat for sage-grouse includes sagebrush with a diverse canopy and healthy understory of native forbs and grasses (Wakkinen 1990; Gregg 1991; Schroeder et al 1999; Connelly et al 2000). During the spring breeding season—approximately March 1 through May 15 in Elko, Eureka, and Lander counties, Nevada (BLM 2014)—males gather on breeding grounds called “leks” to perform courtship displays. Typical lek habitat consists of open areas including bare soil, short-grass steppe, windswept ridges, and exposed knolls near denser shrub-steppe habitat with substantial cover (Connelly et al. 2004).

In order to identify and incorporate appropriate protection measures for these essential habitats, sage-grouse habitat on BLM-administered lands was categorized in the ARMPA as Priority Habitat Management Areas (PHMAs), General Habitat Management Areas (GHMAs), Other Habitat Management Areas (OHMAs), and non-habitat. A summary description of these categories is presented below:

- PHMAs are identified as having the highest value to maintaining sustainable sage-grouse populations. PHMA largely coincide with areas identified as Priority Areas for Conservation by the USFWS. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.
- GHMAs are those occupied by the sage-grouse on a seasonal or year-round basis that lie outside PHMAs. Some special management conditions, including infrastructure avoidance areas, post-fire treatment prioritization, integrated pest-management approaches, and other strategies, may apply to these areas to sustain sage-grouse populations.
- OHMAs were identified using updated modeling data and are defined as habitat that is unmapped within the planning area and contains seasonal habitat or connectivity corridors.
- Non-habitat areas are outside of mapped sage-grouse habitats (PHMA, GHMA, and OHMAs) that do not contain suitable habitat for sage-grouse life-history requirements.

Figure 3.1-1 illustrates the BLM Habitat Management Areas from the 2019 ARMPA and the lek locations within the Project Area.

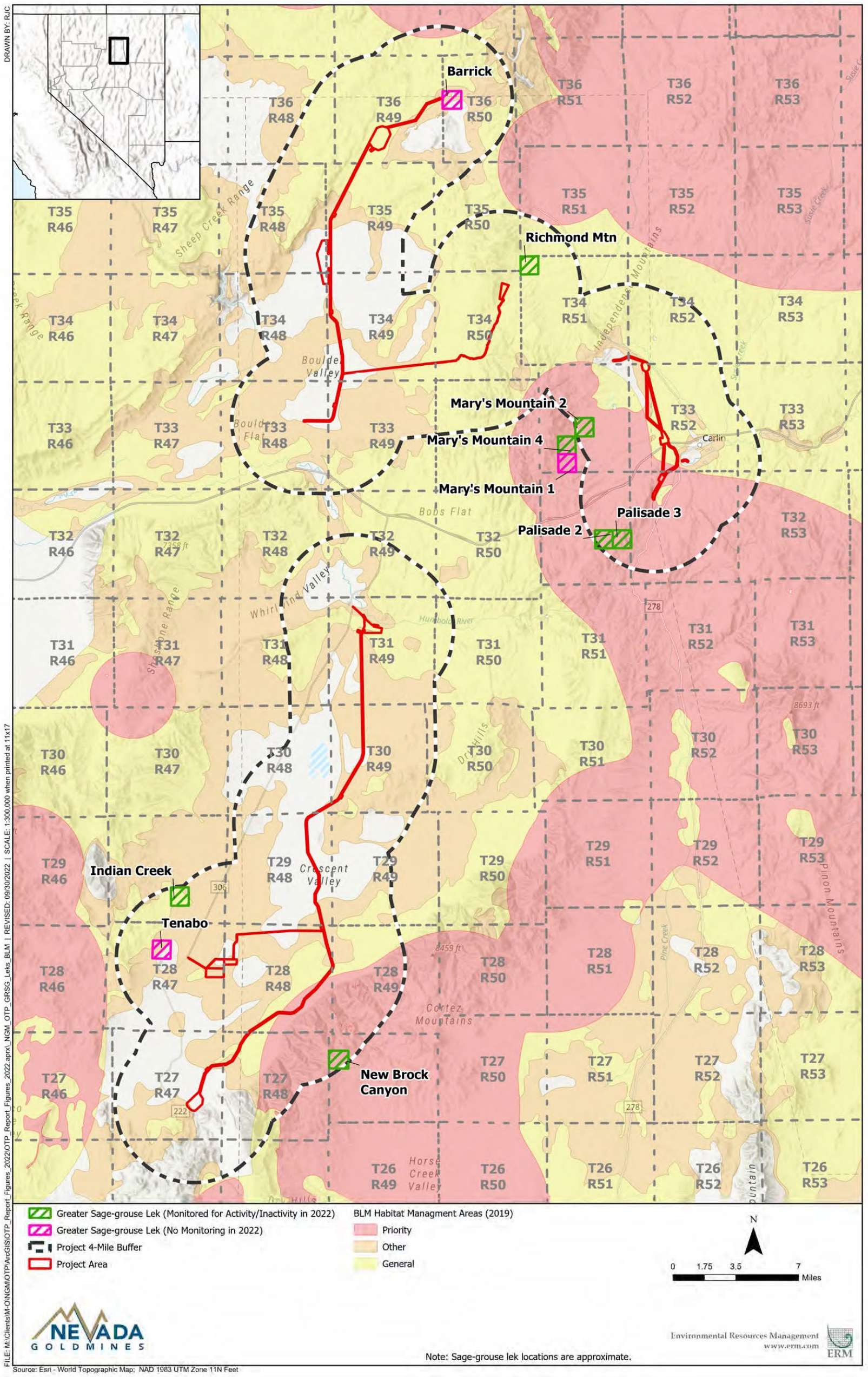


Figure 3.1-1: Greater Sage-grouse Leks and BLM Habitat Management Areas

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3.1.2. Study Methodology

As described in the *Year 1 Biological Baseline Report* (ERM 2022a), eight sage-grouse leks within a 4-mile buffer of the Project were identified using data obtained from NDOW through a sensitive data request. Additionally, two leks located outside of the 4-mile buffer (Mary's Mountain 1 and Mary's Mountain 4) were included in the 2022 monitoring plan per request by NDOW during coordination on December 3, 2021, one of which was later removed from monitoring efforts (Mary's Mountain 1). The 4-mile buffer was applied based on the BLM ARMPA for lek buffer distances when approving NEPA actions (BLM 2015). In spring 2021, ground-based lek counts were performed at 4 of the 10 known leks by either NDOW or ERM, in conjunction with annual surveys occurring for NGM in the Cortez District. Lek count data from the remaining six leks was compiled to support the 2022 monitoring efforts, including date of last survey, date of last activity, and current NDOW lek status.

Prior to conducting the Year 2 baseline surveys, ERM in coordination with NDOW developed a monitoring plan to confirm the leks to be monitored and the number of surveys required at each lek. The required monitoring efforts for these leks were confirmed with NDOW on March 3, 2022, and are presented in Table 3.1-1.

Table 3.1-1: Sage-grouse NDOW Lek Status and 2022 Monitoring Plan

Lek	Lek ID	NDOW Lek Status [a]	Last Survey Year	2022 Monitoring Plan
Mary's Mountain 1 [b]	COR-007	Pending [c]	2019	No Monitoring
Mary's Mountain 2	COR-006	Active	2021	Monitor for activity
Mary's Mountain 4	COR-031	Pending [c]	2021	Monitor for activity
Palisade 2	COR-018	Inactive	2019	Monitor for inactivity
Palisade 3	COR-015	Active	2019	Monitor for activity
New Brock Canyon [d]	COR-032	Active	2021	Monitor for activity
Indian Creek [d]	SHO-018	Inactive	2021	Monitor for inactivity
Tenabo [b]	SHO-006	Unknown	2016	No monitoring
Barrick [b]	TUS-078	Unknown	2007	No monitoring
Richmond Mountain	NOFO-139	Unknown	2014	Monitor for activity

ID = identification; NDOW = Nevada Department of Wildlife
[a] Received from NDOW in January 2022.
[b] NDOW confirmed no monitoring required.
[c] Official NDOW status changed from *Inactive* in 2021 to *Pending* in 2022.
[d] 2022 monitoring efforts at these leks were coordinated with other NGM-related projects conducted by ERM.

The monitoring plan was developed based on each lek's official NDOW status. The NDOW-classified statuses of these leks included three leks categorized as *Active*, two leks categorized as *Inactive*, two leks categorized as *Pending*, three leks categorized as *Unknown,* and zero categorized as *Historic*. The official NDOW lek status for two leks (Mary's Mountain 1 and Mary's Mountain 4) was updated between 2021 and 2022. The official NDOW lek statuses are based on the following criteria (NDOW 2017):

- *Active*—Two or more males observed at least twice in the last 5 years.
- *Pending*—Two or more males observed only once in the last 5 years.

- *Inactive*—Zero to one male observed during every visit, for a minimum of two visits, in the last 5 years.
- *Historic*—Zero to one male observed during every visit, for a minimum of five visits in the last 30 years.
- *Unknown*—None of the above-described conditions have been met.

Mary's Mountain 1 (categorized as *Pending* by NDOW), Tenabo (categorized as *Unknown* by NDOW), and Barrick (categorized as *Unknown* by NDOW) were not required to be monitored per coordination with NDOW. Based on the monitoring plan, ERM surveyed a total of seven leks, as shown on Figure 3.1-1. Specific coordinate information for sage-grouse leks is confidential per the data-sharing agreement and confidentiality agreement between NDOW and ERM; therefore, the lek locations shown on Figure 3.1-1 are approximate.

Monitoring events were conducted by a team of two ERM biologists following the Statewide Wildlife Survey Protocols (BLM 2014) and NDOW Lek Survey Protocol (NDOW 2013). All leks slated for monitoring in 2022 with an NDOW lek status of *Active*, *Pending*, or *Unknown* were surveyed three times and at least 7 days apart to monitor for activity. *Inactive* leks were surveyed once to confirm inactivity, with the exception of Palisade 2, which was surveyed three times in concurrent effort with Palisade 3 due to proximity. All lek surveys were conducted in March and April during spring breeding season.

Prior to monitoring, biologists performed a reconnaissance of each lek location to determine the best vantage point(s) and accessibility. For each monitoring event, biologists arrived at the lek vantage point a minimum of 45 minutes before sunrise and maintained a minimum distance of 200 yards from the lek to minimize disturbance to sage-grouse. For survey locations with obstructed visibility, viewing was attempted on foot from separate vantage points to gain full coverage of the lek. Once visibility was confirmed, the area was surveyed with either binoculars or a spotting scope.

Four counts, in which biologists scan the lek location and surrounding landscape for visual observations of sage-grouse, were obtained during each monitoring event at 15-minute intervals between 30 minutes before and 90 minutes after sunrise, with the exception of the Indian Creek survey where the "lek route protocol" was used. The lek route protocol (NDOW 2013)—a method approved for ERM use by NDOW in 2021—is used when sage-grouse are not visually or audibly identified during a monitoring event. When using this protocol, four counts are obtained at 2-minute intervals within the same monitoring period, as opposed to 15-minute intervals, while walking the lek to look and listen for sage-grouse and search for recent sign (e.g., cecal tar, scat, tracks, feathers).

Lek locations and vantage points were mapped using ArcGIS Field Maps. All survey data were collected electronically in ArcGIS Survey123 using the NDOW Lek Count Data Collection Form (NDOW 2013). The following data were documented during each monitoring event.

- Biologists recorded the following upon arrival:
  - Lek name, activity, and sign of recent activity
  - Coordinates of the survey vantage point
  - Date and time of survey
  - Time of sunrise
  - Wind speed (miles per hour)
  - Temperature (Fahrenheit)
  - Cloud Cover
  - Precipitation
- Males and females were distinguished during counts. Per NDOW protocol, if the sex of the bird could not be identified, the sex was recorded as *Unknown*.
- Any predators observed were recorded by species, time, and type of activity.
- Any presence of Common Ravens (*Corvus corax*) at a lek during a survey was recorded per request from NDOW on March 4, 2022.
- Evidence of any recent sign was recorded during the lek route protocol (NDOW 2013).
- The survey end time and departure time were recorded.

Any birds that were not counted during a count but were discovered after all four counts were completed (i.e., were located while walking the lek to look for sign) were noted by the biologist and added into the count data, where appropriate, to ensure inclusion in the final dataset.

3.1.3. Results and Discussion

Leks in the Project Area are primarily located in open, sparsely vegetated areas along windswept ridges and hillsides and adjacent to sagebrush-steppe communities. The sagebrush-steppe communities at the leks vary from dense, big sagebrush (*Artemisia tridentata*) to sparse, low-growing sagebrush species, such as low sagebrush (*Artemisia nova*) and budsage (*Artemisia spinescens*). Lek activity is typically observed in the sagebrush habitat, particularly in areas containing the low-growing species. Figure 3.1-2 through Figure 3.1-4 show the general lek locations in relation to the U.S. Geological Survey (USGS) Southwest Regional Gap Analysis Project (SWReGAP) landcover types. The lek locations are dominated by four landcover types: Inter-Mountain Basins Big Sagebrush Shrubland (46 percent), Great Basin Xeric Mixed Sagebrush Shrubland (14 percent), Inter-Mountain Basins Montane Sagebrush Steppe (10 percent), and Invasive Annual Grassland (10 percent) (Lowry et al. 2005).

Of the seven leks monitored in 2022, five are contained within BLM PHMAs or areas of BLM-administered land identified as having the highest value to maintaining sustainable sage-grouse populations (Figure 3.1-1; BLM 2019b). The other two leks are located primarily within GHMAs and provide seasonal breeding habitat for sage-grouse.

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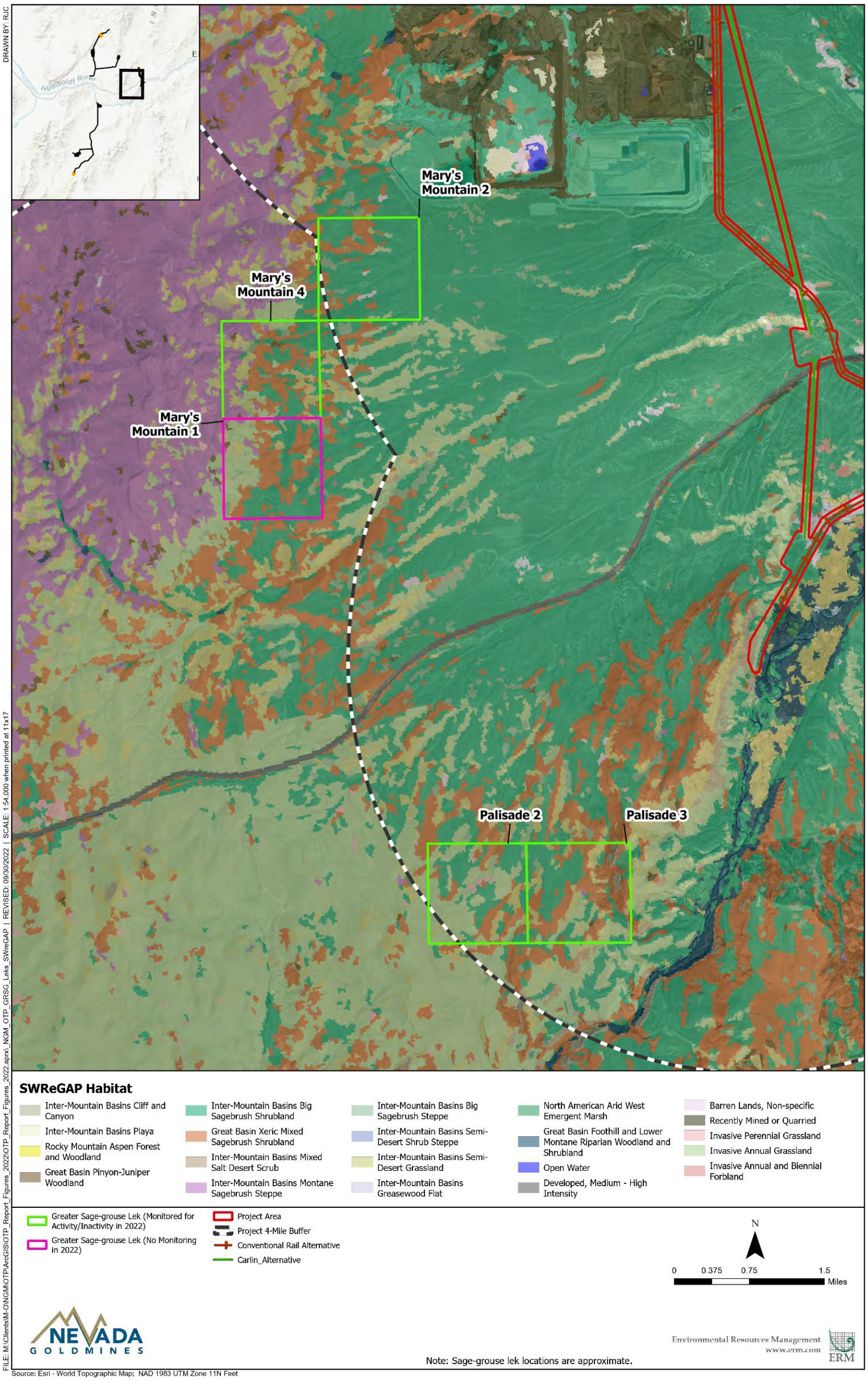


Figure 3.1-2: Greater Sage-grouse Lek Locations and USGS Landcover Types—Carlin Survey Area

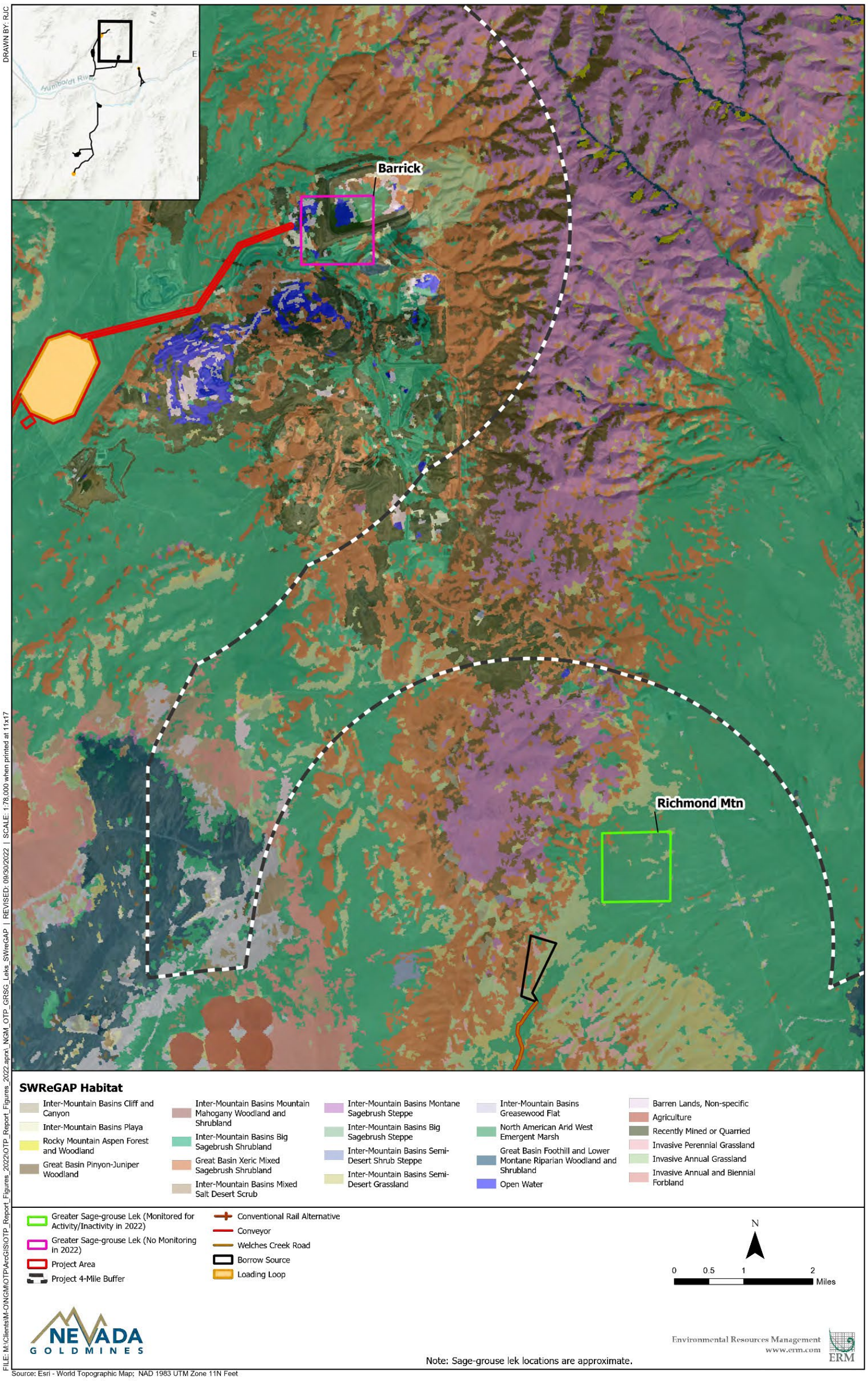


Figure 3.1-3: Greater Sage-grouse Leks Locations and USGS Landcover Types—Goldstrike Survey Area

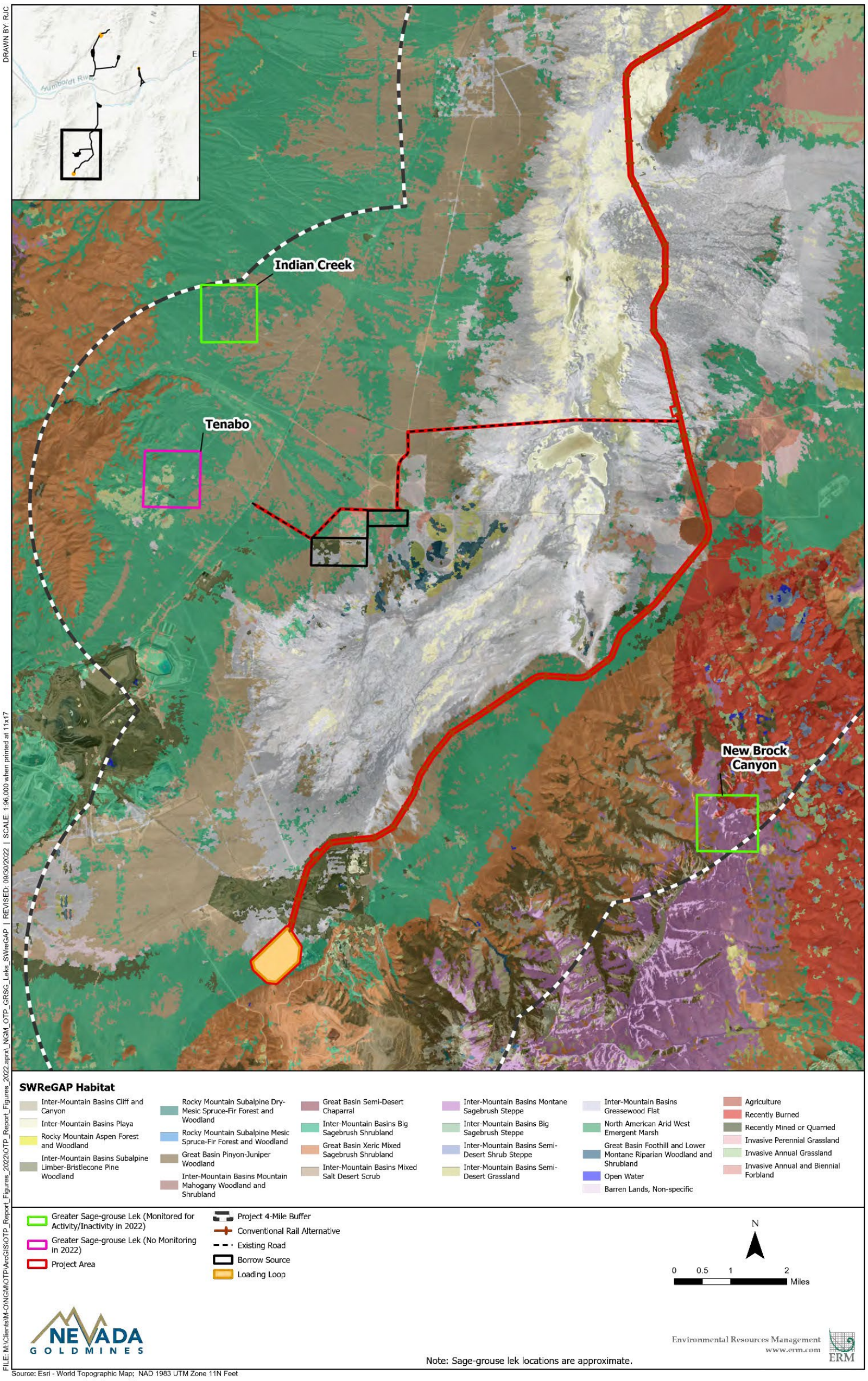


Figure 3.1-4: Greater Sage-grouse Leks Locations and USGS Landcover Types—Crescent Valley Survey Area

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Seven leks were monitored during the Year 2 baseline studies, of which two leks had male and/or female sage-grouse on the lek or in the immediate area. New Brock Canyon had the highest count of males on a lek (28), and Mary's Mountain 2 had the highest count of females (2). The remaining five leks did not have any sage-grouse activity or recent sage-grouse sign observed during the monitoring events. Table 3.1-2 summarizes survey dates and high counts for the monitored leks. Detailed survey form results can be found in Appendix A, Greater Sage-grouse Data.

Table 3.1-2: Summary of 2022 Lek Survey Dates and High Counts

Lek	Lek ID	Survey 1 Date	Survey 2 Date	Survey 3 Date	High Count Males	High Count Females	High Count Unknowns
Mary's Mountain 2	COR-006	04/05/22	04/19/22	04/27/22	0	2	2
Mary's Mountain 4	COR-031	04/05/22	04/19/22	04/27/22	0	0	0
Palisade 2	COR-018	04/02/22	04/11/22	04/21/22	0	0	0
Palisade 3	COR-015	04/02/22	04/11/22	04/21/22	0	0	0
New Brock Canyon	COR-032	04/04/22	04/21/22	04/28/22	28	1	0
Indian Creek	SHO-018	03/11/22	-	-	0	0	0
Richmond Mountain	NOFO-139	04/06/22	04/16/22	04/29/22	0	0	0

ID = identification

During Year 2 monitoring, sage-grouse at the New Brock Canyon lek were dispersed across a larger area than previously documented and there was a 6 percent decrease in male high counts observed compared to Year 1. This may be attributed to the presence of Golden Eagles (*Aquila chrysaetos*) and Common Ravens on the lek, which were observed during two of the three survey events. During the April 4, 2022, monitoring event, a Golden Eagle flushed several birds off the lek during the first count, resulting in a significantly lower survey count than the other monitoring events. In total, the Year 2 season high count for New Brock Canyon was 28 males and 1 female.

At Mary's Mountain 2, a total of three females and two birds of an *Unknown* sex were observed near the lek or flushed from surrounding areas, but no active lekking was recorded on the lek during the Year 2 monitoring. During the first monitoring event on April 4, 2022, two *Unknown* sage-grouse were flushed approximately 0.25-mile south of the documented lek area and fresh sign was observed. During the second and third monitoring events, three female sage-grouse were flushed approximately 0.25 mile southwest from the lek location in sagebrush shrubland. Based on the 2022 monitoring events, Mary's Mountain 2 lek activity may be shifting south/southwest of the documented location to an area with slightly more vegetation cover and further distance from the existing two-track road and Gold Quarry Mine. Small shifts in lek locations can occur due to changes in vegetation abundance, anthropogenic disturbance or

activity, and other undetermined factors. In total, the 2022 season high count for Mary's Mountain 2 was zero males and two females.

Palisade 2 and Palisade 3 leks were monitored concurrently, and no sage-grouse or recent sign was observed at either lek. Cattle were present at both lek locations, and noise from the Union Pacific Railroad and Interstate 80 could be heard during the first survey event on April 2, 2022, at Palisade 3.

Similar to the Palisade leks, Indian Creek, Mary's Mountain 4, and Richmond Mountain leks had no sage-grouse or recent sign observed during the 2022 surveys. Mining-related noise could be heard at the Richmond Mountain lek during the first two survey events on April 6, 2022, and April 16, 2022.

As referenced in the Year 1 report (ERM 2022a), the most consistent historical lek count data for the Project Area was collected within the last 10 to 15 years. Conventionally, historical high-count data only represents high counts for males. Table 3.1-3 and Table 3.1-4 present historical high-count lek data for the leks surveyed in 2022 categorized by the Mount Lewis and Tuscarora BLM Field Offices. Figure 3.1-5 provides a graphical representation of male sage-grouse high counts at the seven leks monitored in 2022 (ERM 2021b; NDOW 2021).

There are relatively insufficient historic lek data available for the seven leks monitored in 2022 to suggest statistically meaningful biological trends in sage-grouse populations for the Project, as the most consistent data for the majority of the leks only started recently in 2010. Additionally, data are highly variable due to several years of gaps in monitoring. However, lek data collected since 2010 show that Mary's Mountain 2, Mary's Mountain 4, Palisade 2, and Palisade 3 leks have had birds on lek in 2010 or more recently but have since gone to zero birds observed in 2022. Furthermore, historic lek data for Indian Creek and Palisade 2 leks date back to 1971 and 1991, respectively, and both leks have seen a decline in sage-grouse over the last 30 to 50 years. Despite high-count numbers between 20 and 60 at the New Brock Canyon lek over the last 11 years, no clear trend can be observed to date.

The decoupling or decline in sage-grouse populations throughout their range has been documented over the past few decades (Garton et al. 2015; WAFWA 2015; Coates et al. 2021). Reasons for this decline can be attributed to a variety of environmental and anthropogenic factors, including habitat loss and degradation from prolonged grazing, invasion of exotic vegetation, energy development, and an increasing wildfire regime, in addition to both localized and large-scale climate-related events (ERM 2022c).

Table 3.1-3: Mount Lewis Field Office, Historical Male High-Count Data 2010–2022

Lek	Lek ID	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Indian Creek	SHO-018	-	-	0	-	-	-		0	0	0	0	0	0

Source: ERM 2021b; NDOW 2021

ID = identification

Table 3.1-4: Tuscarora Field Office, Historical Male High-Count Data 2010–2022

Lek	Lek ID	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Mary's Mountain 2	COR-006	9	-	14	7	3	10	12	9	5	0	-	0	0
Mary's Mountain 4	COR-031	2	-		-	-	7	5	0	0	0	-	0	0
New Brock Canyon	COR-032	--	-	37	22	51	50	59	37	51	39	40	30	28
Palisade 2	COR-018	14	-	0	-	-	0	0	0	0	0	-	-	0
Palisade 3	COR-015	11	-	12	-	-	3	4	7	3	12	-	-	0
Richmond Mountain	NOFO-139	0	-	0	-	0	-	-	-	-	-	-	-	0

Source: ERM 2021b; NDOW 2021

ID = identification

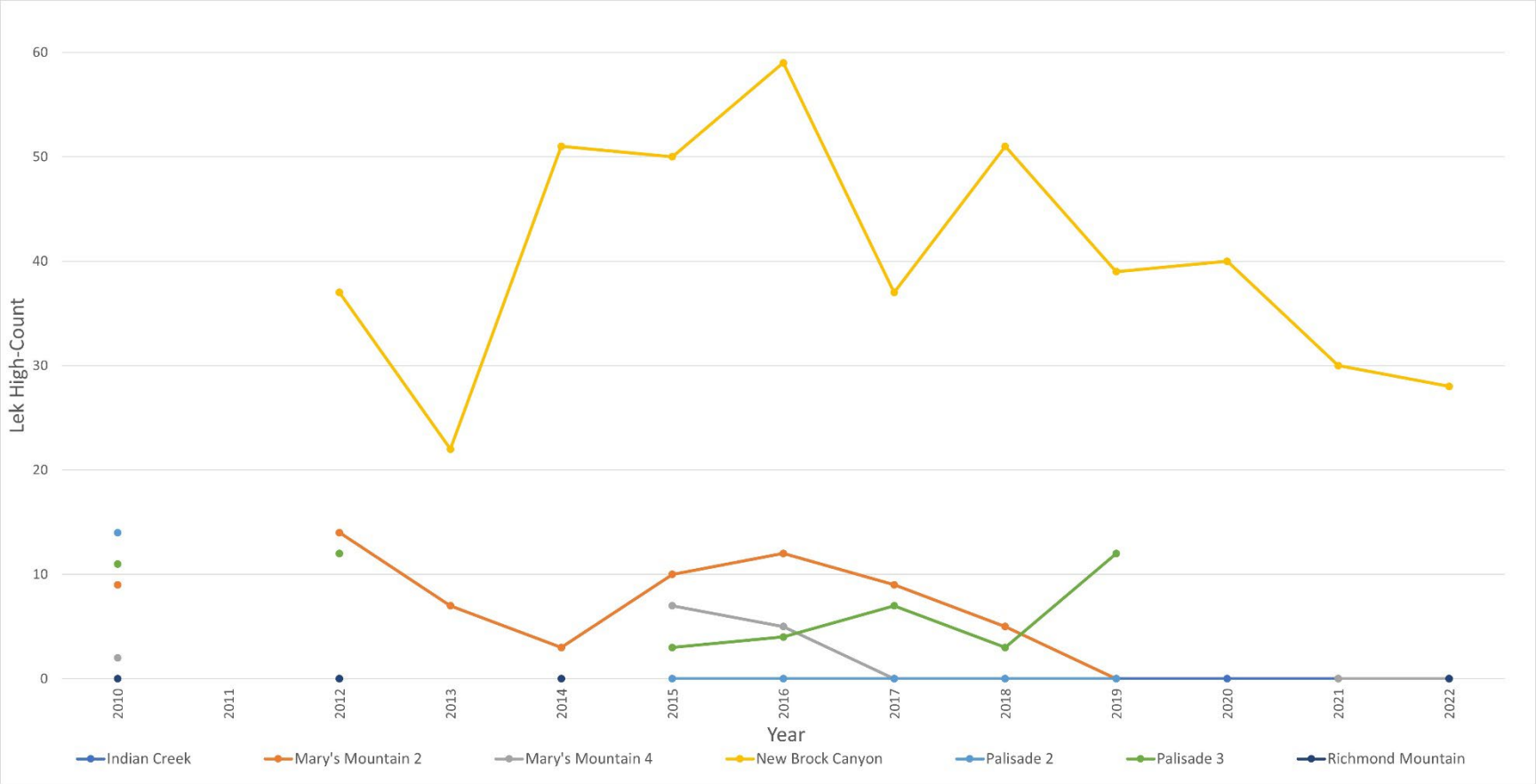


Figure 3.1-5: High Count for Ore Transportation Project Leks, 2010–2022

3.2. DARK AND PALE KANGAROO MICE

3.1.1 Background

Dark kangaroo mouse (*Microdipodops megacephalus*) and pale kangaroo mouse (*Microdipodops pallidus*) are BLM special status species in Nevada and are Protected Mammals under NAC 503.030 (Table 3.2-1). Both species are nocturnal, emerging from their burrows during low-light conditions (Amos 2017; Peterson 2000). Kangaroo mice are predominantly herbivorous, foraging primarily on seeds and grains but incorporate insects in dry summer months to meet caloric requirements (NatureServe 2022; Roach 2016). Specialized kidneys and metabolism allow kangaroo mice to persist in arid environments and meet water requirements through diet alone (Amos 2017; Peterson 2000). Kangaroo mice are thought to be almost exclusively bipedal (use two feet) when aboveground. Long hind limbs with stiff hairs along the foot margins and muscular tails allow the two species to move quickly in sandy soils, while smaller forelimbs aid in turning at high speeds (Peterson 2000).

Table 3.2-1: Agency Status and General Habitat for Special Status Kangaroo Mice

Species	Agency Status	Nevada Wildlife Action Plan Habitat Description
Dark kangaroo mouse (*Microdipodops megacephalus*)	BLM Nevada Sensitive; NDOW Protected Mammal	Inter-Mountain Cold Desert Scrub, Sagebrush, Mojave Warm Desert and Mixed Desert Scrub, Grasslands and Meadows, Sand Dunes and Badlands, Desert Playas and Ephemeral Pools
Pale kangaroo mouse (*Microdipodops pallidus*)	BLM Nevada Sensitive; NDOW Protected Mammal	Inter-Mountain Cold Desert Scrub, Sagebrush, Grasslands and Meadows, Sand Dunes and Badlands

Source: BLM 2018; NDOW 2022; Wildlife Action Plan Team 2013

BLM = Bureau of Land Management; NDOW = Nevada Department of Wildlife

The dark kangaroo mouse requires loose sand and gravelly soils (Hafner et al. 1998; Ghiselin 1970) associated with vegetative communities of rabbitbrush (*Chrysothamnus* spp.), horsebrush (*Tetradymia* spp.), sagebrush (Artemisia spp.), and Indian ricegrass (*Oryzoipsis hymenoides*) (GBE 2016; NatureServe 2022). The dark kangaroo mouse is mainly solitary, living independently from other kangaroo mice (Amos 2017) and maintaining home ranges approximating 1.6 acres for males and 0.9 acre for females (Amos 2017; Roach 2016). While home territories may overlap between two individuals, dark kangaroo mice actively defend their burrows from other kangaroo mice. They are known to store excess seed and grains within their burrows for winter, at which currently it is thought they hibernate (Amos 2017). Typically, burrow complexes occur between 3,940 feet to 6,725 feet in elevation, below pinyon-juniper communities but above communities of greasewood (*Sarcobatus vermiculatus*) and saltbrush (*Atriplex* spp.) (Amos 2017; Hafner and Upham 2011).

The pale kangaroo mouse is a more highly specialized sand-obligate compared to the dark kangaroo mouse (Hafner et al. 2008). The pale kangaroo mouse is restricted to habitats with fine, windblown, sandy soils with little or no gravelly overlay. The pale kangaroo mouse is associated with alkali-sink and desert scrub environments dominated by shadscale (*Atriplex*

confertifolia), saltbush, and greasewood (BLM 2019a). Burrows of pale kangaroo mouse are usually situated near the base of shrubs or along open sand banks. Pale kangaroo mouse burrows are relatively simplistic compared to the burrows excavated by dark kangaroo mouse. The pale kangaroo mouse is thought to be as solitary as the dark kangaroo mouse but more aggressive towards intruders of the same species (Peterson 2000). Pale kangaroo mice also likely store food for winter; and although it is unknown whether they hibernate, there is evidence they can enter torpor (a lethargic state) when temperatures are very high or very low and food sources are scarce (Peterson 2000; Zeiner et al. 1990). Pale kangaroo mice maintain similar sized home ranges for males and females as the dark kangaroo mouse (Peterson 2000), with burrows occurring between 3,600 feet to 8,200 feet in elevation, typically above creosote (*Larrea tridentata*) habitat but below sagebrush communities (Hafner and Upham 2011; Peterson 2000).

Habitat alteration, particularly the introduction of weedy grasses, conversion of land for agricultural and livestock use, and irrigation of dry sink habitats, is thought to negatively affect both pale and dark kangaroo mice populations (Amos 2017; Hefner et al. 1998; Peterson 2000). Habitat alterations resulting from wildfires, anthropogenic activity, and overgrazing of livestock also decrease habitat suitability for kangaroo mice (Wildlife Action Plan Team 2013; GBE 2016).

The Year 2 baseline studies for kangaroo mouse consisted of trapping surveys conducted in locations identified during the Year 1 baseline field assessment (ERM 2022a) as containing the highest potential habitat for kangaroo mouse (Table 3.2-2).

3.1.2 Study Methodology

Trapping surveys for kangaroo mice were conducted according to Statewide Wildlife Survey Protocols (BLM 2014) and the Modified Hycroft *Microdipodos* Survey Protocol (BLM et al. 2019). Through discussions between ERM and the BLM Elko District Office, modifications to methodology, such as trap site location and number of transects per trapping site, were approved. The first dark and pale kangaroo mice trapping event was conducted May 4 to 7, 2022, when ambient nighttime temperatures reached or exceeded 32 °F. Because no kangaroo mice were trapped during the first event, a second 4-day trapping event was conducted in the same locations June 11 to 14, 2022, in accordance with protocol and coordination with the BLM Elko District Office.

Two teams of two biologists set small, folding, aluminum Sherman live traps (dimensions 2 inches by 2.5 inches by 6.5 inches) to capture kangaroo mice. Sherman live traps are reusable and provide safe capture and protection for small mammals. The length of each transect, the number of traps per transect, and timing of each trapping event was determined in coordination between ERM and the BLM Elko District Office. Approximately 165-foot-long transects were established with 10 Sherman traps each. Table 3.2-2 summarizes the National Resource Conservation Service's (NRCS) soil map units, SWReGAP landcover types and acreage, and the number of transects required per trap site. The three trap sites identified during Year 1 surveys and evaluated in Year 2 are shown on Figure 3.2-1 through Figure 3.2-4.

Table 3.2-2: Locations of Kangaroo Mouse Trapping

Survey Area	Trap Site	NRCS Soil Map Units	SWReGAP Landcover Type	Area (acres)	Number of Transects and Traps
Crescent Valley	Crescent Playa Margin 1 (Trap Site 1)	Batan-Ocala Association	Inter-Mountain Basins Big Sagebrush Shrubland	0.5	20 traps across two approximately 165-foot transects
			Inter-Mountain Basins Greasewood Flat	22.3	
			Inter-Mountain Basins Mixed Salt Desert Scrub	0.2	
			Inter-Mountain Basins Playa	14.9	
	Crescent Playa Margin 2 (Trap Site 2)	Batan-Ocala Association	Inter-Mountain Basins Greasewood Flat	118.2	30 traps across three approximately 165-foot transects
			Inter-Mountain Basins Playa	23.1	
	Cortez Foothills North (Trap Site 3)	Enko-Davey-McConnel Association Zineb gravelly loam, 2 to 8 percent slopes Batan-Ocala Association	Agriculture	7.1	50 traps across five approximately 165-foot transects
			Barren Lands, non-specific	4.6	
			Inter-Mountain Basins Big Sagebrush Shrubland	183	
			Inter-Mountain Basins Greasewood Flat	38	
			Inter-Mountain Basins Mixed Salt Desert Scrub	113.5	
			Invasive Annual and Biennial Forbland	2.4	
			Recently Mined or Quarried	5.7	

Source: NRCS 2019; Lowry et al. 2005

NRCS = National Resource Conservation Service; SWReGAP = Southwest Regional Gap Analysis Project

Transects were placed in transitional zones between SWReGAP landcover types. Transitional areas are spaces between different landcover types that contain characteristics of both landcover types and habitats. Precise trap placement was where prevailing habitat conditions were most suitable and chances of trapping success were highest, such as sandy areas near shrub bases or sandy soil inclusions in mixed shrub habitats with abundant grass communities. In accordance with the trap grid design (BLM et al. 2019), a pair of traps was set approximately every 33 feet along 165-foot-long transects. Ten traps were placed along each transect 33 feet apart. In total, 100 traps were deployed during each trapping night. Trap Site 1 contained 20 traps across two transects, Trap Site 2 contained 30 traps across three transects, and Trap Site 3 contained 50 traps across five transects each trapping night.

Kangaroo mouse activity is highest immediately after sunset and continues through the night (Manley et al. 2006). All traps were set approximately 1 hour before sunset and checked within 1 hour of sunrise the following morning. Prior to each survey night, traps were baited with a mixture of rolled oats, peanut butter, and birdseed and insulated with poly-fill material. Bait and insulation were replaced as needed prior to each survey night. Traps were left in place over the entire 4-day trapping event but were closed during the day when not in use to reduce capture of non-target species.

All captured animals were handled as described in the 2016 Guidelines of the American Society of Mammalogists (Sikes 2016). Non-target species captured were identified and released without further evaluation.

As part of the field survey, biologists searched for kangaroo mouse sign, such as scat, tracks, and burrows. Kangaroo mouse scat is similar in size to a grain of rice and appears desiccated as opposed to larger, more hydrated scat produced by rats, voles, and shrews. Mouse and rat scat often appears scattered along wildlife trails while shrews and voles leave scat in larger piles (“latrines”) near water sources. The distinct gait of kangaroo mice leaves unique tracks in loose sand that appear as long, parallel rear footprints with deep tail drag marks between the footprints. Due to low adult weight (0.4 ounce to 0.6 ounce) of kangaroo mice, footprints are often only discernable on loose or wet soils, along sand dunes, or in powdery playa salt deposits (Amos 2017; Peterson 2000). While similar in structure to kangaroo rat tracks, kangaroo mouse tracks are noticeably smaller and shallower. Discerning the burrows of kangaroo mice is difficult as they are similar in appearance to other small mammals and some reptiles; however, burrows within sandy soils with scat and/or confirmed kangaroo tracks leading to the burrow entrance assist in properly identifying kangaroo mouse burrows (iNaturalist n.d.).

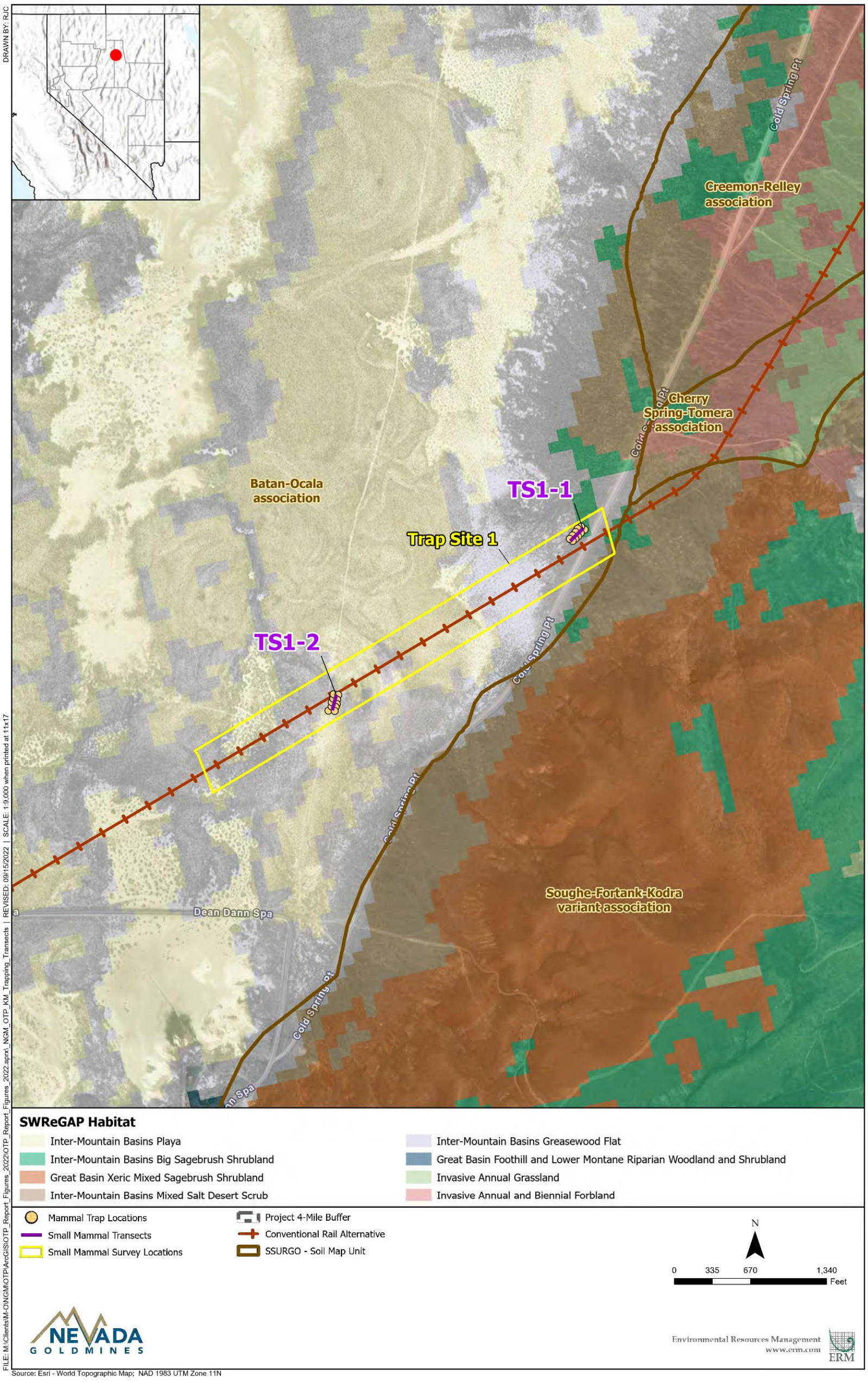


Figure 3.2-1: Kangaroo Mouse Trapping Areas and Transects—Trap Site 1

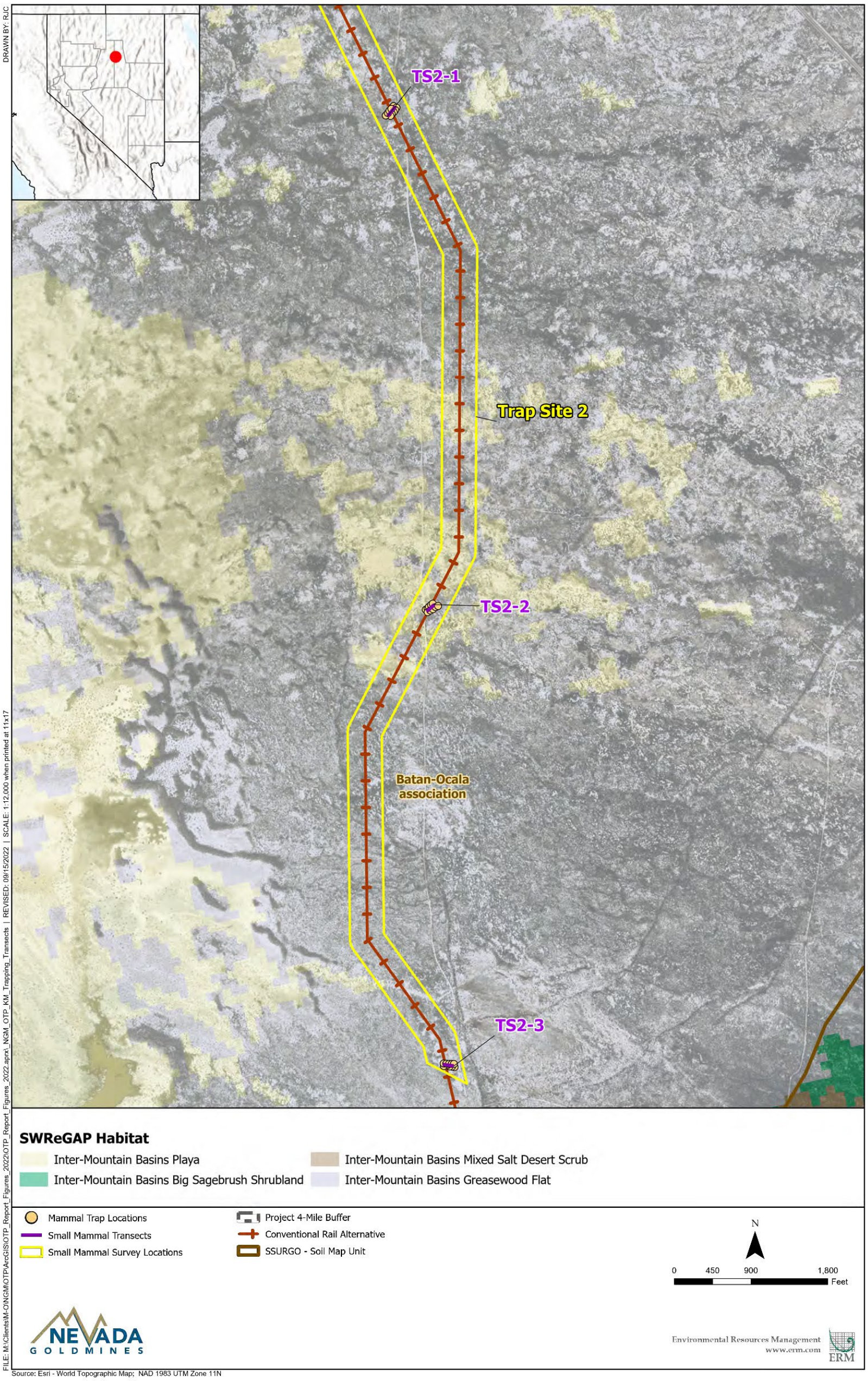


Figure 3.2-2: Kangaroo Mouse Trapping Areas and Transects—Trap Site 2

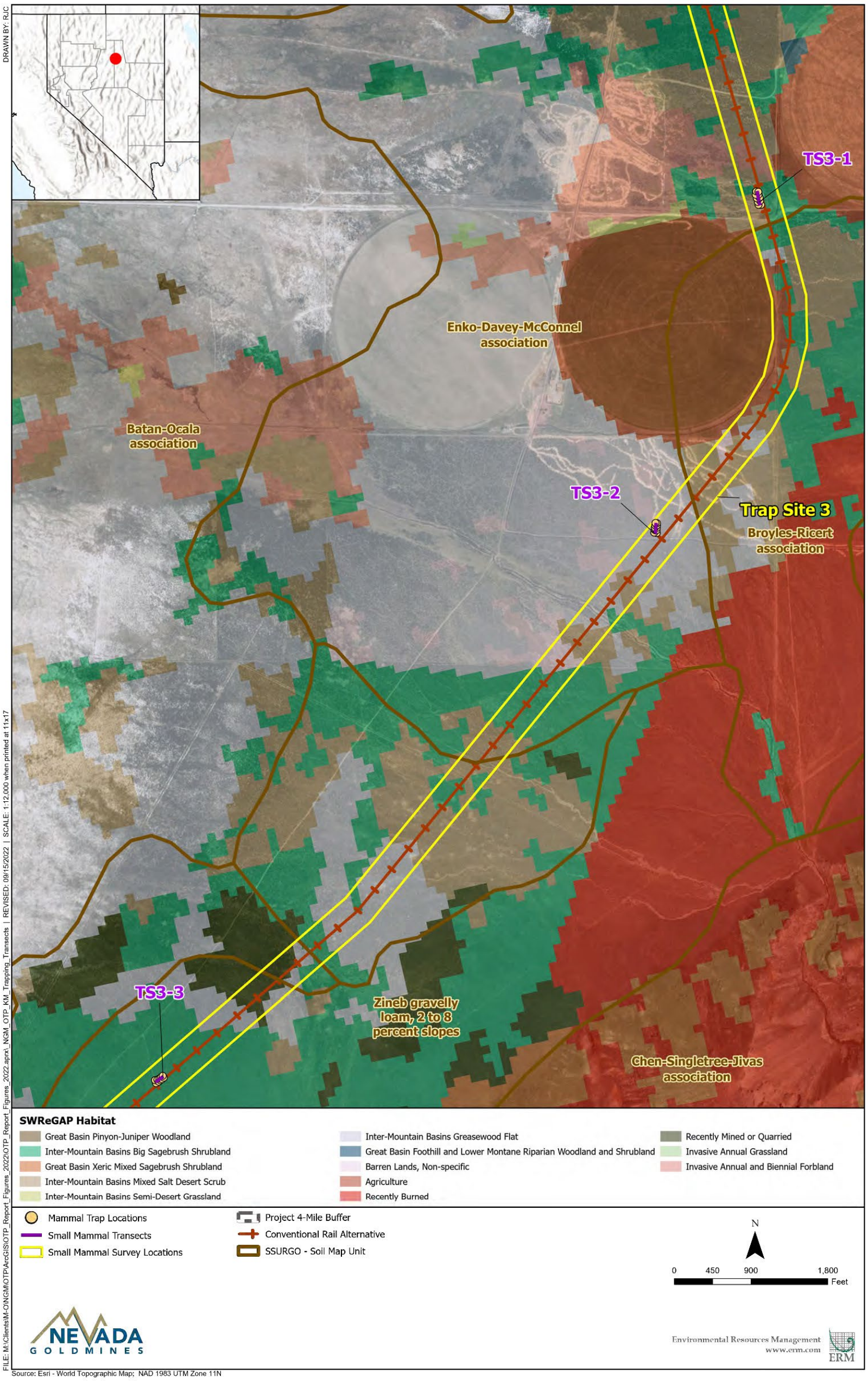


Figure 3.2-3: Kangaroo Mouse Trapping Areas and Transects—Trap Site 3 North

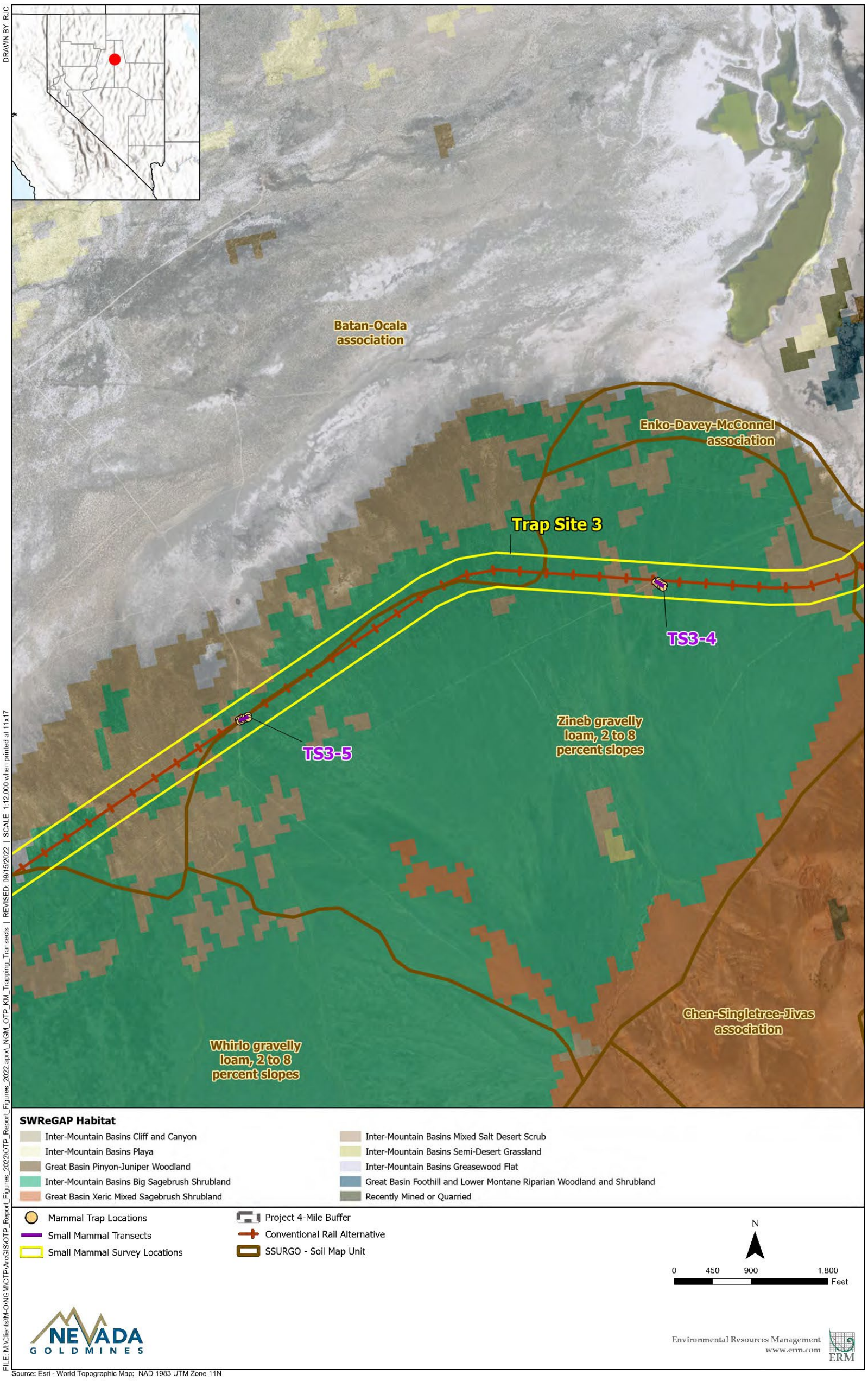


Figure 3.2-4: Kangaroo Mouse Trapping Areas and Transects—Trap Site 3 South

Biologists recorded the Universal Transverse Mercator coordinates of each trap and georeferenced these locations using the ArcGIS Field Maps application. Information gathered from each trap location included: trap identification number, date, start/end time, surveyor names, SWReGAP landcover type, temperature, wind speed, cloud cover, precipitation, habitat description, species identification, sex, condition, and condition of specimen upon release (live-release or mortality). Photographs were taken and georeferenced during each trapping event. All data collected by field biologists were recorded using ArcGIS Survey123 electronic data forms.

3.1.3 Results and Discussion

Trapping for kangaroo mice occurred over two separate 4-day events: the first trapping event was conducted May 4 to 7, 2022, and the second trapping event was conducted June 11 to 14, 2022. No kangaroo mice were captured during either trapping event, and no sign of kangaroo mice was observed. Figure 3.2-1 through Figure 3.2-4 depict the trapping locations and transects within the three trap sites.

During the first trapping event, two small mammal species were captured and identified: deer mouse (*Peromyscus maniculatus*) and Great Basin pocket mouse (*Perognathus parvus*). During the second trapping event, four small mammal species were captured and identified: deer mouse, Great Basin pocket mouse, Merriam's kangaroo rat (*Dipodomys merriami*), and least chipmunk (*Neotamias minimus*). Deer mice were the most abundant small mammal captured, comprising 70.3 percent of the total captures, followed by Great Basin pocket mice (24.6 percent), Merriam's kangaroo rat (3.4 percent), and least chipmunk (1.7 percent). Table 3.2-3 summarizes the total number of each species captured at each trap site during the baseline trapping events. Detailed Survey123 field data and photographs are in Appendix B, Dark and Pale Kangaroo Mice Data.

Table 3.2-3: Small Mammal Captures Summary

Trap Site	Species Collected	Total Number Captured
Trap Site 1	Deer mouse (*Peromyscus maniculatus*)	5
	Great Basin pocket mouse (*Perognathus parvus*)	5
	Merriam's kangaroo rat (*Dipodomys merriami*)	3
Trap Site 2	Deer mouse (*Peromyscus maniculatus*)	54
	Great Basin pocket mouse (*Perognathus parvus*)	6
	Least chipmunk (*Neotamias minimus*)	2
Trap Site 3	Deer mouse (*Peromyscus maniculatus*)	24
	Great Basin pocket mouse (*Perognathus parvus*)	18
	Merriam's kangaroo rat (*Dipodomys merriami*)	1

At transect 1-1, the shrub community is comprised of black greasewood and shadscale saltbrush with sparse stands of big sagebrush, while the herbaceous community was dominated by saltgrass (*Distichlis spicata*), whitetop (*Lepidium draba*), and clasping pepperweed (*Lepodium perfoliatum*). The transect is within the Batan-Ocala association NRCS soil unit, which is described as moderately well-drained saline silt loam over fine sandy loam to silty clays (NRCS 2019). Biological crusts ("bio-crusts") and pioneering lichen communities were observed at soils near the base of shrubs along transect 1-1, indicating ground disturbance in this area (such as burrow construction by mice) has not occurred in recent years. Overall, friable (spongy) soils within the greasewood flat component of the transitional habitat provided suitable soil conditions for kangaroo mice in discreet locations; however, compacted soils within open playa depressions and along wildlife trails observed in this area were the dominant condition observed and limit suitability for kangaroo mice in most of the area surrounding transect 1-1 (see Photos 7, 9, and 10 in Section B.2 of Appendix B, Dark and Pale Kangaroo Mice Data).

Transect 1-2 shrub community consisted of black greasewood with some shadscale, while the herbaceous layer was sparsely vegetated with saltgrass and halogeton (*Halogeton glomeratus*). The transect is within the Batan-Ocala association NRCS soil unit, which is described as moderately well-drained saline silt loam over fine sandy loam to silty clays (NRCS 2019). Observed soils along transect 1-2 was bare, with a thin, hard salt crust in several locations, reducing suitability for burrowing (see Photos 13 and 20 in Section B.2 of Appendix B). In some locations along transect 1-2, there was suitable loose, gravelly, sandy soils surrounding shrubs and some areas with powdery, windblown salt, though these conditions were uncommon at transect 1-2 (see Photo 18 in Section B.2 of Appendix B). Though soil conditions meet the burrowing needs for kangaroo mouse in some locations, the absence of native grasses in the immediate landscape and the hard salt crusts observed reduces the suitability of habitat throughout transect 1-2.

The shrub community at transects 2-1, 2-2, and 2-3 was dominated by black greasewood with sparse amounts of fourwing saltbrush (*Atriplex* canescens), spiny hop sage (*Grayia spinosa*), and shadscale. The herbaceous community was dominated by saltgrass and pickleweed (*Salicornia* spp.) with some Great Basin wild rye (*Leymus cinereus*) (see Photos 23, 34, and 45 in Section B.2 of Appendix B). Dry playa depressions were observed around each transect, and bare soils and evaporate salt crusts occupied areas between shrub stands (see Photos 28, 40, and 51 in Section B.2 of Appendix B). All three transects are within the Batan-Ocala association NRCS soil unit, which consists of moderately well-drained saline silt loam over fine sandy loam to silty clays (NRCS 2019). Observed soils within the transects was a mix of sand and light gravel with some areas developing bio-crusts, particularly near dense shrub stands. Sparse amounts of shallow sand and windblown salt banks were concentrated in areas immediately around shrub bases (see Photos 29, 39, and 52 in Section B.2 of Appendix B), but continuous windblown sand banks were not observed within or adjacent to the three transects. In general, the presence of native herbaceous grasses provides ideal foraging for kangaroo mice, but the lack of continuous loose, sandy soils limits this area for use by kangaroo mouse burrowing.

At transect 3-1, the shrub community included big sagebrush with a sparse amount of black greasewood, and a heavily disturbed herbaceous community dominated by cheatgrass (*Bromus*

tectorum) and sparse amounts of clasping pepperweed and halogeton (see Photos 57 and 61 in Section B.2 of Appendix B). Cattle disturbance was observed immediately south of the transect. The transect is within the Enko-Davey-McConnel association, which consists of well-drained saline loams to sandy loams with extremely gravelly coarse sandy stratifications (NRCS 2019). Observed soils were composed of loamy sand with pockets of loose sand, providing suitable conditions for kangaroo mouse. However, the abundance of weedy herbaceous species and significant livestock disturbance in the area reduces habitat suitability for kangaroo mice in area of transect 3-1 (Wildlife Action Plan Team 2013; GBE 2016).

The shrub community at transect 3-2 was composed solely of sparse black greasewood, and the herbaceous community was dominated by bluegrass (*Poa pratensis*), blue mustard (*Chorispora tenella*), and cheatgrass (see Photo 67 in Section B.2 of Appendix B). Supplemental hay bales and cattle activity were observed south of the transect. The transect is within the Enko-Davey-McConnel association, which consists of well-drained saline loams to sandy loams with extremely gravelly coarse sandy stratifications (NRCS 2019). Observed soils were sandy loam, which provide adequate burrowing opportunities for small mammals and meet the habitat requirements of kangaroo mice; however, the coverage of weedy herbaceous species and lack of bare sandy soils reduce kangaroo mouse habitat suitability.

Big sagebrush comprised nearly all the shrub community at transects 3-3 and 3-4, while the herbaceous community was dominated by cheatgrass and clasping pepperweed, with sparse amounts of halogeton and Indian ricegrass (see Photos 78 and 89 in Section B.2 of Appendix B). These transects are within the Zineb gravelly loam 2 to 8 percent slopes soil unit, which consists of well-drained non-saline to slightly saline gravelly loams to extremely cobbly sandy loams (NRCS 2019). Observed soils consisted of loose, loamy sand with a significant gravel component, providing suitable soil conditions for dark kangaroo mouse, but windblown sand banks were not observed.

At transect 3-5, the shrub community was dominated by black greasewood and shadscale with lesser amounts of big sagebrush, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), and rubber rabbitbrush (*Ericameria nauseosa*) (see Photos 101 and 105 in Section B.2 of Appendix B). The herbaceous community was disturbed and dominated by cheatgrass and clasping pepperweed and sparse amounts of Great Basin wild rye, Indian ricegrass, and bottlebrush squirreltail (*Elymus elymoides*). This transect crosses two NRCS soil units. The Zineb gravelly loam 2 to 8 percent slopes soil unit consists of well-drained non-saline to slightly saline gravelly loams to extremely cobbly sandy loams. The Batan-Ocala association soil unit consists of moderately well-drained saline silt loam over fine sandy loam to silty clays (NRCS 2019). Soils were sandy with substantial amounts of gravel. Sand banks and bare soils were absent within the transect (see Photo 107 in Section B.2 of Appendix B). The inclusions of native grasses provide an important food source for small mammals, and the sandy, gravelly soils provide adequate soil characteristics for kangaroo mouse habitat; however, the coverage of weedy herbaceous species reduces overall habitat suitability for kangaroo mice.

The results of both the Year 1 habitat assessment and the Year 2 trapping events indicate that kangaroo mouse habitat suitability is low across the Project Area. In total, 800 traps were

deployed over two trapping events, covering 97.1 percent of all SWReGAP landcover types within areas identified as having the most suitable vegetation and soil supportive of kangaroo mice. The remaining 2.9 percent of landcover types not incorporated within transects was either not observed within the vicinity of trap sites, such as Recently Mined or Quarried and Invasive Annual and Biennial Forbland landcover types, or was actively irrigated agricultural land not suitable for trapping surveys. Weather conditions and the timing of trapping events were within the acceptable range suggested by field protocols (BLM et al. 2019; BLM 2014). Although habitat conditions suitable to kangaroo mouse were observed in small, fragmented patches along many of the trapping transects, including areas with sandy, gravelly soils and preferred shrub communities, the encroachment of weedy plant species such as cheatgrass and clasping pepperweed have reduced the development of sand banks and open sand habitat most supportive to kangaroo mouse habitation. These developments have led to the absence of large areas with suitable characteristics; instead, there are areas supporting only a mosaic of small patches with marginal suitable habitat. Additionally, substantial livestock disturbance, particularly at Trap Site 3, has reduced the quality of both soil conditions and vegetative characteristics required by kangaroo mice.

3.3. SHREWS

3.3.1. Background

Four species of shrew including the American water shrew (*Sorex palustris*), Inyo shrew (*Sorex tenellus*), Merriams' shrew (*Sorex merriami*), and Preble's shrew (*Sorex preblei*) potentially occur in the Project Area and are BLM special status species (Table 3.3-1). *Sorex* species are associated with inter-mountain scrub habitat and are found in areas with shadscale *(Atriplex confertifolia),* sagebrush *(Artemisia tridentata)*, and alkali-sink plant communities with riparian features (BLM 2018, 2019a; Wildlife Action Plan Team 2013). Shrew habitat generally includes riparian zones adjacent to flowing streams, wet meadows, areas surrounding springs, and seasonally inundated playas and surrounding vegetation (EBP et al. 2020). Riparian zones or riparian corridors are transitional areas where the terrestrial ecosystem is substantially affected by the presence of water (or the aquatic ecosystem is substantially affected by the lack of water), often resulting in a unique plant community composition along the terrestrial-aquatic ecosystem boundary (USFS 2004).

Shrews are generally solitary invertivores (diet of invertebrates) that can also forage on small fish or amphibians. Shrews maintain an extremely high metabolism relative to other mammals and require nearly constant foraging (NatureServe 2022). While many small mammals hibernate during winter months, shrews instead reduce their energy needs when food sources are scarce (Pucek 1965). Shrew species remain active through winter months and create networks of tunnels under snow banks. Shrews are thought to vigorously defend their burrows from other shrews and animals (Carmen 2001).

Table 3.3-1: Agency Status and General Habitat for Special Status Shrews

Species	Agency Status	Nevada Wildlife Action Plan Habitat Description
American water shrew (*Sorex palustris*)	BLM Nevada Sensitive	Most abundant along small streams with thick riparian growth around lakes, ponds, marshes, bogs, and other lentic habitats.
Inyo shrew (*Sorex tenellus*)	BLM Nevada Sensitive	Habitats include riparian zones and canyon bottoms, rocky mountain habitat in areas with logs, boulders, or sagebrush scrub and red-fir communities. In Great Basin National Park, this shrew was found at 9,800 feet in habitat dominated by Engelmann spruce.
Merriam's shrew (*Sorex merriami*)	BLM Nevada Sensitive	Primarily found in various grassland habitats, including grasses in sagebrush scrub/pinyon-juniper habitat, as well as in mountain-mahogany and mixed woodlands.
Preble's shrew (*Sorex preblei*)	BLM Nevada Sensitive	Habitats include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush, willow-fringed creeks, marshes, bunchgrass, sagebrush-aspen and sagebrush-grass associations, and alkaline shrublands.

Source: BLM 2018; Wildlife Action Plan Team 2013

BLM = Bureau of Land Management

The American water shrew is approximately 6 inches long from head to tail and weighs less than an ounce. The tip of the tail is tufted, and its pelage is typically all black, while the ventral (belly) side is black, silvery white, or light brown. The feet are large and webbed on the hind limbs (Reid 2006). The American water shrew is a widely distributed species across North America with populations spanning from the Appalacian Mountains to the Sierra Nevada and Cascade Ranges, northward to eastern Alaska, and as far south as Arizona's White Mountains. In Nevada, the American water shrew is restricted to riparian habitats associated with stagnant pools, wet meadows, wetlands, and streams that contain significant overhanging vegetation demonstrating diversity of suitable habitat (EBP et al. 2020). The primary diet of the water shrew is aquatic and terrestrial invertebrates, tadpoles, and small fish (Johnson 1999). Instream features such as overhanging vegetation, fallen logs or snags, and rocky bottom substrate provide habitat for invertebrates and thereby increase foraging access and habitat suitability for water shrews (NatureServe 2022; Smith 2013).

Adult Inyo shrews can grow to 4.1 inches long and weigh approximately 0.1 ounce (Reid 2006). The dorsal (top) side of Inyo shrews range in color from light gray to brown, and the ventral side ranges from silver to gray. The light brown tail has a small black tuft at the end (Reid 2006). The distribution of the Inyo shrew in North America is poorly documented but known to occur throughout the California-Nevada border from the Sierra Nevada mountain range to the Spring Mountain range, with disjunct populations also in Nevada's Great Basin National Park and the west-central ranges in Utah (NatureServe 2022). The Inyo shrews have been known to specialize on mollusks in addition to typical invertivorous items (NatureServe 2022). Although detailed habitat preferences of the Inyo shrew are not well documented, they have been described in the Great Basin National Park in rocky-riparian habitat of spruce-fir forests and in aspen woodlands (Rickart and Robson 2005). In general, suitable habitat for Inyo shrew in Nevada likely includes riparian zones in montane woodlands, pinyon-juniper woodlands, sagebrush scrub, and alkali desert scrub (Johnson 2008).

The Merriam's shrew can achieve lengths of 4 inches and weigh approximately 0.75 ounce. The Merriam's shrew has a white belly and a light gray-brown back. Relative to other shrew species occurring in the region like the vagrant shrew (*Sorex vagrens*), the Merriam's shrew's fur is short and its ears are prominent. The tail is slightly bicolor with light brown on the dorsal side and a short tuft of hair at the tip (Reid 2006). The Merriam's shrew occurs widely across the western United States, including the Great Basin, Columbia Plateau, northern Great Plains, and southern Rocky Mountains (NatureServe 2022). The Merriam's shrew has been documented in a diverse range of grassland habitats, including grasslands associated with sagebrush scrub, pinyon-juniper woodlands, and mountain mohagany (*Cercocarpus* spp.) shrublands. The Merriam's shrew has the strongest bite force of all shrew species and specializes on larger, hard-bodied insects in addition to other invertabrates (NatureServe 2022). Merriam's shrews can use vole runways and have been known to occupy vole burrows where their ranges overlaps.

The Preble's shrew reaches a maximum length of 3.2 inches and can weigh up to approximately 0.1 ounce (Reid 2006). The Preble's shrew is brown dorsally and laterally (sides), except in winter when their pelage turns grey. Portions of its feet are pale, and the tail is brown with no discernable tuft (Reid 2006). It occurs from the Columbia Plateau to the northern Great Plains and southward to northern New Mexico. The Preble's shrew has been documented at elevations ranging between 4,200 and 8,350 feet in arid environments including shrub-grassland associations, willow-fringed creeks, marshes, xeric and mesic sagebrush-grass communities, and alkaline shrubland, and is considered rare throughout its range (NatureServe 2022).

Livestock activity and land development threaten shrew populations by causing habitat loss, habitat fragmentation, and the displacement of preferred shrew habitats, such as sagebrush-grassland communities—particularly important to the Preble's and Merriam's shrews. The introduction and expansion of weedy species, such as cheatgrass (*Bromus tectorum*), prevailing drought conditions, and increased prevalence of wildfires have led to further loss of native sagebrush-grassland habitat (WDFW 2022). Shrew populations are known to be negatively affected by intensive livestock browsing and trampling of riparian zones; however, significant data gaps for Preble's and Merriam's shrew species still exist (Schmidt et al. 2009; Natureserve 2022). The American water shrew is primarily vulnerable to loss or degradation of riparian and aquatic habitats (Natureserve 2022). Anthropogenic activities, which negatively affect shrew populations, include construction of roads, mining, agriculture, and logging and act to fragment large swaths of high quality sagebrush-grassland habitats. Specific negative disturbances to Inyo shrews have not yet been determined, but it is believed their populations are affected in a similar way as other *Sorex* species listed above (NatureServe 2022).

The Year 2 baseline studies for shrews consisted of trapping surveys conducted in locations identified during the Year 1 baseline field assessment (ERM 2022a) as containing the highest potential habitat for the four shrew species detailed above. Figure 3.3-1 displays the locations identified during the Year 1 field assessment and evaluated in Year 2.

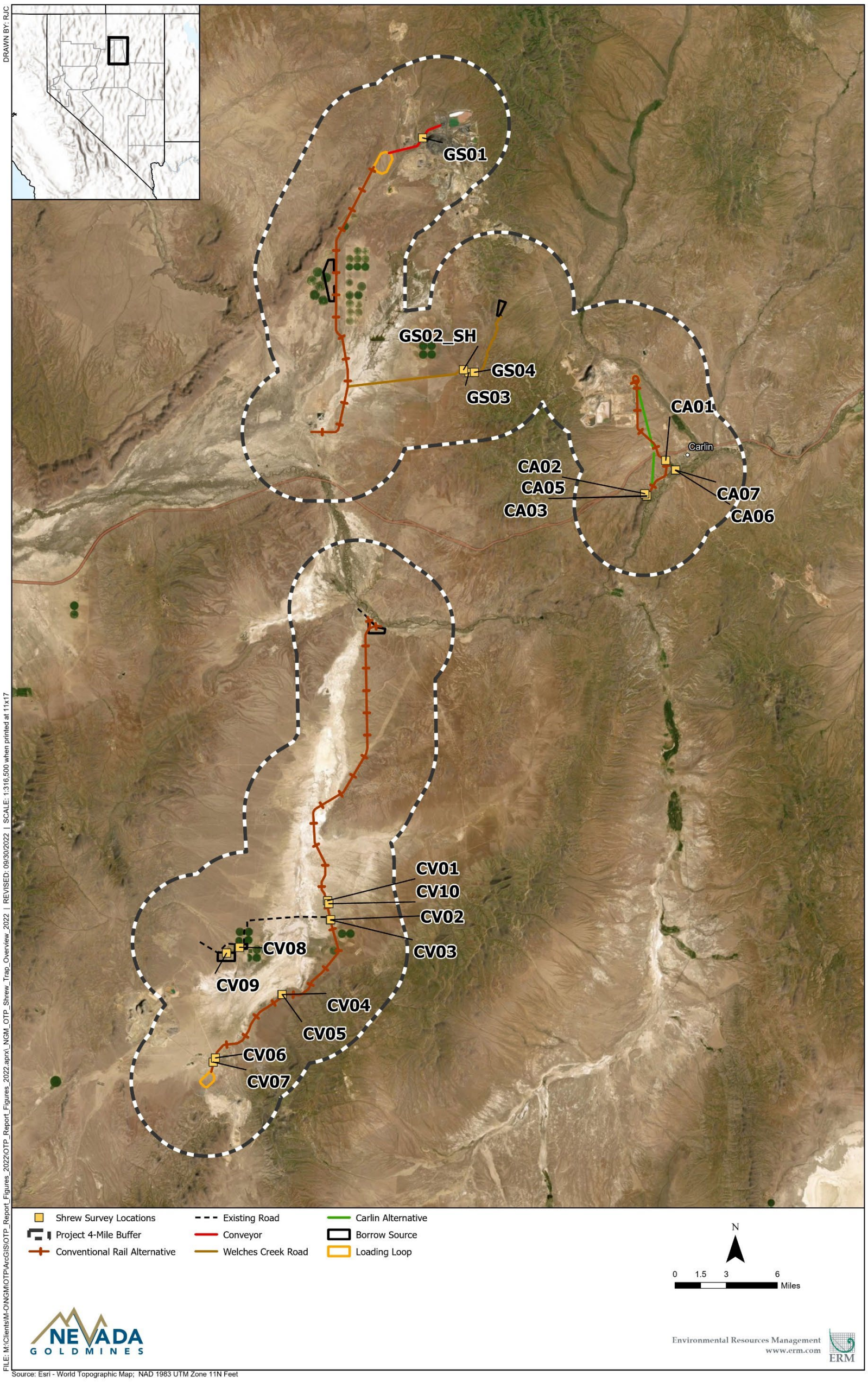


Figure 3.3-1: Shrew Trap Locations—Project Area

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3.3.2. Study Methodology

Trapping surveys for shrews were conducted according to the *Sorex Capture and Handling Protocol for Northern Nevada* (EBP et al. 2022). Precise locations for trapping sites, number of traps, and the survey timing were determined during a discussion between ERM and the BLM Elko District Office. Table 3.3-2 displays the SWReGAP landcover type for each trapping location. In total, 20 trap locations were set, including 6 in Carlin, 10 in Crescent Valley, and 4 in the Goldstrike Survey Areas. Four-day trapping events at the 20 selected sites were split into two separate survey events with 10 trapping locations surveyed during each trapping event. The first trapping event was conducted May 25 to 28, 2022, in the Crescent Valley Survey Area, and the second trapping event was conducted June 4 to 7, 2022, in the Goldstrike and Carlin Survey Areas.

Table 3.3-2: Areas of Shrew Trapping and Associated Landcover—Year 2

Survey Area	Trapping Location	SWReGAP Landcover Type
Goldstrike Area	GS01	Inter-Mountain Basins Big Sagebrush Shrubland
	GS02	Inter-Mountain Basins Big Sagebrush Shrubland
	GS03	Inter-Mountain Basins Big Sagebrush Shrubland
	GS04	Inter-Mountain Basins Big Sagebrush Shrubland
Carlin Area	CA01	Inter-Mountain Basins Big Sagebrush Shrubland
	CA02	Invasive Annual Grassland
	CA03	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	CA05	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	CA06	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	CA07	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
Crescent Valley Area	CV01	Inter-Mountain Basins Greasewood Flat
	CV02	Inter-Mountain Basins Greasewood Flat
	CV03	Inter-Mountain Basins Greasewood Flat
	CV04	Inter-Mountain Basins Mixed Salt Desert Scrub
	CV05	Inter-Mountain Basins Mixed Salt Desert Scrub
	CV06	Recently Mined or Quarried
	CV07	Recently Mined or Quarried
	CV08	Inter-Mountain Basins Big Sagebrush Shrubland
	CV09	Inter-Mountain Basins Mixed Salt Desert Scrub
	CV10	Inter-Mountain Basins Greasewood Flat

Source: USGS 2005

SWReGAP = Southwest Regional Gap Analysis Project

Small, folding, aluminum Sherman live traps (dimenions 2 inches by 2.5 inches by 6.5 inches) were used to capture shrews during the trapping event. All traps were set approximately 1 hour before sunset and checked within 1 hour of sunrise the following morning. Prior to each survey night, traps were baited with a mixture of rolled oats, peanut butter, mealworms, and insulated with poly-fill material. Bait and insulation were replaced as needed prior to each survey night.

Traps were left in place over the entire 4-day trapping event but were closed during the day when not in use to reduce capture of non-target species.

In accordance with protocol (EBP et al. 2020), biologists conducted a single 4-day trapping event in each of the 20 trapping locations, resulting in a total of four trap checks during the trapping events. Trapping events for shrews were completed using either a parallel or linear transect array. In both arrays, traps were placed approximately 33 feet apart along respective transects. Parallel transects of five traps were placed in two habitats: directly adjacent to streams and within upland habitat adjacent to the riparian corridor. Linear transects were used at three trapping locations (CA02, CV02, and CV03), where the bed and banks of playa wetlands were less distinct, or where the stream and its associated riparian corridors were comparatively thin. Within these habitats, transects were placed in locations with the highest chances of shrew trapping success, such as areas with the lowest annual grass and forb coverage; where there is highest shrub or tree cover; and where rodent paths were observed. Biologists recorded the positions of each transect using the ArcGIS Field Maps application.

Field survey data, including the Trap Check and the Trapping Site Description datasheets, were collected electronically using ArcGIS Survey123. Trap Check datasheets were completed for each trap during each trap check and used for documenting the trap identification number, date, temperature, windspeed, cloud cover, precipitation, geo-location, surveyor names, start/end time, number of successful traps, number of false trips, and all non-target species captured. The Trapping Site Description form was completed once for each transect and was used for documenting transect name, geo-location, surveyor names, trap set date, trap removal date, habitat type, stream/waterbody type, and evidence of habitat disturbances within or adjacent to the trapping location. Detailed Survey123 field data are provided in Section C.1 of Appendix C, Shrews Data.

All captured animals were handled as described in the 2016 Guidelines of the American Society of Mammalogists (Sikes 2016). Any mortalities of captured small mammals were recorded and reported to NDOW. Non-target species captured were identified and released without further evaluation.

As part of the field survey, biologists searched for shrew sign such as scat, burrows, and runways. Shrew burrows are not unlike other small mammal or reptile burrows in terms of size and shape. However, shrews often excavate their burrows or occupy other mammal burrows that are directly adjacent to a water source. Shrew scat is generally 0.05 inch in diameter and can be up to 0.25 inch in length with a distinctive curl and tapered ends. Unlike mouse or rat scat, which can be dispersed along runways, shrews often maintain one or several scat piles (“latrines”) near the waters’ edge where they deposit their scat. Although runways can be used by several different species at any time, runways that lead to the water along with identification of distinct latrines along the runway aid in the proper identification of shrew sign.

3.3.3. Results and Discussion

ERM biologists conducted shrew trapping in the Crescent Valley Survey Area May 25 to 28, 2022, and in the Goldstrike and Carlin Survey Areas June 4 to 7, 2022. In total, 800 traps were deployed in areas identified as having the most suitable hydrological and vegetative characteristics for shrew species in the Carlin, Goldstrike, and Crescent Valley Survey Areas. No shrews were captured during the trapping events. Though several trapping locations support habitats suitable to shrew species, including dense riparian vegetation, abundant shrub coverage, and aquatic conditions, locations with these characteristics also exhibited substantial cattle activity and/or anthropogeic disturbances from railroads and/or road traffic.

Non-target species captured included 94 deer mice (*Peromyscus maniculatus*), comprising 98.9 percent of captured mammals, and 1 house mouse (*Mus musculus*), comprising 1.1 percent of captured mammals. Table 3.3-3 summarizes captured species for each of the trapping locations. The 20 trapping locations identified during Year 1 surveys and evaluated in Year 2 are shown on Figures 3.3-2 to 3.3-4.

Table 3.3-3: Small Mammal Captures Summary

Trapping Location	Species Collected	Total Number Captured
GS01	Deer mouse (*Peromyscus maniculatus*)	21
GS02	Deer mouse (*Peromyscus maniculatus*)	2
GS03	Deer mouse (*Peromyscus maniculatus*)	8
GS04	--	--
CA01	Deer mouse (*Peromyscus maniculatus*)	21
CA02	--	--
CA03	--	--
CA05	Deer mouse (*Peromyscus maniculatus*)	5
CA06	--	--
CA07	--	--
CV01	--	--
CV02	Deer mouse (*Peromyscus maniculatus*)	9
CV03	Deer mouse (*Peromyscus maniculatus*)	11
CV04	--	--
CV05	--	--
CV06	Deer mouse (*Peromyscus maniculatus*)	1
CV07	Deer mouse (*Peromyscus maniculatus*)	13
	House Mouse (*Mus musculus*)	1
CV08	Deer mouse (*Peromyscus maniculatus*)	2
CV09	--	--
CV10	--	--

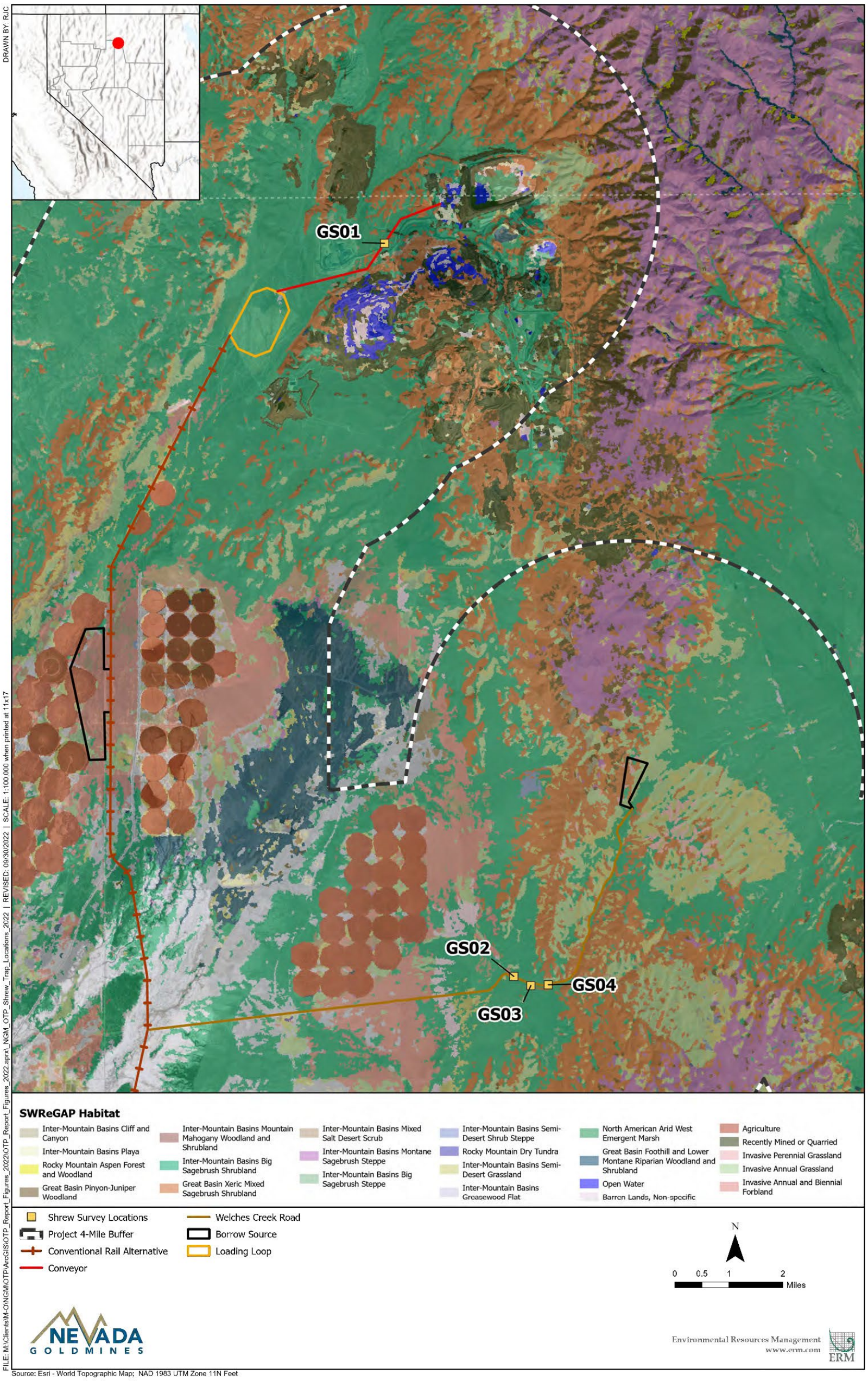


Figure 3.3-2: Shrew Trap Locations—Goldstrike Survey Area

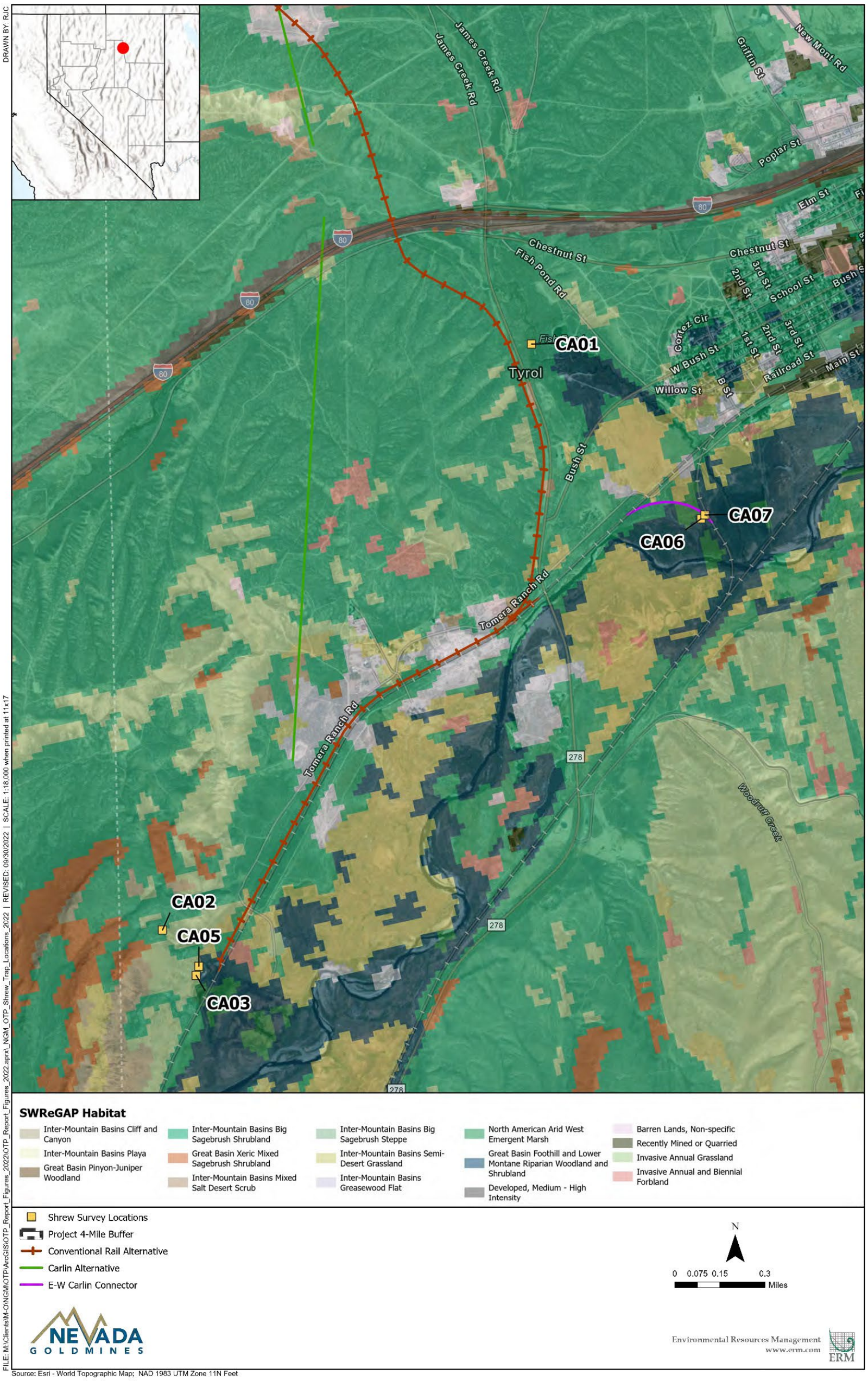


Figure 3.3-3: Shrew Trap Locations—Carlin Survey Area

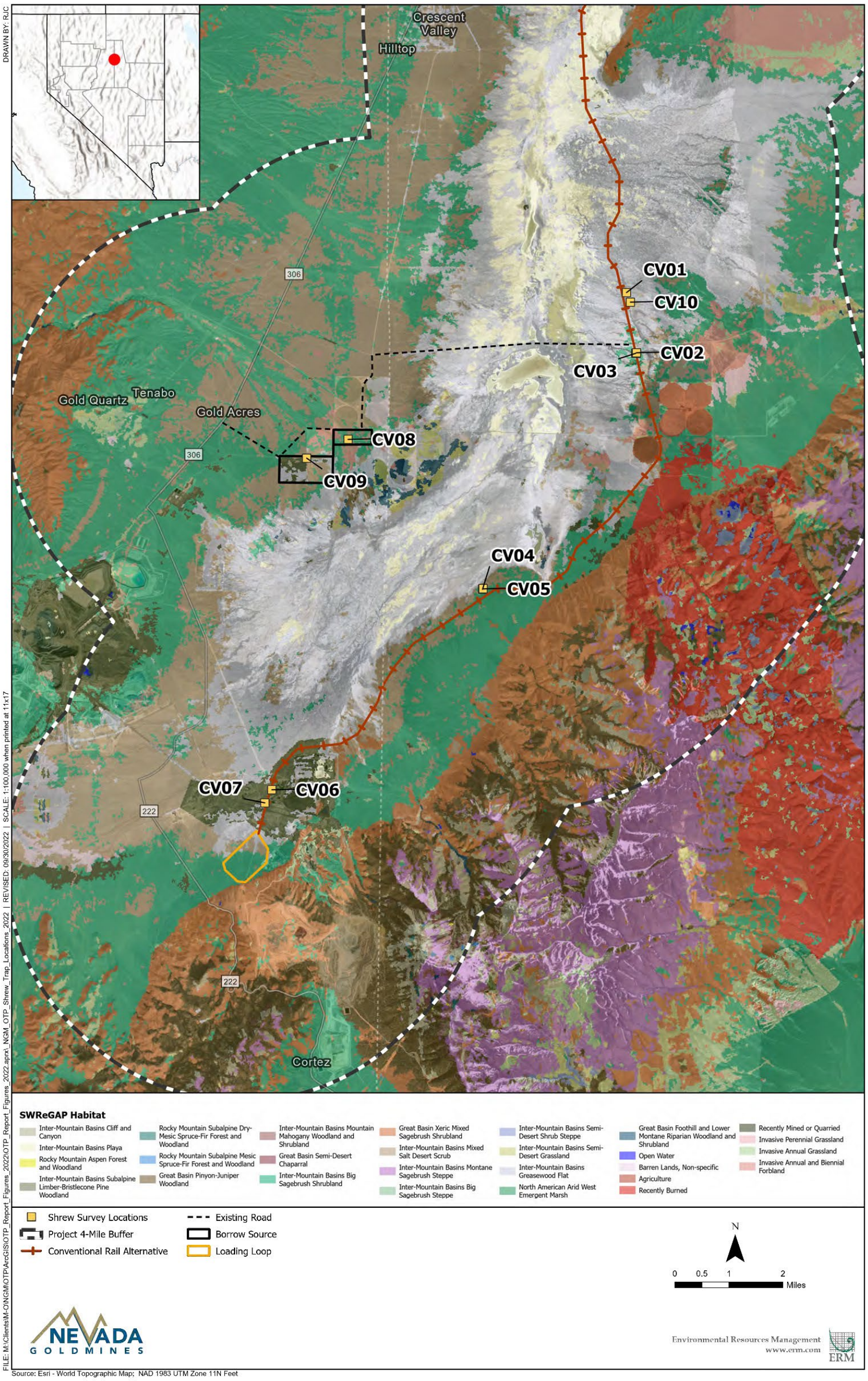


Figure 3.3-4: Shrew Trap Locations—Crescent Valley Survey Area

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3.3.3.1. Goldstrike Results and Discussion

The Goldstrike Survey Area consists of only one landcover type: Inter-Mountain Basins Big Sagebrush Shrubland. The habitat includes flat to steeply sloping uplands on alluvial fans and terraces, draws, badlands, and deep, well-drained alluvial bottomland foothills and basins that are consistent with preferred shrew habitat; however, no shrew species were captured in this survey area as shown in Table 3.3-3.

The GS01 trapping location was placed in Inter-Mountain Basins Big Sagebrush Scrub in the vicinity of a small flowing stream surrounded by wet meadows on each side (see Photos 1, 3, and 4 in Section C.2 of Appendix C, Shrews Data). Dense populations of cattail (*Typha* spp.) were established throughout the stream channel, particularly in areas where the stream banks widened. Areas with shallow water were dominated by rushes (*Juncus* spp.). Soils were saturated throughout the heavily vegetated riparian corridor, and several suspected mammal burrows and runways existed throughout the habitat (see Photo 9 in Section C.2 of Appendix C). The shrub community in this area was comprised mostly of big sagebrush, while the herbaceous community supported a mosaic of Great Basin wild rye (*Leymus cinereus*), bottlebrush squirreltail (*Elymus elymoides*), Indian ricegrass (*Oryzopsis hymenoides*), crested wheatgrass (*Agropyron cristatum*), and cheatgrass (see Photos 10, 11, and 12 in Section C.2 of Appendix C). Anthropogenic disturbances observed in the area included an aboveground water pipe surrounded by a mowed right-of-way 130 feet southwest, and an active mine haul road located within 600 to 1,000 feet north, south, and east of the transect (see Photos 3 and 4 in Section C.2 of Appendix C). An active open-pit mine exists beyond the haul road east, and mining activity (drills, traffic, miscellaneous machinery) was audible throughout the survey period. The suitability of this site for shrews may be reduced by the existing haul road traffic and mining activity at this trapping location.

Trapping locations GS02, GS03, and GS04 were located along Welch Creek—an incised intermittent stream—in Inter-Mountain Basins Big Sagebrush (see Photos 16, 29, and 45 in Section C.2 of Appendix C). The riparian corridor and upland areas were dominated by big sagebrush, with herbaceous community including foxtail barley (*Hordeum jubatum*), bluegrass (*Poa secondo*), cheatgrass, and sparse amounts of Great Basin wild rye. During the trapping event, GS02 and GS03 contained damp soils and isolated stagnant pools, while GS04 supported flowing water (see Photos 25, 39, and 52 in Section C.2 of Appendix C). Cattle disturbance was observed at all three trapping locations in the form of scat and tracks throughout the bed and bank of the stream channel. The trampling of stream banks causes sedimentation in the streambed and reduces the potential development of overhanging vegetation (Ehrhart and Hansen 1997). Some anthropogenic disturbance was also observed in the area, including a corral and cattle gate approximately 450 feet west of the GS02 trapping location, and a dirt road directly adjacent to the western riparian corridors of all three trapping locations. The relatively dense riparian community and aquatic habitat at this location is suitable shrew habitat, but the cattle disturbance in the riparian corridor and the streambed and bank reduced the overall habitat suitability for shrews.

3.3.3.2. Carlin Results and Discussion

The Carlin Survey Area consists of three SWReGAP landcover types: Inter-Mountain Basins Big Sagebrush Shrubland; Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland; Invasive Annual Grassland. The proximity to the Humboldt River and its tributaries, as well as adjacent grasslands, willow-fringed creeks, and areas dominanted by sagebrush has the potential to provide suitable riparian habitat for shrew species listed in Table 3.3-1; however, no shrew species were collected within this survey area as shown in Table 3.3-3.

Three locations in the Carlin Survey Area identified for trapping during the Year 1 Baseline Study (CA03, CA04, and CA05) were inundated and could not be sampled in 2022. As a result, biologists adjusted the positioning of CA03 and CA05 (referred to as CA03_SH_Alt and CA05_SH_Alt in Appendix C, Shrews Data) to the margins of the wetland, approximately 150 feet northeast of their previous positions. Due to spatial constraints imposed by the repositioning of CA03 and CA05, trapping location CA04 was removed from the Carlin Survey Area and a compensatory trapping location (CV10) was added in the Crescent Valley Survey Area. Figure 3.3-3 displays the trapping locations within the Carlin Survey Area.

Trapping location CA01 was placed along a deeply incised perennial stream in Inter-Mountain Basins Big Sagebrush Shrubland. At the time of survey, minimal surface flow was observed. In the stream channel, dense populations of sedges (*Carex* spp.), cattail, watercress (*Nasturtium officinale*), and filamentous algae were observed (see Photos 73 and 79 in Section C.2 of Appendix C, Shrews Data). The shrub layer within the riparian corridor was dominated by dense stands of arroyo willow (*Salix lasiolepsis*) and small stands of big sagebrush. The herbaceous layer was comprised of bluegrass, cheatgrass, whitetop, tall whitetop (*Lepidium latifolium*), scotch thistle (*Onopordum acanthium*), musk thistle (*Carduus nutans*), and sparse amounts of dock (*Rumex* spp.) (see Photos 83 in Section C.2 of Appendix C). The proximity to water and the densely vegetated riparian zone provided suitable habitat for shrew species within the trapping location.

Trapping location CA02 was placed along a perennial stream within the Invasive Annual Grassland. Water is present in this location as a result of a corrugated pipe conveying water from a natural spring into the channel (see Photos 71 and 73 in Section C.2 of Appendix C, Shrews Data). The streambed has cobble substrate, but dense watercress mats cover approximately 50 percent of the total wetted width. The riparian corridor was densely vegetated but comprised mostly of weedy plant species such as Canada thistle, whitetop, scotch thistle, and Russian knapweed (*Rhaponticum repens*). Cattle scat and tracks were observed within the riparian corridor of the stream, and the dense weedy species established in the area are likely a result of preferential grazing. The hydrologic condition, cobble substrate, and dense riparian vegetation provide adequate cover and suitable habitat, particularly for the American water shrew; however, cattle disturbance both instream and within the riparian zone reduced the overall habitat suitability for all shrew species at this trapping location.

Trapping locations CA03 and CA05 were placed along a riparian corridor adjacent to an emergent wetland in Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland. Dense stands of cattail and dark green bulrush were observed (see Photo 88 in

Section C.2 of Appendix C). Several small mammal runways were observed in riparian grass communities (see Photo 95 in Section C.2 of Appendix C). Cattle disturbance was observed throughout the landscape in the form of tracks and scat within the upland areas, but the riparian corridor appeared free of cattle disturbance. Active railroad tracks are located approximately 200 feet southeast of the trapping locations and form the eastern boundary of the wetland. The absence of dense riparian vegetative cover reduced the overall habitat suitability for all shrew species at these trapping locations.

Trapping locations CA06 and CA07 were placed in the riparian corridor surrounding a wet meadow and emergent wetland in Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland. Surface water was only present in the deepest, central portion of the wetland feature, and soils within the adjacent meadow were dry. In the riparian corridor, herbaceous vegetative species included bluegrass, dense stands of cattail, and rushes (*Juncus* spp.). Dessicating mudflats were present in the margins of the wetland. Sparse amounts of big sagebrush and rubber rabbitbrush (*Ericameria nauseosa*) were located in the rocky foundation of nearby railroad tracks located approximately 5 to 6 feet above the surrounding landscape and were not within the riparian corridor (see Photo 104 and 105 in Section C.2 of Appendix C, Shrews Data). Both trapping locations are positioned approximately 50 feet west of an active railroad and are within a rotating cattle paddock. Canada thistle, whitetop, and Russian knapweed were the dominant species in the riparian corridors of the trapping locations. The absence of a shrub layer in the riparian zone and disturbances from both railroad and cattle reduced the overall habitat suitability at these locations for shrew species.

3.3.3.3. Crescent Valley Results and Discussion

The Crescent Valley Survey Area consists of four SWReGAP landcover types. Greasewood and desert scrub playa habitats are dominant in this area and are consistent with shrew species preferred habitat, specifically the Preble's shrew and Inyo shrew; however, no shrew species were collected within this survey area, as shown in Table 3.3-3. Trapping locations CV01 and CV10 were both located in areas with groundwater seeps in Inter-Mountain Basins Greasewood Flat landcover. Groundwater seeps are geological features where groundwater reaches the soil surface, resulting in year-round soil saturation. The soils in these two seeps were damp in the lowest areas, and the vegetative community was dominated by saltgrass (*Distichlis spicata*) and sedges (*Carex* spp.). Sparse amounts of Great Basin wild rye were identified in some locations where dryer soil was present. The margins of the seep were dominated by yellow rabbitbrush (*Chrysothamnus viscidiflorus*) and greasewood (*Sarcobatus vermiculatus*) (see Photos 132 and 135 in Section C.2 of Appendix C, Shrews Data). Cattle scat and tracks were observed in the immediate area of the seep, resulting in trampling of the herbaceous layer outside of the seep. The dense riparian vegetation provides suitable cover for shrew species, but evidence of cattle activity noted in the surrounding area may have contributed to the reduced quality of this habitat for shrew species.

Trapping locations CV02 and CV03 were located along a boundary between an emergent and scrub-shrub wetland. Some surface flow was observed in the emergent wetland flowing eastward, but no surface water existed in the adjacent scrub-shrub wetland (see Photos 150

and 164 in Section C.2 of Appendix C). Big sagebrush and greasewood were the dominate shrub vegetation (see Photos 147 and 161 in Section C.2 of Appendix C), and the herbaceous layer was dominated by thick stands of Great Basin wild rye. Cattle tracks were observed in the surrounding landscape but not within the wetland features or riparian corridors. The wetland was dominated by cattail (*Typha* spp.), with inclusions of dark green bulrush (*Scirpus atrovierens*) and spike-rushes (*Eleocharis* spp.). Within the riparian corridor, local concentrations of Great Basin wildrye and other native grasses provided heavy vegetation with suitable habitat for shrews.

Trapping locations CV04 and CV05 were in two side-by-side groundwater seeps in Inter-Mountain Basins Mixed Salt Desert Shrub landcover. Within the seeps, saltgrass dominated the vegetative community while the margins supported greasewood and big sagebrush, with some inclusions of fourwing saltbrush (*Atriplex canescens*) and shadscale (*Atriplex confertifolia*) (see Photos 177 and 192 in Section C.2 of Appendix C, Shrews Data). Disturbance from cattle in the form of tracks and trampled and/or grazed herbaceous plants were observed in the seep margins, as well as the surrounding landscape. Cattle tracks and scat within the seep was also observed. The dense vegetative cover surrounding the groundwater seeps provides suitable cover for shrews, but disturbance by cattle reduced overall quality of this habitat for shrew species.

Trapping locations CV06 and CV07 were placed along riparian corridors of two open-water habitats. These two artificial ponds provide a perennial source of water, likely sourced from groundwater. At both locations, a similar shrub community of horsebrush (*Tetradymia* spp.) and yellow rabbitbrush was present, but the CV07 trapping location supported a more densely vegetated riparian zone than the CV06 trapping location (see Photos 205 and 218 in Section C.2 of Appendix C). Saltgrass and Russian thistle (*Salsola tragus*) with inclusions of cheatgrass were the dominant herbaceous layer. Cattle were present during trap checks at both transects, and trampling and browsing of riparian vegetation were observed. CV06 provided only marginally suitable habitat due to the sparse riparian vegetation and cattle disturbance noted at the trapping location. The densely vegetated riparian corridor at CV07 provided suitable habitat for shrews; however, the cattle disturbance reduced the overall suitability at this trapping location.

Trapping location CV08 was placed along an ephemeral stream within the Inter-Mountain Basins Big Sagebrush Shrubland. At the time of the survey, surface water was not observed in the channel and sediments were dry. Soil appeared to have been added to the streambanks, resulting in the top of bank to sit approximately 3 feet above the surrounding upland landscape and approximately 5 feet above the channel bottom (see Photos 233 and 234 in Section C.2 of Appendix C). No riparian corridor or riparian habitat was found at this location, likely a result of the soil disturbance and modifications of the streambank. The area adjacent to the stream channel was sparsely vegetated and comprised mostly of bare soil and weedy plant species such as Russian thistle, western tanseymustard (*Descurainia pinnata*), whitetop (*Lepidium draba*), and cheatgrass. Big sagebrush shrubs occurred intermittently throughout the trapping location but provided minimal cover relative to the amount of bare soil. The lack of riparian

habitat, absence of hydrology, and lack of dense riparian vegetation reduced the suitability of this trapping location for shrews.

Trapping location CV09 was placed along a wetland within Inter-Mountain Basins Mixed Salt Desert Scrub. The wetland at this site is created by water overtopping a cattle trough roughly 75 feet northwest of the trapping location (see Photo 246 in Section C.2 of Appendix C, Shrews Data). Outside the margins of the wetland, bare soils dominated the trapping area, with sparse vegetation comprised mostly of weedy plant species including western tanseymustard, clasping pepperweed (*Lepidium perfoliatum*), Russian thistle, and whitetop (see Photos 254 to 258 in Section C.2 of Appendix C). Sparse stands of dark green bulrush (*Scirpus atrovirens*) occupied the margins in some locations of the wetland, and dense free-floating algae was observed in middle portion of the wetland (see Photos 248 to 253 in Section C.2 of Appendix C). The absence of vegetative cover in the riparian zone and disturbance by cattle indicate this area has reduced suitability for shrews.

3.4. AMPHIBIANS

3.4.1. Background

Amphibians potentially occurring in the Project Area designated as BLM sensitive species include the Columbia spotted frog (*Rana luteiventris*, Great Basin population), northern leopard frog (*Lithobates pipiens*), and western toad (*Anaxyrus boreas*). The Columbia spotted frog and the northern leopard frog are also NDOW state-protected species covered under NAC 503.075.2 (NDOW 2022). All three species occur in wetlands and slow-moving streams or in uplands adjacent to aquatic habitats (BLM 2018). Table 3.4-1 describes the agency status and general habitat for each amphibian species discussed in this section.

Table 3.4-1: BLM and NDOW Special Status Amphibian Species

Species	Agency Status	Nevada Wildlife Action Plan Habitat Description
Columbia spotted frog (*Rana luteiventris*, Great Basin population)	BLM Nevada Sensitive; NDOW State Protected	Closely associated with clear, slow-moving or ponded surface waters with little shade and relatively constant water temperatures; Overwintering occurs in spring heads and deep undercuts with overhanging vegetation and ice-covered deep ponds
Northern leopard frog (*Lithobates pipiens*)	BLM Nevada Sensitive; NDOW State Protected	Permanent ponds, swamps, marshes, and slow-moving streams throughout forest, open, and urban areas; Normally inhabit waterbodies with abundant aquatic vegetation
Western toad (*Anaxyrus boreas*)	BLM Nevada Sensitive	Found in a wide variety of habitats ranging from desert springs to mountain wetland and various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers or streams

Source: BLM 2018; NDOW 2022; Wildlife Action Plan Team 2013

BLM = Bureau of Land Management; NDOW = Nevada Department of Wildlife

The Columbia spotted frog can reach lengths up to 4 inches and is characterized by two ridged, dorsolateral folds along the back. It can range in color from beige and olive brown to brick red and has black spots with ragged edges and light centers (WDFW 2022a). The Great Basin population inhabits clear, slow-moving waters and ponds with little shade and relatively constant temperatures (NatureServe 2022a). Suitable habitat includes riparian corridors, wetlands, and areas supporting a mix of wetland/upland habitats. Breeding occurs in stagnant or slow-moving water, and successful egg deposition requires shallow water (NatureServe 2022a). Eggs are normally deposited in water at temperatures of approximately 57 °F, with larval metamorphosis requiring periods of warmer temperatures. Waters fed continuously by cold-water springs or otherwise prevented from warming during the day are unlikely to support successful breeding of the Columbia spotted frog (Patla and Keinath 2005).

The historical range of Columbia spotted frogs in Nevada included central and northwestern Nevada in Lander and Humboldt counties, respectively. However, more recent studies indicate only central and northeastern parts of Nevada retain these populations, including Nye, Elko, and Eureka counties at elevations of 5,600 to 8,700 feet (NatureServe 2022a). Nevada has three geographically distinct subpopulations of Columbia spotted frogs: the Jarbidge-Independence Range, Ruby Mountain, and the Toiyabe Mountain populations. Columbia spotted frogs potentially occurring in the Project Area are part of the Jarbidge-Independence subpopulation (Patla and Keinath 2005).

The northern leopard frog can reach lengths up to 4.5 inches and ranges in color from green-brown to yellowish-green with a white or cream-colored belly. This species has distinguishing dark oval spots outlined by lighter halos, and a pair of continuous white- or cream-colored dorsolateral ridges extends from behind the eyes to the lower back (Kendell 2002). The northern leopard frog requires a mix of aquatic and upland habitats, with linkages between them. During the winter months, they hibernate underwater in ponds, lakes, or on the bottom of streams or springs that do not freeze and are well-oxygenated (USFWS 2015). Breeding habitat includes a variety of aquatic habitats—preferably permanent pools—along marshy edges or the side channels of streams, rivers, springs, wetlands (NPS 2015). Leopard frogs can be heard calling soon after hibernation periods (hibernation occurs from September or October through March or April), when water and air temperatures reach approximately 50 °F (Kendell 2002; MNHP and MFWP 2022). Eggs are laid and larvae develop in shallow, still, perennial waters exposed to sunlight. Eggs are attached to vegetation just below the water surface, and each female leopard frog deposits one egg mass annually (Kendell 2002).

The western toad is a wide-bodied, short-legged, warty-skinned amphibian that ranges in size from 2 to 5 inches long. This species can be brown, green, gray, or reddish-brown and is identifiable by a thin light-colored strip running along the middle of the back, with two obvious oval glands located behind the eyes on the top of the head. The underside of the western toad is light with dark markings (WDFW 2022b). According to the Montana Field Guide, the western toad is known to use a wide variety of habitats, including desert springs and streams, meadows and woodlands, mountain wetlands, beaver ponds, marshes, ditches, and backwater channels of rivers where they prefer shallow areas with mud bottoms (MNHP and MFWP 2022). Western toads return to the same breeding sites every year, gathering in large numbers to breed

communally for a 1- to 2-week period between April and May, typically breeding in shallow, sandy margins of waterbodies (NatureServe 2022b). Western toads are active in daylight during cool weather of late winter and spring, but most activity is at night during warmer weather (NatureServe 2022b).

These species are each susceptible to disturbances that threaten aquatic habitat, including water diversion, habitat degradation, and drought (Wildlife Action Plan Team 2013). Livestock activities and anthropogenic changes to the regional landscape can also reduce both quality and quantity of aquatic habitats. Additionally, the introduction of the non-native American bullfrog (*Rana catesbeiana*) has caused declines in native frogs in Nevada, impacting native amphibians via predation and competition, particularly when native amphibians are in the tadpole stage (Patla and Keinath 2005).

As described in the *Year 1 Biological Baseline Report* (ERM 2022a), Visual Encounter Surveys were conducted in 24 areas with potentially suitable amphibian habitat, and sightings of several American bullfrogs (*Lithobates catesbeianus*) and one western toad were documented. Of the 24 areas, four locations in the Project Area were determined to have the highest potential for special status amphibians to occur, all of which were within the Carlin Survey Area. The objective of the Year 2 baseline studies was to conduct egg mass monitoring and nocturnal call baiting to further evaluate the most suitable of these areas for the occurrence of amphibian species within the locations identified in Year 1.

3.4.2. Study Methodology

Biologists conducted one egg mass survey event in April 2022 and two nocturnal call baiting survey events in June and July 2022. Amphibian egg mass surveys were conducted in accordance with the *Survey Protocol for the Northern Leopard Frog* (Kendell 2002) and *Instruction Manual and Frog Survey Protocols for Region 1 National Wildlife Refuges, East-side Zone (Great Basin and Great Northern LCCs)* (Rombough 2012). Call baiting surveys were conducted in accordance with the *North American Amphibian Monitoring Program* protocol (USGS 2015).

Surveys took place at four transects along suitable habitat features within locations established during the Year 1 baseline surveys. All transects were located within the Carlin Survey Area (Table 3.4-2; Figure 3.4-1 and Figure 3.4-2).

Table 3.4-2: Locations of Amphibian Surveys

Transect	Egg Mass Survey Locations	Call Baiting Stations	SWReGAP Landcover Type(s)	Length (feet)
1	AMP#1	AMP1_1	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	736
		AMP1_2	North American Arid West Emergent Marsh	
2	AMP#2	AMP2_1	North American Arid West Emergent Marsh	646
		AMP2_2	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	
3	AMP#3	AMP3_1	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	938
		AMP3_2	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	
		AMP3_3	North American Arid West Emergent Marsh	
12	AMP#12	AMP12_1	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	967
		AMP12_2	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	
		AMP12_3	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	

SWReGAP = Southwest Regional Gap Analysis Project

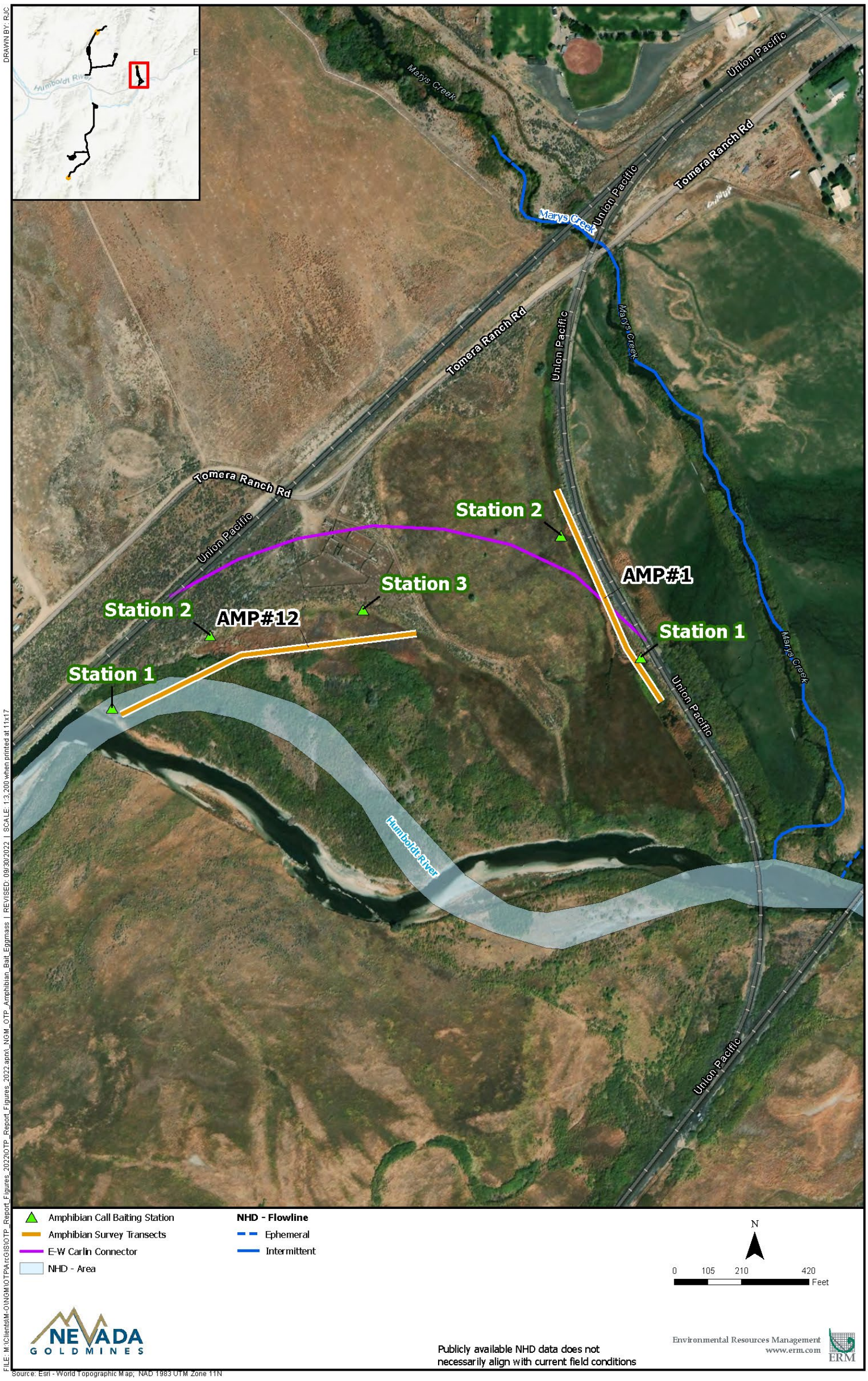


Figure 3.4-1: Amphibian Call Baiting Stations and Egg Mass Transects (1)—Carlin Survey Area



Figure 3.4-2: Amphibian Call Baiting Stations and Egg Mass Transects (2)—Carlin Survey Area

3.4.2.1. Egg Mass Surveys

A team of two biologists conducted egg mass surveys in areas supporting the most suitable habitat for amphibian egg deposition within the four transects (Table 3.4-2). Transects were located running the length of suitable habitat and parallel to the direction of water drainage. Surveys were completed in April 2022 when temperatures remained above 50 °F (Kendell 2002).

Surveys involved slowly walking the entire transect while carefully and systematically looking for suitable breeding habitat, paying particular attention to shallow waters with ample sunlight exposure and emergent, aquatic vegetation. If no emergent vegetation was present or if water depths were shallow, biologists focused on the floor and substrate of the waterbody where egg masses may be deposited. Biologists also looked under surface cover when present. Monitoring was not time-restrained and concluded when the entire transect was walked. Surveys were conducted during late morning to early afternoon in order to maximize light penetration and increase visibility as egg masses are often located at or below the water surface (Rombough 2012).

During each survey, biologists recorded the survey start and end times; date; location; current weather conditions; waterbody descriptions including waterbody type, dominant emergent vegetation, average water depth, turbidity, drainage regime, flow, and substrate. If incidental observations for amphibians outside of the targeted species occurred, the location of observation, species identified, and amphibian life stage (egg mass, tadpole, metamorph [recently transformed frog or toad], or adult) were noted (Rombough 2012). Photographs were taken of representative habitat at each transect and are included in Section D.1 of Appendix D, Amphibians Data. All collected data were recorded electronically using ArcGIS Survey123 following the Northern Leopard Frog Survey Data Sheet (Kendell 2002) as a guide for data collection.

3.4.2.2. Call Baiting Surveys

To evaluate the presence or absence of Columbia spotted frog, northern leopard frog, and western toad in the Project Area, 10 call baiting stations were established within the four transects from which egg mass surveys were conducted in April. Survey protocols followed the *North American Amphibian Monitoring Program* protocol developed by the USGS (2015). The protocol describes call baiting surveys as conducted by driving along roads and listening at established stations along each route. This protocol was modified for use in pedestrian-based surveys by reducing the distance between listening stations from 0.5 mile to 330 feet (100 meters). Protocol modifications were approved by BLM during coordination regarding the 2022 work plan (ERM 2021a) and prior to the start of fieldwork. Before conducting the surveys, biologists studied vocalizations of the three BLM Sensitive species.

Two listening stations each were established for transects AMP#2 and AMP#3, and three listening stations each were established for transects AMP#12 and AMP#1 (Figure 3.4-1 and Figure 3.4-2). Listening stations were accessed by foot and placed as close to the habitat as

feasible without causing disturbance to species. Nocturnal surveys began no earlier than 30 minutes after sunset and were completed no later than 1:00 a.m.

At each listening station, biologists performed call baiting by playing a recording of vocalizations of the Columbia spotted frog, northern leopard frog, and western toad to illicit a response from nearby amphibians. Biologists used an EcoTrek speaker for playing recordings of frog and toad calls, which has a 100-watt amplifier for broadcasting. Vocalizations were played for 1 minute at each listening station prior to a 5-minute listening interval. To the extent possible, listening stations were positioned away from roads or other sources of ambient noise that could mask amphibian calls or interfere with listening. If there was noise lasting longer than 1 minute, the listening period of 5 minutes was paused and resumed after noise subsided. At each call station, biologists documented the survey start times, date, current weather conditions, the call index for each species present, latitude and longitude coordinates, and general notes including any noise.

3.4.3. Results and Discussion

Field biologists completed egg mass surveys along the four transects on April 19 and 20, 2022, and nocturnal call baiting surveys at 10 listening stations within the same four transects over two, 2-day events June 2 and 3 and July 14 and 15, 2022 (Figure 3.4-3 and Figure 3.4-4). No amphibian egg masses were observed during the survey events, and one BLM special status species (i.e., western toad) was heard during call baiting surveys. For reference, the location of the western toad observation from the Year 1 baseline studies is included on Figure 3.4-4.



Figure 3.4-4: Amphibian Species Observations and Vocalizations; Year 1 and Year 2 (2)—Carlin Survey Area

3.4.3.1. Transect Habitat

All four transects were located within wetlands in the greater Humboldt River floodplain and were adjacent to the Union Pacific Railroad (UPRR) (Figures 3.4-1 and 3.4-2). Surface water was present in three of the four transects (AMP#1, AMP#3, and AMP#12) located in historic drainage channels and one stream (AMP#3). These transects contained aquatic habitat in the form of shallow, standing water, and submerged vegetation root mats, as outlined in Table 3.4-3. The dominant emergent vegetation within the survey areas included bulrush species (*Schoenoplectus* spp.), residual cattail (*Typha* spp.), and sedges (*Carex* spp.).

Table 3.4-3: Aquatic Habitat at Transect Locations

Transect ID	Aquatic Habitat	Waterbody Descriptions		Species Observed and Life Cycle	Emergent Vegetation Abundance	Emergent Vegetation Species
		Average Water Depth (inches)	Flow			
AMP#1	Shallow, standing water	5.5	None	None	25–50%	Residual bulrush and cattail spp.
AMP#2	None	Dry	None	None	>50%	Bulrush spp.
AMP#3	Drainage channel with flow	19.6	Slow	American bullfrog - Metamorph	>50%	Bulrush spp.
AMP#12	Partly-submerged vegetation in inundated portion of wetland	4.7	None	None	>50%	Sedges, bulrush, and cattail spp.

ID = Identification

Transect AMP#1 was placed in a wetland located approximately 30 feet west of the UPRR (Figure 3.4-1). When water is present, this wetland drains southeast into the Humboldt River and outside of the Project Area. At the time of surveys, the wetland was not connected hydrologically to the Humboldt River. Transect AMP#1 was 736 feet long, with aquatic conditions over approximately 400 feet along in the southern section. The remaining section on the northern portion was dry. Dominant wetland vegetation consisted of bulrush and cattail species (see Photo 7 in Section D.1 of Appendix D, Amphibians Data).

Transect AMP#2 is 646 feet long and was placed in a wetland approximately 1,320 feet northwest of the Humboldt River and approximately 180 feet northwest of the UPRR (Figure 3.4-2). During egg mass surveys, no standing water was observed within the transect, but saturated soils were present following a drainage feature running along the transect. Water marks on vegetation adjacent to the drainage feature (see Photo 2 in Section D.1 of Appendix D, Amphibians Data), indicated water levels along this transect fluctuate and habitat in this area may be lacking permanent water sources required for egg mass deposition. Dominant wetland vegetation within the transect consisted of bulrush species.

Transect AMP#3 is located approximately 30 feet northwest of the UPRR and approximately 100 feet southwest of AMP#2 (Figure 3.4-2). The transect is 939 feet long and runs along two drainage channels and associated wetlands. The drainage channel in the northern section of the transect was dry during the time of surveys (see Photo 4 in Section D.1 of Appendix D, Amphibians Data). The drainage in the southern portion of the transect receives flows from the abutting wetlands and supported low flows at the time of survey as it drained northwest to a culvert under the UPRR. Bulrush was the dominant emergent wetland vegetation observed.

AMP#12 is located within wetland adjacent to the Humboldt River and southwest of the town of Carlin (Figure 3.4-1). The transect is 967 feet long, of which approximately 800 feet of the northern section was dry at the time of egg mass surveys. As the wetland drains towards the Humboldt River, several drainage channels have formed (shown on Photo 5 in Section D.1 of Appendix D, Amphibians Data). Dominant wetland vegetation consisted of sedges, bulrush, and cattail with some scattered willow shrubs (*Salix* spp.) along the edges of the wetland area.

3.4.3.2. Egg Mass Surveys

No amphibian egg masses were observed during surveys. Biologists identified only one species of amphibian, metamorph American bullfrogs, within a slow-moving drainage channel at Transect AMP#3. An incidental sighting of bullfrog tadpoles and adult bullfrogs that occurred in the Humboldt River approximately 140 feet southwest of Transect AMP#12 suggests bullfrogs are common in this area where aquatic habitat occurs.

3.4.3.3. Call Baiting Surveys

During the first call baiting event in June, three western toad vocalizations were heard from the listening station closest to the Humboldt River at Transect AMP#12 (Listening Station 1; AMP12_1). American bullfrogs were heard at two call stations, one within AMP#3 (Listening Station 3; AMP3_3) and one within #AMP2 (Listening Station 1; AMP2_1). The call of a western toad was suspected at AMP2_1 but could not be confirmed as the vocalization was faint. Noise from traffic on the I-80 roadway was heard during surveys at AMP#1 and AMP#12 but did not interfere or necessitate pausing the survey; however, the survey was paused for over 1 minute due to a passing train at call stations AMP1_1, AMP12_2, and AMP2_2. Detailed survey data can be found in Appendix D, Amphibians Data.

During the second survey event in July, no species of concern were heard but as many as 10 American bullfrogs were chorusing at 5 of the 10 call stations at (Table 3.4-3).

Table 3.4-4: Call Baiting Survey Data Summary

Transect	Site ID	Call Baiting Results	
		June Survey	July Survey
1	AMP1_1	None	None
	AMP1_2	None	None
2	AMP2_1	American bullfrog	American bullfrog
	AMP2_2	None	American bullfrog
3	AMP3_1	None	None

Transect	Site ID	Call Baiting Results	
		June Survey	July Survey
	AMP3_2	None	None
	AMP3_3	American bullfrog	American bullfrog
12	AMP12_1	Western toad	American bullfrog
	AMP12_2	None	None
	AMP12_3	None	American bullfrog

ID = identification

Amphibian abundance in the Project Area has likely been negatively impacted by ongoing regional drought. In Elko County, 2022 was the 4th driest year to date since 1894 (NOAA 2022b). The U.S. Drought Monitor classified the town of Carlin as in severe drought (D2) during April, June, and July (NOAA 2022b), coinciding with egg mass and call baiting surveys. A negative correlation between amphibian captures and extended drought has been documented in various studies (Bucciarelli et al. 2020; Hitchcock 2001).

Records of northern leopard frogs in northeast Nevada date back to 1911 to 1916 along and near the Humboldt River (AmphibiaWeb 2022; Rogers and Peacock 2012). Rogers and Peacock (2012) conducted surveys at historic northern leopard frog monitoring locations and additional areas with suitable habitat in eastern Nevada in 2001, identifying northern leopard frogs at only 18 of the 97 historical sites, with the nearest population identified approximately 30 miles east of the Carlin Survey Area. There have been no other nearby reports of northern leopard frogs since 1916 (AmphibiaWeb 2022), and most Nevada populations are thought to be extirpated (Rogers and Peacock 2012).

Columbia spotted frogs have been documented in Maggie Creek since 1912 and more recently within 3.7 miles—the maximum known dispersal distance—of the Carlin Survey Area (USFWS 2015; NDOW 2015). However, recent barriers to movement such as land development and drought are fragmenting habitat populations, making presence in the Project Area from the Maggie Creek location unlikely. Activity and movement patterns are generally unknown for the Columbia spotted frog, but activity is sporadic in May and early June with frogs remaining underwater during periods of low temperatures (Patla and Keinath 2005). No presence of Columbia spotted frog was observed or heard during the 2022 surveys.

One western toad was observed at AMP#2 during the Year 1 baseline surveys, and western toad vocalizations were confirmed at AMP#12 during the 2022 call baiting surveys in June, suggesting this species is present within the Carlin Survey Area and thus the Project Area. Activity of western toads varies seasonally and geographically, potentially explaining the observations and vocalizations occurring in different transect locations. Because western toads return to the same breeding site every year, it is possible that drought conditions have limited the number of toads returning to these sites, or that toads have had to use other locations for breeding instead. The presence of American bullfrogs throughout the study may also impact western toad activity, from predation on tadpoles early in the season to competition with native species for resources.

3.5. SPRINGSNAILS

3.5.1. Background

Springsnails are small aquatic gastropods (snails) that live in fresh and brackish waters and are often endemic to specific seep and spring ecosystems (Springsnail Conservation Team 2020). Because the springs and seeps they occupy are often widely dispersed and disconnected, most springsnail populations are highly isolated (Wildlife Action Plan Team 2013). Many springsnails have specialized adaptations to the particular geochemistry and temperature of the individual springs and occur at only one or a few water sources (Stevens et al. 2022). Springsnails are particularly diverse in arid Nevada and Utah, where at least 103 taxa have been documented (Springsnail Conservation Team 2020; Stevens et al. 2022). The size and featureless shells of springsnails make them difficult to study, and there is limited information available for described species (Hershler and Liu 2017). The 13 springsnail species listed as BLM special status species potentially occurring in the Project Area are described in Table 3.5-1. Additionally, springsnail genera *Eremopyrgus*, *Fluminicola*, *Juga*, *Pyrgulopsis*, and *Tryoniaare* are included in NDOW's 2013 WAP and are at moderate risk of extinction because of their localized ranges, small population sizes, and site-specific endemism (Wildlife Action Plan Team 2013).

Table 3.5-1: Agency Status and General Habitat for Springsnails

Species	Agency Status	Nevada Wildlife Action Plan Habitat Description
California floater (*Anodonta californiensis*)	BLM Nevada Sensitive	Shallow areas associated with clean, clear lakes, ponds, and large rivers. Prefer lower elevations and soft, silty substrate for burrowing.
Carinate Duckwater pyrg (*Pyrgulopsis carinata*)	BLM Nevada Sensitive	Known to inhabit Little Warm Spring in Duckwater Valley, Nye County, Nevada.
Duckwater pyrg (*Pyrgulopsis aloba*)	BLM Nevada Sensitive	Only known to inhabit two unnamed springs northwest and southeast of Duckwater, Nevada.
Duckwater Warm Springs pyrg (*Pyrgulopsis villacampae*)	BLM Nevada Sensitive	Known to inhabit Big Warm Springs complex in Duckwater Valley, Nye County, Nevada.
Goshute mountain snail (*Oreohelix loisae*)	BLM Nevada Sensitive	Restricted to limestone spring features. Only known to inhabit two springs in the Goshute Mountains, Elko County, Nevada.
Humboldt pyrg (*Pyrgulopsis humboldtensis*)	BLM Nevada Sensitive	Restricted to the aquatic systems in the Lahontan Basin.
Large-gland Carico pyrg (*Pyrgulopsis basiglans*)	BLM Nevada Sensitive	Known to inhabit two springs along Crooks Creek in Carico Lake Basin, Lander County, Nevada. Insufficient surveys to delineate habitat requirements.
Median-gland Nevada pyrg (*Pyrgulopsis pisteri*)	BLM Nevada Sensitive	Known to inhabit Marsh Springs, North Scruggs Springs, and below School Springs (all within 1.2 miles of each other).
Oasis Valley pyrg	BLM Nevada Sensitive	Known to inhabit springs in Oasis Valley, Nevada.

Species	Agency Status	Nevada Wildlife Action Plan Habitat Description
(*Pyrgulopsis micrococcus*)		
Ovate Cain Spring pyrg (*Pyrgulopsis pictilis*)	BLM Nevada Sensitive	Known to inhabit springs within the Reese River Valley, Nevada.
Sada's pyrg (*Pyrgulopsis sadai)*	BLM Nevada Sensitive	Known to inhabit two springs north of Carlin, Nevada.
Southern duckwater pyrg (*Pyrgulopsis anatine*)	BLM Nevada Sensitive	Known to inhabit a single spring southeast of Old Collins Springs near Duckwater, Nevada.
Vinyards pyrg (*Pyrgulopsis vinyardi*)	BLM Nevada Sensitive	Restricted to springs in the Lahontan Basin.

Source: BLM 2018; Wildlife Action Plan Team 2013

BLM = Bureau of Land Management

Seeps and springs providing suitable habitat for springsnails are prevalent throughout the Project Area region, with more than 4,000 springs occurring in Nevada and 1,600 seeps and springs documented in Eureka County (Wildlife Action Plan Team 2013; Eureka County 2016). Seeps and springs occur where deep or shallow groundwater flows from bedrock or natural fill (aquifers) onto the land surface and forms surface flow or a waterbody (Wildlife Action Plan Team 2013). Seeps and springs represent rare and important habitat because they provide moist oases in otherwise arid environments. Springsnails typically occur at elevations of less than 6,550 feet (Stevens et al. 2022).

Impacts to aquatic habitats and springsnails can result from pumping of groundwater (Hershler et al. 2014), livestock activity, and the establishment of non-native aquatic organisms (Wildlife Action Plan Team 2013). The introduction of non-native crayfish, particularly the red swamp crayfish (*Procambarus clarkii*), virile crayfish (*Orconectes virilis*), and rusty crayfish (*Orconectes rusticus*), has been linked to the collapse or reduction of springsnail populations through intense predation in various Nevada springs (Springsnail Conservation Team 2020). Parasites within non-native aquatic organisms, such as the trematode in some red-rimmed melania snail (*Melanoides tuberculate*), can impact populations by reducing successful reproduction of native springsnails. Additionally, the invasive New Zealand mudsnail (*Potamopygrus antipodarum*) are able to asexually reproduce and outcompete native springsnail populations that rely on sexual reproduction (Springsnail Conservation Team 2020).

3.5.2. Study Methodology

During Year 1 Baseline Field Studies, areas supporting aquatic habitat suitable to springsnails were identified within the Project Area (ERM 2022a). Based on this evaluation, 11 locations with suitable springsnail habitat were evaluated for springsnail species during Year 2 baseline studies, including 4 locations in both the Goldstrike and Carlin Survey Areas and 3 locations in the Crescent Valley Survey Area (Table 3.5-2). Springsnail surveys were conducted May 18 to 20, 2022, and completed in accordance with the *Nevada Springsnail Survey Protocol* (Helmig et al. 2018).

Table 3.5-2: Springsnail Survey Locations

Survey Area	Location	Name
Goldstrike	GS01	Rodeo Creek
	GS02	Boulder Creek
	GS03	Welches Creek Reach 2
	GS04	Welches Creek Reach 1
Carlin	CA01	Warm Springs Reach 1 and 2
	CA02	Wetland
	CA03	Wetland
	CA04	Wetland
Crescent Valley	CV01	Cottonwood Creek Diversion
	CV02	Brock Creek Diversion
	CV03	Indian Creek

Two biologists conducted presence/absence surveys at each of the 11 locations. The location of each surveyed spring was recorded to sub-meter accuracy using a Trimble R1 receiver and the ArcGIS Field Maps application. The type of spring was documented as a limnocrene spring, which occur when groundwater flows into one or more pools before entering a channel; rheocrene spring, which emerge and immediately enter a channel; or a helocrene spring, which emerge diffusely in a marshy, wet meadow and lack a discrete source (Stevens et al. 2020; Helmig et al. 2018). In addition to identifying the spring type, biologists collected water quality information using a YSI Pro1020 handheld meter to measure temperature, specific conductance, and pH. If water was flowing, biologists recorded the flow status, turbidity, water depth, and wetted width. All data were recorded electronically using ArcGIS Survey123 data forms.

Starting from the springhead or most upstream portion of the water source, biologists searched opposing sides of the channel for springsnails, moving in a downstream direction. Both biologists moved in tandem to reduce duplicating search effort. Springsnails are often attached to the surface of gravel, cobbles, and other instream substrate and biologists searched through the channel substrate, picking up individual rocks or sticks and examining each side before moving downstream. Care was taken to not stir fine sediments and reduce visibility. Submerged stems of living and/or dead vegetation present within the channel were also examined for springsnails. The survey continued until either the first live snail was detected or the search time reached 10 minutes. If a live snail was detected, biologists recorded the distance from the beginning of the reach and time to the first detected live snail. Upon detecting a springsnail, the second protocol for the timed observation count occurred.

The second protocol (i.e., the timed observation count) consisted of an additional 10-minute search of the channel, moving downstream from the location of the first snail encounter. Biologists again searched the channel substrate and submerged vegetation for springsnails in tandem and maintained separate counts. At the end of the 10-minute search, the sum of each biologists' counts was recorded as the total number of observed springsnails for the location. Biologists documented the total occupied length, which is the length of the wetted run occupied

by springsnails. Notable habitat disturbance and if other aquatic species were present were also documented. If springsnails were present, habitat and water quality data was recorded for the springhead, mid-point of run, and the end of the occupied length. If springsnails were not observed, habitat, water quality, vegetation, and substrate type were recorded only for the springhead. Water quality monitoring equipment and field biologists' apparel were decontaminated between each location.

3.5.3. Results and Discussions

Field surveys were conducted at 11 locations within the Project Area during the Year 2 baseline studies May 18 to May 20, 2022 (Figures 3.4-1 through 3.4-3). Surveys included four locations in the Goldstrike Survey Area, four locations in the Carlin Survey Area, and three locations in the Crescent Valley Survey Area. Springsnails were observed at one location within the Carlin Survey Area (see Photo 15 in Section E.2 of Appendix E, Springsnail Data). Table 3.5-3 summarizes the springsnail survey data, including spring type, presence of springsnails, and water quality data. Detailed Survey123 field data forms and representative photographs can be found in Appendix E, Springsnail Data.

Table 3.5-3: Springsnail Survey Results

Location	Spring Type	Total Wetted Length (feet)	Springsnails Observed	Number of Springsnails Observed	Total Occupied Length (feet)	Water Quality		
						pH	Flow Conditions	Temp (°F)
Goldstrike								
GS01	Rheocrene	Dry	No	0	0	N/A	N/A	N/A
GS02	Rheocrene	Dry	No	0	0	N/A	N/A	N/A
GS03	Rheocrene	2,099	No	0	0	8.75	Moderate	73
GS04	Rheocrene	3,280	No	0	0	8.5	Moderate	77
Carlin								
CA01	Rheocrene	758	Yes	396	758	8	Moderate to High	86
CA02	Helocrene	Dry	No	0	0	N/A	N/A	N/A
CA03	Helocrene	56	No	0	0	7.4	Little to none	56
CA04	Limnocrene	541	No	0	0	8.3	Moderate	57
Crescent Valley								
CV01	Rheocrene	Dry	No	0	0	N/A	N/A	N/A
CV02	Rheocrene	1,082	No	0	0	10	Moderate	79
CV03	Rheocrene	Dry	No	0	0	N/A	N/A	N/A

°F = degrees Fahrenheit; N/A = data not available

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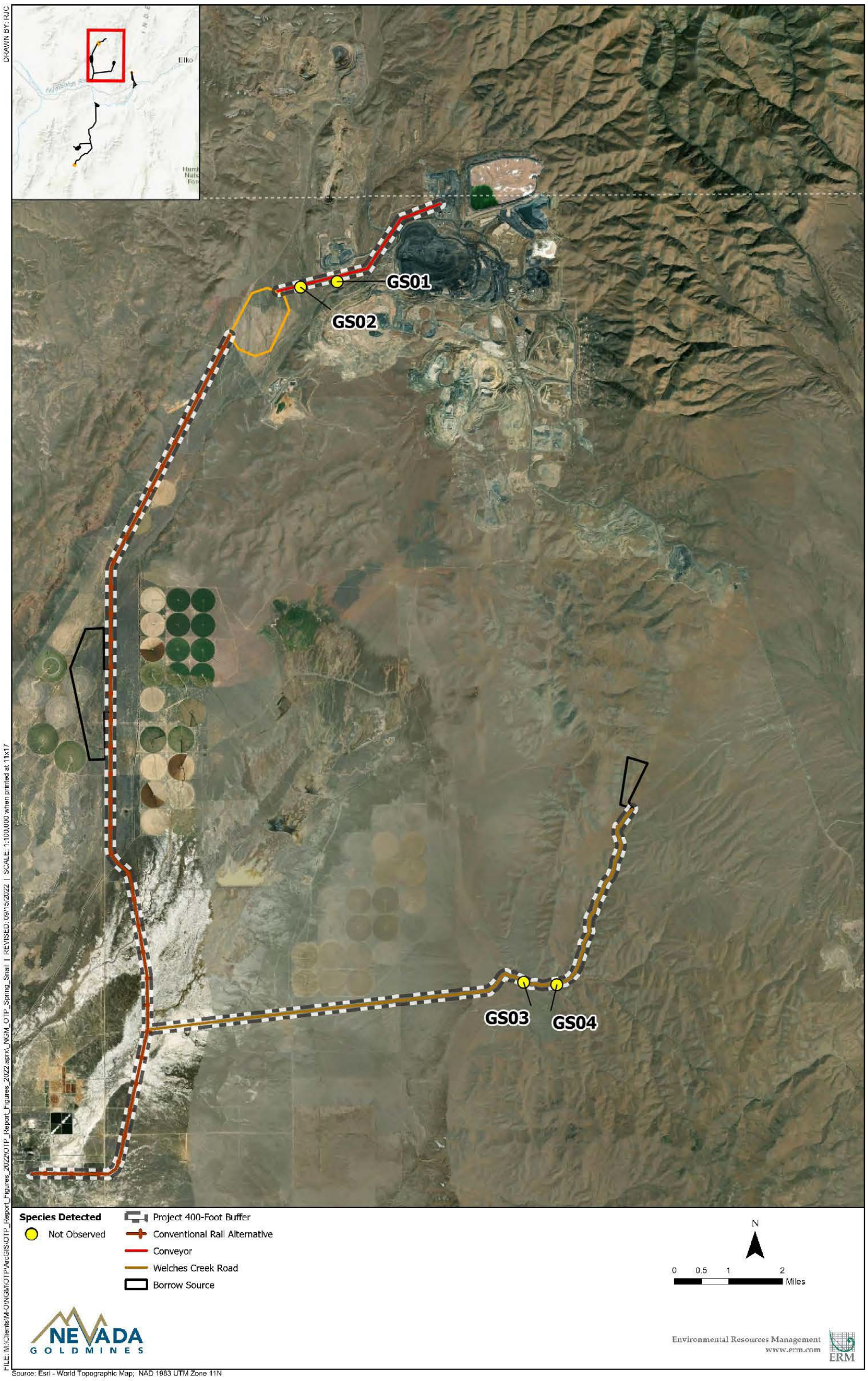


Figure 3.5-1: Springsnail Survey Locations—Goldstrike Survey Area

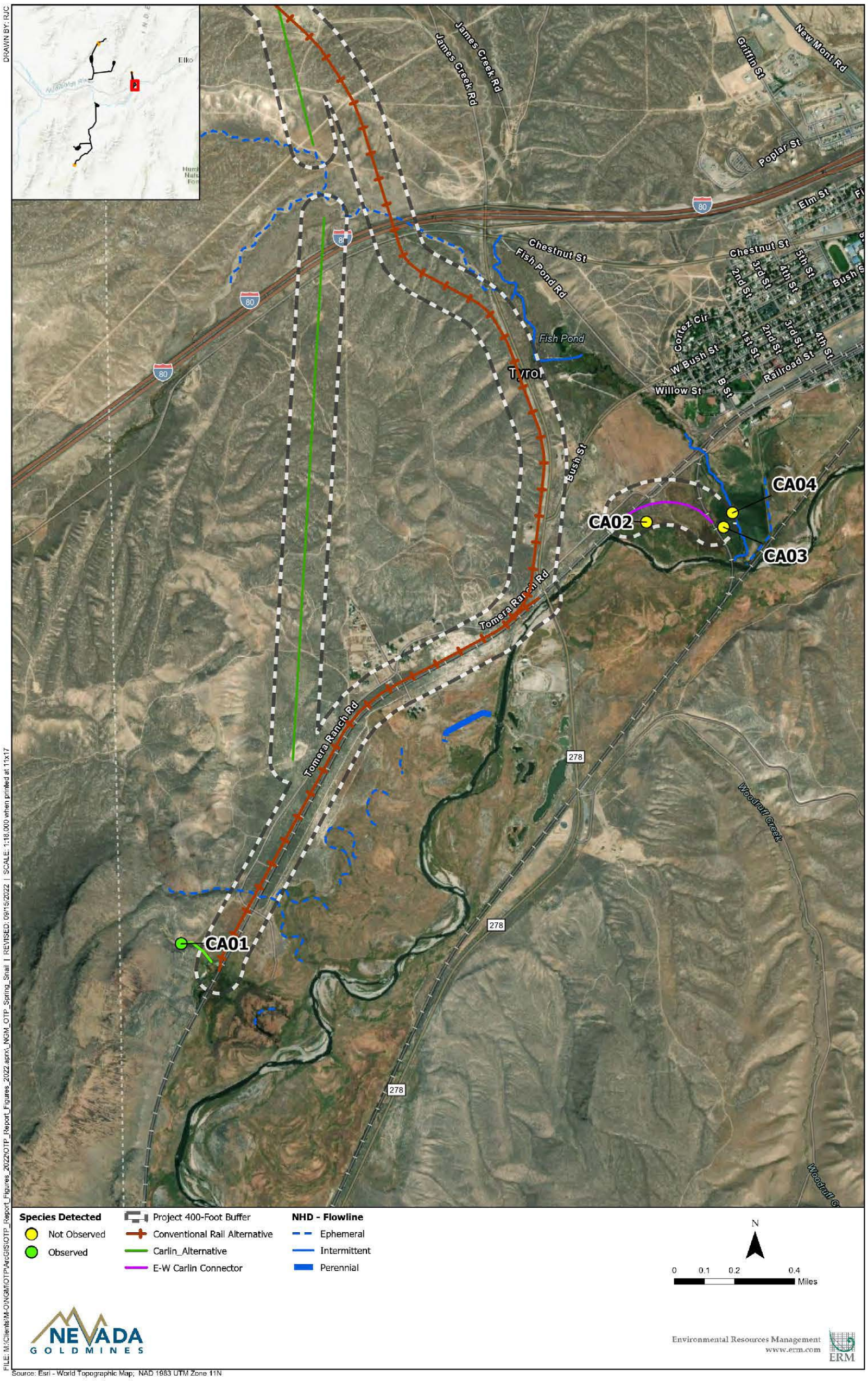


Figure 3.5-2: Springsnail Survey Locations—Carlin Survey Area

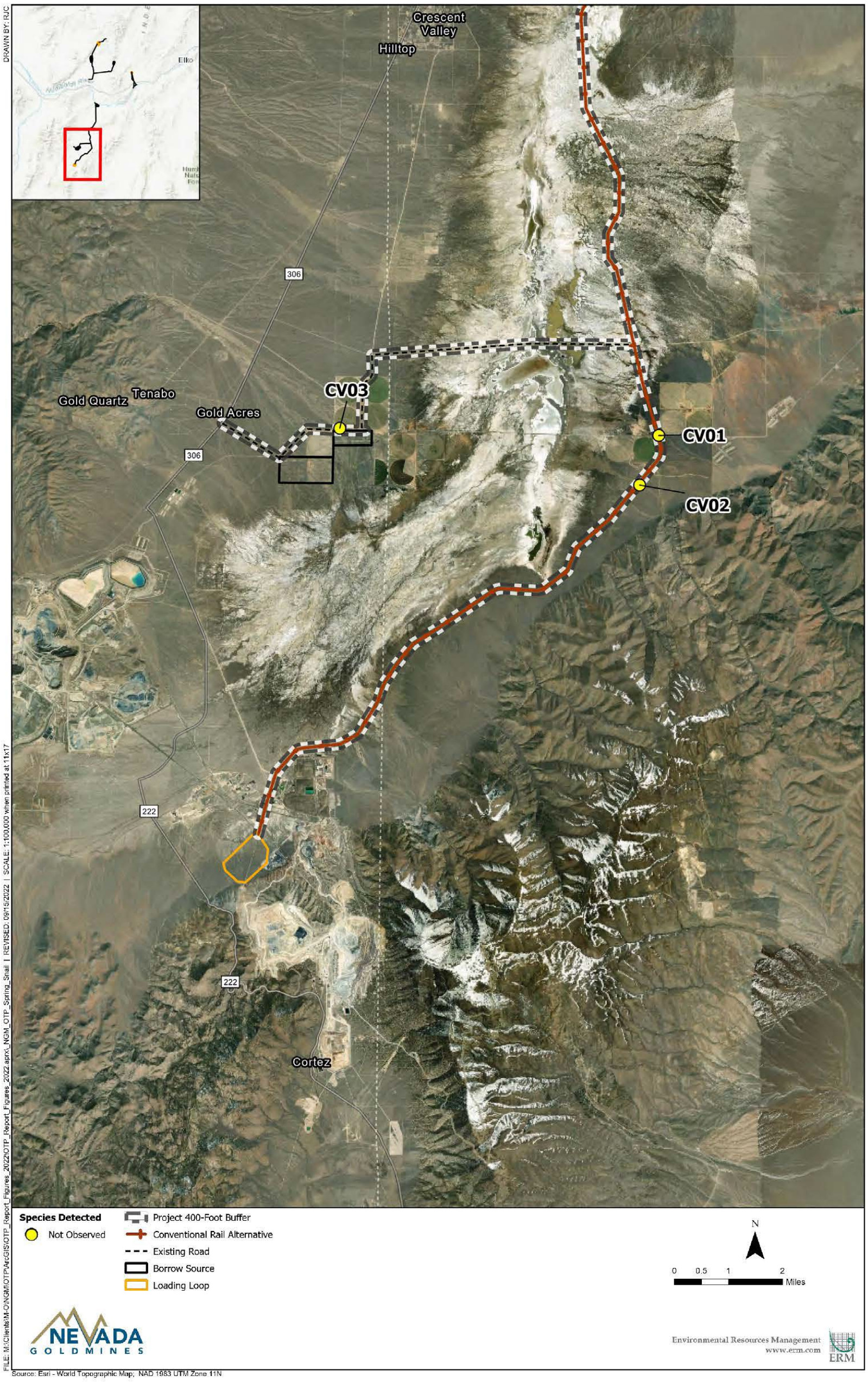


Figure 3.5-3: Springsnail Survey Locations—Crescent Valley Survey Area

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The four locations surveyed in the Goldstrike Survey Area were GS01, GS02, GS03, and GS04. Sites GS01 and GS02 were dry at the time of survey, and flowing water was observed at sites GS03 and GS04 (see Photos 1, 3, 5, and 7 in Section E.2 of Appendix E, Springsnails Data). All four locations are rheocrene springs. Big sagebrush (*Atemisia tridentata*) and cheatgrass (*Bromus tectorum*) were the dominate vegetation in the riparian and upland areas of each site. Non-native plants were observed, specifically cheatgrass along the banks and common mullein (*Verbascum thapsus*) along the tops of the banks and scattered throughout the greater floodplain. Livestock paths were concentrated along the riparian zones.

The locations along GS03 (downstream) and GS04 (upstream) had clear, flowing water, with sand and silt as the dominant substrate in upstream areas and gravel dominating in downstream areas. GS04 was narrow, with steep banks and moderate flow (see Photo 8 in Section E.2 of Appendix E). Free-floating algae was attached to dead vascular vegetation, with some duckweed (*Lemnoideae* spp.) in areas with shallow pools. No other aquatic vegetation was observed at this site. The riparian zone provided some shade along the streambank. As the channel widened in GS03, the total wetted width decreased. The vegetation community in the downstream area was similar to GS04 but included additional bunch grasses (*Poaceae* spp.) and Woods' rose (*Rosa woodsii*) along the bank. Beetles (*Coleoptera)* were the only aquatic macroinvertebrate observed.

The four locations surveyed in the Carlin Survey Area were CA01, CA02 (emergent/scrub-shrub wetland boundary), CA03 (emergent/scrub-shrub wetland boundary), and CA04 (emergent/scrub-shrub wetland boundary). The surveyed locations included a variety of identified spring types: rheocrene (CA01), helocrene (CA02, CA03), and limnocrene (CA04) (Figure 3.5-1). Locations CA02, CA03, and CA04 were dry during the Year 2 springsnail survey, but CA01 contained flowing water (see Photos 9, 16, 18, and 20 in Section E.2 of Appendix E). Biologists observed springsnails at location CA01 and counted 396 springsnails during the timed observation count. To determine total occupancy of the spring, biologists checked downstream sections, concluding presence throughout the spring from the springhead to the point of intersection with a larger wetland southeast of the spring. The total wetted length and total distance of springsnail occupancy of the spring was 758 feet.

Location CA01 consisted of a cobble and gravel substrate with a steady to high flow and little to no habitat disturbance. The riparian vegetation community consisted of big sagebrush, bunch grasses, and wild rose. Emergent vegetation within the spring included sedges (*Carex* spp.), seep monkeyflower (*Erythranthe guttata*), in the downstream reaches the spring opens into a larger wetland body to the southeast and is dominated by willows (*Salix* spp.), watercress (*Nasturtium officinale*), and cattail (*Typha* spp.) (see Photos 13 and 14 in Section E.2 of Appendix E). Other aquatic macroinvertebrate species found at the CA01 location included beetle larvae (*Coleoptera* spp.) and caddisfly larvae (*Trichoptera* spp.), which were both observed on submerged rocks along with springsnail species.

Location CA02 was dry during the Year 2 baseline springsnail survey. The emergent vegetation community consisted of cattail and dark green bulrush (*Scirpus*) with stands of willow within the wetland (see Photos 16 and 17 in Section E.2 of Appendix E). Soil saturation was difficult to gauge due to the large amount of residual (dead, fallen) cattail and bullrush from previous

growing seasons. Disturbance from livestock was apparent throughout the wetland, including paths leading up the northern banks creating mild erosional channels. Location CA03 had 55.8 feet of wetted length, with little to no flow and no springsnails observed. The emergent vegetation community was dominated by cattail with willows (*Salix* spp.) scattered throughout the wider floodplain (see Photos 18 and 19 in Section E.2 in Appendix E). Location CA04 is within Mary's Creek, a tributary of the Humboldt River, and maintained a wetted length of 541 feet with moderate flow. Shallow rooted bunch grasses dominated the sandy banks, while a dense stand of willows was established beyond the grass community, dominating sections of the floodplain. No emergent vegetation was observed at this location. Impacts from livestock observed in the area included thinning of the riparian zone and trampling of the streambed and bank (see Photos 20 and 21 in Section E.2 of Appendix E). Cattle were observed in the field adjacent to the site.

The Crescent Valley Survey Area had three survey locations: CV01, CV02, and CV03. All three locations were rheocrene spring types; however, CV02 was the only location observed with flowing water during the surveys (see Photos 22, 24, and 26 in Section E.2 in Appendix E). No springsnails were observed at the three Crescent Valley Survey Area locations (Figure 3.5-3). All survey locations showed sign of disturbance from livestock and/or anthropogenic activities, which are described below.

Location CV01 was dry with no soil saturation and had been manipulated for water diversion. Large diameter water pipes were placed in the creek bed and led to a confluence of several similar pipes east of the location, likely for agricultural use on adjacent farms (see Photos 22 and 23 in Section E.2 of Appendix E). Cheatgrass was the only vegetation within the creek bed; however, rabbitbrush (*Chrysothamnus* spp.), cheatgrass, and patches of Great Basin wild rye (*Leymus cincereus*) were observed in the greater floodplain. Location CV02 was a narrow waterbody with moderate water flow and substrate dominated by gravel and cobble. Little to no emergent vegetation and a small amount of free-floating algae masses along the banks was observed (see Photos 24 and 25 in Section E.2 of Appendix E). The banks were moderately barren with cheatgrass dominating the understory between rabbitbrush, common muellin, sagebrush, and stinging nettle (*Urtica dioica*) on adjacent hillslopes. Location CV03 was dry and the streambed was dominated by cheatgrass (see Photos 26 and 27 in Section E.2 of Appendix E). Scotch thistle (*Onopordum acanthium*) and tumble mustard (*Sisymbrium* altissimum) were observed along the banks and in the greater floodplain.

Similar to other aquatic habitats in the Project Area, spring habitats provide water for livestock, wild horses, and agricultural or pastoral diversions, which can put spring and seep habitats at risk of disturbance and cause other negative impacts to springsnails. Springsnails are highly susceptible to local disturbances that affect the quantity and quality of water in which they reside. Livestock was the most common local disturbance observed throughout the springsnail survey areas, causing mobilization of sediments along banks, and extensive browsing and trampling of riparian vegetation. Springsnails were documented at one location (CA01) during Year 2 baseline studies. The area at CA01 was relatively undisturbed with the least evidence of livestock activity. Additionally, the riparian zone was intact and moderate-to-high flows were observed in the stream channel.

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APPENDIX A
GREATER SAGE-GROUSE DATA

A-1. Detailed Greater Sage-grouse Survey Results

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A.1 Detailed Greater Sage-grouse Survey Results

Lek Name	Date	Time of Sunrise	Arrival Time	Surveyor #1	Surveyor #2	Lek Activity?	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation	Survey Start Time	Count 1 (Males)	Count 1 (Females)	Count 1 (Unknown)	Count 2 (Males)	Count 2 (Females)	Count 2 (Unknown)	Count 3 (Males)	Count 3 (Females)	Count 3 (Unknown)	Count 4 (Males)	Count 4 (Females)	Count 4 (Unknown)	Survey End Time	High Count (Males)	High Count (Females)	High Count (Unknown)	Recent Sign Observed?	Departure Time	Notes
Indian Creek	3/11/2022	6:03	5:14	Austin Linville	Sean Basilio	No	1	16	0-25%	None	05:59	0	0	0	0	0	0	0	0	0	0	0	0	06:25	0	0	0	No	06:58	No birds or recent sign observed. Used lek route protocol.
Marys Mountain 2	4/5/2022	06:21	05:08	Kelsey Uligian	Kelsey Uligian	Yes	11	36	25-50%	None	06:15	0	0	2	0	0	0	0	0	0	0	0	0	07:25	0	0	2	Yes	08:01	No active lekking observed or heard; however, 2 unknown greater sage-grouse flushed and flew overhead prior to start of survey. Included in count 1. Walked lek after count to look for more lekking birds and recent sign. Fresh sign found approximately 1/4 mile south of the lek coordinates. No additional greater sage-grouse observed.
Marys Mountain 2	4/19/2022	05:59	05:03	Kelsey Uligian	Kelsey Uligian	Yes	8	42	25-50%	None	05:45	0	0	0	0	0	0	0	0	0	0	1	0	07:05	0	1	0	Yes	07:22	No birds observed lekking, but lek was walked for last count and a female flushed roughly 1/4 mile southwest of lek location. No other greater sage-grouse found.
Marys Mountain 2	4/27/2022	05:48	04:42	Kelsey Uligian	Kelsey Uligian	Yes	3	37	0-25%	None	05:35	0	0	0	0	0	0	0	0	0	0	2	0	06:39	0	2	0	Yes	06:58	No lekking activity observed; however, observed 2 females approximately 1/4 mile southwest of lek coordinates, near location of flush and recent sign from previous surveys. Did not walk lek or area where birds and sign have been observed to avoid disturbance during this survey.
Marys Mountain 4	4/5/2022	06:21	05:51	Nicole St. John	Nicole St. John	No	11	41	75-100%	None	06:04	0	0	0	0	0	0	0	0	0	0	0	0	07:02	0	0	0	No	07:10	Ground wet from little bit of rain this morning. Windy conditions. Walked lek to look and listen for birds and look for sign. No birds or recent sign observed.
Marys Mountain 4	4/19/2022	05:59	05:21	Nicole St. John	Nicole St. John	No	5	43	50-75%	None	05:44	0	0	0	0	0	0	0	0	0	0	0	0	06:43	0	0	0	No	06:58	Walked lek to look and listen for birds and look for recent sign. No birds or recent sign observed. Mary's Mountain 4.
Marys Mountain 4	4/27/2022	05:48	04:33	Nicole St. John	Nicole St. John	No	1	38	0-25%	None	05:35	0	0	0	0	0	0	0	0	0	0	0	0	06:41	0	0	0	No	06:47	Mary's Mountain 4. Walked lek to look and listen for birds and look for recent sign. No birds or recent sign observed.
New Brock Canyon	4/4/2022	06:24	05:31	Nicole St. John	Kelsey Uligian	Yes	11	34	50-75%	None	06:15	13	0	0	2	0	0	2	0	0	1	0	0	07:11	13	0	0	Yes	07:29	Birds flushed off lek during first count. Ravens circling lek and calling throughout survey. One Golden Eagle observed on the ground near the lek in between first and second counts. Lekking activity quiet. Any birds left on the lek after first count were just sitting on lek and not actively lekking. Windy conditions.
New Brock Canyon	4/21/2022	05:58	05:08	Henson DeBruler	Tim Wilson	Yes	9	36	25-50%	None	06:03	28	1	0	28	0	0	27	0	0	27	0	0	06:50	28	1	0	Yes	07:12	Female flew off lek between counts 1 and 2.
New Brock Canyon	4/28/2022	06:44	06:01	Kelsey Uligian	Tim Wilson	Yes	10	39	75-100%	None	06:40	22	0	0	24	0	0	22	0	0	18	1	0	07:31	24	1	0	Yes	07:48	Golden Eagle soaring roughly 1,200 meters northwest of lek starting first count. Two pronghorn on lek during first count. Wind picked up over the course of the survey.
Palisade 2	4/2/2022	06:26	05:50	Kelsey Uligian	Kelsey Uligian	No	3	34	0-25%	None	06:15	0	0	0	0	0	0	0	0	0	0	0	0	07:20	0	0	0	No	07:32	No birds observed or heard, no sign (old or recent) and no predators. Cows grazing 600 meters from lek location. Not great lekking habitat, limited sagebrush around.
Palisade 2	4/11/2022	06:11	05:30	Kelsey Uligian	Kelsey Uligian	No	9	26	50-75%	None	05:55	0	0	0	0	0	0	0	0	0	0	0	0	06:48	0	0	0	No	07:00	No sign, no calls heard or birds observed. Cows on the lek location, but no predators around.
Palisade 2	4/21/2022	05:56	04:57	Kelsey Uligian	Kelsey Uligian	No	3	36	50-75%	None	05:44	0	0	0	0	0	0	0	0	0	0	0	0	06:37	0	0	0	No	06:47	No birds or calls heard. No sign observed. Lek walked for last count.
Palisade 3	4/2/2022	06:26	05:53	Nicole St. John	Nicole St. John	No	2	34	0-25%	None	06:18	0	0	0	0	0	0	0	0	0	0	0	0	07:16	0	0	0	No	07:34	Noise from railroad and highway is very prevalent. No birds or recent sign observed. Some old sign located approximately 220 meters southwest of lek coordinates. Cattle present at lek. Pronghorn on lek.
Palisade 3	4/11/2022	06:11	05:30	Nicole St. John	Nicole St. John	No	9	26	75-100%	None	05:55	0	0	0	0	0	0	0	0	0	0	0	0	07:01	0	0	0	No	07:04	Walked lek to look for sign and listen/look for birds. No recent sign or birds observed.
Palisade 3	4/21/2022	05:56	04:57	Nicole St. John	Nicole St. John	No	4	38	50-75%	None	05:43	0	0	0	0	0	0	0	0	0	0	0	0	06:44	0	0	0	No	06:49	Walked lek to look and listen for birds and look for recent sign. No birds or recent sign observed.
Richmond Mtn	4/6/2022	06:20	05:22	Nicole St. John	Kelsey Uligian	No	3	24	0-25%	None	06:01	0	0	0	0	0	0	0	0	0	0	0	0	07:02	0	0	0	No	07:22	Walked lek to listen and look for birds. No birds or sign observed. Mine noise prevalent at lek.
Richmond Mtn	4/16/2022	06:03	04:48	Kelsey Uligian	Nicole St. John	No	3	29	25-50%	None	05:45	0	0	0	0	0	0	0	0	0	0	0	0	06:41	0	0	0	No	06:50	No birds or sign observed, no lekking noises heard. Mine noise very prevalent. Walked the Lek during the 4th count.
Richmond Mtn	4/29/2022	5:45	5:01	Kelsey Uligian	Nicole St. John	No	3	37	25-50%	None	5:30	0	0	0	0	0	0	0	0	0	0	0	0	6:23	0	0	0	No	6:35	No birds observed or sign found. Walked lek for 3rd and 4th count.

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APPENDIX B
DARK AND PALE KANGAROO MICE DATA

B-1. Detailed Kangaroo Mice Trapping Survey Results

B-2. Photographic Log

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B.1. Detailed Kangaroo Mice Trapping Survey Results

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS1-1-1	Lat: 40.4318, Long: -116.4963	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS1-1-1	Lat: 40.4318, Long: -116.4963	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	04:43	04:43	Sean Basilio	Daniel Robison	Salt desert scrub	no								5	55	0-25%	None
TS1-1-1	Lat: 40.4318, Long: -116.4963	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:49	05:49	Sean Basilio	Daniel Robison	Salt desert scrub	no								5	65	75-100%	None
TS1-1-1	Lat: 40.4318, Long: -116.4963	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	04:47	04:47	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-1	Lat: 40.4318, Long: -116.4963	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	04:47	04:47	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-1	Lat: 40.4255, Long: -116.5027	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:34	05:37	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-1	Lat: 40.3263, Long: -116.4832	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:32	05:32	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	25-50%	None
TS1-1-1	Lat: 40.3276, Long: -116.4814	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:34	05:34	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	45	0-25%	None
TS1-1-10	Lat: 40.4316, Long: -116.4968	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	04:51	04:51	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-10	Lat: 40.4316, Long: -116.4968	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:53	05:53	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	12	65	75-100%	None
TS1-1-10	Lat: 40.4316, Long: -116.4968	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	04:52	04:52	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-10	Lat: 40.4316, Long: -116.4968	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	04:51	04:51	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-10	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-10	Lat: 40.4316, Long: -116.4968	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:40	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	yes	Deer mouse	1		1			NA	1	39	25-50%	None
TS1-1-10	Lat: 40.4317, Long: -116.4962	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:38	05:38	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-1-10	Lat: 40.4315, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:39	05:39	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	47	0-25%	None
TS1-1-2	Lat: 40.4318, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	04:55	04:55	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-2	Lat: 40.4319, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	06:01	06:01	Sean Basilio	Daniel Robison	Salt desert scrub	no								12	65	75-100%	None
TS1-1-2	Lat: 40.4318, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	04:57	04:57	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-2	Lat: 40.4318, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	04:55	04:55	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-2	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-2	Lat: 40.4317, Long: -116.4965	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:37	05:37	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-2	Lat: 40.4279, Long: -116.4988	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:41	05:41	Sean Basilio	Michael Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-1-2	Lat: 40.4318, Long: -116.4965	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:48	05:48	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1					NA	2	47	0-25%	None
TS1-1-3	Lat: 40.4317, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	04:45	04:45	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-3	Lat: 40.4317, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:50	05:50	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-1-3	Lat: 40.4317, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	04:48	04:48	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Merriam's kangaroo rat	1				1	NA	3	48	25-50%	None
TS1-1-3	Lat: 40.4317, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	04:47	04:47	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	1	33	0-25%	None
TS1-1-3	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-3	Lat: 40.4316, Long: -116.4965	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:38	05:38	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-3	Lat: 40.4318, Long: -116.4964	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:33	05:33	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	2	48	25-50%	None
TS1-1-3	Lat: 40.4318, Long: -116.4963	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:34	05:34	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	45	0-25%	None
TS1-1-4	Lat: 40.4318, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	04:54	04:54	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-4	Lat: 40.4318, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:59	05:59	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Merriam's kangaroo rat	1				1	NA	12	65	75-100%	None
TS1-1-4	Lat: 40.4318, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	04:56	04:56	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-4	Lat: 40.4318, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	04:53	04:53	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Merriam's kangaroo rat	1				1	NA	1	33	0-25%	None
TS1-1-4	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-4	Lat: 40.4318, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:45	05:45	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-4	Lat: 40.4317, Long: -116.4962	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:40	05:40	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-1-4	Lat: 40.4318, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:46	05:47	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	2	47	0-25%	None
TS1-1-5	Lat: 40.4317, Long: -116.4964	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	04:46	04:46	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-5	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:51	05:51	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-1-5	Lat: 40.4316, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	04:49	04:49	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-5	Lat: 40.4316, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	04:49	04:49	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-5	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-5	Lat: 40.4317, Long: -116.496	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:48	05:48	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-5	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:35	05:35	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	25-50%	None
TS1-1-5	Lat: 40.4317, Long: -116.4964	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:36	05:36	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	45	0-25%	None
TS1-1-6	Lat: 40.4317, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	04:53	04:53	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-6	Lat: 40.4317, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:55	05:55	Sean Basilio	Daniel Robison	Salt desert scrub	no								12	65	75-100%	None
TS1-1-6	Lat: 40.4317, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	04:56	04:56	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-6	Lat: 40.4317, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	04:52	04:52	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-6	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-6	Lat: 40.4316, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:43	05:43	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-6	Lat: 40.4317, Long: -116.4962	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:39	05:39	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-1-6	Lat: 40.4316, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:45	05:45	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	47	0-25%	None
TS1-1-7	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	04:49	04:49	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-7	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:51	05:51	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-1-7	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	04:50	04:50	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-7	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	04:49	04:49	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-7	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-7	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:39	05:39	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-7	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:36	05:36	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-1-7	Lat: 40.4316, Long: -116.4965	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:37	05:37	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	45	0-25%	None
TS1-1-8	Lat: 40.4316, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	04:52	04:52	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-8	Lat: 40.4316, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:54	05:54	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-1-8	Lat: 40.4316, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	04:53	04:53	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS1-1-8	Lat: 40.4317, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	04:51	04:51	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-8	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-8	Lat: 40.4316, Long: -116.4968	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:42	05:42	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-8	Lat: 40.4317, Long: -116.4962	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:39	05:39	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-1-8	Lat: 40.4316, Long: -116.4968	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:40	05:40	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	1	47	0-25%	None
TS1-1-9	Lat: 40.4315, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	04:50	04:50	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-1-9	Lat: 40.4315, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:52	05:52	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-1-9	Lat: 40.4315, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	04:50	04:50	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-1-9	Lat: 40.4315, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	04:50	04:50	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-1-9	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:36	05:40	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-1-9	Lat: 40.4315, Long: -116.4967	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:39	05:39	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-1-9	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:37	05:37	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-1-9	Lat: 40.4316, Long: -116.4966	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:38	05:38	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	47	0-25%	None
TS1-2-1	Lat: 40.4274, Long: -116.5045	Inter-Mountain Basins Playa	6/11/2022 19:00	05:01	05:01	Sean Basilio	Daniel Robison	Salt desert scrub	no								5	55	0-25%	None
TS1-2-1	Lat: 40.4274, Long: -116.5045	Inter-Mountain Basins Playa	6/12/2022 19:00	06:08	06:08	Sean Basilio	Daniel Robison	Salt desert scrub	no								8	65	75-100%	None
TS1-2-1	Lat: 40.4275, Long: -116.5044	Inter-Mountain Basins Playa	6/13/2022 19:00	05:02	05:02	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-1	Lat: 40.4275, Long: -116.5044	Inter-Mountain Basins Playa	6/14/2022 19:00	04:57	04:59	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-1	Lat: 40.4277, Long: -116.5044	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	29	0-25%	None
TS1-2-1	Lat: 40.4317, Long: -116.496	Inter-Mountain Basins Playa	5/5/2022 19:00	05:54	05:54	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-2-1	Lat: 40.4234, Long: -116.5032	Inter-Mountain Basins Playa	5/6/2022 19:00	05:42	05:42	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-2-1	Lat: 40.4316, Long: -116.4962	Inter-Mountain Basins Playa	5/7/2022 19:00	05:57	05:57	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	47	0-25%	None
TS1-2-10	Lat: 40.4278, Long: -116.5041	Inter-Mountain Basins Playa	6/11/2022 19:00	05:07	05:07	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-2-10	Lat: 40.4278, Long: -116.5041	Inter-Mountain Basins Playa	6/12/2022 19:00	06:12	06:12	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-10	Lat: 40.4278, Long: -116.5041	Inter-Mountain Basins Playa	6/13/2022 19:00	05:07	05:07	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	48	25-50%	None
TS1-2-10	Lat: 40.4278, Long: -116.5041	Inter-Mountain Basins Playa	6/14/2022 19:00	05:04	05:04	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-10	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-2-10	Lat: 40.4278, Long: -116.5043	Inter-Mountain Basins Playa	5/5/2022 19:00	05:58	05:58	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-2-10	Lat: 40.4279, Long: -116.5044	Inter-Mountain Basins Playa	5/6/2022 19:00	05:47	05:47	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS1-2-10	Lat: 40.4278, Long: -116.5041	Inter-Mountain Basins Playa	5/7/2022 19:00	06:00	06:00	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	47	0-25%	None
TS1-2-2	Lat: 40.4274, Long: -116.5043	Inter-Mountain Basins Playa	6/11/2022 19:00	05:10	05:10	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-2-2	Lat: 40.4274, Long: -116.5043	Inter-Mountain Basins Playa	6/12/2022 19:00	06:15	06:15	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-2	Lat: 40.4274, Long: -116.5043	Inter-Mountain Basins Playa	6/13/2022 19:00	05:10	05:10	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-2	Lat: 40.4275, Long: -116.5042	Inter-Mountain Basins Playa	6/14/2022 19:00	05:07	05:07	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-2	Lat: 40.4275, Long: -116.5042	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-2-2	Lat: 40.4254, Long: -116.505	Inter-Mountain Basins Playa	5/5/2022 19:00	06:02	06:02	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-2-2	Lat: 40.419, Long: -116.5064	Inter-Mountain Basins Playa	5/6/2022 19:00	05:49	05:49	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS1-2-2	Lat: 40.4275, Long: -116.5042	Inter-Mountain Basins Playa	5/7/2022 19:00	06:02	06:02	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS1-2-3	Lat: 40.4276, Long: -116.5043	Inter-Mountain Basins Playa	6/11/2022 19:00	05:02	05:02	Sean Basilio	Daniel Robison	Salt desert scrub	no								5	55	0-25%	None
TS1-2-3	Lat: 40.4276, Long: -116.5043	Inter-Mountain Basins Playa	6/12/2022 19:00	06:09	06:09	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	10	65	75-100%	None
TS1-2-3	Lat: 40.4276, Long: -116.5043	Inter-Mountain Basins Playa	6/13/2022 19:00	05:03	05:03	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-3	Lat: 40.4276, Long: -116.5043	Inter-Mountain Basins Playa	6/14/2022 19:00	05:01	05:01	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-3	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-2-3	Lat: 40.4275, Long: -116.5044	Inter-Mountain Basins Playa	5/5/2022 19:00	05:56	05:56	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-2-3	Lat: 40.4275, Long: -116.5044	Inter-Mountain Basins Playa	5/6/2022 19:00	05:44	05:44	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-2-3	Lat: 40.4275, Long: -116.5044	Inter-Mountain Basins Playa	5/7/2022 19:00	05:57	05:57	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	47	0-25%	None
TS1-2-4	Lat: 40.4276, Long: -116.5042	Inter-Mountain Basins Playa	5/7/2022 19:00	06:01	06:01	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	0-25%	None
TS1-2-4	Lat: 40.4275, Long: -116.5042	Inter-Mountain Basins Playa	6/11/2022 19:00	05:09	05:09	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-2-4	Lat: 40.4275, Long: -116.5042	Inter-Mountain Basins Playa	6/12/2022 19:00	06:14	06:14	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-4	Lat: 40.4275, Long: -116.5042	Inter-Mountain Basins Playa	6/13/2022 19:00	05:09	05:09	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-4	Lat: 40.4276, Long: -116.5042	Inter-Mountain Basins Playa	6/14/2022 19:00	05:06	05:06	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-4	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS1-2-4	Lat: 40.4273, Long: -116.5046	Inter-Mountain Basins Playa	5/5/2022 19:00	06:01	06:01	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS1-2-4	Lat: 40.4224, Long: -116.5046	Inter-Mountain Basins Playa	5/6/2022 19:00	05:49	05:49	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS1-2-5	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS1-2-5	Lat: 40.4276, Long: -116.5044	Inter-Mountain Basins Playa	5/5/2022 19:00	05:57	05:57	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS1-2-5	Lat: 40.4276, Long: -116.5043	Inter-Mountain Basins Playa	5/7/2022 19:00	05:58	05:58	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	47	0-25%	None
TS1-2-5	Lat: 40.4276, Long: -116.5043	Inter-Mountain Basins Playa	6/11/2022 19:00	05:03	05:03	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	55	0-25%	None
TS1-2-5	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	6/12/2022 19:00	06:10	06:10	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-5	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	6/13/2022 19:00	05:04	05:04	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-5	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	6/14/2022 19:00	05:01	05:02	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-5	Lat: 40.4275, Long: -116.5044	Inter-Mountain Basins Playa	5/6/2022 19:00	05:45	05:45	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	48	0-25%	None
TS1-2-6	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS1-2-6	Lat: 40.4275, Long: -116.5046	Inter-Mountain Basins Playa	5/5/2022 19:00	06:01	06:01	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS1-2-6	Lat: 40.4277, Long: -116.5042	Inter-Mountain Basins Playa	5/7/2022 19:00	06:01	06:01	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	0-25%	None
TS1-2-6	Lat: 40.4276, Long: -116.5042	Inter-Mountain Basins Playa	6/11/2022 19:00	05:08	05:08	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-2-6	Lat: 40.4276, Long: -116.5042	Inter-Mountain Basins Playa	6/12/2022 19:00	06:14	06:14	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-6	Lat: 40.4276, Long: -116.5042	Inter-Mountain Basins Playa	6/13/2022 19:00	05:09	05:09	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-6	Lat: 40.4276, Long: -116.5042	Inter-Mountain Basins Playa	6/14/2022 19:00	05:06	05:06	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-6	Lat: 40.4254, Long: -116.505	Inter-Mountain Basins Playa	5/6/2022 19:00	05:48	05:48	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS1-2-7	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS1-2-7	Lat: 40.4278, Long: -116.5043	Inter-Mountain Basins Playa	5/5/2022 19:00	05:59	05:59	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS1-2-7	Lat: 40.4278, Long: -116.5043	Inter-Mountain Basins Playa	5/7/2022 19:00	05:59	05:59	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	47	0-25%	None
TS1-2-7	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	6/11/2022 19:00	05:04	05:04	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-2-7	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	6/12/2022 19:00	06:11	06:11	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-7	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	6/13/2022 19:00	05:05	05:05	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-7	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	6/14/2022 19:00	05:02	05:02	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-7	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Playa	5/6/2022 19:00	05:45	05:45	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS1-2-8	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS1-2-8	Lat: 40.4278, Long: -116.5043	Inter-Mountain Basins Playa	5/5/2022 19:00	06:00	06:00	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS1-2-8	Lat: 40.4277, Long: -116.5042	Inter-Mountain Basins Playa	5/7/2022 19:00	06:00	06:00	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	47	0-25%	None
TS1-2-8	Lat: 40.4277, Long: -116.5042	Inter-Mountain Basins Playa	6/11/2022 19:00	05:08	05:08	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-2-8	Lat: 40.4277, Long: -116.5042	Inter-Mountain Basins Playa	6/12/2022 19:00	06:13	06:13	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-8	Lat: 40.4277, Long: -116.5041	Inter-Mountain Basins Playa	6/13/2022 19:00	05:08	05:08	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-8	Lat: 40.4277, Long: -116.5041	Inter-Mountain Basins Playa	6/14/2022 19:00	05:05	05:05	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS1-2-8	Lat: 40.4283, Long: -116.5044	Inter-Mountain Basins Playa	5/6/2022 19:00	05:47	05:47	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS1-2-9	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:47	05:50	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS1-2-9	Lat: 40.4279, Long: -116.5043	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:57	05:57	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS1-2-9	Lat: 40.4278, Long: -116.5043	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	05:59	05:59	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	47	0-25%	None
TS1-2-9	Lat: 40.4278, Long: -116.5043	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:05	05:05	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS1-2-9	Lat: 40.4278, Long: -116.5043	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	06:11	06:11	Sean Basilio	Daniel Robison	Salt desert scrub	no								10	65	75-100%	None
TS1-2-9	Lat: 40.4278, Long: -116.5042	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:06	05:06	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS1-2-9	Lat: 40.4278, Long: -116.5042	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:03	05:03	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS1-2-9	Lat: 40.4277, Long: -116.5043	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:46	05:46	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-1-1	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-1-1	Lat: 40.4233, Long: -116.5039	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:11	06:11	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS2-1-1	Lat: 40.4275, Long: -116.5043	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:14	06:14	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	48	0-25%	None
TS2-1-1	Lat: 40.4273, Long: -116.5045	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:20	05:20	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-1	Lat: 40.3771, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	04:54	04:54	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-1	Lat: 40.3771, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:22	05:22	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-1-1	Lat: 40.3771, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:17	05:17	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-1	Lat: 40.4152, Long: -116.5091	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:50	05:50	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-1-10	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-1-10	Lat: 40.3769, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:15	06:15	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS2-1-10	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:18	06:18	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	0-25%	None
TS2-1-10	Lat: 40.3769, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:25	05:25	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-10	Lat: 40.3769, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:00	05:00	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	61	50-75%	None
TS2-1-10	Lat: 40.3769, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:27	05:27	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	48	25-50%	None
TS2-1-10	Lat: 40.3769, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:21	05:21	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-10	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:59	05:59	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-1-2	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-1-2	Lat: 40.3771, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:24	06:24	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS2-1-2	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:22	06:22	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	0-25%	None
TS2-1-2	Lat: 40.3772, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:28	05:28	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-2	Lat: 40.3772, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:03	05:03	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-2	Lat: 40.3772, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:30	05:30	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-1-2	Lat: 40.3772, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:25	05:25	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-2	Lat: 40.3771, Long: -116.5157	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:07	06:07	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-1-3	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-1-3	Lat: 40.3771, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:13	06:13	Sean Basilio	Michael Robison	Salt desert scrub	no								1	39	25-50%	None
TS2-1-3	Lat: 40.3771, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:16	06:16	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	0-25%	None
TS2-1-3	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:21	05:21	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-3	Lat: 40.377, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	04:55	04:55	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-3	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:23	05:23	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-1-3	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:17	05:17	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-3	Lat: 40.3771, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:56	05:56	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	3	48	0-25%	None
TS2-1-4	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	29	0-25%	None
TS2-1-4	Lat: 40.3771, Long: -116.516	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:23	06:23	Sean Basilio	Michael Robison	Salt desert scrub	yes	Deer mouse	1			1		NA	1	39	25-50%	None
TS2-1-4	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:04	06:04	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1			1		NA	3	48	0-25%	None
TS2-1-4	Lat: 40.3771, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:27	05:27	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-4	Lat: 40.3771, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:03	05:03	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-4	Lat: 40.3771, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:30	05:30	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-1-4	Lat: 40.3771, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:24	05:24	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-4	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:21	06:21	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-1-5	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:22	05:22	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-5	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	04:56	04:56	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-5	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:24	05:24	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-1-5	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:18	05:18	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-5	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS2-1-5	Lat: 40.3771, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:13	06:13	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS2-1-5	Lat: 40.3771, Long: -116.5158	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:56	05:56	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-1-5	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:16	06:16	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-1-6	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:26	05:26	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-6	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:02	05:02	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-6	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:29	05:29	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS2-1-6	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:23	05:23	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS2-1-6	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-1-6	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:20	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS2-1-6	Lat: 40.377, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:03	06:03	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-1-6	Lat: 40.3769, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:20	06:20	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	48	0-25%	None
TS2-1-7	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:23	05:23	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-7	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	04:58	04:58	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	61	50-75%	None
TS2-1-7	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:25	05:25	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-1-7	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:19	05:19	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-7	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-1-7	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:14	06:14	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS2-1-7	Lat: 40.3771, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:58	05:58	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-1-7	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:17	06:17	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-1-8	Lat: 40.377, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:26	05:26	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-1-8	Lat: 40.3769, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:01	05:01	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-8	Lat: 40.377, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:28	05:28	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS2-1-8	Lat: 40.377, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:22	05:22	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-1-8	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-1-8	Lat: 40.3769, Long: -116.5162	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:16	06:16	Sean Basilio	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	39	25-50%	None
TS2-1-8	Lat: 40.3769, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:03	06:03	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	3	48	0-25%	None
TS2-1-8	Lat: 40.3769, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:19	06:19	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	48	0-25%	None
TS2-1-9	Lat: 40.3768, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:23	05:23	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	55	0-25%	None
TS2-1-9	Lat: 40.3768, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	04:59	04:59	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-1-9	Lat: 40.3768, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:26	05:26	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	48	25-50%	None
TS2-1-9	Lat: 40.3769, Long: -116.5161	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:20	05:20	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS2-1-9	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:01	06:07	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-1-9	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:14	06:14	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	39	25-50%	None
TS2-1-9	Lat: 40.377, Long: -116.5159	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	05:58	05:59	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-1-9	Lat: 40.3769, Long: -116.516	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:17	06:17	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-2-1	Lat: 40.3609, Long: -116.5147	Inter-Mountain Basins Playa	6/11/2022 19:00	05:33	05:33	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-2-1	Lat: 40.361, Long: -116.5147	Inter-Mountain Basins Playa	6/12/2022 19:00	05:08	05:08	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-1	Lat: 40.3609, Long: -116.5147	Inter-Mountain Basins Playa	6/13/2022 19:00	05:36	05:36	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS2-2-1	Lat: 40.3609, Long: -116.5147	Inter-Mountain Basins Playa	6/14/2022 19:00	05:30	05:30	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-1	Lat: 40.3772, Long: -116.5157	Inter-Mountain Basins Playa	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-2-1	Lat: 40.3757, Long: -116.5154	Inter-Mountain Basins Playa	5/5/2022 19:00	06:29	06:29	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-2-1	Lat: 40.3764, Long: -116.5155	Inter-Mountain Basins Playa	5/6/2022 19:00	06:12	06:12	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-2-1	Lat: 40.3771, Long: -116.5159	Inter-Mountain Basins Playa	5/7/2022 19:00	06:29	06:29	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	1	50	0-25%	None
TS2-2-10	Lat: 40.3611, Long: -116.5142	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:38	05:39	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-2-10	Lat: 40.3611, Long: -116.5142	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:12	05:12	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	61	50-75%	None
TS2-2-10	Lat: 40.3611, Long: -116.5142	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:41	05:41	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-2-10	Lat: 40.3611, Long: -116.5142	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:37	05:37	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS2-2-10	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-2-10	Lat: 40.3612, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:34	06:34	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-2-10	Lat: 40.361, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:16	06:16	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-2-10	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:33	06:33	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	50	0-25%	None
TS2-2-2	Lat: 40.3608, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:43	05:43	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-2-2	Lat: 40.3608, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:15	05:15	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-2	Lat: 40.3608, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:45	05:45	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-2-2	Lat: 40.3609, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:40	05:40	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-2	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	yes	Deer mouse	1		1			NA	3	32	0-25%	None
TS2-2-2	Lat: 40.3609, Long: -116.5148	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:36	06:36	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-2-2	Lat: 40.3555, Long: -116.5148	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:19	06:19	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	48	0-25%	None
TS2-2-2	Lat: 40.3609, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:36	06:36	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	50	0-25%	None
TS2-2-3	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	6/11/2022 19:00	05:34	05:34	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	55	0-25%	None
TS2-2-3	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	6/12/2022 19:00	05:09	05:09	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-3	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	6/13/2022 19:00	05:36	05:36	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	48	25-50%	None
TS2-2-3	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	6/14/2022 19:00	05:31	05:31	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-3	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	yes	Deer mouse	1		1			NA	3	32	0-25%	None
TS2-2-3	Lat: 40.3609, Long: -116.5147	Inter-Mountain Basins Playa	5/5/2022 19:00	06:30	06:30	Sean Basilio	Michael Robison	Sagebrush scrub	yes	Deer mouse	1		1			NA	1	39	25-50%	None
TS2-2-3	Lat: 40.361, Long: -116.5147	Inter-Mountain Basins Playa	5/6/2022 19:00	06:12	06:12	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1			1		NA	1	48	0-25%	None
TS2-2-3	Lat: 40.3609, Long: -116.5147	Inter-Mountain Basins Playa	5/7/2022 19:00	06:30	06:30	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	50	0-25%	None
TS2-2-4	Lat: 40.3609, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:42	05:42	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-2-4	Lat: 40.3609, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:15	05:15	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS2-2-4	Lat: 40.3609, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:44	05:44	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-2-4	Lat: 40.3609, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:39	05:39	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-4	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-2-4	Lat: 40.3609, Long: -116.5148	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:36	06:36	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-2-4	Lat: 40.3576, Long: -116.5148	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:18	06:18	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-2-4	Lat: 40.361, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:35	06:35	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	50	0-25%	None
TS2-2-5	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	6/11/2022 19:00	05:35	05:35	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-2-5	Lat: 40.361, Long: -116.5145	Inter-Mountain Basins Playa	6/12/2022 19:00	05:10	05:10	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-5	Lat: 40.361, Long: -116.5145	Inter-Mountain Basins Playa	6/13/2022 19:00	05:39	05:39	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS2-2-5	Lat: 40.361, Long: -116.5145	Inter-Mountain Basins Playa	6/14/2022 19:00	05:33	05:33	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-5	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Playa	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-2-5	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	5/5/2022 19:00	06:32	06:32	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-2-5	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	5/6/2022 19:00	06:13	06:13	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-2-5	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Playa	5/7/2022 19:00	06:31	06:31	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	50	0-25%	None
TS2-2-6	Lat: 40.361, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:42	05:42	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-2-6	Lat: 40.361, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:14	05:14	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-6	Lat: 40.361, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:43	05:43	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-2-6	Lat: 40.361, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:38	05:38	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-6	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-2-6	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:35	06:35	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-2-6	Lat: 40.3604, Long: -116.5148	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:18	06:18	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-2-6	Lat: 40.361, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:35	06:35	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	50	0-25%	None
TS2-2-7	Lat: 40.3611, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:33	06:33	Sean Basilio	Michael Robison	Salt desert scrub	no								1	40	25-50%	None
TS2-2-7	Lat: 40.3611, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:36	05:36	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	55	0-25%	None
TS2-2-7	Lat: 40.3611, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:11	05:11	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-7	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:40	05:40	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS2-2-7	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:34	05:34	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-7	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-2-7	Lat: 40.3611, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:15	06:15	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-2-7	Lat: 40.3611, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:31	06:32	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	50	0-25%	None
TS2-2-8	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-2-8	Lat: 40.361, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:35	06:35	Sean Basilio	Michael Robison	Salt desert scrub	no								1	40	25-50%	None
TS2-2-8	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:34	06:34	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	50	0-25%	None
TS2-2-8	Lat: 40.361, Long: -116.5143	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:39	05:39	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Least chipmunk	1				1	NA	3	55	0-25%	None
TS2-2-8	Lat: 40.361, Long: -116.5143	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:13	05:13	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-8	Lat: 40.361, Long: -116.5143	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:42	05:42	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS2-2-8	Lat: 40.361, Long: -116.5143	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:38	05:38	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-2-8	Lat: 40.3609, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:17	06:17	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-2-9	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:13	06:20	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-2-9	Lat: 40.3611, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:34	06:34	Sean Basilio	Michael Robison	Salt desert scrub	no								1	40	25-50%	None
TS2-2-9	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:37	05:37	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	55	0-25%	None
TS2-2-9	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:12	05:12	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-2-9	Lat: 40.3612, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:40	05:40	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	48	25-50%	None
TS2-2-9	Lat: 40.3612, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:34	05:34	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS2-2-9	Lat: 40.361, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:14	06:14	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-2-9	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:33	06:33	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	50	0-25%	None
TS2-3-1	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-3-1	Lat: 40.3578, Long: -116.5148	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:41	06:41	Sean Basilio	Michael Robison	Salt desert scrub	no								1	40	25-50%	None
TS2-3-1	Lat: 40.3462, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:54	05:54	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	56	0-25%	None
TS2-3-1	Lat: 40.3462, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:21	05:21	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-3-1	Lat: 40.3462, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:52	05:52	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-3-1	Lat: 40.3462, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:44	05:44	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-3-1	Lat: 40.3491, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:22	06:22	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-3-1	Lat: 40.3609, Long: -116.5145	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:37	06:37	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	50	0-25%	None
TS2-3-10	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-3-10	Lat: 40.3463, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:48	06:48	Sean Basilio	Michael Robison	Salt desert scrub	no								1	40	25-50%	None
TS2-3-10	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:46	06:46	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	50	0-25%	None
TS2-3-10	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	06:00	06:00	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	56	0-25%	None
TS2-3-10	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:26	05:26	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-3-10	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:56	05:56	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	48	25-50%	None
TS2-3-10	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:47	05:47	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS2-3-10	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:26	06:26	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	48	0-25%	None
TS2-3-2	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-3-2	Lat: 40.3539, Long: -116.5148	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:51	06:51	Sean Basilio	Michael Robison	Salt desert scrub	no								1	40	25-50%	None
TS2-3-2	Lat: 40.3463, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:51	06:51	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	3	50	0-25%	None
TS2-3-2	Lat: 40.3463, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	06:05	06:05	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-3-2	Lat: 40.3463, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:30	05:30	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	61	50-75%	None
TS2-3-2	Lat: 40.3463, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	06:00	06:00	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	48	25-50%	None
TS2-3-2	Lat: 40.3463, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:52	05:52	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS2-3-2	Lat: 40.3447, Long: -116.513	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:29	06:29	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-3-3	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Salt desert scrub	no								3	32	0-25%	None
TS2-3-3	Lat: 40.3463, Long: -116.5135	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:42	06:42	Sean Basilio	Michael Robison	Salt desert scrub	yes	Deer mouse	1			1		NA	1	40	25-50%	None
TS2-3-3	Lat: 40.3462, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:56	05:56	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-3-3	Lat: 40.3462, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:21	05:21	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	61	50-75%	None
TS2-3-3	Lat: 40.3462, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:52	05:52	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-3-3	Lat: 40.3462, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:45	05:45	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS2-3-3	Lat: 40.3462, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:23	06:23	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-3-3	Lat: 40.3463, Long: -116.5135	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:42	06:42	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	2	50	0-25%	None
TS2-3-4	Lat: 40.3611, Long: -116.5144	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Salt desert scrub	yes	Deer mouse	1			1		NA	3	32	0-25%	None
TS2-3-4	Lat: 40.351, Long: -116.5146	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:51	06:51	Sean Basilio	Michael Robison	Salt desert scrub	no								1	40	25-50%	None
TS2-3-4	Lat: 40.3463, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	06:04	06:04	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-3-4	Lat: 40.3463, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:29	05:29	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	61	50-75%	None
TS2-3-4	Lat: 40.3463, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:59	05:59	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	3	48	25-50%	None
TS2-3-4	Lat: 40.3463, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:51	05:51	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	33	0-25%	None
TS2-3-4	Lat: 40.3464, Long: -116.5134	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:28	06:28	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-3-4	Lat: 40.3463, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:50	06:50	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	50	0-25%	None
TS2-3-5	Lat: 40.3462, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:56	05:57	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	55	0-25%	None
TS2-3-5	Lat: 40.3462, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:23	05:23	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-3-5	Lat: 40.3462, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:53	05:53	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-3-5	Lat: 40.3462, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:45	05:45	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-3-5	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-3-5	Lat: 40.3463, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:45	06:45	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-3-5	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:23	06:23	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-3-5	Lat: 40.3462, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:43	06:43	Sean Basilio	Daniel Robison	Sagebrush scrub	no								2	50	0-25%	None
TS2-3-6	Lat: 40.3463, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	06:03	06:03	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	56	0-25%	None
TS2-3-6	Lat: 40.3463, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:28	05:28	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	61	50-75%	None
TS2-3-6	Lat: 40.3463, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:58	05:58	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	48	25-50%	None
TS2-3-6	Lat: 40.3463, Long: -116.5138	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:50	05:50	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	1	33	0-25%	None
TS2-3-6	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-3-6	Lat: 40.3481, Long: -116.5135	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:50	06:50	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-3-6	Lat: 40.3464, Long: -116.5136	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:28	06:28	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-3-6	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:48	06:49	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	3	50	0-25%	None
TS2-3-7	Lat: 40.3462, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:58	05:58	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	3	56	0-25%	None
TS2-3-7	Lat: 40.3462, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:24	05:24	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-3-7	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:54	05:54	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	48	25-50%	None
TS2-3-7	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:46	05:46	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	33	0-25%	None
TS2-3-7	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-3-7	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:46	06:46	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-3-7	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:25	06:25	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	48	0-25%	None
TS2-3-7	Lat: 40.3463, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:44	06:44	Sean Basilio	Daniel Robison	Sagebrush scrub	no								1	50	0-25%	None
TS2-3-8	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	06:02	06:02	Sean Basilio	Daniel Robison	Salt desert scrub	no								3	56	0-25%	None
TS2-3-8	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:26	05:26	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Least chipmunk	1				1	NA	1	61	50-75%	None
TS2-3-8	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:57	05:57	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	48	25-50%	None
TS2-3-8	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:49	05:49	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	1	33	0-25%	None
TS2-3-8	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-3-8	Lat: 40.3464, Long: -116.5134	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:49	06:49	Sean Basilio	Michael Robison	Sagebrush scrub	no								1	40	25-50%	None
TS2-3-8	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:27	06:27	Sean Basilio	Daniel Robison	Sagebrush scrub	no								3	48	0-25%	None
TS2-3-8	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:47	06:47	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1			1		NA	2	50	0-25%	None
TS2-3-9	Lat: 40.3463, Long: -116.5141	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:59	05:59	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1			1		NA	3	56	0-25%	None
TS2-3-9	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:25	05:25	Sean Basilio	Daniel Robison	Salt desert scrub	no								1	61	50-75%	None
TS2-3-9	Lat: 40.3463, Long: -116.5141	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:55	05:55	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	1	48	25-50%	None
TS2-3-9	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:47	05:47	Sean Basilio	Daniel Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	1	33	0-25%	None
TS2-3-9	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	06:24	06:30	Sean Basilio	Michael Robison	Sagebrush scrub	no								3	32	0-25%	None
TS2-3-9	Lat: 40.3463, Long: -116.5139	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	06:47	06:47	Sean Basilio	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	40	25-50%	None
TS2-3-9	Lat: 40.3463, Long: -116.514	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:24	06:24	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	48	0-25%	None
TS2-3-9	Lat: 40.3463, Long: -116.5137	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:45	06:45	Sean Basilio	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	50	0-25%	None
TS3-1-1	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-1	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	05:30	05:30	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-1-1	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	05:31	05:31	Austin Linville	Michael Robison	Sagebrush scrub	no								4	34	0-25%	None
TS3-1-1	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	05:29	05:29	Austin Linville	Michael Robison	Sagebrush scrub	no								6	48	0-25%	None
TS3-1-1	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	04:59	04:59	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-1	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	04:46	04:46	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	1	63	50-75%	None
TS3-1-1	Lat: 40.3027, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	04:55	04:55	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-1	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	04:58	04:58	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	25-50%	None
TS3-1-1	Lat: 40.3027, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	04:58	04:58	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-10	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-10	Lat: 40.3032, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:39	05:39	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-1-10	Lat: 40.3032, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:44	05:44	Austin Linville	Michael Robison	Sagebrush scrub	no								4	34	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS3-1-10	Lat: 40.3032, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:50	05:50	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	3	48	0-25%	None
TS3-1-10	Lat: 40.3032, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:05	05:05	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-10	Lat: 40.3032, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	04:51	04:51	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-10	Lat: 40.3032, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:01	05:01	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	25-50%	None
TS3-1-10	Lat: 40.3032, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:01	05:01	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-2	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-2	Lat: 40.3028, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	05:31	05:31	Austin Linville	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	6	34	0-25%	None
TS3-1-2	Lat: 40.3028, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	05:34	05:34	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	5	34	0-25%	None
TS3-1-2	Lat: 40.3028, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	05:31	05:31	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	6	48	0-25%	None
TS3-1-2	Lat: 40.3027, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	05:09	05:09	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-2	Lat: 40.3027, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	05:04	05:04	Austin Linville	Michael Robison	Sagebrush scrub	yes	Mirriam's kangaroo rat	1			1		NA	3	50	25-50%	None
TS3-1-2	Lat: 40.3028, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:04	05:05	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-3	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-3	Lat: 40.3029, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	05:33	05:33	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-1-3	Lat: 40.3029, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	05:34	05:34	Austin Linville	Michael Robison	Sagebrush scrub	no								5	34	0-25%	None
TS3-1-3	Lat: 40.3029, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	05:35	05:35	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	5	48	0-25%	None
TS3-1-3	Lat: 40.3028, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	05:08	05:08	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-3	Lat: 40.3029, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	04:54	04:54	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-3	Lat: 40.3029, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	05:04	05:04	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	25-50%	None
TS3-1-3	Lat: 40.3029, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:04	05:04	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-4	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-4	Lat: 40.3029, Long: -116.5004	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	05:33	05:33	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-1-4	Lat: 40.3029, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	05:35	05:35	Austin Linville	Michael Robison	Sagebrush scrub	no								5	34	0-25%	None
TS3-1-4	Lat: 40.3029, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	05:40	05:40	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	4	48	0-25%	None
TS3-1-4	Lat: 40.3029, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	05:00	05:00	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-4	Lat: 40.3029, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	04:48	04:48	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-4	Lat: 40.3029, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	04:59	04:59	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	25-50%	None
TS3-1-4	Lat: 40.3029, Long: -116.5003	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	04:59	04:59	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-5	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-5	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:35	05:35	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-1-5	Lat: 40.303, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:39	05:39	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	5	34	0-25%	None
TS3-1-5	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:43	05:43	Austin Linville	Michael Robison	Sagebrush scrub	no								4	48	0-25%	None
TS3-1-5	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:02	05:02	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	56	0-25%	None
TS3-1-5	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:00	05:00	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	50	25-50%	None
TS3-1-5	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:00	05:00	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	2	32	0-25%	None
TS3-1-6	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-6	Lat: 40.3029, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:34	05:34	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-1-6	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:42	05:42	Austin Linville	Michael Robison	Sagebrush scrub	no		1						4	34	0-25%	None
TS3-1-6	Lat: 40.303, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:44	05:44	Austin Linville	Michael Robison	Sagebrush scrub	no								4	48	0-25%	None
TS3-1-6	Lat: 40.303, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:07	05:07	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-6	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	04:49	04:49	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	1	63	50-75%	None
TS3-1-6	Lat: 40.303, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	04:53	04:53	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-6	Lat: 40.303, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:03	05:03	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	25-50%	None
TS3-1-6	Lat: 40.303, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:03	05:03	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-7	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:29	05:36	Austin Linville	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	2	32	0-25%	None
TS3-1-7	Lat: 40.303, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:36	05:36	Austin Linville	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	6	34	0-25%	None
TS3-1-7	Lat: 40.3031, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:42	05:42	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	4	34	0-25%	None
TS3-1-7	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:46	05:46	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	48	0-25%	None
TS3-1-7	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:06	05:06	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-7	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	04:53	04:53	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-7	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:02	05:02	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	50	25-50%	None
TS3-1-7	Lat: 40.3031, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:03	05:03	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-8	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:26	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-8	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:38	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	6	34	0-25%	None
TS3-1-8	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:43	05:43	Austin Linville	Michael Robison	Sagebrush scrub	no								4	34	0-25%	None
TS3-1-8	Lat: 40.3031, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:45	05:45	Austin Linville	Michael Robison	Sagebrush scrub	no								3	48	0-25%	None
TS3-1-8	Lat: 40.3031, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:03	05:04	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-8	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	04:50	04:50	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-8	Lat: 40.3031, Long: -116.5003	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:01	05:01	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	25-50%	None
TS3-1-8	Lat: 40.3031, Long: -116.5004	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:01	05:01	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-9	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	05:29	05:38	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-1-9	Lat: 40.3032, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	05:39	05:39	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-1-9	Lat: 40.3032, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	05:46	05:46	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	4	34	0-25%	None
TS3-1-9	Lat: 40.3032, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	05:52	05:52	Austin Linville	Michael Robison	Sagebrush scrub	no								3	48	0-25%	None
TS3-1-9	Lat: 40.3032, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:05	05:05	Austin Linville	Michael Robison	Sagebrush scrub	no								3	56	0-25%	None
TS3-1-9	Lat: 40.3032, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	04:52	04:52	Austin Linville	Michael Robison	Sagebrush scrub	no								1	63	50-75%	None
TS3-1-9	Lat: 40.3032, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:02	05:02	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	25-50%	None
TS3-1-9	Lat: 40.3032, Long: -116.5005	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:02	05:02	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	2	32	0-25%	None
TS3-2-1	Lat: 40.2922, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Salt desert scrub	no								2	33	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS3-2-1	Lat: 40.2921, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:52	05:52	Austin Linville	Daniel Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	6	34	0-25%	None
TS3-2-1	Lat: 40.2922, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:04	06:04	Austin Linville	Michael Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	4	35	0-25%	None
TS3-2-1	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:08	06:08	Austin Linville	Michael Robison	Salt desert scrub	no								4	48	0-25%	None
TS3-2-1	Lat: 40.2922, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/11/2022 12:21	05:21	05:21	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-1	Lat: 40.2922, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:05	05:05	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-1	Lat: 40.2922, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:18	05:18	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-1	Lat: 40.2922, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:14	05:14	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-10	Lat: 40.3234, Long: -116.4815	Barren Lands, non-specific	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-2-10	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	5/5/2022 19:00	05:57	05:57	Austin Linville	Daniel Robison	Salt desert scrub	no								6	34	0-25%	None
TS3-2-10	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	5/6/2022 19:00	06:11	06:11	Austin Linville	Michael Robison	Salt desert scrub	no								4	35	0-25%	None
TS3-2-10	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	5/7/2022 19:00	06:19	06:19	Austin Linville	Michael Robison	Salt desert scrub	no								3	48	0-25%	None
TS3-2-10	Lat: 40.2926, Long: -116.5048	Barren Lands, non-specific	6/11/2022 19:00	05:25	05:25	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-10	Lat: 40.2926, Long: -116.5048	Barren Lands, non-specific	6/12/2022 19:00	05:08	05:08	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-10	Lat: 40.2926, Long: -116.5048	Barren Lands, non-specific	6/13/2022 19:00	05:20	05:20	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-10	Lat: 40.2926, Long: -116.5048	Barren Lands, non-specific	6/14/2022 19:00	05:17	05:17	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-2	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-2-2	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:53	05:53	Austin Linville	Daniel Robison	Salt desert scrub	no								6	34	0-25%	None
TS3-2-2	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:09	06:09	Austin Linville	Michael Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	4	48	0-25%	None
TS3-2-2	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:29	05:29	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-2	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:12	05:12	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-2	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:19	05:19	Austin Linville	Michael Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	2	32	0-25%	None
TS3-2-2	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:14	06:14	Austin Linville	Michael Robison	Sagebrush scrub	no								4	35	0-25%	None
TS3–2-2	Lat: 40.2922, Long: -116.5048	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:23	05:23	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	3	50	25-50%	None
TS3-2-3	Lat: 40.3234, Long: -116.4815	Barren Lands, non-specific	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-2-3	Lat: 40.2923, Long: -116.5048	Barren Lands, non-specific	5/7/2022 19:00	06:11	06:11	Austin Linville	Michael Robison	Salt desert scrub	yes	Deer mouse	1				1	NA	4	48	0-25%	None
TS3-2-3	Lat: 40.2923, Long: -116.5048	Barren Lands, non-specific	6/11/2022 19:00	05:28	05:28	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-3	Lat: 40.2923, Long: -116.5048	Barren Lands, non-specific	6/12/2022 19:00	05:11	05:11	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-3	Lat: 40.2923, Long: -116.5048	Barren Lands, non-specific	6/13/2022 19:00	05:22	05:22	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-3	Lat: 40.2923, Long: -116.5048	Barren Lands, non-specific	6/14/2022 19:00	05:19	05:19	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-3	Lat: 40.2923, Long: -116.5048	Barren Lands, non-specific	5/5/2022 19:00	05:54	05:54	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-2-3	Lat: 40.2923, Long: -116.5048	Barren Lands, non-specific	5/6/2022 19:00	06:13	06:13	Austin Linville	Michael Robison	Sagebrush scrub	no								4	35	0-25%	None
TS3-2-4	Lat: 40.2923, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:13	06:13	Austin Linville	Michael Robison	Salt desert scrub	no								3	48	0-25%	None
TS3-2-4	Lat: 40.2923, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:22	05:22	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-4	Lat: 40.2923, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:06	05:06	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-4	Lat: 40.2923, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:18	05:18	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-4	Lat: 40.2923, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:15	05:15	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-4	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-2-4	Lat: 40.2923, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:54	05:54	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-2-4	Lat: 40.2923, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:06	06:06	Austin Linville	Michael Robison	Sagebrush scrub	no								4	35	0-25%	None
TS3-2-5	Lat: 40.3234, Long: -116.4815	Barren Lands, non-specific	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-2-5	Lat: 40.2924, Long: -116.5047	Barren Lands, non-specific	5/7/2022 19:00	06:14	06:14	Austin Linville	Michael Robison	Salt desert scrub	no								3	48	0-25%	None
TS3-2-5	Lat: 40.2924, Long: -116.5047	Barren Lands, non-specific	6/11/2022 19:00	05:23	05:23	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-5	Lat: 40.2924, Long: -116.5047	Barren Lands, non-specific	6/12/2022 19:00	05:06	05:06	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-5	Lat: 40.2924, Long: -116.5047	Barren Lands, non-specific	6/13/2022 19:00	05:19	05:19	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-5	Lat: 40.2924, Long: -116.5047	Barren Lands, non-specific	6/14/2022 19:00	05:15	05:16	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-5	Lat: 40.2924, Long: -116.5047	Barren Lands, non-specific	5/5/2022 19:00	05:55	05:55	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-2-5	Lat: 40.2924, Long: -116.5047	Barren Lands, non-specific	5/6/2022 19:00	06:06	06:06	Austin Linville	Michael Robison	Sagebrush scrub	no								4	35	0-25%	None
TS3-2-6	Lat: 40.3235, Long: -116.4815	Barren Lands, non-specific	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-2-6	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	5/7/2022 19:00	06:14	06:14	Austin Linville	Michael Robison	Salt desert scrub	no								3	48	0-25%	None
TS3-2-6	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	6/11/2022 19:00	05:28	05:28	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-6	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	6/13/2022 19:00	05:22	05:22	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-6	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	6/14/2022 19:00	05:18	05:18	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-6	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	5/5/2022 19:00	05:55	05:55	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-2-6	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	5/6/2022 19:00	06:12	06:12	Austin Linville	Michael Robison	Sagebrush scrub	no								4	35	0-25%	None
TS3-2-6	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	6/12/2022 19:00	05:10	05:10	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-2-7	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	5/7/2022 19:00	06:15	06:15	Austin Linville	Michael Robison	Salt desert scrub	no								3	48	0-25%	None
TS3-2-7	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	6/11/2022 19:00	05:26	05:26	Austin Linville	Michael Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	2	56	0-25%	None
TS3-2-7	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	6/12/2022 19:00	05:09	05:09	Austin Linville	Michael Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	1	64	50-75%	None
TS3-2-7	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	6/13/2022 19:00	05:21	05:21	Austin Linville	Michael Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	3	50	25-50%	None
TS3-2-7	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	6/14/2022 19:00	05:18	05:18	Austin Linville	Michael Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	2	32	0-25%	None
TS3-2-7	Lat: 40.3234, Long: -116.4815	Barren Lands, non-specific	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-2-7	Lat: 40.2925, Long: -116.5048	Barren Lands, non-specific	5/5/2022 19:00	05:55	05:55	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-2-7	Lat: 40.2924, Long: -116.5048	Barren Lands, non-specific	5/6/2022 19:00	06:12	06:12	Austin Linville	Michael Robison	Sagebrush scrub	no								4	35	0-25%	None
TS3-2-8	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:16	06:16	Austin Linville	Michael Robison	Salt desert scrub	no								3	48	0-25%	None
TS3-2-8	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:24	05:24	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-8	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:07	05:07	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-8	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:19	05:19	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-8	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:16	05:16	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-8	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS3-2-8	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:56	05:56	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-2-8	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:07	06:07	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	4	35	0-25%	None
TS3-2-9	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Greasewood Flat	5/4/2022 19:00	05:51	06:00	Austin Linville	Daniel Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-2-9	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/7/2022 19:00	06:17	06:17	Austin Linville	Michael Robison	Salt desert scrub	yes	Great Basin pocket mouse	1				1	NA	3	48	0-25%	None
TS3-2-9	Lat: 40.2926, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/11/2022 19:00	05:25	05:25	Austin Linville	Michael Robison	Salt desert scrub	no								2	56	0-25%	None
TS3-2-9	Lat: 40.2926, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/12/2022 19:00	05:08	05:08	Austin Linville	Michael Robison	Salt desert scrub	no								1	64	50-75%	None
TS3-2-9	Lat: 40.2926, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/13/2022 19:00	05:20	05:20	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	25-50%	None
TS3-2-9	Lat: 40.2926, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	6/14/2022 19:00	05:16	05:16	Austin Linville	Michael Robison	Salt desert scrub	no								2	32	0-25%	None
TS3-2-9	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/5/2022 19:00	05:56	05:56	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-2-9	Lat: 40.2925, Long: -116.5047	Inter-Mountain Basins Greasewood Flat	5/6/2022 19:00	06:11	06:11	Austin Linville	Michael Robison	Sagebrush scrub	no								4	35	0-25%	None
TS3-3-1	Lat: 40.2746, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-3-1	Lat: 40.2921, Long: -116.5048	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:05	06:05	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-3-1	Lat: 40.2746, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:22	06:22	Austin Linville	Michael Robison	Sagebrush scrub	no								3	35	0-25%	None
TS3-3-1	Lat: 40.2746, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:33	06:33	Austin Linville	Michael Robison	Sagebrush scrub	no								3	49	0-25%	None
TS3-3-1	Lat: 40.2746, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 12:37	05:37	05:37	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-1	Lat: 40.2745, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:20	05:20	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-1	Lat: 40.2746, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:33	05:33	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-1	Lat: 40.2746, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:28	05:28	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-10	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-3-10	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:11	06:11	Austin Linville	Daniel Robison	Sagebrush scrub	no								5	35	0-25%	None
TS3-3-10	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:29	06:29	Austin Linville	Michael Robison	Sagebrush scrub	no								3	36	0-25%	None
TS3-3-10	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:41	06:41	Austin Linville	Michael Robison	Sagebrush scrub	no								3	49	0-25%	None
TS3-3-10	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:41	05:41	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-10	Lat: 40.2749, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:24	05:24	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-10	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:36	05:36	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-10	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:31	05:31	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-2	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-3-2	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:05	06:05	Austin Linville	Daniel Robison	Sagebrush scrub	no								5	34	0-25%	None
TS3-3-2	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:31	06:31	Austin Linville	Michael Robison	Sagebrush scrub	no								3	36	0-25%	None
TS3-3-2	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:33	06:33	Austin Linville	Michael Robison	Sagebrush scrub	no								3	49	0-25%	None
TS3-3-2	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:44	05:44	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-2	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:26	05:26	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-2	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:38	05:38	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-2	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:33	05:33	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-3	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-3-3	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:09	06:09	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	34	0-25%	None
TS3-3-3	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:31	06:31	Austin Linville	Michael Robison	Sagebrush scrub	no								3	36	0-25%	None
TS3-3-3	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:34	06:34	Austin Linville	Michael Robison	Sagebrush scrub	no								3	49	0-25%	None
TS3-3-3	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:43	05:43	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-3	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:26	05:26	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-3	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:37	05:37	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-3	Lat: 40.2747, Long: -116.5259	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:32	05:32	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-4	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-3-4	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:07	06:08	Austin Linville	Daniel Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	6	34	0-25%	None
TS3-3-4	Lat: 40.2746, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:23	06:23	Austin Linville	Michael Robison	Sagebrush scrub	no								3	35	0-25%	None
TS3-3-4	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:34	06:34	Austin Linville	Michael Robison	Sagebrush scrub	no								3	48	0-25%	None
TS3-3-4	Lat: 40.2746, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:38	05:38	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-4	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:21	05:21	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	1	64	50-75%	None
TS3-3-4	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:33	05:33	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-4	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:29	05:29	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-5	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-3-5	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:09	06:09	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	35	0-25%	None
TS3-3-5	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:23	06:23	Austin Linville	Michael Robison	Sagebrush scrub	no								3	35	0-25%	None
TS3-3-5	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:35	06:35	Austin Linville	Michael Robison	Sagebrush scrub	no								3	49	0-25%	None
TS3-3-5	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:39	05:39	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-5	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:22	05:22	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-5	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:34	05:34	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-5	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:29	05:29	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-6	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:15	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-3-6	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:09	06:10	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	35	0-25%	None
TS3-3-6	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:30	06:30	Austin Linville	Michael Robison	Sagebrush scrub	no								3	36	0-25%	None
TS3-3-6	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:35	06:35	Austin Linville	Michael Robison	Sagebrush scrub	no								3	48	0-25%	None
TS3-3-6	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:43	05:43	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-6	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:25	05:25	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-6	Lat: 40.2748, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:37	05:37	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-6	Lat: 40.2747, Long: -116.5258	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:32	05:32	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-7	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-3-7	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:10	06:10	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	35	0-25%	None
TS3-3-7	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:30	06:30	Austin Linville	Michael Robison	Sagebrush scrub	no								3	36	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS3-3-7	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:36	06:36	Austin Linville	Michael Robison	Sagebrush scrub	no								3	49	0-25%	None
TS3-3-7	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:42	05:42	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-7	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:25	05:25	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-7	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:36	05:36	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-3-7	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:31	05:31	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-8	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-3-8	Lat: 40.2747, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:10	06:10	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	35	0-25%	None
TS3-3-8	Lat: 40.2747, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:25	06:25	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	35	0-25%	None
TS3-3-8	Lat: 40.2747, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:36	06:36	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	49	0-25%	None
TS3-3-8	Lat: 40.2747, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:40	05:40	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-8	Lat: 40.2748, Long: -116.5257	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:23	05:23	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	1	64	50-75%	None
TS3-3-8	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:34	05:34	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	5	51	25-50%	None
TS3-3-8	Lat: 40.2747, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:30	05:30	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-3-9	Lat: 40.3234, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:05	06:12	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-3-9	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:11	06:11	Austin Linville	Daniel Robison	Sagebrush scrub	no								5	35	0-25%	None
TS3-3-9	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:26	06:26	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	35	0-25%	None
TS3-3-9	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:39	06:39	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	3	49	0-25%	None
TS3-3-9	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:40	05:40	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-3-9	Lat: 40.2748, Long: -116.5256	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:24	05:24	Austin Linville	Michael Robison	Sagebrush scrub	no								1	64	50-75%	None
TS3-3-9	Lat: 40.2748, Long: -116.5255	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:35	05:35	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	5	51	25-50%	None
TS3-3-9	Lat: 40.2748, Long: -116.5255	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:30	05:30	Austin Linville	Michael Robison	Sagebrush scrub	yes	Great Basin pocket mouse	1				1	NA	2	32	0-25%	None
TS3-4-1	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-4-1	Lat: 40.2615, Long: -116.5487	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:18	06:18	Austin Linville	Daniel Robison	Salt desert scrub	no								7	35	0-25%	None
TS3-4-1	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:39	06:39	Austin Linville	Michael Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-4-1	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	06:54	06:54	Austin Linville	Michael Robison	Salt desert scrub	no								4	50	0-25%	None
TS3-4-1	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	05:59	05:59	Austin Linville	Michael Robison	Salt desert scrub	no								2	57	0-25%	None
TS3-4-1	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 12:35	05:35	05:35	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-4-1	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	05:45	05:45	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-4-1	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:47	05:47	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-4-10	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-4-10	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:22	06:22	Austin Linville	Daniel Robison	Salt desert scrub	no								7	35	0-25%	None
TS3-4-10	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:42	06:42	Austin Linville	Michael Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-4-10	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:59	06:59	Austin Linville	Michael Robison	Salt desert scrub	no								10	50	0-25%	None
TS3-4-10	Lat: 40.2612, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:54	05:54	Austin Linville	Michael Robison	Salt desert scrub	no								2	57	0-25%	None
TS3-4-10	Lat: 40.2612, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:39	05:39	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-4-10	Lat: 40.2612, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:48	05:48	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-4-10	Lat: 40.2612, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:43	05:43	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-4-2	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-4-2	Lat: 40.2614, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:18	06:18	Austin Linville	Daniel Robison	Salt desert scrub	no								7	35	0-25%	None
TS3-4-2	Lat: 40.2614, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:39	06:39	Austin Linville	Michael Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-4-2	Lat: 40.2614, Long: -116.5487	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	06:54	06:54	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	0-25%	None
TS3-4-2	Lat: 40.2614, Long: -116.5487	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 12:51	05:51	05:51	Austin Linville	Michael Robison	Salt desert scrub	no								2	57	0-25%	None
TS3-4-2	Lat: 40.2614, Long: -116.5487	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:43	05:43	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-4-2	Lat: 40.2615, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	05:51	05:51	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-4-2	Lat: 40.2615, Long: -116.5487	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:41	05:41	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-4-3	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-4-3	Lat: 40.2614, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:18	06:18	Austin Linville	Daniel Robison	Salt desert scrub	no								7	35	0-25%	None
TS3-4-3	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:40	06:40	Austin Linville	Michael Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-4-3	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	06:55	06:55	Austin Linville	Michael Robison	Salt desert scrub	no								4	50	0-25%	None
TS3-4-3	Lat: 40.2614, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	05:51	05:51	Austin Linville	Michael Robison	Salt desert scrub	no								2	57	0-25%	None
TS3-4-3	Lat: 40.2614, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:42	05:42	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-4-3	Lat: 40.2614, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	05:50	05:50	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-4-3	Lat: 40.2614, Long: -116.5486	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:42	05:42	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-4-4	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-4-4	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:19	06:19	Austin Linville	Daniel Robison	Salt desert scrub	no								7	36	0-25%	None
TS3-4-4	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:44	06:44	Austin Linville	Michael Robison	Salt desert scrub	no								4	36	0-25%	None
TS3-4-4	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	06:56	06:56	Austin Linville	Michael Robison	Salt desert scrub	no								5	50	0-25%	None
TS3-4-4	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	05:58	05:58	Austin Linville	Michael Robison	Salt desert scrub	no								2	57	0-25%	None
TS3-4-4	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:36	05:36	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-4-4	Lat: 40.2615, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	05:46	05:46	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-4-4	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:46	05:46	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-4-5	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-4-5	Lat: 40.2614, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:20	06:20	Austin Linville	Daniel Robison	Sagebrush scrub	no								7	35	0-25%	None
TS3-4-5	Lat: 40.2614, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:43	06:43	Austin Linville	Michael Robison	Sagebrush scrub	no								5	36	0-25%	None
TS3-4-5	Lat: 40.2614, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:56	06:56	Austin Linville	Michael Robison	Sagebrush scrub	no								3	50	0-25%	None
TS3-4-5	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:57	05:57	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-4-5	Lat: 40.2614, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:37	05:37	Austin Linville	Michael Robison	Sagebrush scrub	no								5	65	50-75%	None
TS3-4-5	Lat: 40.2614, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:46	05:46	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-4-5	Lat: 40.2614, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:45	05:45	Austin Linville	Michael Robison	Sagebrush scrub	no								2	33	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS3-4-6	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-4-6	Lat: 40.2613, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:20	06:20	Austin Linville	Daniel Robison	Sagebrush scrub	no								7	35	0-25%	None
TS3-4-6	Lat: 40.2613, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:44	06:44	Austin Linville	Michael Robison	Sagebrush scrub	no								4	36	0-25%	None
TS3-4-6	Lat: 40.2613, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:57	06:57	Austin Linville	Michael Robison	Sagebrush scrub	no								5	50	0-25%	None
TS3-4-6	Lat: 40.2613, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:52	05:52	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-4-6	Lat: 40.2613, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:40	05:41	Austin Linville	Michael Robison	Sagebrush scrub	no								5	65	50-75%	None
TS3-4-6	Lat: 40.2613, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:50	05:50	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-4-6	Lat: 40.2613, Long: -116.5485	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:42	05:42	Austin Linville	Michael Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-4-7	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-4-7	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:20	06:21	Austin Linville	Daniel Robison	Sagebrush scrub	no								7	35	0-25%	None
TS3-4-7	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:42	06:42	Austin Linville	Michael Robison	Sagebrush scrub	no								3	36	0-25%	None
TS3-4-7	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:57	06:57	Austin Linville	Michael Robison	Sagebrush scrub	no								6	50	0-25%	None
TS3-4-7	Lat: 40.2612, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:53	05:53	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-4-7	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:40	05:40	Austin Linville	Michael Robison	Sagebrush scrub	no								5	65	50-75%	None
TS3-4-7	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:49	05:49	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-4-7	Lat: 40.2612, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:43	05:43	Austin Linville	Michael Robison	Sagebrush scrub	no								2	32	0-25%	None
TS3-4-8	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-4-8	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:21	06:21	Austin Linville	Daniel Robison	Sagebrush scrub	no								7	35	0-25%	None
TS3-4-8	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:43	06:43	Austin Linville	Michael Robison	Sagebrush scrub	no								5	36	0-25%	None
TS3-4-8	Lat: 40.2614, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:58	06:58	Austin Linville	Michael Robison	Sagebrush scrub	no								7	50	0-25%	None
TS3-4-8	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:56	05:56	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-4-8	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:38	05:38	Austin Linville	Michael Robison	Sagebrush scrub	no								5	65	50-75%	None
TS3-4-8	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:47	05:47	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-4-8	Lat: 40.2613, Long: -116.5484	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:45	05:45	Austin Linville	Michael Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-4-9	Lat: 40.3235, Long: -116.4815	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:22	06:28	Austin Linville	Daniel Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-4-9	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:21	06:21	Austin Linville	Daniel Robison	Sagebrush scrub	no								7	35	0-25%	None
TS3-4-9	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:41	06:41	Austin Linville	Michael Robison	Sagebrush scrub	yes	Deer mouse	1				1	NA	3	36	0-25%	None
TS3-4-9	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	06:58	06:58	Austin Linville	Michael Robison	Sagebrush scrub	no								7	50	0-25%	None
TS3-4-9	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	05:55	05:55	Austin Linville	Michael Robison	Sagebrush scrub	no								2	57	0-25%	None
TS3-4-9	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:38	05:38	Austin Linville	Michael Robison	Sagebrush scrub	no								5	65	50-75%	None
TS3-4-9	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	05:47	05:47	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-4-9	Lat: 40.2613, Long: -116.5483	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:44	05:44	Austin Linville	Michael Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	34	0-25%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:29	06:29	Austin Linville	Daniel Robison	Salt desert scrub	no								5	36	0-25%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	07:01	07:01	Austin Linville	Micheal Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:11	07:11	Austin Linville	Michael Robison	Salt desert scrub	no								8	50	0-25%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	06:13	06:13	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 12:49	05:49	05:49	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:01	06:01	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-1	Lat: 40.2571, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:57	05:57	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-10	Lat: 40.3234, Long: -116.4814	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-5-10	Lat: 40.2571, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:34	06:34	Austin Linville	Daniel Robison	Salt desert scrub	no								6	36	0-25%	None
TS3-5-10	Lat: 40.2571, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:57	06:57	Austin Linville	Micheal Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-5-10	Lat: 40.2571, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	07:15	07:15	Austin Linville	Michael Robison	Salt desert scrub	no								8	51	0-25%	None
TS3-5-10	Lat: 40.2571, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	06:08	06:08	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-10	Lat: 40.2572, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:54	05:54	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-10	Lat: 40.2571, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	06:04	06:04	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-10	Lat: 40.2571, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:54	05:54	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-2	Lat: 40.3234, Long: -116.4814	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	34	0-25%	None
TS3-5-2	Lat: 40.257, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:29	06:29	Austin Linville	Daniel Robison	Salt desert scrub	no								5	36	0-25%	None
TS3-5-2	Lat: 40.257, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:51	06:51	Austin Linville	Micheal Robison	Salt desert scrub	no								5	36	0-25%	None
TS3-5-2	Lat: 40.257, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:11	07:11	Austin Linville	Michael Robison	Salt desert scrub	no								8	50	0-25%	None
TS3-5-2	Lat: 40.257, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 13:04	06:04	06:04	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-2	Lat: 40.257, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:57	05:57	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-2	Lat: 40.257, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:06	06:06	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-2	Lat: 40.257, Long: -116.5662	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:52	05:52	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-3	Lat: 40.3235, Long: -116.4814	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	34	0-25%	None
TS3-5-3	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:30	06:30	Austin Linville	Daniel Robison	Salt desert scrub	no								5	36	0-25%	None
TS3-5-3	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:53	06:53	Austin Linville	Micheal Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-5-3	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:12	07:12	Austin Linville	Michael Robison	Salt desert scrub	no								8	50	0-25%	None
TS3-5-3	Lat: 40.257, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	06:06	06:06	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-3	Lat: 40.257, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:57	05:57	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-3	Lat: 40.257, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:06	06:06	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-3	Lat: 40.257, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:52	05:52	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-4	Lat: 40.3235, Long: -116.4814	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	34	0-25%	None
TS3-5-4	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:30	06:30	Austin Linville	Daniel Robison	Salt desert scrub	no								5	36	0-25%	None
TS3-5-4	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	07:00	07:00	Austin Linville	Micheal Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-5-4	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:12	07:12	Austin Linville	Michael Robison	Salt desert scrub	no								8	50	0-25%	None
TS3-5-4	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	06:12	06:12	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None

Trap ID	Site Grid	SWReGAP	Survey Date	Start Time	End Time	Surveyor 1	Surveyor 2	Habitat	Captured Individuals	Species	Number Captured	Describe Other	Count Male	Count Female	Count Unknown	Sample ID	Wind Speed (mph)	Temperature (°F)	Cloud Cover	Precipitation
TS3-5-4	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:50	05:50	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-4	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:01	06:01	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-4	Lat: 40.2571, Long: -116.5661	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:57	05:57	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-5	Lat: 40.3235, Long: -116.4814	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-5-5	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:31	06:31	Austin Linville	Daniel Robison	Salt desert scrub	no								5	36	0-25%	None
TS3-5-5	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:59	06:59	Austin Linville	Micheal Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-5-5	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:13	07:13	Austin Linville	Michael Robison	Salt desert scrub	no								8	50	0-25%	None
TS3-5-5	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	06:11	06:11	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-5	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:51	05:51	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-5	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:02	06:02	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-5	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:56	05:56	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-6	Lat: 40.3234, Long: -116.4814	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-5-6	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:31	06:32	Austin Linville	Daniel Robison	Salt desert scrub	no								5	36	0-25%	None
TS3-5-6	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:54	06:54	Austin Linville	Micheal Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-5-6	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:13	07:13	Austin Linville	Michael Robison	Salt desert scrub	no								8	50	0-25%	None
TS3-5-6	Lat: 40.257, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	06:07	06:07	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-6	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:56	05:56	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-6	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:05	06:05	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-6	Lat: 40.2571, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:53	05:53	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-7	Lat: 40.3234, Long: -116.4814	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Salt desert scrub	no								3	33	0-25%	None
TS3-5-7	Lat: 40.2571, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:32	06:32	Austin Linville	Daniel Robison	Salt desert scrub	no								6	36	0-25%	None
TS3-5-7	Lat: 40.2571, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:56	06:56	Austin Linville	Michael Robison	Salt desert scrub	no								3	36	0-25%	None
TS3-5-7	Lat: 40.2571, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:14	07:14	Austin Linville	Michael Robison	Salt desert scrub	no								3	50	0-25%	None
TS3-5-7	Lat: 40.2571, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	06:07	06:07	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-7	Lat: 40.2571, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:55	05:55	Austin Linville	Michael Robison	Salt desert scrub	no								5	65	50-75%	None
TS3-5-7	Lat: 40.2571, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:05	06:05	Austin Linville	Michael Robison	Salt desert scrub	no								5	51	25-50%	None
TS3-5-7	Lat: 40.2571, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:53	05:53	Austin Linville	Michael Robison	Salt desert scrub	no								2	33	0-25%	None
TS3-5-8	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	6/11/2022 19:00	06:10	06:11	Austin Linville	Michael Robison	Salt desert scrub	no								4	58	0-25%	None
TS3-5-8	Lat: 40.3234, Long: -116.4814	Inter-Mountain Basins Mixed Salt Desert Scrub	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-5-8	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	5/5/2022 19:00	06:32	06:32	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	36	0-25%	None
TS3-5-8	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	5/6/2022 19:00	06:58	06:58	Austin Linville	Micheal Robison	Sagebrush scrub	no								3	36	0-25%	None
TS3-5-8	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	5/7/2022 19:00	07:14	07:14	Austin Linville	Michael Robison	Sagebrush scrub	no								8	50	0-25%	None
TS3-5-8	Lat: 40.2572, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/12/2022 19:00	05:52	05:52	Austin Linville	Michael Robison	Sagebrush scrub	no								5	65	50-75%	None
TS3-5-8	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Mixed Salt Desert Scrub	6/13/2022 19:00	06:03	06:03	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-5-8	Lat: 40.2572, Long: -116.566	Inter-Mountain Basins Mixed Salt Desert Scrub	6/14/2022 19:00	05:55	05:55	Austin Linville	Michael Robison	Sagebrush scrub	no								2	33	0-25%	None
TS3-5-9	Lat: 40.3234, Long: -116.4814	Inter-Mountain Basins Big Sagebrush Shrubland	5/4/2022 19:00	06:35	06:40	Austin Linville	Daniel Robison	Sagebrush scrub	no								3	33	0-25%	None
TS3-5-9	Lat: 40.2572, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	5/5/2022 19:00	06:33	06:33	Austin Linville	Daniel Robison	Sagebrush scrub	no								6	36	0-25%	None
TS3-5-9	Lat: 40.2572, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	5/6/2022 19:00	06:58	06:58	Austin Linville	Micheal Robison	Sagebrush scrub	no								3	36	0-25%	None
TS3-5-9	Lat: 40.2572, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	5/7/2022 19:00	07:15	07:15	Austin Linville	Michael Robison	Sagebrush scrub	no								8	51	0-25%	None
TS3-5-9	Lat: 40.2572, Long: -116.5658	Inter-Mountain Basins Big Sagebrush Shrubland	6/11/2022 19:00	06:09	06:09	Austin Linville	Michael Robison	Sagebrush scrub	no								4	58	0-25%	None
TS3-5-9	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Big Sagebrush Shrubland	6/12/2022 19:00	05:53	05:53	Austin Linville	Michael Robison	Sagebrush scrub	no								5	65	50-75%	None
TS3-5-9	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Big Sagebrush Shrubland	6/13/2022 19:00	06:04	06:04	Austin Linville	Michael Robison	Sagebrush scrub	no								5	51	25-50%	None
TS3-5-9	Lat: 40.2572, Long: -116.5659	Inter-Mountain Basins Big Sagebrush Shrubland	6/14/2022 19:00	05:55	05:55	Austin Linville	Michael Robison	Sagebrush scrub	no								2	33	0-25%	None

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-1 transect	0642316

Photo No.	Date:
1	5/3/2022

Direction Photo Taken:
Southwest

Description:
Overview of the TS1-1 transect. Dominant shrubs species are black greasewood and shadscale.



Photo No.	Date:
2	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 1 within the TS1-1 transect. Soils are loose and friable near bases of shrubs, soil cracks observed as a result of ephemeral saturation.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-1 transect	0642316

Photo No.	Date:
3	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 2 within the TS1-1 transect. Soils are loose and friable near bases of shrubs, soil cracks observed as a result of ephemeral saturation.



Photo No.	Date:
4	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 3 within the TS1-1 transect. Soils are most friable near bases of shrubs but expand in some area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-1 transect	0642316

Photo No.	Date:
5	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 4 within the TS1-1 transect. Soils are loose and friable near bases of shrubs, soil cracks observed as a result of ephemeral saturation.



Photo No.	Date:
6	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 5 within the TS1-1 transect. Soils are most friable near bases of shrubs, soil cracks observed as a result of ephemeral saturation. Evidence of bio-crusts shown in right of image near shrub base.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-1 transect	0642316

Photo No.	Date:
7	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 6 within the TS1-1 transect. Soils are most friable near bases of shrubs. Wildlife paths with relatively more compacted soils cross the landscape.



Photo No.	Date:
8	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 7 within the TS1-1 transect. Soils are loose and friable near bases of shrubs. Some evidence of ephemeral pooling in top-left of image.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-1 transect	0642316

Photo No.	Date:
9	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 8 within the TS1-1 transect. Soils are most friable near bases of shrubs. Wildlife paths with relatively more compacted soils cross the landscape.



Photo No.	Date:
10	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 9 within the TS1-1 transect. Soils are loose and friable near bases of shrubs. Wildlife paths with relatively more compacted soils cross the landscape.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-1 transect	0642316

Photo No.	Date:
11	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 10 within the TS1-1 transect. Soils are most friable near bases of shrubs. Large bunches of shrubs often results in larger areas of loose, friable soil.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-2 transect	0642316

Photo No.	Date:
12	5/3/2022

Direction Photo Taken:
South

Description:
Overview of the TS1-1 transect. Increasing amounts of open bare soils were observed as transects neared playa habitats.



Photo No.	Date:
13	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 1 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-2 transect	0642316

Photo No.	Date:
14	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 2 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat.



Photo No.	Date:
15	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 3 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-2 transect	0642316

Photo No.	Date:
16	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 4 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat.



Photo No.	Date:
17	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 5 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-2 transect	0642316

Photo No.	Date:
18	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 6 within the TS1-2 transect. Soil cracks ephemeral saturation and powdery, windblow salt deposits (top-left in image) were adjacent to the transect but these salt deposits were rare in the surrounding habitat.



Photo No.	Date:
19	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 7 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-2 transect	0642316

Photo No.	Date:
20	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 8 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat. Minor salt layers noted in top-left of image.



Photo No.	Date:
21	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 9 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS1-2 transect	0642316

Photo No.	Date:
22	5/3/2022

Direction Photo Taken:
South

Description:
Close view of trap 10 within the TS1-2 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transition zone between greasewood flat and playa-type habitat.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-1 transect	0642316

Photo No.	Date:
23	5/3/2022

Direction Photo Taken:
Southwest

Description:
Overview of the TS2-1 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



Photo No.	Date:
24	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 1 within the TS2-1 transect. Soil cracks and thin salt layer evidence of ephemeral saturation. Friable soils near shrub bases. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-1 transect	0642316

Photo No.	Date:
25	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 2 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



Photo No.	Date:
26	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 3 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-1 transect	0642316

Photo No.	Date:
27	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 4 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



Photo No.	Date:
28	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 5 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-1 transect	0642316

Photo No.	Date:
29	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 6 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



Photo No.	Date:
30	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 7 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-1 transect	0642316

Photo No.	Date:
31	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 8 within the TS2-1 transect. Soil cracks and less distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



Photo No.	Date:
32	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 9 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover. Gravel overlay significant in some areas of the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-1 transect	0642316

Photo No.	Date:
33	5/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 10 within the TS2-1 transect. Soil cracks and a more distinct salt layer. Habitat within a transitional zone displaying greater playa-type characteristics but with significant greasewood cover.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-2 transect	0642316

Photo No.	Date:
34	5/3/2022

Direction Photo Taken:
Northeast

Description:
Overview of the TS2-2 transect. Transitional habitat between playa and greasewood flats. While the higher salt concentrations are indicative of playa there is still a significant coverage of vegetation.



Photo No.	Date:
35	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 1 within the TS2-2 transect. Areas of friable soils intermingle with locations of deep salt crusts.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-2 transect	0642316

Photo No.	Date:
36	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 2 within the TS2-2 transect. Areas of friable soils intermingle with locations of deep salt crusts.



Photo No.	Date:
37	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 3 within the TS2-2 transect. Friable soils concentrated near shrub bases, salt crusts and bare soils dominate in areas between shrub stands.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-2 transect	0642316

Photo No.	Date:
38	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 4 within the TS2-2 transect. Loose soils are mostly concentrated in areas with lots of vegetation.



Photo No.	Date:
39	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 5 within the TS2-2 transect. Friable soils concentrated near shrub bases, salt crusts and bare soils dominate in areas between shrub stands. Light windblown salt was observed on top of a harder salt crust.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-2 transect	0642316

Photo No.	Date:
40	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 6 within the TS2-2 transect. More expansive playa depressions with thin salt crusts.



Photo No.	Date:
41	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 7 within the TS2-2 transect. More expansive playa depressions with thin salt crusts.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-2 transect	0642316

Photo No.	Date:
42	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 8 within the TS2-2 transect. Soil cracks evidence of ephemeral saturation. Light salt crusts in some areas within the transect.



Photo No.	Date:
43	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 9 within the TS2-2 transect. More expansive playa depressions with thin salt crusts.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-2 transect	0642316

Photo No.	Date:
44	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 10 within the TS2-2 transect. Soil cracks evidence of ephemeral saturation. Light salt crusts in some areas within the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-3 transect	0642316

Photo No.	Date:
45	5/3/2022

Direction Photo Taken:
Northeast

Description:
Overview of the TS2-3 transect. Transitional habitat between playa and greasewood flats. While the higher salt concentrations are indicative of playa there is still a significant coverage of vegetation.



Photo No.	Date:
46	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 1 within the TS2-3 transect. Some accumulations of windblown salt deposits rest on top of developed salt crusts. Soil cracks show evidence of ephemeral saturation.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-3 transect	0642316

Photo No.	Date:
47	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 2 within the TS2-3 transect. Some accumulations of windblown salt deposits rest on top of developed salt crusts. Soil cracks show evidence of ephemeral saturation. Some loose sandy soils appear throughout this transect.



Photo No.	Date:
48	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 3 within the TS2-3 transect. Soil cracks show evidence of ephemeral saturation. Herbaceous grasses noted in the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-3 transect	0642316

Photo No.	Date:
49	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 4 within the TS2-3 transect. Some accumulations of windblown salt deposits rest on top of developed salt crusts and areas of loose soils.



Photo No.	Date:
50	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 5 within the TS2-3 transect. Thicker, more developed salt crusts, characteristic of playa habitat, begins to become more pronounced.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-3 transect	0642316

Photo No.	Date:
51	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 6 within the TS2-3 transect. Thicker, more developed salt crusts, characteristic of playa habitat, begins to become more pronounced.



Photo No.	Date:
52	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 7 within the TS2-3 transect. Thicker, more developed salt crusts, characteristic of playa habitat, begins to become more pronounced.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-3 transect	0642316

Photo No.	Date:
53	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 8 within the TS2-3 transect. Looser soils begin to occur in areas between shrubs.



Photo No.	Date:
54	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 9 within the TS2-3 transect. Looser soils begin to occur in areas between shrubs. Herbaceous grasses were locally dominate for some trap locations.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS2-3 transect	0642316

Photo No.	Date:
55	5/3/2022

Direction Photo Taken:
West

Description:
Close view of trap 10 within the TS2-3 transect. Looser soils begin to occur in areas between shrubs.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-1 transect	0642316

Photo No.	Date:
56	5/3/2022

Direction Photo Taken:
North

Description:
Overview of the TS2-3 transect. Transect is affected by anthropogenic sources (construction equipment staged in the top-left of image.



Photo No.	Date:
57	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 1 within the TS3-1 transect. Increasing amounts of cheatgrass have established populations throughout the area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-1 transect	0642316

Photo No.	Date:
58	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 2 within the TS3-1 transect. Game trails were noted with ungulate tracks. Cheatgrass still dominates ground cover.

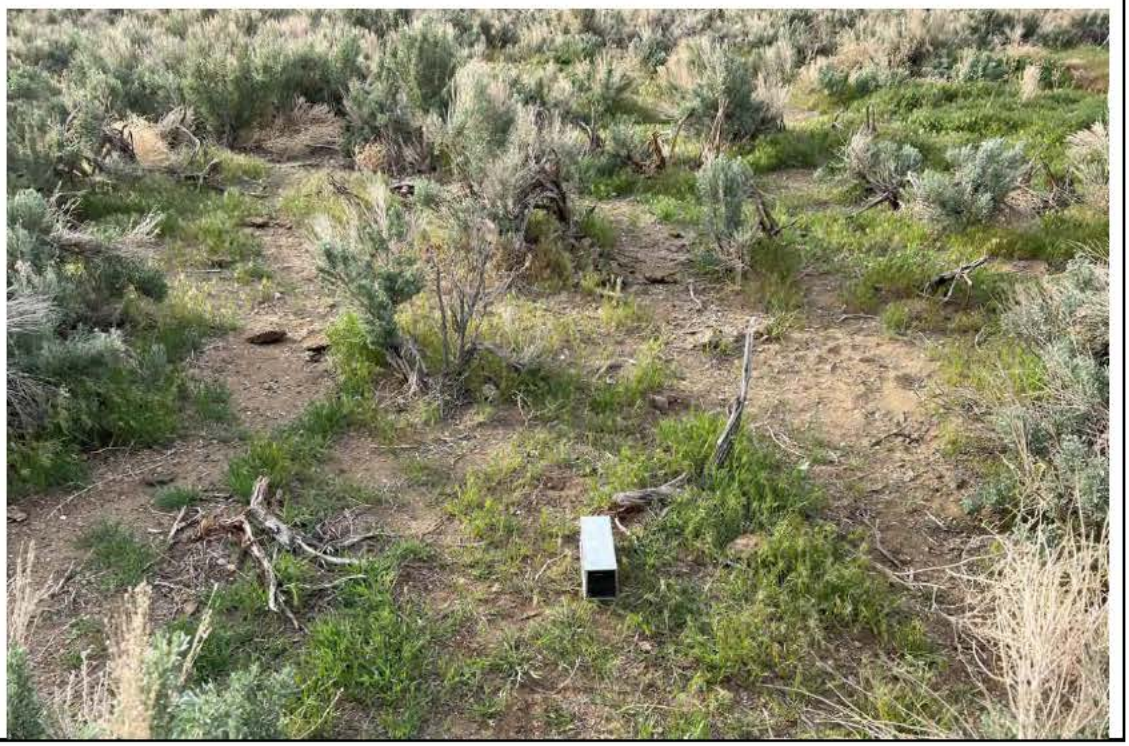


Photo No.	Date:
59	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 3 within the TS3-1 transect. Game trails were noted with ungulate tracks. Cheatgrass still dominates ground cover.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-1 transect	0642316

Photo No.	Date:
60	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 4 within the TS3-1 transect. Game trails were noted with ungulate tracks. Cheatgrass still dominates ground cover.



Photo No.	Date:
61	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 5 within the TS3-1 transect. Cheatgrass dominates ground cover. Bare sandy soils are almost non-existent for a large portion of the landscape.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-1 transect	0642316

Photo No.	Date:
62	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 6 within the TS3-1 transect. Cheatgrass dominates ground cover. Bare sandy soils are almost non-existent for a large portion of the landscape



Photo No.	Date:
63	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 7 within the TS3-1 transect. Cheatgrass dominates ground cover. Bare sandy soils are almost non-existent for a large portion of the landscape



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-1 transect	0642316

Photo No.	Date:
64	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 8 within the TS3-1 transect. Cheatgrass dominates ground cover. Bare sandy soils are almost non-existent for a large portion of the landscape. A field of thistle located south of the transect.



Photo No.	Date:
65	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 9 within the TS3-1 transect. Cheatgrass population are lower but cattle tracks were noted in the southern portions of the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-1 transect	0642316

Photo No.	Date:
66	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 10 within the TS3-1 transect. A ditch was created just north of trap 10 for a water pipe. The ditch remains open and contains loose sandy soils.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-2 transect	0642316

Photo No.	Date:
67	5/3/2022

Direction Photo Taken:
North

Description:
Overview of the TS3-2 transect. Barren land dominated this trap site with saltgrass and *Poa* species covering the majority of soils.



Photo No.	Date:
68	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 1 within the TS3-2 transect. Cattle activity noted in the area. Soils were significantly vegetated, stabilizing sandy soils. Cattle trails can be seen in the right of the image.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-2 transect	0642316

Photo No.	Date:
69	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 2 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer.



Photo No.	Date:
70	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 3 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-2 transect	0642316

Photo No.	Date:
71	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 4 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer. Cattle tracks can be seen in the top-right of image.



Photo No.	Date:
72	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 5 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer. Cattle tracks can be seen in the right of image.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-2 transect	0642316

Photo No.	Date:
73	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 6 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer.



Photo No.	Date:
74	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 7 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-2 transect	0642316

Photo No.	Date:
75	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 8 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer. Cattle trail evident.



Photo No.	Date:
76	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 9 within the TS3-2 transect. Sparse greasewood shrubs interrupt the herbaceous layer. Cattle trail evident.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-2 transect	0642316

Photo No.	Date:
77	5/3/2022

Direction Photo Taken:
North

Description:
Close view of trap 10 within the TS3-2 transect. Increasing amounts of greasewood towards the northern boundary of the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-3 transect	0642316

Photo No.	Date:
78	5/4/2022

Direction Photo Taken:
Northwest

Description:
Overview of the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



Photo No.	Date:
79	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 1 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-3 transect	0642316

Photo No.	Date:
80	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 2 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



Photo No.	Date:
81	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 3 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-3 transect	0642316

Photo No.	Date:
82	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 4 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed. Loose soils are located close to the bases of shrubs.



Photo No.	Date:
83	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 5 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed. Loose soils are located close to the bases of shrubs.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-3 transect	0642316

Photo No.	Date:
84	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 6 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed. Loose soils are located close to the bases of shrubs.



Photo No.	Date:
85	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 7 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed. Loose soils are located close to the bases of shrubs.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-3 transect	0642316

Photo No.	Date:
86	5/3/2022

Direction Photo Taken:
Northwest

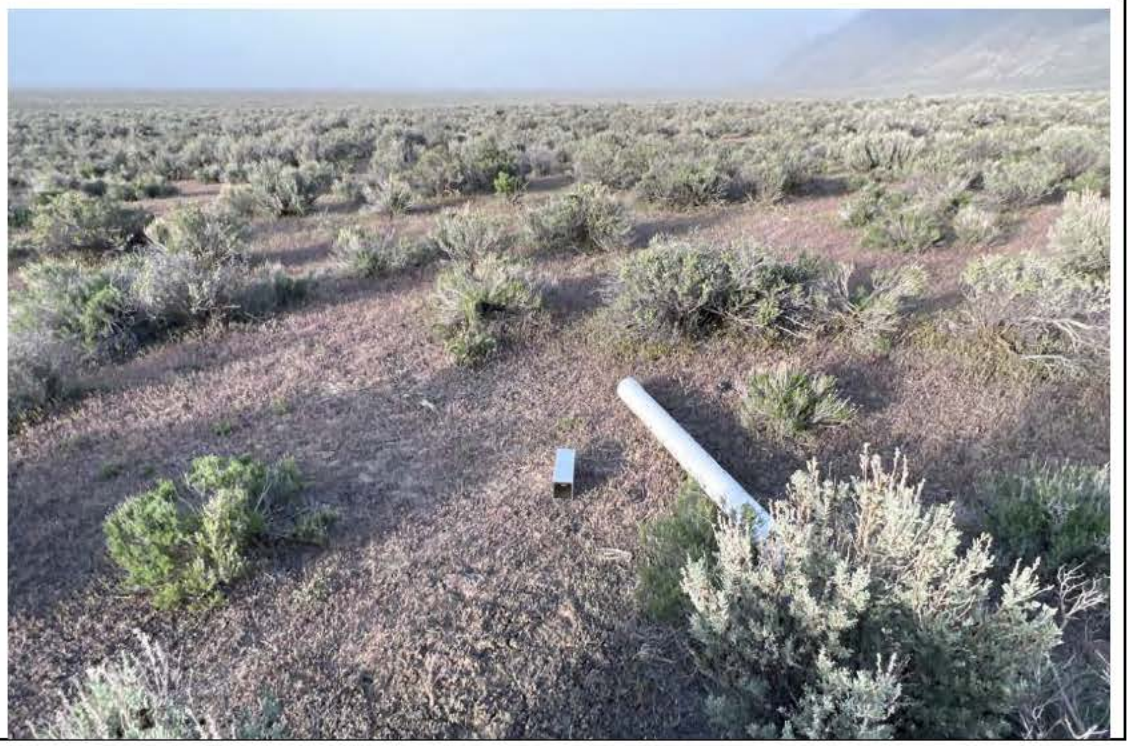
Description:
Close view of trap 8 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed. Loose soils are located close to the bases of shrubs.



Photo No.	Date:
87	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 9 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed. Loose soils are located close to the bases of shrubs.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-3 transect	0642316

Photo No.	Date:
88	5/3/2022

Direction Photo Taken:
Northwest

Description:
Close view of trap 10 within the TS3-3 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed. Loose soils are located close to the bases of shrubs.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-4 transect	0642316

Photo No.	Date:
89	5/3/2022

Direction Photo Taken:
Southeast

Description:
Overview of the TS3-4 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



Photo No.	Date:
90	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 1 within the TS3-4 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-4 transect	0642316

Photo No.	Date:
91	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 2 within the TS3-4 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



Photo No.	Date:
92	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 3 within the TS3-4 transect. Sagebrush is sparser in some areas of the transect but this open space is dominated by desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-4 transect	0642316

Photo No.	Date:
93	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 4 within the TS3-4 transect. Sagebrush is sparser in some areas of the transect but this open space is dominated by desiccated cheatgrass and clasping pepperweed.



Photo No.	Date:
94	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 5 within the TS3-4 transect. Sagebrush is sparser in some areas of the transect but this open space is dominated by desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-4 transect	0642316

Photo No.	Date:
95	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 6 within the TS3-4 transect. Sagebrush is sparser in some areas of the transect but this open space is dominated by desiccated cheatgrass and clasping pepperweed.



Photo No.	Date:
96	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 7 within the TS3-4 transect. Sagebrush is sparser in some areas of the transect but this open space is dominated by desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-4 transect	0642316

Photo No.	Date:
97	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 8 within the TS3-4 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



Photo No.	Date:
98	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 9 within the TS3-4 transect. Sagebrush dominates the landscape with sandy/gravelly soils covered with desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-4 transect	0642316

Photo No.	Date:
99	5/3/2022

Direction Photo Taken:
Southeast

Description:
Close view of trap 10 within the TS3-4 transect. Sagebrush is sparser in some areas of the transect but this open space is dominated by desiccated cheatgrass and clasping pepperweed.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-5 transect	0642316

Photo No.	Date:
100	5/3/2022

Direction Photo Taken:
Northeast

Description:
Overview of the TS3-5 transect. Greasewood and shadscale dominate the shrub community.



Photo No.	Date:
101	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 1 within the TS3-5 transect. Black greasewood, shadscale, with some sagebrush and rabbitbrush in some areas of the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-5 transect	0642316

Photo No.	Date:
102	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 2 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Great Basin wild rye, bottlebrush squirreltail, and Indian ricegrass was spares throughout the transect.



Photo No.	Date:
103	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 3 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Great Basin wild rye, bottlebrush squirreltail, and Indian ricegrass was spares throughout the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-5 transect	0642316

Photo No.	Date:
104	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 4 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Great Basin wild rye, bottlebrush squirreltail, and Indian ricegrass was spares throughout the transect.



Photo No.	Date:
105	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 5 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Some areas of the trap site contained more loose soils where cheatgrass and/or clasping pepperweed had not yet covered.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-5 transect	0642316

Photo No.	Date:
106	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 6 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Some areas of the trap site contained more loose soils where cheatgrass and/or clasping pepperweed had not yet covered.



Photo No.	Date:
107	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 7 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Great Basin wild rye, bottlebrush squirreltail, and Indian ricegrass was spares throughout the transect. Sand banks are not present.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-5 transect	0642316

Photo No.	Date:
108	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 8 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Great Basin wild rye, bottlebrush squirreltail, and Indian ricegrass was spares throughout the transect.



Photo No.	Date:
109	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 9 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Great Basin wild rye, bottlebrush squirreltail, and Indian ricegrass was spares throughout the transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	TS3-5 transect	0642316

Photo No.	Date:
110	5/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 10 within the TS3-5 transect. Open areas within the transect were dominated by desiccated cheatgrass and clasping pepperweed. Great Basin wild rye, bottlebrush squirelltail, and Indian ricegrass was spares throughout the transect.



APPENDIX C
SHREWS DATA

C-1. Detailed Shrew Trapping Survey Results

C-2. Photographic Log

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C.1. Detailed Shrew Trapping Survey Results

Table C.1-1: Site Descriptions

Trap Location	Set Date	Set Time	Remove Date	Remove Time	Surveyor 1	Surveyor 2	Temperature (°F)	Precipitation Type	Wind Speed	Cloud Cover (%)	Total Traps Deployed	Setup Design	Habitat Type	Water Type	Mesic Vegetation Species	Estimated mesic vegetation width (m)	Estimated water width (m)	Upland Vegetation Species	Disturbances Observed								Notes, Comments
																			Springhead Modification	Ungulate Use	Off-trail OHV Use	Wildfire	Human Disturbance	Oil, Gas, Mineral, Geothermal	Aquatic Invasive Spp.	Riparian Invasive Spp.	Drought	
CA01_SH	6/3/2022	18:55	6/7/2022	06:25	SeanBasilio	DanRobison	78	None	Calm	75-100	10	Parallel	Riparian Corridor	Perennial	Sedge	3	2	Sagebrush	n/a	No	No	No	No	No	No	Yes	Yes	The stream is mostly dry with a few areas of standing water. Canada thistle within immediate area.
CA02_SH	6/3/2022	17:36	6/7/2022	05:36	SeanBasilio	DanRobison	81	None	Calm	25-50	10	Linear	Riparian Corridor	Perennial	Watercress	7	3.5	Sagebrush	Yes	Yes	No	No	Yes	No	No	Yes	No	Cow droppings, trails observed. Water originates at pipe, modifying the springhead. Human disturbance includes water pipe, low-head dam, and fencing near the trap site. Canada thistle, whitetop, scotch thistle, and Russian knapweed within immediate area.
CA03_SH_Alt	6/3/2022	17:14	6/7/2022	05:36	SeanBasilio	DanRobison	81	None	Calm	25-50	10	Parallel	Wet Meadow	Perennial	Rush	45	22	Sagebrush	n/a	Yes	No	No	Yes	No	No	Yes	Yes	Cow droppings, trails observed. Fencing around the immediate area observed. Canada thistle, scotch thistle, Russian knapweed within immediate area. The water level appears low, desiccating mudflats surround bulrush / cattail stands.
CA05_SH_Alt	6/3/2022	17:00	6/7/2022	05:36	SeanBasilio	DanRobison	81	None	Calm	25-50	10	Parallel	Riparian Corridor	Ephemeral	Rush	7	0	Rabbitbrush	n/a	Yes	No	No	Yes	No	No	Yes	Yes	Cow droppings, trails observed. Broken down wood bridges, and irrigation pipes observed. Canada thistle and Russian knapweed within immediate area. Water level appears low, dessiccating mudflats surround bulrush / cattail stands.
CA06_SH	6/3/2022	18:18	6/7/2022	06:09	SeanBasilio	DanRobison	81	None	Light	25-50	10	Parallel	Wet Meadow	Perennial	Reed	7	3	Sagebrush	n/a	Yes	No	No	Yes	No	No	Yes	Yes	Cattle tracks observed. Chain fencing and railroad tracks are 25 meters away from trap location. Canada thistle within immediate area.
CA07_SH	6/3/2022	18:28	6/7/2022	06:08	SeanBasilio	DanRobison	79	None	Moderate	75-100	10	Parallel	Wet Meadow	Perennial	Reed	15	3	Sagebrush	n/a	Yes	No	No	Yes	No	No	Yes	Yes	Cattle tracks observed. Train tracks are 15 meters away from trap location. Canada thistle within immediate area.
CV01_SH	5/24/2022	18:25	5/28/2022	05:19	SeanBasilio	DanRobison	74	None	Light	0-25	10	Parallel	Spring Source	Perennial	Sedge	5	0	Rabbitbrush	n/a	Yes	No	No	No	No	No	No	Yes	Cattle droppings observed
CV02_SH	5/24/2022	19:26	5/28/2022	06:03	SeanBasilio	DanRobison	72	None	Light	0-25	10	Linear	Riparian Corridor	Perennial	Reed	10	5	Greasewood	n/a	Yes	No	No	No	No	No	No	Yes	Cow droppings, trails observed.
CV03_SH	5/24/2022	19:46	5/28/2022	06:12	SeanBasilio	DanRobison	72	None	Calm	0-25	10	Linear	Riparian Corridor	Perennial	Reed	8	5	Greasewood	n/a	Yes	No	No	No	No	No	No	Yes	Cow droppings, trails observed.
CV04_SH	5/24/2022	19:44	5/28/2022	06:38	AustinLinville	MichaelRobison	67	None	Calm	0-25	10	Parallel	Spring Source	Perennial	Rush	10.5	0	Rabbitbrush, Sagebrush	No	Yes	No	No	Yes	No	No	No	Yes	Cow droppings, trails observed. Two posts and spare barbed wires coiled in northwest portion of spring. The spring area resembles a wet meadow, soils are saturated.
CV05_SH	5/24/2022	20:24	5/28/2022	06:30	SeanBasilio	DanRobison	67	None	Calm	0-25	10	Parallel	Spring Source	Perennial	Rush	10	0	Rabbitbrush, Sagebrush	No	Yes	No	No	No	No	No	No	Yes	Cow droppings, trails observed. The spring area resembles a wet meadow, soils are saturated.
CV06_SH	5/24/2022	19:03	5/28/2022	06:05	AustinLinville	MichaelRobison	75	None	Light	0-25	10	Parallel	Riparian Corridor	Perennial	Rush	2	75	Rabbitbrush	n/a	Yes	No	No	Yes	Yes	Yes	No	Yes	Cow droppings, trails observed. The waterbody appears artificial. Within Cortez PoO boundary. Dense cattail (*Typha*) stands in waterbody.
CV07_SH	5/24/2022	18:47	5/28/2022	05:56	AustinLinville	MichaelRobison	77	None	Light	0-25	10	Parallel	Riparian Corridor	Perennial	Other	4	16	Greasewood	n/a	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Cow droppings, trails observed. The waterbody is likely artificial. Salt cedar observed on western shoreline of waterbody. Within Cortez Plan of Operations boundary. Cheatgrass and halogeton in understory.
CV08_SH	5/24/2022	18:06	5/28/2022	05:26	AustinLinville	MichaelRobison	77	None	Light	0-25	10	Parallel	Riparian Corridor	Ephemeral	Other	0	0	Sagebrush	n/a	Yes	No	No	Yes	No	No	No	Yes	Cow droppings, trails observed. The waterbody appears channelized with several large diameter above ground water pipes immediatly south of trapping location. There is gravel and sand piled up on banks. No water, no soil moisture, and no mesic vegetation. Vegetation along banks include: Russian thistle, big sagebrush, Western tansymustard, whitetop, cheatgrass.
CV09_SH	5/24/2022	17:36	5/28/2022	05:12	AustinLinville	MichaelRobison	76	None	Light	0-25	10	Parallel	Riparian Corridor	Perennial	Rush	4	6	Sagebrush	n/a	Yes	Yes	No	Yes	No	No	Yes	Yes	Cow droppings, trails observed. Shallow tire tracks on either side of waterbody observed. The water originates at cattle trough, and area is fenced in for cattle. Cheatgrass, and clasping pepperweed observed
CV10_SH	5/24/2022	18:48	5/28/2022	05:31	SeanBasilio	DanRobison	74	None	Light	0-25	10	Parallel	Spring Source	Perennial	Rush	3	1	Rabbitbrush	No	Yes	No	No	Yes	No	No	No	Yes	Cattle droppings observed. Old fence line observed near transect.
GS01_SH	6/3/2022	19:16	6/7/2022	05:16	AustinLinville	MichaelRobison	72	None	Calm	50-75	10	Parallel	Wet Meadow	Perennial	Rush	22	2	Sagebrush	n/a	No	No	No	Yes	Yes	No	Yes	Yes	Located within Goldstrike Plan of Operations. Haul roads surround the area, and an aboveground pipeline is directly south of the site. Cheatgrass within the immediate area.
GS02_SH	6/3/2022	17:28	6/7/2022	06:18	AustinLinville	MichaelRobison	72	None	Calm	0-25	10	Parallel	Riparian Corridor	Ephemeral	Other	1.5	0	Sagebrush	n/a	Yes	Yes	No	No	No	No	Yes	Yes	Cattle droppings observed. Established two-track immediately north of site. Cheatgrass, narrowleaf milkweed, common nettle along stream banks. The stream reach is dry, but has sparse moist spots in thalweg (deepest part of channel).
GS03_SH	6/3/2022	17:48	6/7/2022	06:23	AustinLinville	MichaelRobison	70	None	Calm	0-25	10	Parallel	Riparian Corridor	Perennial	Rush	0.5	0.75	Sagebrush	n/a	Yes	No	No	No	No	No	Yes	Yes	Cattle droppings observed. Cheatgrass within the immediate area.
GS04_SH	6/3/2022	18:18	6/7/2022	06:27	AustinLinville	MichaelRobison	70	None	Calm	0-25	10	Parallel	Riparian Corridor	Perennial	Rush	1.5	0.75	Sagebrush	n/a	Yes	Yes	No	No	No	No	Yes	Yes	Cattle droppings observed. Established two-track immediatly north of trap location. Cheatgrass within the immediate area.

Table C.1-2: Shrew Trapping and Capture Database

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CA01_SH	6/4/2022	10	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			yes	NA	Deer mouse			-116.1306831	40.7124479	11T 573428E 4507200N
CA01_SH	6/4/2022	9	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			yes	NA	Deer mouse			-116.1306554	40.71239646	11T 573430E 4507194N
CA01_SH	6/4/2022	8	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			no			Intact		-116.1305952	40.71232613	11T 573435E 4507186N
CA01_SH	6/4/2022	7	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			no			Intact		-116.1305382	40.7122637	11T 573440E 4507179N
CA01_SH	6/4/2022	6	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			no			Intact		-116.1305465	40.71218461	11T 573439E 4507171N
CA01_SH	6/4/2022	5	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			no			Intact		-116.1304874	40.71215615	11T 573444E 4507167N
CA01_SH	6/4/2022	4	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			yes	NA	Deer mouse			-116.1304431	40.71229618	11T 573448E 4507183N
CA01_SH	6/4/2022	3	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			yes	NA	Deer mouse			-116.1305207	40.71236692	11T 573441E 4507191N
CA01_SH	6/4/2022	2	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			no			Intact		-116.1306053	40.71242968	11T 573434E 4507198N
CA01_SH	6/4/2022	1	SeanBasilio	DanRobison	06:32	06:37	60	0	75-100%	None	no			no			Intact		-116.1306351	40.71247155	11T 573432E 4507202N
CA01_SH	6/5/2022	10	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.1306812	40.71244445	11T 573428E 4507199N
CA01_SH	6/5/2022	9	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	no			FalseClose		-116.1306427	40.71238901	11T 573431E 4507193N
CA01_SH	6/5/2022	8	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.130597	40.71232102	11T 573435E 4507186N
CA01_SH	6/5/2022	7	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	no			Intact		-116.130527	40.71225415	11T 573441E 4507178N
CA01_SH	6/5/2022	6	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1305422	40.71217469	11T 573440E 4507169N
CA01_SH	6/5/2022	5	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.1304725	40.71215518	11T 573446E 4507167N
CA01_SH	6/5/2022	4	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.1304377	40.71228242	11T 573449E 4507182N
CA01_SH	6/5/2022	3	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.1305217	40.71236837	11T 573441E 4507191N
CA01_SH	6/5/2022	2	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1305868	40.71242384	11T 573436E 4507197N
CA01_SH	6/5/2022	1	SeanBasilio	DanRobison	06:19	06:23	55	0	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1306258	40.71246774	11T 573432E 4507202N
CA01_SH	6/6/2022	10	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			yes	NA	Deer mouse			-116.1306834	40.712448	11T 573428E 4507200N
CA01_SH	6/6/2022	9	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			yes	NA	Deer mouse			-116.130637	40.71240142	11T 573432E 4507195N
CA01_SH	6/6/2022	8	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			yes	NA	Deer mouse			-116.1305829	40.71232888	11T 573436E 4507187N
CA01_SH	6/6/2022	7	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			no			Intact		-116.1305284	40.71225902	11T 573441E 4507179N
CA01_SH	6/6/2022	6	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			no			Intact		-116.1305294	40.71217065	11T 573441E 4507169N
CA01_SH	6/6/2022	5	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			yes	NA	Deer mouse			-116.1304766	40.71215294	11T 573445E 4507167N
CA01_SH	6/6/2022	4	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			yes	NA	Deer mouse			-116.1304417	40.71227818	11T 573448E 4507181N
CA01_SH	6/6/2022	3	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			yes	NA	Deer mouse			-116.1305163	40.71237452	11T 573442E 4507192N
CA01_SH	6/6/2022	2	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			no			Intact		-116.1305848	40.71242335	11T 573436E 4507197N
CA01_SH	6/6/2022	1	SeanBasilio	DanRobison	06:15	06:18	51	1	0-25%	None	no			no			Intact		-116.130634	40.71246934	11T 573432E 4507202N
CA01_SH	6/7/2022	10	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			yes	NA	Deer mouse			-116.1306684	40.71245827	11T 573429E 4507201N
CA01_SH	6/7/2022	9	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			yes	NA	Deer mouse			-116.1306404	40.7124016	11T 573431E 4507195N
CA01_SH	6/7/2022	8	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			yes	NA	Deer mouse			-116.1305853	40.7123118	11T 573436E 4507185N
CA01_SH	6/7/2022	7	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			no			Intact		-116.130521	40.71224484	11T 573442E 4507177N
CA01_SH	6/7/2022	6	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			no			Intact		-116.1305314	40.71216985	11T 573441E 4507169N
CA01_SH	6/7/2022	5	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			yes	NA	Deer mouse			-116.1304767	40.71215342	11T 573445E 4507167N
CA01_SH	6/7/2022	4	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			yes	NA	Deer mouse			-116.1304241	40.71226644	11T 573450E 4507180N
CA01_SH	6/7/2022	3	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			yes	NA	Deer mouse			-116.1305098	40.7123666	11T 573442E 4507191N
CA01_SH	6/7/2022	2	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			no			Intact		-116.1305943	40.71242516	11T 573435E 4507197N
CA01_SH	6/7/2022	1	SeanBasilio	DanRobison	06:23	06:25	46	0	0-25%	None	no			no			Intact		-116.1306323	40.71246679	11T 573432E 4507202N
CA02_SH	6/4/2022	1	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1543273	40.68426274	11T 571461E 4504051N
CA02_SH	6/4/2022	2	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1542921	40.68422631	11T 571464E 4504047N
CA02_SH	6/4/2022	3	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1542678	40.68418097	11T 571466E 4504042N
CA02_SH	6/4/2022	4	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1542298	40.68411673	11T 571469E 4504035N
CA02_SH	6/4/2022	5	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1541826	40.68408929	11T 571473E 4504032N
CA02_SH	6/4/2022	6	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1541318	40.68405238	11T 571477E 4504028N
CA02_SH	6/4/2022	7	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.154105	40.68401099	11T 571480E 4504024N
CA02_SH	6/4/2022	8	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1540966	40.68391958	11T 571480E 4504014N
CA02_SH	6/4/2022	9	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1540433	40.68385048	11T 571485E 4504006N
CA02_SH	6/4/2022	10	SeanBasilio	DanRobison	05:24	05:27	62	0	75-100%	None	no			no			Intact		-116.1539917	40.68380166	11T 571489E 4504001N
CA02_SH	6/5/2022	1	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1543243	40.68425007	11T 571461E 4504050N
CA02_SH	6/5/2022	2	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.15429	40.68421552	11T 571464E 4504046N
CA02_SH	6/5/2022	3	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1542769	40.68416287	11T 571465E 4504040N
CA02_SH	6/5/2022	4	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1542357	40.68410324	11T 571468E 4504034N
CA02_SH	6/5/2022	5	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1541929	40.68407497	11T 571472E 4504031N
CA02_SH	6/5/2022	6	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.154148	40.68404075	11T 571476E 4504027N
CA02_SH	6/5/2022	7	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1541	40.68400506	11T 571480E 4504023N
CA02_SH	6/5/2022	8	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1541047	40.68390757	11T 571480E 4504012N
CA02_SH	6/5/2022	9	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1540397	40.68384401	11T 571485E 4504005N
CA02_SH	6/5/2022	10	SeanBasilio	DanRobison	05:20	05:25	52	1	75-100%	None	yes	Rain	0.01in	no			Intact		-116.1539909	40.68379417	11T 571490E 4504000N
CA02_SH	6/6/2022	1	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1543254	40.68426539	11T 571461E 4504052N
CA02_SH	6/6/2022	2	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1543013	40.68420512	11T 571463E 4504045N
CA02_SH	6/6/2022	3	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1542823	40.68415853	11T 571464E 4504040N
CA02_SH	6/6/2022	4	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.154248	40.68411156	11T 571467E 4504035N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CA02_SH	6/6/2022	5	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1541956	40.68408048	11T 571472E 4504031N
CA02_SH	6/6/2022	6	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1541478	40.68404344	11T 571476E 4504027N
CA02_SH	6/6/2022	7	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1541164	40.68400664	11T 571479E 4504023N
CA02_SH	6/6/2022	8	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1541017	40.68390415	11T 571480E 4504012N
CA02_SH	6/6/2022	9	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.154035	40.68383411	11T 571486E 4504004N
CA02_SH	6/6/2022	10	SeanBasilio	DanRobison	05:15	05:18	49	1	0-25%	None	no			no			Intact		-116.1539882	40.68379683	11T 571490E 4504000N
CA02_SH	6/7/2022	1	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			FalseClose		-116.1543207	40.68420983	11T 571461E 4504046N
CA02_SH	6/7/2022	2	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1542922	40.6841948	11T 571464E 4504044N
CA02_SH	6/7/2022	3	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.154279	40.68414297	11T 571465E 4504038N
CA02_SH	6/7/2022	4	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1542372	40.68410642	11T 571468E 4504034N
CA02_SH	6/7/2022	5	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1541842	40.68406281	11T 571473E 4504029N
CA02_SH	6/7/2022	6	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1541382	40.68402266	11T 571477E 4504025N
CA02_SH	6/7/2022	7	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1541048	40.68398678	11T 571480E 4504021N
CA02_SH	6/7/2022	8	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1540793	40.68388968	11T 571482E 4504010N
CA02_SH	6/7/2022	9	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1539815	40.68378344	11T 571490E 4503999N
CA02_SH	6/7/2022	10	SeanBasilio	DanRobison	05:14	05:17	45	1	0-25%	None	no			no			Intact		-116.1539713	40.68377683	11T 571491E 4503998N
CA03_SH_Alt	6/4/2022	1	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1519188	40.68204875	11T 571666E 4503808N
CA03_SH_Alt	6/4/2022	2	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1518878	40.6821049	11T 571669E 4503814N
CA03_SH_Alt	6/4/2022	3	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.151868	40.68215939	11T 571671E 4503820N
CA03_SH_Alt	6/4/2022	4	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1518431	40.68220534	11T 571673E 4503825N
CA03_SH_Alt	6/4/2022	5	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1517999	40.6822796	11T 571676E 4503833N
CA03_SH_Alt	6/4/2022	6	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1517323	40.68225014	11T 571682E 4503830N
CA03_SH_Alt	6/4/2022	7	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			FalseClose		-116.1517529	40.68218349	11T 571680E 4503823N
CA03_SH_Alt	6/4/2022	8	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1517728	40.68212815	11T 571679E 4503817N
CA03_SH_Alt	6/4/2022	9	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1518128	40.68208417	11T 571675E 4503812N
CA03_SH_Alt	6/4/2022	10	SeanBasilio	DanRobison	05:40	05:45	60	0	75-100%	None	no			no			Intact		-116.1518536	40.68203699	11T 571672E 4503806N
CA03_SH_Alt	6/5/2022	5	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517837	40.6822756	11T 571678E 4503833N
CA03_SH_Alt	6/5/2022	4	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.151824	40.68221022	11T 571674E 4503826N
CA03_SH_Alt	6/5/2022	3	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1518448	40.68215846	11T 571673E 4503820N
CA03_SH_Alt	6/5/2022	2	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1518725	40.68210814	11T 571670E 4503814N
CA03_SH_Alt	6/5/2022	1	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1519083	40.68205808	11T 571667E 4503809N
CA03_SH_Alt	6/5/2022	10	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1518374	40.68202779	11T 571673E 4503805N
CA03_SH_Alt	6/5/2022	9	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517938	40.68209075	11T 571677E 4503812N
CA03_SH_Alt	6/5/2022	8	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517567	40.68213361	11T 571680E 4503817N
CA03_SH_Alt	6/5/2022	7	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517133	40.68220185	11T 571684E 4503825N
CA03_SH_Alt	6/5/2022	6	SeanBasilio	DanRobison	05:33	05:36	52	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517008	40.68226016	11T 571685E 4503831N
CA03_SH_Alt	6/6/2022	1	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1519012	40.68205458	11T 571668E 4503808N
CA03_SH_Alt	6/6/2022	2	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.151871	40.68210861	11T 571670E 4503814N
CA03_SH_Alt	6/6/2022	3	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.151847	40.6821599	11T 571672E 4503820N
CA03_SH_Alt	6/6/2022	4	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1518193	40.68221905	11T 571675E 4503827N
CA03_SH_Alt	6/6/2022	5	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1517799	40.68229192	11T 571678E 4503835N
CA03_SH_Alt	6/6/2022	6	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1517126	40.68224903	11T 571684E 4503830N
CA03_SH_Alt	6/6/2022	7	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1517365	40.68218241	11T 571682E 4503823N
CA03_SH_Alt	6/6/2022	8	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1517759	40.68212206	11T 571678E 4503816N
CA03_SH_Alt	6/6/2022	9	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1518087	40.6820719	11T 571676E 4503810N
CA03_SH_Alt	6/6/2022	10	SeanBasilio	DanRobison	05:26	05:29	59	1	0-25%	None	no			no			Intact		-116.1518525	40.68201981	11T 571672E 4503805N
CA03_SH_Alt	6/7/2022	1	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			FalseClose		-116.1519019	40.68204007	11T 571668E 4503807N
CA03_SH_Alt	6/7/2022	2	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1518681	40.68209716	11T 571671E 4503813N
CA03_SH_Alt	6/7/2022	3	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1518367	40.68214321	11T 571673E 4503818N
CA03_SH_Alt	6/7/2022	4	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1518079	40.68219994	11T 571676E 4503825N
CA03_SH_Alt	6/7/2022	5	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1517743	40.68227232	11T 571678E 4503833N
CA03_SH_Alt	6/7/2022	6	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1517049	40.68225224	11T 571684E 4503830N
CA03_SH_Alt	6/7/2022	7	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1517319	40.68218266	11T 571682E 4503823N
CA03_SH_Alt	6/7/2022	8	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1517698	40.68211748	11T 571679E 4503815N
CA03_SH_Alt	6/7/2022	9	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1517991	40.68206932	11T 571677E 4503810N
CA03_SH_Alt	6/7/2022	10	SeanBasilio	DanRobison	05:32	05:36	45	1	0-25%	None	no			no			Intact		-116.1518323	40.68200835	11T 571674E 4503803N
CA05_SH_Alt	6/4/2022	1	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			Intact		-116.1520154	40.68273665	11T 571658E 4503884N
CA05_SH_Alt	6/4/2022	2	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			Intact		-116.1519364	40.6827111	11T 571664E 4503881N
CA05_SH_Alt	6/4/2022	3	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			Intact		-116.151858	40.68269062	11T 571671E 4503879N
CA05_SH_Alt	6/4/2022	4	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			Intact		-116.1517799	40.68265057	11T 571678E 4503875N
CA05_SH_Alt	6/4/2022	5	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			Intact		-116.1517183	40.68262071	11T 571683E 4503871N
CA05_SH_Alt	6/4/2022	6	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			FalseClose		-116.1517743	40.68253724	11T 571678E 4503862N
CA05_SH_Alt	6/4/2022	7	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			FalseClose		-116.1518498	40.68258536	11T 571672E 4503867N
CA05_SH_Alt	6/4/2022	8	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			FalseClose		-116.1519164	40.68262259	11T 571666E 4503871N
CA05_SH_Alt	6/4/2022	9	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			FalseClose		-116.1519829	40.68266232	11T 571660E 4503876N
CA05_SH_Alt	6/4/2022	10	SeanBasilio	DanRobison	05:35	05:39	60	0	75-100%	None	no			no			FalseClose		-116.1520357	40.68268982	11T 571656E 4503879N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CA05_SH_Alt	6/5/2022	1	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	yes	NA	Deer mouse			-116.1520273	40.68273553	11T 571657E 4503884N
CA05_SH_Alt	6/5/2022	2	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1519321	40.6827104	11T 571665E 4503881N
CA05_SH_Alt	6/5/2022	3	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1518529	40.68268939	11T 571671E 4503879N
CA05_SH_Alt	6/5/2022	4	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517802	40.68264717	11T 571678E 4503874N
CA05_SH_Alt	6/5/2022	5	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517052	40.68261887	11T 571684E 4503871N
CA05_SH_Alt	6/5/2022	6	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1517617	40.68254016	11T 571679E 4503862N
CA05_SH_Alt	6/5/2022	7	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1518359	40.68258418	11T 571673E 4503867N
CA05_SH_Alt	6/5/2022	8	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1519015	40.68262416	11T 571667E 4503872N
CA05_SH_Alt	6/5/2022	9	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1519711	40.6826657	11T 571661E 4503876N
CA05_SH_Alt	6/5/2022	10	SeanBasilio	DanRobison	05:30	05:33	52	1	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1520262	40.6826892	11T 571657E 4503879N
CA05_SH_Alt	6/6/2022	1	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1520281	40.68271968	11T 571657E 4503882N
CA05_SH_Alt	6/6/2022	2	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1519372	40.68270085	11T 571664E 4503880N
CA05_SH_Alt	6/6/2022	3	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1518551	40.68267686	11T 571671E 4503877N
CA05_SH_Alt	6/6/2022	4	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1517755	40.6826338	11T 571678E 4503873N
CA05_SH_Alt	6/6/2022	5	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1517159	40.68260955	11T 571683E 4503870N
CA05_SH_Alt	6/6/2022	6	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1517782	40.68252842	11T 571678E 4503861N
CA05_SH_Alt	6/6/2022	7	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1518456	40.6825742	11T 571672E 4503866N
CA05_SH_Alt	6/6/2022	8	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1519129	40.6826193	11T 571666E 4503871N
CA05_SH_Alt	6/6/2022	9	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1519779	40.68264829	11T 571661E 4503874N
CA05_SH_Alt	6/6/2022	10	SeanBasilio	DanRobison	05:23	05:26	49	1	0-25%	None	no			no			Intact		-116.1520303	40.6826841	11T 571656E 4503878N
CA05_SH_Alt	6/7/2022	1	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			yes	NA	Deer mouse			-116.1520074	40.68270959	11T 571658E 4503881N
CA05_SH_Alt	6/7/2022	2	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			no			Intact		-116.1519268	40.68270062	11T 571665E 4503880N
CA05_SH_Alt	6/7/2022	3	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			no			Intact		-116.1518523	40.68267754	11T 571671E 4503878N
CA05_SH_Alt	6/7/2022	4	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			no			Intact		-116.1517746	40.68263408	11T 571678E 4503873N
CA05_SH_Alt	6/7/2022	5	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			yes	NA	Deer mouse		Two Deer mouse in same trap, one survived and one deceased	-116.1517076	40.68261549	11T 571684E 4503871N
CA05_SH_Alt	6/7/2022	6	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			no			Intact		-116.1517673	40.68250649	11T 571679E 4503859N
CA05_SH_Alt	6/7/2022	7	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			yes	NA	Deer mouse			-116.1518245	40.68256017	11T 571674E 4503865N
CA05_SH_Alt	6/7/2022	8	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			no			Intact		-116.1518909	40.68260623	11T 571668E 4503870N
CA05_SH_Alt	6/7/2022	9	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			no			Intact		-116.1519524	40.68264118	11T 571663E 4503873N
CA05_SH_Alt	6/7/2022	10	SeanBasilio	DanRobison	05:21	05:24	45	1	0-25%	None	no			no			Intact		-116.15203	40.68266499	11T 571656E 4503876N
CA06_SH	6/4/2022	1	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1199911	40.70389868	11T 574340E 4506260N
CA06_SH	6/4/2022	2	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1199392	40.70384492	11T 574345E 4506254N
CA06_SH	6/4/2022	3	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1198826	40.70380079	11T 574350E 4506249N
CA06_SH	6/4/2022	4	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1198461	40.70376261	11T 574353E 4506245N
CA06_SH	6/4/2022	5	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1197971	40.70371818	11T 574357E 4506240N
CA06_SH	6/4/2022	6	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1198579	40.70368653	11T 574352E 4506236N
CA06_SH	6/4/2022	7	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1199244	40.70374785	11T 574346E 4506243N
CA06_SH	6/4/2022	8	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1199517	40.70377449	11T 574344E 4506246N
CA06_SH	6/4/2022	9	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1199984	40.7038341	11T 574340E 4506253N
CA06_SH	6/4/2022	10	SeanBasilio	DanRobison	06:06	06:10	60	0	75-100%	None	no			no			Intact		-116.1200461	40.70387977	11T 574336E 4506258N
CA06_SH	6/5/2022	1	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199402	40.70384509	11T 574345E 4506254N
CA06_SH	6/5/2022	2	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1198901	40.70380041	11T 574349E 4506249N
CA06_SH	6/5/2022	3	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1198467	40.70376426	11T 574353E 4506245N
CA06_SH	6/5/2022	4	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.119797	40.7037151	11T 574357E 4506239N
CA06_SH	6/5/2022	5	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1197956	40.7037182	11T 574357E 4506240N
CA06_SH	6/5/2022	6	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1198744	40.70368028	11T 574350E 4506236N
CA06_SH	6/5/2022	7	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199248	40.70373727	11T 574346E 4506242N
CA06_SH	6/5/2022	8	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199515	40.70377229	11T 574344E 4506246N
CA06_SH	6/5/2022	9	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199974	40.70383232	11T 574340E 4506252N
CA06_SH	6/5/2022	10	SeanBasilio	DanRobison	06:01	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1200384	40.70388114	11T 574336E 4506258N
CA06_SH	6/6/2022	1	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1200095	40.70389038	11T 574339E 4506259N
CA06_SH	6/6/2022	2	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1199445	40.70383364	11T 574344E 4506253N
CA06_SH	6/6/2022	3	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1198923	40.70378981	11T 574349E 4506248N
CA06_SH	6/6/2022	4	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1198538	40.70375864	11T 574352E 4506244N
CA06_SH	6/6/2022	5	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.119795	40.70370432	11T 574357E 4506238N
CA06_SH	6/6/2022	6	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1198659	40.70367575	11T 574351E 4506235N
CA06_SH	6/6/2022	7	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1199205	40.70374075	11T 574346E 4506242N
CA06_SH	6/6/2022	8	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.119952	40.70376574	11T 574344E 4506245N
CA06_SH	6/6/2022	9	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1199926	40.70382308	11T 574340E 4506251N
CA06_SH	6/6/2022	10	SeanBasilio	DanRobison	05:56	05:58	50	1	0-25%	None	no			no			Intact		-116.1200383	40.70387298	11T 574336E 4506257N
CA06_SH	6/7/2022	1	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1199918	40.70389716	11T 574340E 4506260N
CA06_SH	6/7/2022	2	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1199355	40.70384391	11T 574345E 4506254N
CA06_SH	6/7/2022	3	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1198931	40.7037913	11T 574349E 4506248N
CA06_SH	6/7/2022	4	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1198493	40.70376111	11T 574352E 4506245N
CA06_SH	6/7/2022	5	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1197921	40.70370252	11T 574357E 4506238N
CA06_SH	6/7/2022	6	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1198573	40.70367692	11T 574352E 4506235N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CA06_SH	6/7/2022	7	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1199012	40.70374024	11T 574348E 4506242N
CA06_SH	6/7/2022	8	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1199367	40.70376907	11T 574345E 4506245N
CA06_SH	6/7/2022	9	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.119979	40.70383196	11T 574341E 4506252N
CA06_SH	6/7/2022	10	SeanBasilio	DanRobison	06:00	06:03	46	0	0-25%	None	no			no			Intact		-116.1200331	40.70387408	11T 574337E 4506257N
CA07_SH	6/4/2022	1	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1198587	40.70410162	11T 574351E 4506282N
CA07_SH	6/4/2022	2	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1199087	40.70415338	11T 574347E 4506288N
CA07_SH	6/4/2022	3	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1199398	40.70421197	11T 574344E 4506295N
CA07_SH	6/4/2022	4	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1199693	40.70426722	11T 574342E 4506301N
CA07_SH	6/4/2022	5	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1200071	40.70432094	11T 574338E 4506307N
CA07_SH	6/4/2022	6	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1199614	40.70434478	11T 574342E 4506309N
CA07_SH	6/4/2022	7	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1199192	40.70429873	11T 574346E 4506304N
CA07_SH	6/4/2022	8	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1198822	40.70424098	11T 574349E 4506298N
CA07_SH	6/4/2022	9	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1198402	40.70418729	11T 574353E 4506292N
CA07_SH	6/4/2022	10	SeanBasilio	DanRobison	06:11	06:15	60	0	75-100%	None	no			no			Intact		-116.1197921	40.70412409	11T 574357E 4506285N
CA07_SH	6/5/2022	1	SeanBasilio	DanRobison	05:58	06:00	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1198606	40.70409663	11T 574351E 4506282N
CA07_SH	6/5/2022	2	SeanBasilio	DanRobison	05:59	06:01	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199021	40.70415095	11T 574347E 4506288N
CA07_SH	6/5/2022	3	SeanBasilio	DanRobison	05:60	06:02	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199365	40.7042142	11T 574345E 4506295N
CA07_SH	6/5/2022	4	SeanBasilio	DanRobison	05:61	06:03	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199629	40.70426784	11T 574342E 4506301N
CA07_SH	6/5/2022	5	SeanBasilio	DanRobison	05:62	06:04	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1200057	40.70431256	11T 574339E 4506306N
CA07_SH	6/5/2022	6	SeanBasilio	DanRobison	05:63	06:05	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199485	40.7043347	11T 574343E 4506308N
CA07_SH	6/5/2022	7	SeanBasilio	DanRobison	05:64	06:06	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1199192	40.70428862	11T 574346E 4506303N
CA07_SH	6/5/2022	8	SeanBasilio	DanRobison	05:65	06:07	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1198891	40.70422498	11T 574349E 4506296N
CA07_SH	6/5/2022	9	SeanBasilio	DanRobison	05:66	06:08	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1198464	40.7041751	11T 574352E 4506290N
CA07_SH	6/5/2022	10	SeanBasilio	DanRobison	05:67	06:09	54	0	75-100%	Rain	yes	Rain	0.01in	no			Intact		-116.1197913	40.70411605	11T 574357E 4506284N
CA07_SH	6/6/2022	1	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1199325	40.7043106	11T 574345E 4506305N
CA07_SH	6/6/2022	2	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1199073	40.70427173	11T 574347E 4506301N
CA07_SH	6/6/2022	3	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1198762	40.70421382	11T 574350E 4506295N
CA07_SH	6/6/2022	4	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1198441	40.7041596	11T 574352E 4506289N
CA07_SH	6/6/2022	5	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1197914	40.70410658	11T 574357E 4506283N
CA07_SH	6/6/2022	6	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1198509	40.70408436	11T 574352E 4506280N
CA07_SH	6/6/2022	7	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1199004	40.70414429	11T 574348E 4506287N
CA07_SH	6/6/2022	8	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1199292	40.70420219	11T 574345E 4506293N
CA07_SH	6/6/2022	9	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1199604	40.70425974	11T 574342E 4506300N
CA07_SH	6/6/2022	10	SeanBasilio	DanRobison	05:52	05:55	50	1	0-25%	None	no			no			Intact		-116.1199978	40.70431079	11T 574339E 4506305N
CA07_SH	6/7/2022	1	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1198417	40.7040952	11T 574353E 4506282N
CA07_SH	6/7/2022	2	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.119896	40.70415091	11T 574348E 4506288N
CA07_SH	6/7/2022	3	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1199182	40.70421208	11T 574346E 4506295N
CA07_SH	6/7/2022	4	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1199435	40.70426612	11T 574344E 4506301N
CA07_SH	6/7/2022	5	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1199857	40.70432287	11T 574340E 4506307N
CA07_SH	6/7/2022	6	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1199362	40.70433503	11T 574344E 4506308N
CA07_SH	6/7/2022	7	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1199103	40.70427243	11T 574347E 4506301N
CA07_SH	6/7/2022	8	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1198703	40.70421211	11T 574350E 4506295N
CA07_SH	6/7/2022	9	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.1198341	40.70416719	11T 574353E 4506290N
CA07_SH	6/7/2022	10	SeanBasilio	DanRobison	06:04	06:08	46	0	0-25%	None	no			no			Intact		-116.119824	40.70414668	11T 574354E 4506287N
CV01_SH	5/25/2022	1	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5109414	40.34110726	11T 541537E 4465732N
CV01_SH	5/25/2022	2	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.510854	40.34113899	11T 541544E 4465736N
CV01_SH	5/25/2022	3	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.510729	40.34117402	11T 541555E 4465740N
CV01_SH	5/25/2022	4	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5106035	40.34115235	11T 541566E 4465737N
CV01_SH	5/25/2022	5	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5104825	40.34111683	11T 541576E 4465733N
CV01_SH	5/25/2022	6	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5105252	40.34105096	11T 541572E 4465726N
CV01_SH	5/25/2022	7	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5106265	40.34106938	11T 541564E 4465728N
CV01_SH	5/25/2022	8	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5107239	40.34109303	11T 541555E 4465731N
CV01_SH	5/25/2022	9	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5108337	40.34109701	11T 541546E 4465731N
CV01_SH	5/25/2022	10	SeanBasilio	DanRobison	05:18	05:22	43	1	0-25%	None	no			no			Intact		-116.5109099	40.34107206	11T 541540E 4465728N
CV01_SH	5/26/2022	1	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5109442	40.34111691	11T 541537E 4465733N
CV01_SH	5/26/2022	2	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5108347	40.34115229	11T 541546E 4465737N
CV01_SH	5/26/2022	3	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5107138	40.34118185	11T 541556E 4465741N
CV01_SH	5/26/2022	4	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5105927	40.34115995	11T 541567E 4465738N
CV01_SH	5/26/2022	5	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5104844	40.34112674	11T 541576E 4465735N
CV01_SH	5/26/2022	6	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5105259	40.3410668	11T 541572E 4465728N
CV01_SH	5/26/2022	7	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5106328	40.3410815	11T 541563E 4465729N
CV01_SH	5/26/2022	8	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5107245	40.34110802	11T 541555E 4465732N
CV01_SH	5/26/2022	9	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.5108373	40.34110251	11T 541546E 4465732N
CV01_SH	5/26/2022	10	SeanBasilio	DanRobison	05:10	05:17	51	1	0-25%	None	no			no			Intact		-116.510933	40.34108345	11T 541538E 4465730N
CV01_SH	5/27/2022	1	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5109351	40.3411247	11T 541538E 4465734N
CV01_SH	5/27/2022	2	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5108264	40.34115724	11T 541547E 4465738N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CV01_SH	5/27/2022	3	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5107051	40.34118193	11T 541557E 4465741N
CV01_SH	5/27/2022	4	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5105816	40.34116342	11T 541568E 4465739N
CV01_SH	5/27/2022	5	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5104792	40.3411189	11T 541576E 4465734N
CV01_SH	5/27/2022	6	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5105153	40.3410571	11T 541573E 4465727N
CV01_SH	5/27/2022	7	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.510609	40.34108233	11T 541565E 4465730N
CV01_SH	5/27/2022	8	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5107042	40.34110572	11T 541557E 4465732N
CV01_SH	5/27/2022	9	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5108279	40.34110263	11T 541547E 4465732N
CV01_SH	5/27/2022	10	AustinLinville	SeanBasilio	05:11	05:15	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5109115	40.34107814	11T 541540E 4465729N
CV01_SH	5/28/2022	1	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5109213	40.34112786	11T 541539E 4465734N
CV01_SH	5/28/2022	2	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5108243	40.34115824	11T 541547E 4465738N
CV01_SH	5/28/2022	3	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5107057	40.34118076	11T 541557E 4465740N
CV01_SH	5/28/2022	4	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.510589	40.3411687	11T 541567E 4465739N
CV01_SH	5/28/2022	5	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5104788	40.3411245	11T 541576E 4465734N
CV01_SH	5/28/2022	6	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5105159	40.34106503	11T 541573E 4465728N
CV01_SH	5/28/2022	7	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5106133	40.34108918	11T 541565E 4465730N
CV01_SH	5/28/2022	8	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5107123	40.34111459	11T 541556E 4465733N
CV01_SH	5/28/2022	9	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5108299	40.34111468	11T 541546E 4465733N
CV01_SH	5/28/2022	10	SeanBasilio	DanRobison	05:11	05:17	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.510912	40.34108405	11T 541540E 4465730N
CV02_SH	5/25/2022	1	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.507433	40.32499094	11T 541845E 4463945N
CV02_SH	5/25/2022	2	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			yes	NA	Deer mouse			-116.507312	40.32496842	11T 541855E 4463943N
CV02_SH	5/25/2022	3	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.5072075	40.32498466	11T 541864E 4463944N
CV02_SH	5/25/2022	4	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.5071127	40.32503353	11T 541872E 4463950N
CV02_SH	5/25/2022	5	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			yes	NA	Deer mouse			-116.5070322	40.32508616	11T 541879E 4463956N
CV02_SH	5/25/2022	6	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.5069479	40.32513073	11T 541886E 4463961N
CV02_SH	5/25/2022	7	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.5068577	40.32517026	11T 541894E 4463965N
CV02_SH	5/25/2022	8	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.5067602	40.32521854	11T 541902E 4463971N
CV02_SH	5/25/2022	9	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.5066764	40.3252535	11T 541909E 4463974N
CV02_SH	5/25/2022	10	SeanBasilio	DanRobison	06:04	06:10	44	1	0-25%	None	no			no			Intact		-116.5065942	40.32526662	11T 541916E 4463976N
CV02_SH	5/26/2022	1	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5074506	40.32499956	11T 541843E 4463946N
CV02_SH	5/26/2022	2	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			yes	NA	Deer mouse			-116.5073356	40.32497595	11T 541853E 4463943N
CV02_SH	5/26/2022	3	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5072161	40.32498415	11T 541863E 4463944N
CV02_SH	5/26/2022	4	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5071185	40.32503335	11T 541872E 4463950N
CV02_SH	5/26/2022	5	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			yes	NA	Deer mouse			-116.5070544	40.32508403	11T 541877E 4463955N
CV02_SH	5/26/2022	6	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5069544	40.32513947	11T 541886E 4463962N
CV02_SH	5/26/2022	7	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5068654	40.32517625	11T 541893E 4463966N
CV02_SH	5/26/2022	8	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5067807	40.32521575	11T 541900E 4463970N
CV02_SH	5/26/2022	9	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5066967	40.32524585	11T 541907E 4463974N
CV02_SH	5/26/2022	10	SeanBasilio	DanRobison	05:47	05:55	50	1	0-25%	None	no			no			Intact		-116.5066182	40.32526667	11T 541914E 4463976N
CV02_SH	5/27/2022	1	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			KnockedOver		-116.5074453	40.32499502	11T 541844E 4463945N
CV02_SH	5/27/2022	2	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.5073108	40.32497575	11T 541855E 4463943N
CV02_SH	5/27/2022	3	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.507211	40.32498588	11T 541864E 4463944N
CV02_SH	5/27/2022	4	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5071307	40.32503675	11T 541871E 4463950N
CV02_SH	5/27/2022	5	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5070405	40.32508058	11T 541878E 4463955N
CV02_SH	5/27/2022	6	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5069512	40.32514362	11T 541886E 4463962N
CV02_SH	5/27/2022	7	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5068631	40.32518166	11T 541893E 4463966N
CV02_SH	5/27/2022	8	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.506769	40.32522634	11T 541901E 4463971N
CV02_SH	5/27/2022	9	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.5066824	40.32526544	11T 541909E 4463976N
CV02_SH	5/27/2022	10	AustinLinville	SeanBasilio	05:40	05:45	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5065972	40.32526744	11T 541916E 4463976N
CV02_SH	5/28/2022	1	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.507449	40.32501094	11T 541844E 4463947N
CV02_SH	5/28/2022	2	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.5073194	40.32497147	11T 541855E 4463943N
CV02_SH	5/28/2022	3	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5072121	40.32497951	11T 541864E 4463944N
CV02_SH	5/28/2022	4	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5071207	40.32503783	11T 541871E 4463950N
CV02_SH	5/28/2022	5	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5070453	40.32507924	11T 541878E 4463955N
CV02_SH	5/28/2022	6	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5069553	40.32514337	11T 541885E 4463962N
CV02_SH	5/28/2022	7	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.506878	40.32517975	11T 541892E 4463966N
CV02_SH	5/28/2022	8	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5067669	40.32521865	11T 541901E 4463971N
CV02_SH	5/28/2022	9	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.506689	40.32525644	11T 541908E 4463975N
CV02_SH	5/28/2022	10	SeanBasilio	DanRobison	05:54	05:59	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5066097	40.32526864	11T 541915E 4463976N
CV03_SH	5/25/2022	1	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.5077669	40.32491592	11T 541817E 4463936N
CV03_SH	5/25/2022	2	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			yes	NA	Deer mouse			-116.5078812	40.3248891	11T 541807E 4463933N
CV03_SH	5/25/2022	3	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.5078812	40.32481956	11T 541807E 4463926N
CV03_SH	5/25/2022	4	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.507962	40.32480819	11T 541800E 4463924N
CV03_SH	5/25/2022	5	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.5080364	40.32488001	11T 541794E 4463932N
CV03_SH	5/25/2022	6	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.5081231	40.32492494	11T 541786E 4463937N
CV03_SH	5/25/2022	7	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.5082125	40.32495422	11T 541779E 4463941N
CV03_SH	5/25/2022	8	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.5083264	40.32497525	11T 541769E 4463943N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CV03_SH	5/25/2022	9	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			yes	NA	Deer mouse			-116.5084072	40.32497423	11T 541762E 4463943N
CV03_SH	5/25/2022	10	SeanBasilio	DanRobison	06:13	06:18	45	0	0-25%	None	no			no			Intact		-116.508486	40.32498283	11T 541756E 4463944N
CV03_SH	5/26/2022	1	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.5077785	40.32492256	11T 541816E 4463937N
CV03_SH	5/26/2022	2	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.5078963	40.3248874	11T 541806E 4463933N
CV03_SH	5/26/2022	3	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			yes	NA	Deer mouse			-116.5078962	40.32481072	11T 541806E 4463925N
CV03_SH	5/26/2022	4	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.5079779	40.32481071	11T 541799E 4463925N
CV03_SH	5/26/2022	5	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.508046	40.32488329	11T 541793E 4463933N
CV03_SH	5/26/2022	6	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.5081347	40.32493693	11T 541785E 4463939N
CV03_SH	5/26/2022	7	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.5082195	40.32495721	11T 541778E 4463941N
CV03_SH	5/26/2022	8	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.50834	40.32497991	11T 541768E 4463943N
CV03_SH	5/26/2022	9	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			yes	NA	Deer mouse			-116.5084092	40.32498452	11T 541762E 4463944N
CV03_SH	5/26/2022	10	SeanBasilio	DanRobison	05:55	05:59	50	1	0-25%	None	no			no			Intact		-116.5084937	40.32498191	11T 541755E 4463943N
CV03_SH	5/27/2022	1	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5077946	40.32491076	11T 541814E 4463936N
CV03_SH	5/27/2022	2	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.5078959	40.32489198	11T 541806E 4463934N
CV03_SH	5/27/2022	3	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5078946	40.32481504	11T 541806E 4463925N
CV03_SH	5/27/2022	4	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.507974	40.32480964	11T 541799E 4463925N
CV03_SH	5/27/2022	5	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5080485	40.32488543	11T 541793E 4463933N
CV03_SH	5/27/2022	6	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5081307	40.32493406	11T 541786E 4463938N
CV03_SH	5/27/2022	7	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5082197	40.32495798	11T 541778E 4463941N
CV03_SH	5/27/2022	8	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.5083478	40.32498733	11T 541767E 4463944N
CV03_SH	5/27/2022	9	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5084167	40.32498277	11T 541761E 4463944N
CV03_SH	5/27/2022	10	AustinLinville	SeanBasilio	05:51	05:57	47	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5084957	40.32498254	11T 541755E 4463944N
CV03_SH	5/28/2022	1	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5077849	40.32491175	11T 541815E 4463936N
CV03_SH	5/28/2022	2	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.507899	40.32488461	11T 541805E 4463933N
CV03_SH	5/28/2022	3	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.5078955	40.3248107	11T 541806E 4463925N
CV03_SH	5/28/2022	4	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.507981	40.32480929	11T 541799E 4463925N
CV03_SH	5/28/2022	5	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5080487	40.32487865	11T 541793E 4463932N
CV03_SH	5/28/2022	6	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5081317	40.32492985	11T 541786E 4463938N
CV03_SH	5/28/2022	7	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.5082254	40.32495411	11T 541778E 4463940N
CV03_SH	5/28/2022	8	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.5083477	40.32497665	11T 541767E 4463943N
CV03_SH	5/28/2022	9	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.508419	40.32498449	11T 541761E 4463944N
CV03_SH	5/28/2022	10	SeanBasilio	DanRobison	06:04	06:10	50	0	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.508497	40.32497567	11T 541755E 4463943N
CV04_SH	5/25/2022	1	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5618384	40.26154609	11T 537258E 4456879N
CV04_SH	5/25/2022	2	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5619174	40.26151887	11T 537251E 4456875N
CV04_SH	5/25/2022	3	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5619859	40.26147793	11T 537245E 4456871N
CV04_SH	5/25/2022	4	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5620735	40.26144579	11T 537238E 4456867N
CV04_SH	5/25/2022	5	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5621397	40.26140387	11T 537232E 4456863N
CV04_SH	5/25/2022	6	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.562209	40.26143255	11T 537226E 4456866N
CV04_SH	5/25/2022	7	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5621455	40.26149216	11T 537232E 4456872N
CV04_SH	5/25/2022	8	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5620658	40.26154264	11T 537238E 4456878N
CV04_SH	5/25/2022	9	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5620125	40.26158095	11T 537243E 4456882N
CV04_SH	5/25/2022	10	AustinLinville	DanRobison	06:33	06:37	54	2	0-25%	None	no			no			Intact		-116.5619405	40.26162981	11T 537249E 4456888N
CV04_SH	5/26/2022	1	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5619543	40.26163444	11T 537248E 4456888N
CV04_SH	5/26/2022	2	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5620194	40.26157955	11T 537242E 4456882N
CV04_SH	5/26/2022	3	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5620849	40.26154253	11T 537237E 4456878N
CV04_SH	5/26/2022	4	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5621464	40.26149334	11T 537232E 4456873N
CV04_SH	5/26/2022	5	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5622059	40.26143324	11T 537227E 4456866N
CV04_SH	5/26/2022	6	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5621293	40.26140211	11T 537233E 4456862N
CV04_SH	5/26/2022	7	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5620693	40.26144813	11T 537238E 4456868N
CV04_SH	5/26/2022	8	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5619932	40.26148122	11T 537245E 4456871N
CV04_SH	5/26/2022	9	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5619232	40.26152411	11T 537251E 4456876N
CV04_SH	5/26/2022	10	AustinLinville	MichaelRobison	06:21	06:26	56	2	0-25%	None	no			no			Intact		-116.5618526	40.26155425	11T 537257E 4456879N
CV04_SH	5/27/2022	1	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5619435	40.26164509	11T 537249E 4456889N
CV04_SH	5/27/2022	2	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5620112	40.26160089	11T 537243E 4456885N
CV04_SH	5/27/2022	3	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5620766	40.26155683	11T 537238E 4456880N
CV04_SH	5/27/2022	4	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.562135	40.26151148	11T 537233E 4456875N
CV04_SH	5/27/2022	5	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5621954	40.26145376	11T 537228E 4456868N
CV04_SH	5/27/2022	6	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5621225	40.26141477	11T 537234E 4456864N
CV04_SH	5/27/2022	7	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5620578	40.26146299	11T 537239E 4456869N
CV04_SH	5/27/2022	8	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5619874	40.26149856	11T 537245E 4456873N
CV04_SH	5/27/2022	9	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5619143	40.26153998	11T 537251E 4456878N
CV04_SH	5/27/2022	10	AustinLinville	SeanBasilio	06:35	06:40	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5618421	40.26156864	11T 537257E 4456881N
CV04_SH	5/28/2022	1	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5619235	40.26163528	11T 537251E 4456888N
CV04_SH	5/28/2022	2	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.561994	40.26158024	11T 537245E 4456882N
CV04_SH	5/28/2022	3	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5620578	40.26153962	11T 537239E 4456878N
CV04_SH	5/28/2022	4	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5621167	40.26148724	11T 537234E 4456872N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CV04_SH	5/28/2022	5	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			FalseClose		-116.5621711	40.26143577	11T 537230E 4456866N
CV04_SH	5/28/2022	6	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5621163	40.26140054	11T 537234E 4456862N
CV04_SH	5/28/2022	7	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.562042	40.26144807	11T 537241E 4456868N
CV04_SH	5/28/2022	8	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5619845	40.26147654	11T 537245E 4456871N
CV04_SH	5/28/2022	9	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5618969	40.26151036	11T 537253E 4456875N
CV04_SH	5/28/2022	10	AustinLinville	MichaelRobison	06:35	06:40	53	5	75-100%	None	yes	Rain	0.11in	no			Intact		-116.561833	40.2615403	11T 537258E 4456878N
CV05_SH	5/25/2022	1	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5617845	40.26181231	11T 537262E 4456908N
CV05_SH	5/25/2022	2	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5617062	40.26181184	11T 537269E 4456908N
CV05_SH	5/25/2022	3	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5616369	40.26176244	11T 537275E 4456903N
CV05_SH	5/25/2022	4	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5615588	40.26174759	11T 537281E 4456901N
CV05_SH	5/25/2022	5	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5614753	40.26170973	11T 537289E 4456897N
CV05_SH	5/25/2022	6	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5615192	40.26166246	11T 537285E 4456892N
CV05_SH	5/25/2022	7	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5616166	40.26170169	11T 537277E 4456896N
CV05_SH	5/25/2022	8	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5616632	40.26174036	11T 537273E 4456900N
CV05_SH	5/25/2022	9	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5617323	40.26175517	11T 537267E 4456902N
CV05_SH	5/25/2022	10	AustinLinville	MichaelRobison	06:28	06:33	54	2	0-25%	None	no			no			Intact		-116.5618086	40.26178149	11T 537260E 4456905N
CV05_SH	5/26/2022	1	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5618132	40.26177685	11T 537260E 4456904N
CV05_SH	5/26/2022	2	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5617288	40.26175082	11T 537267E 4456901N
CV05_SH	5/26/2022	3	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5616588	40.26173344	11T 537273E 4456899N
CV05_SH	5/26/2022	4	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5616024	40.26169127	11T 537278E 4456895N
CV05_SH	5/26/2022	5	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5615196	40.26165846	11T 537285E 4456891N
CV05_SH	5/26/2022	6	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5614862	40.2617061	11T 537288E 4456896N
CV05_SH	5/26/2022	7	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5615614	40.26174245	11T 537281E 4456900N
CV05_SH	5/26/2022	8	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5616597	40.26176681	11T 537273E 4456903N
CV05_SH	5/26/2022	9	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5617146	40.26181107	11T 537268E 4456908N
CV05_SH	5/26/2022	10	AustinLinville	MichaelRobison	06:17	06:20	56	3	0-25%	None	no			no			Intact		-116.5617916	40.26181601	11T 537262E 4456908N
CV05_SH	5/27/2022	1	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5617836	40.26183435	11T 537262E 4456911N
CV05_SH	5/27/2022	2	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5616948	40.26183105	11T 537270E 4456910N
CV05_SH	5/27/2022	3	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5616408	40.26179402	11T 537274E 4456906N
CV05_SH	5/27/2022	4	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5615443	40.26176185	11T 537283E 4456903N
CV05_SH	5/27/2022	5	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5614702	40.26171463	11T 537289E 4456897N
CV05_SH	5/27/2022	6	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			FalseClose		-116.5615125	40.26166921	11T 537285E 4456892N
CV05_SH	5/27/2022	7	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5616044	40.26170986	11T 537278E 4456897N
CV05_SH	5/27/2022	8	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5616628	40.26174768	11T 537273E 4456901N
CV05_SH	5/27/2022	9	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5617377	40.26176342	11T 537266E 4456903N
CV05_SH	5/27/2022	10	AustinLinville	SeanBasilio	06:25	06:30	54	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5618079	40.26179185	11T 537260E 4456906N
CV05_SH	5/28/2022	1	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5617665	40.26182831	11T 537264E 4456910N
CV05_SH	5/28/2022	2	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5616848	40.26181923	11T 537271E 4456909N
CV05_SH	5/28/2022	3	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5616312	40.26177999	11T 537275E 4456905N
CV05_SH	5/28/2022	4	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5615328	40.26175289	11T 537284E 4456902N
CV05_SH	5/28/2022	5	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5614626	40.2617167	11T 537290E 4456898N
CV05_SH	5/28/2022	6	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5614878	40.26166891	11T 537288E 4456892N
CV05_SH	5/28/2022	7	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5615876	40.26170214	11T 537279E 4456896N
CV05_SH	5/28/2022	8	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.5616513	40.26174344	11T 537274E 4456900N
CV05_SH	5/28/2022	9	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.561705	40.26175595	11T 537269E 4456902N
CV05_SH	5/28/2022	10	AustinLinville	MichaelRobison	06:28	06:34	53	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.561784	40.26178337	11T 537262E 4456905N
CV06_SH	5/26/2022	10	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6360585	40.20828256	11T 530971E 4450938N
CV06_SH	5/26/2022	9	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6359731	40.2083263	11T 530978E 4450943N
CV06_SH	5/26/2022	8	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6359279	40.20837581	11T 530982E 4450948N
CV06_SH	5/26/2022	7	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6358358	40.20840827	11T 530990E 4450952N
CV06_SH	5/26/2022	6	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6357741	40.20844079	11T 530995E 4450956N
CV06_SH	5/26/2022	5	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6357168	40.20840292	11T 531000E 4450951N
CV06_SH	5/26/2022	4	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6358225	40.20835513	11T 530991E 4450946N
CV06_SH	5/26/2022	3	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			yes	NA	Deer mouse			-116.6358876	40.20832541	11T 530985E 4450943N
CV06_SH	5/26/2022	2	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6359478	40.20828129	11T 530980E 4450938N
CV06_SH	5/26/2022	1	AustinLinville	MichaelRobison	06:01	06:07	49	2	0-25%	None	no			no			Intact		-116.6360011	40.20822777	11T 530976E 4450932N
CV06_SH	5/27/2022	1	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.6360759	40.20821002	11T 530969E 4450930N
CV06_SH	5/27/2022	2	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.635912	40.20836959	11T 530983E 4450948N
CV06_SH	5/27/2022	3	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.6358251	40.20841057	11T 530991E 4450952N
CV06_SH	5/27/2022	4	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.6357459	40.20844976	11T 530997E 4450957N
CV06_SH	5/27/2022	5	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			FalseClose		-116.6356733	40.20849498	11T 531004E 4450962N
CV06_SH	5/27/2022	6	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.6357136	40.20840418	11T 531000E 4450952N
CV06_SH	5/27/2022	7	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.6358147	40.20835971	11T 530992E 4450947N
CV06_SH	5/27/2022	8	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.6358739	40.2083318	11T 530987E 4450943N
CV06_SH	5/27/2022	9	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.635945	40.20828806	11T 530981E 4450939N
CV06_SH	5/27/2022	10	AustinLinville	MichaelRobison	05:52	05:57	55	2	0-25%	None	no			no			Intact		-116.6360055	40.20823782	11T 530975E 4450933N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CV06_SH	5/28/2022	1	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6360363	40.20830409	11T 530973E 4450940N
CV06_SH	5/28/2022	2	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6359959	40.2083338	11T 530976E 4450944N
CV06_SH	5/28/2022	3	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6359059	40.2083692	11T 530984E 4450948N
CV06_SH	5/28/2022	4	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.635812	40.20840052	11T 530992E 4450951N
CV06_SH	5/28/2022	5	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6357436	40.20844496	11T 530998E 4450956N
CV06_SH	5/28/2022	6	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6357063	40.2083854	11T 531001E 4450950N
CV06_SH	5/28/2022	7	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6358041	40.20835567	11T 530992E 4450946N
CV06_SH	5/28/2022	8	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6358849	40.20832426	11T 530986E 4450943N
CV06_SH	5/28/2022	9	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6359353	40.20828114	11T 530981E 4450938N
CV06_SH	5/28/2022	10	AustinLinville	SeanBasilio	06:30	06:35	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6359946	40.20823043	11T 530976E 4450932N
CV06_SH	5/5/2022	1	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6359807	40.2082291	11T 530978E 4450932N
CV06_SH	5/5/2022	2	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6359199	40.20826214	11T 530983E 4450936N
CV06_SH	5/5/2022	3	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6358461	40.20830759	11T 530989E 4450941N
CV06_SH	5/5/2022	4	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6357701	40.20833817	11T 530995E 4450944N
CV06_SH	5/5/2022	5	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6356999	40.2083737	11T 531001E 4450948N
CV06_SH	5/5/2022	6	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6357284	40.20843764	11T 530999E 4450955N
CV06_SH	5/5/2022	7	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6358219	40.20840018	11T 530991E 4450951N
CV06_SH	5/5/2022	8	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6359153	40.20836418	11T 530983E 4450947N
CV06_SH	5/5/2022	9	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6359784	40.20831813	11T 530978E 4450942N
CV06_SH	5/5/2022	10	AustinLinville	MichaelRobison	06:01	06:06	52	4	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6360585	40.20827944	11T 530971E 4450938N
CV07_SH	5/25/2022	1	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			no			Intact		-116.6385016	40.20468396	11T 530765E 4450538N
CV07_SH	5/25/2022	2	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			no			Intact		-116.6385932	40.20469507	11T 530757E 4450539N
CV07_SH	5/25/2022	3	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			no			Intact		-116.6386801	40.2047115	11T 530749E 4450541N
CV07_SH	5/25/2022	4	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			no			Intact		-116.6387634	40.20471904	11T 530742E 4450541N
CV07_SH	5/25/2022	5	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			no			Intact		-116.6388445	40.20473932	11T 530735E 4450544N
CV07_SH	5/25/2022	6	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.6388162	40.20481262	11T 530738E 4450552N
CV07_SH	5/25/2022	7	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			no			Intact		-116.6387274	40.20480104	11T 530745E 4450551N
CV07_SH	5/25/2022	8	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			no			Intact		-116.6386463	40.20479249	11T 530752E 4450550N
CV07_SH	5/25/2022	9	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			yes	NA	House mouse			-116.6385655	40.20478074	11T 530759E 4450548N
CV07_SH	5/25/2022	10	AustinLinville	MichaelRobison	05:52	05:57	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.6384561	40.20475912	11T 530768E 4450546N
CV07_SH	5/26/2022	10	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			yes	NA	Deer mouse			-116.638521	40.20468057	11T 530763E 4450537N
CV07_SH	5/26/2022	9	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			no			Intact		-116.6386088	40.2046937	11T 530755E 4450539N
CV07_SH	5/26/2022	8	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			no			Intact		-116.6386869	40.20470095	11T 530749E 4450540N
CV07_SH	5/26/2022	7	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			no			Intact		-116.6387716	40.20471492	11T 530742E 4450541N
CV07_SH	5/26/2022	6	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			no			Intact		-116.6388548	40.20473504	11T 530735E 4450543N
CV07_SH	5/26/2022	5	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			yes	NA	Deer mouse			-116.6388232	40.20480734	11T 530737E 4450551N
CV07_SH	5/26/2022	4	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			no			Intact		-116.638737	40.20480096	11T 530745E 4450551N
CV07_SH	5/26/2022	3	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			no			Intact		-116.6386559	40.20479242	11T 530751E 4450550N
CV07_SH	5/26/2022	2	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			yes	NA	Deer mouse			-116.6385868	40.20477879	11T 530757E 4450548N
CV07_SH	5/26/2022	1	AustinLinville	MichaelRobison	05:42	05:49	54	2	0-25%	None	no			yes	NA	Deer mouse			-116.6384729	40.20476536	11T 530767E 4450547N
CV07_SH	5/27/2022	10	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.6385094	40.20469752	11T 530764E 4450539N
CV07_SH	5/27/2022	9	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.638594	40.20470784	11T 530757E 4450540N
CV07_SH	5/27/2022	8	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6386758	40.20472295	11T 530750E 4450542N
CV07_SH	5/27/2022	7	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6387664	40.20473175	11T 530742E 4450543N
CV07_SH	5/27/2022	6	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			FalseClose		-116.6388519	40.20474775	11T 530735E 4450545N
CV07_SH	5/27/2022	5	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			FalseClose		-116.6388203	40.2048272	11T 530737E 4450553N
CV07_SH	5/27/2022	4	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6387345	40.20481498	11T 530745E 4450552N
CV07_SH	5/27/2022	3	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6386632	40.20480765	11T 530751E 4450551N
CV07_SH	5/27/2022	2	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6385729	40.20480735	11T 530758E 4450551N
CV07_SH	5/27/2022	1	AustinLinville	SeanBasilio	06:15	06:20	57	3	0-25%	None	yes	Rain	0.01in	yes	NA	Deer mouse			-116.6384747	40.20477224	11T 530767E 4450547N
CV07_SH	5/28/2022	1	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.6384549	40.20475887	11T 530769E 4450546N
CV07_SH	5/28/2022	2	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6385771	40.20479884	11T 530758E 4450550N
CV07_SH	5/28/2022	3	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.638659	40.20481049	11T 530751E 4450552N
CV07_SH	5/28/2022	4	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6387349	40.2048091	11T 530745E 4450551N
CV07_SH	5/28/2022	5	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.6388159	40.20481897	11T 530738E 4450553N
CV07_SH	5/28/2022	6	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.6388417	40.20474354	11T 530736E 4450544N
CV07_SH	5/28/2022	7	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6387581	40.20472898	11T 530743E 4450543N
CV07_SH	5/28/2022	8	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6386665	40.20470927	11T 530751E 4450540N
CV07_SH	5/28/2022	9	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6385893	40.20470382	11T 530757E 4450540N
CV07_SH	5/28/2022	10	AustinLinville	MichaelRobison	05:49	05:56	52	3	75-100%	Rain	yes	Rain	0.11in	yes	NA	Deer mouse			-116.6384941	40.20468443	11T 530765E 4450538N
CV08_SH	5/25/2022	1	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6085756	40.30189187	11T 533264E 4461338N
CV08_SH	5/25/2022	2	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6086038	40.30194022	11T 533261E 4461343N
CV08_SH	5/25/2022	3	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6086257	40.30199382	11T 533259E 4461349N
CV08_SH	5/25/2022	4	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6086526	40.30204872	11T 533257E 4461356N
CV08_SH	5/25/2022	7	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			yes	NA	Deer mouse			-116.6087436	40.30206235	11T 533249E 4461357N
CV08_SH	5/25/2022	8	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6086653	40.30211224	11T 533256E 4461363N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CV08_SH	5/25/2022	5	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6086673	40.30211202	11T 533256E 4461363N
CV08_SH	5/25/2022	6	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6087682	40.30211303	11T 533247E 4461363N
CV08_SH	5/25/2022	9	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.608707	40.30193548	11T 533253E 4461343N
CV08_SH	5/25/2022	10	AustinLinville	MichaelRobison	05:15	05:24	48	3	0-25%	None	no			no			Intact		-116.6087274	40.30186045	11T 533251E 4461335N
CV08_SH	5/26/2022	1	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6085781	40.3018786	11T 533264E 4461337N
CV08_SH	5/26/2022	2	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6086054	40.30194436	11T 533261E 4461344N
CV08_SH	5/26/2022	3	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6086362	40.30198879	11T 533259E 4461349N
CV08_SH	5/26/2022	4	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6086684	40.3020523	11T 533256E 4461356N
CV08_SH	5/26/2022	5	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6086933	40.30211986	11T 533254E 4461363N
CV08_SH	5/26/2022	6	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6087827	40.30211179	11T 533246E 4461362N
CV08_SH	5/26/2022	7	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6087576	40.30205417	11T 533248E 4461356N
CV08_SH	5/26/2022	8	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			yes	NA	Deer mouse			-116.6087619	40.30199416	11T 533248E 4461349N
CV08_SH	5/26/2022	9	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.608732	40.30192923	11T 533250E 4461342N
CV08_SH	5/26/2022	10	AustinLinville	MichaelRobison	05:10	05:15	51	3	0-25%	None	no			no			Intact		-116.6087343	40.30185636	11T 533250E 4461334N
CV08_SH	5/27/2022	1	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6085803	40.30186127	11T 533263E 4461335N
CV08_SH	5/27/2022	2	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6086225	40.30192056	11T 533260E 4461341N
CV08_SH	5/27/2022	3	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6086513	40.30197868	11T 533257E 4461348N
CV08_SH	5/27/2022	4	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6086728	40.30202962	11T 533255E 4461353N
CV08_SH	5/27/2022	5	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			FalseClose		-116.60869	40.30209568	11T 533254E 4461361N
CV08_SH	5/27/2022	6	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6087835	40.30210137	11T 533246E 4461361N
CV08_SH	5/27/2022	7	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6087623	40.30205054	11T 533248E 4461356N
CV08_SH	5/27/2022	8	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6087602	40.30198314	11T 533248E 4461348N
CV08_SH	5/27/2022	9	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6087342	40.3019213	11T 533250E 4461341N
CV08_SH	5/27/2022	10	AustinLinville	SeanBasilio	06:10	06:14	56	4	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6087398	40.30184786	11T 533250E 4461333N
CV08_SH	5/28/2022	10	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6087267	40.3018591	11T 533251E 4461334N
CV08_SH	5/28/2022	9	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6087345	40.30194654	11T 533250E 4461344N
CV08_SH	5/28/2022	8	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6087538	40.30200208	11T 533249E 4461350N
CV08_SH	5/28/2022	7	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6087516	40.30206832	11T 533249E 4461358N
CV08_SH	5/28/2022	6	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6087815	40.30211095	11T 533246E 4461362N
CV08_SH	5/28/2022	5	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6086816	40.30210783	11T 533255E 4461362N
CV08_SH	5/28/2022	4	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6086651	40.30205458	11T 533256E 4461356N
CV08_SH	5/28/2022	3	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6086324	40.30199361	11T 533259E 4461349N
CV08_SH	5/28/2022	2	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6085977	40.30193468	11T 533262E 4461343N
CV08_SH	5/28/2022	1	AustinLinville	MichaelRobison	05:22	05:26	51	3	75-100%	None	yes	Rain	0.11in	no			Intact		-116.6085594	40.30188278	11T 533265E 4461337N
CV09_SH	5/25/2022	1	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6224576	40.29686639	11T 532086E 4460775N
CV09_SH	5/25/2022	2	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6224214	40.29685603	11T 532090E 4460774N
CV09_SH	5/25/2022	3	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6222818	40.29686871	11T 532101E 4460776N
CV09_SH	5/25/2022	4	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.622187	40.29686508	11T 532109E 4460775N
CV09_SH	5/25/2022	5	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6221061	40.2968596	11T 532116E 4460775N
CV09_SH	5/25/2022	6	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6221304	40.29677749	11T 532114E 4460765N
CV09_SH	5/25/2022	7	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6222109	40.2967776	11T 532107E 4460765N
CV09_SH	5/25/2022	8	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6222995	40.29677619	11T 532100E 4460765N
CV09_SH	5/25/2022	9	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6223966	40.29678077	11T 532092E 4460766N
CV09_SH	5/25/2022	10	AustinLinville	MichaelRobison	05:32	05:38	50	4	0-25%	None	no			no			Intact		-116.6224877	40.29677692	11T 532084E 4460765N
CV09_SH	5/26/2022	1	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6225077	40.29680829	11T 532082E 4460769N
CV09_SH	5/26/2022	2	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6224052	40.29677215	11T 532091E 4460765N
CV09_SH	5/26/2022	3	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6223078	40.29677212	11T 532099E 4460765N
CV09_SH	5/26/2022	4	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6222236	40.29677377	11T 532106E 4460765N
CV09_SH	5/26/2022	5	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.622141	40.29677009	11T 532113E 4460765N
CV09_SH	5/26/2022	6	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6221276	40.29685225	11T 532115E 4460774N
CV09_SH	5/26/2022	7	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6222138	40.29685184	11T 532107E 4460774N
CV09_SH	5/26/2022	8	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.622302	40.29685383	11T 532100E 4460774N
CV09_SH	5/26/2022	9	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6224098	40.29685729	11T 532091E 4460774N
CV09_SH	5/26/2022	10	AustinLinville	MichaelRobison	05:24	05:28	52	3	0-25%	None	no			no			Intact		-116.6224713	40.29685933	11T 532085E 4460774N
CV09_SH	5/27/2022	1	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.622573	40.29681151	11T 532077E 4460769N
CV09_SH	5/27/2022	2	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6224023	40.29678784	11T 532091E 4460767N
CV09_SH	5/27/2022	3	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			FalseClose		-116.6222722	40.29678469	11T 532102E 4460766N
CV09_SH	5/27/2022	4	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			KnockedOver		-116.6221934	40.29679886	11T 532109E 4460768N
CV09_SH	5/27/2022	5	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6221039	40.29677597	11T 532117E 4460765N
CV09_SH	5/27/2022	6	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6221242	40.29687195	11T 532115E 4460776N
CV09_SH	5/27/2022	7	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6222109	40.29687255	11T 532107E 4460776N
CV09_SH	5/27/2022	8	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6222966	40.29686621	11T 532100E 4460775N
CV09_SH	5/27/2022	9	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6223971	40.29686687	11T 532092E 4460775N
CV09_SH	5/27/2022	10	AustinLinville	SeanBasilio	06:22	06:27	56	3	0-25%	None	yes	Rain	0.01in	no			Intact		-116.6224651	40.29686189	11T 532086E 4460775N
CV09_SH	5/28/2022	1	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.62245	40.29678076	11T 532087E 4460766N
CV09_SH	5/28/2022	2	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6224002	40.29678183	11T 532091E 4460766N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
CV09_SH	5/28/2022	3	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6222636	40.29677885	11T 532103E 4460766N
CV09_SH	5/28/2022	4	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6221826	40.29677467	11T 532110E 4460765N
CV09_SH	5/28/2022	5	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6221007	40.29676159	11T 532117E 4460764N
CV09_SH	5/28/2022	6	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6220695	40.29685782	11T 532119E 4460774N
CV09_SH	5/28/2022	7	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6221171	40.29685443	11T 532115E 4460774N
CV09_SH	5/28/2022	8	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6222102	40.2968562	11T 532107E 4460774N
CV09_SH	5/28/2022	9	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6222935	40.29685936	11T 532100E 4460774N
CV09_SH	5/28/2022	10	AustinLinville	MichaelRobison	05:08	05:12	51	2	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.6224003	40.29686028	11T 532091E 4460775N
CV10_SH	5/25/2022	1	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5096552	40.33840571	11T 541648E 4465433N
CV10_SH	5/25/2022	2	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5095385	40.33849068	11T 541658E 4465442N
CV10_SH	5/25/2022	3	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.509431	40.33850145	11T 541667E 4465444N
CV10_SH	5/25/2022	4	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5093219	40.33850551	11T 541676E 4465444N
CV10_SH	5/25/2022	5	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5092173	40.33853879	11T 541685E 4465448N
CV10_SH	5/25/2022	6	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5091932	40.33847248	11T 541687E 4465441N
CV10_SH	5/25/2022	7	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5093249	40.33846696	11T 541676E 4465440N
CV10_SH	5/25/2022	8	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5094303	40.33842679	11T 541667E 4465435N
CV10_SH	5/25/2022	9	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.5095284	40.33841526	11T 541659E 4465434N
CV10_SH	5/25/2022	10	SeanBasilio	DanRobison	05:31	05:36	42	1	0-25%	None	no			no			Intact		-116.509614	40.33837229	11T 541651E 4465429N
CV10_SH	5/26/2022	1	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5096575	40.33841235	11T 541648E 4465434N
CV10_SH	5/26/2022	2	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5095525	40.33849068	11T 541657E 4465442N
CV10_SH	5/26/2022	3	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5094378	40.33850726	11T 541666E 4465444N
CV10_SH	5/26/2022	4	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5093175	40.33851343	11T 541677E 4465445N
CV10_SH	5/26/2022	5	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5092225	40.33854333	11T 541685E 4465448N
CV10_SH	5/26/2022	6	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5092007	40.33848606	11T 541686E 4465442N
CV10_SH	5/26/2022	7	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.509324	40.33846806	11T 541676E 4465440N
CV10_SH	5/26/2022	8	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5094261	40.33843786	11T 541667E 4465437N
CV10_SH	5/26/2022	9	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5095295	40.33843518	11T 541659E 4465436N
CV10_SH	5/26/2022	10	SeanBasilio	DanRobison	05:19	05:26	47	1	0-25%	None	no			no			Intact		-116.5096191	40.33837672	11T 541651E 4465430N
CV10_SH	5/27/2022	1	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5096682	40.33840624	11T 541647E 4465433N
CV10_SH	5/27/2022	2	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5095421	40.33850005	11T 541657E 4465443N
CV10_SH	5/27/2022	3	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.509431	40.33851555	11T 541667E 4465445N
CV10_SH	5/27/2022	4	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5093204	40.33851828	11T 541676E 4465446N
CV10_SH	5/27/2022	5	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5092238	40.3385482	11T 541684E 4465449N
CV10_SH	5/27/2022	6	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5091935	40.33848876	11T 541687E 4465442N
CV10_SH	5/27/2022	7	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5093202	40.33847444	11T 541676E 4465441N
CV10_SH	5/27/2022	8	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5094181	40.33843439	11T 541668E 4465436N
CV10_SH	5/27/2022	9	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5095274	40.33843073	11T 541659E 4465436N
CV10_SH	5/27/2022	10	AustinLinville	SeanBasilio	05:18	05:22	45	1	0-25%	None	yes	Rain	0.01in	no			Intact		-116.5096156	40.33837755	11T 541651E 4465430N
CV10_SH	5/28/2022	1	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5096523	40.33840754	11T 541648E 4465433N
CV10_SH	5/28/2022	2	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.509542	40.33849811	11T 541657E 4465443N
CV10_SH	5/28/2022	3	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5094397	40.33851126	11T 541666E 4465445N
CV10_SH	5/28/2022	4	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5093151	40.33851557	11T 541677E 4465445N
CV10_SH	5/28/2022	5	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5092093	40.33855089	11T 541686E 4465449N
CV10_SH	5/28/2022	6	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5091935	40.33850351	11T 541687E 4465444N
CV10_SH	5/28/2022	7	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5093175	40.33848435	11T 541677E 4465442N
CV10_SH	5/28/2022	8	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5094223	40.33845156	11T 541668E 4465438N
CV10_SH	5/28/2022	9	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.509523	40.33844512	11T 541659E 4465437N
CV10_SH	5/28/2022	10	SeanBasilio	DanRobison	05:26	05:30	50	1	75-100%	Rain	yes	Rain	0.11in	no			Intact		-116.5096223	40.33838336	11T 541651E 4465430N
GS01_SH	6/4/2022	1	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			yes	NA	Deer mouse			-116.3994159	40.98761318	11T 550519E 4537555N
GS01_SH	6/4/2022	2	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3993159	40.98768057	11T 550527E 4537563N
GS01_SH	6/4/2022	3	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3992639	40.98772767	11T 550532E 4537568N
GS01_SH	6/4/2022	4	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			yes	NA	Deer mouse			-116.3991945	40.98780436	11T 550538E 4537577N
GS01_SH	6/4/2022	5	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3991062	40.98788753	11T 550545E 4537586N
GS01_SH	6/4/2022	6	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3992762	40.98795533	11T 550531E 4537593N
GS01_SH	6/4/2022	7	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3993497	40.98788223	11T 550524E 4537585N
GS01_SH	6/4/2022	8	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3994596	40.9878096	11T 550515E 4537577N
GS01_SH	6/4/2022	9	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3995503	40.98776786	11T 550508E 4537572N
GS01_SH	6/4/2022	10	AustinLinville	MichaelRobison	06:17	06:25	56	2	50-75%	None	no			no			Intact		-116.3996106	40.98770688	11T 550503E 4537565N
GS01_SH	6/5/2022	1	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	yes	NA	Deer mouse			-116.3994047	40.9876238	11T 550520E 4537556N
GS01_SH	6/5/2022	2	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	yes	NA	Deer mouse			-116.3993233	40.98768604	11T 550527E 4537563N
GS01_SH	6/5/2022	3	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	yes	NA	Deer mouse			-116.3992653	40.98773507	11T 550532E 4537569N
GS01_SH	6/5/2022	4	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	yes	NA	Deer mouse			-116.3991881	40.98781944	11T 550538E 4537578N
GS01_SH	6/5/2022	5	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	no			Intact		-116.3991047	40.9878993	11T 550545E 4537587N
GS01_SH	6/5/2022	6	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	no			Intact		-116.3992827	40.98795448	11T 550530E 4537593N
GS01_SH	6/5/2022	7	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	no			Intact		-116.3993468	40.98788636	11T 550525E 4537586N
GS01_SH	6/5/2022	8	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	no			Intact		-116.3994586	40.98782537	11T 550515E 4537579N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
GS01_SH	6/5/2022	9	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	no			Intact		-116.3995509	40.98778259	11T 550508E 4537574N
GS01_SH	6/5/2022	10	AustinLinville	MichaelRobison	06:14	06:21	54	1	75-100%	None	yes	Rain	0.07in	yes	NA	Deer mouse			-116.3996109	40.98771626	11T 550503E 4537567N
GS01_SH	6/6/2022	1	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.3994401	40.98766528	11T 550517E 4537561N
GS01_SH	6/6/2022	2	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.3993785	40.98771097	11T 550522E 4537566N
GS01_SH	6/6/2022	3	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			no			Intact		-116.3993043	40.9877657	11T 550528E 4537572N
GS01_SH	6/6/2022	4	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.3992201	40.98783283	11T 550535E 4537580N
GS01_SH	6/6/2022	5	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.3991473	40.98790565	11T 550541E 4537588N
GS01_SH	6/6/2022	6	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			no			Intact		-116.3992704	40.98795663	11T 550531E 4537593N
GS01_SH	6/6/2022	7	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.3993343	40.98788955	11T 550526E 4537586N
GS01_SH	6/6/2022	8	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			no			Intact		-116.399433	40.98782549	11T 550518E 4537579N
GS01_SH	6/6/2022	9	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			no			Intact		-116.3995334	40.98778578	11T 550509E 4537574N
GS01_SH	6/6/2022	10	AustinLinville	MichaelRobison	06:13	06:21	52	2	0-25%	None	no			yes	NA	Deer mouse			-116.3996037	40.98772128	11T 550503E 4537567N
GS01_SH	6/7/2022	1	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.3994338	40.98765644	11T 550518E 4537560N
GS01_SH	6/7/2022	2	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.3993725	40.98770595	11T 550523E 4537566N
GS01_SH	6/7/2022	3	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.3993056	40.9877637	11T 550528E 4537572N
GS01_SH	6/7/2022	4	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			no			Intact		-116.3992217	40.9878303	11T 550535E 4537579N
GS01_SH	6/7/2022	5	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.3991468	40.98790818	11T 550542E 4537588N
GS01_SH	6/7/2022	6	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			no			Intact		-116.3992615	40.98793344	11T 550532E 4537591N
GS01_SH	6/7/2022	7	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.3993269	40.9878847	11T 550526E 4537585N
GS01_SH	6/7/2022	8	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.3994351	40.98781542	11T 550517E 4537578N
GS01_SH	6/7/2022	9	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.399541	40.98777001	11T 550508E 4537573N
GS01_SH	6/7/2022	10	AustinLinville	MichaelRobison	05:16	05:22	45	2	0-25%	None	no			yes	NA	Deer mouse			-116.3996006	40.98770956	11T 550504E 4537566N
GS02_SH	6/4/2022	1	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3557754	40.79085823	11T 554351E 4515740N
GS02_SH	6/4/2022	2	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3556849	40.79081784	11T 554359E 4515735N
GS02_SH	6/4/2022	3	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3555664	40.79078554	11T 554369E 4515732N
GS02_SH	6/4/2022	4	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3554709	40.79072128	11T 554377E 4515725N
GS02_SH	6/4/2022	5	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3554113	40.79064077	11T 554382E 4515716N
GS02_SH	6/4/2022	6	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3553354	40.79067216	11T 554388E 4515720N
GS02_SH	6/4/2022	7	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3553893	40.79077032	11T 554383E 4515730N
GS02_SH	6/4/2022	8	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3555168	40.79081728	11T 554373E 4515736N
GS02_SH	6/4/2022	9	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3556339	40.79086386	11T 554363E 4515741N
GS02_SH	6/4/2022	10	AustinLinville	MichaelRobison	05:04	05:09	56	5	50-75%	None	no			no			Intact		-116.3557542	40.79090412	11T 554353E 4515745N
GS02_SH	6/5/2022	1	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3557786	40.79085591	11T 554351E 4515740N
GS02_SH	6/5/2022	2	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3556824	40.79083168	11T 554359E 4515737N
GS02_SH	6/5/2022	3	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3555646	40.79078495	11T 554369E 4515732N
GS02_SH	6/5/2022	4	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3554702	40.79072183	11T 554377E 4515725N
GS02_SH	6/5/2022	5	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.355401	40.79063471	11T 554383E 4515715N
GS02_SH	6/5/2022	6	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3553419	40.79067088	11T 554388E 4515719N
GS02_SH	6/5/2022	7	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3553837	40.79076177	11T 554384E 4515729N
GS02_SH	6/5/2022	8	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3555201	40.79081605	11T 554372E 4515735N
GS02_SH	6/5/2022	9	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	yes	NA	Deer mouse			-116.3556354	40.7908603	11T 554363E 4515740N
GS02_SH	6/5/2022	10	AustinLinville	MichaelRobison	05:04	05:08	55	4	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3557502	40.79090252	11T 554353E 4515745N
GS02_SH	6/6/2022	1	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3557672	40.79085381	11T 554358E 4515738N
GS02_SH	6/6/2022	2	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3556728	40.79081725	11T 554370E 4515731N
GS02_SH	6/6/2022	3	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			yes	NA	Deer mouse			-116.3554596	40.79072353	11T 554378E 4515725N
GS02_SH	6/6/2022	4	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3554621	40.79071977	11T 554377E 4515725N
GS02_SH	6/6/2022	5	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3553932	40.79063709	11T 554383E 4515716N
GS02_SH	6/6/2022	6	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3553333	40.79066894	11T 554388E 4515719N
GS02_SH	6/6/2022	7	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3553748	40.79076705	11T 554385E 4515730N
GS02_SH	6/6/2022	8	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3554957	40.79080958	11T 554374E 4515735N
GS02_SH	6/6/2022	9	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3556274	40.79085916	11T 554363E 4515740N
GS02_SH	6/6/2022	10	AustinLinville	MichaelRobison	05:02	05:06	50	5	0-25%	None	no			no			Intact		-116.3557482	40.79090667	11T 554353E 4515745N
GS02_SH	6/7/2022	1	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3557468	40.79088766	11T 554353E 4515743N
GS02_SH	6/7/2022	2	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3556761	40.79082972	11T 554359E 4515737N
GS02_SH	6/7/2022	3	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			yes	NA	Deer mouse			-116.3555698	40.79078538	11T 554368E 4515732N
GS02_SH	6/7/2022	4	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3554787	40.7907279	11T 554376E 4515726N
GS02_SH	6/7/2022	5	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3554014	40.79065023	11T 554383E 4515717N
GS02_SH	6/7/2022	6	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3553376	40.79067049	11T 554388E 4515719N
GS02_SH	6/7/2022	7	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3553733	40.79076257	11T 554385E 4515730N
GS02_SH	6/7/2022	8	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3554937	40.79080907	11T 554375E 4515735N
GS02_SH	6/7/2022	9	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			FalseClose		-116.3556284	40.79086547	11T 554363E 4515741N
GS02_SH	6/7/2022	10	AustinLinville	MichaelRobison	06:10	06:14	46	5	0-25%	None	no			no			Intact		-116.3557417	40.79089405	11T 554354E 4515744N
GS03_SH	6/4/2022	1	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			no			Intact		-116.3494195	40.78824691	11T 554889E 4515454N
GS03_SH	6/4/2022	2	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			no			Pilfer		-116.3494033	40.78823707	11T 554891E 4515453N
GS03_SH	6/4/2022	3	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			no			Intact		-116.3493207	40.78827945	11T 554898E 4515458N
GS03_SH	6/4/2022	4	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			no			Intact		-116.3492055	40.78828034	11T 554907E 4515458N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
GS03_SH	6/4/2022	5	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			no			Intact		-116.3490929	40.78829826	11T 554917E 4515460N
GS03_SH	6/4/2022	6	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			yes	NA	Deer mouse			-116.349042	40.78835582	11T 554921E 4515466N
GS03_SH	6/4/2022	7	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			yes	NA	Deer mouse			-116.3491705	40.78836066	11T 554910E 4515467N
GS03_SH	6/4/2022	8	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			yes	NA	Deer mouse			-116.3493026	40.78832973	11T 554899E 4515463N
GS03_SH	6/4/2022	9	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			no			Intact		-116.3494438	40.78830236	11T 554887E 4515460N
GS03_SH	6/4/2022	10	AustinLinville	MichaelRobison	05:12	05:19	56	2	50-75%	None	no			no			Intact		-116.3495671	40.78827589	11T 554877E 4515457N
GS03_SH	6/5/2022	1	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3494752	40.78824192	11T 554885E 4515453N
GS03_SH	6/5/2022	2	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3493826	40.78823	11T 554892E 4515452N
GS03_SH	6/5/2022	3	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3493013	40.78827598	11T 554899E 4515457N
GS03_SH	6/5/2022	4	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3491848	40.78827878	11T 554909E 4515458N
GS03_SH	6/5/2022	5	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3490865	40.78829759	11T 554917E 4515460N
GS03_SH	6/5/2022	6	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	yes	NA	Deer mouse			-116.3490625	40.78835145	11T 554919E 4515466N
GS03_SH	6/5/2022	7	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3491737	40.78836878	11T 554910E 4515468N
GS03_SH	6/5/2022	8	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3493187	40.78835042	11T 554898E 4515466N
GS03_SH	6/5/2022	9	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3494455	40.78830887	11T 554887E 4515461N
GS03_SH	6/5/2022	10	AustinLinville	MichaelRobison	05:11	05:16	54	3	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3495769	40.78827267	11T 554876E 4515457N
GS03_SH	6/6/2022	1	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.3495034	40.78824699	11T 554882E 4515454N
GS03_SH	6/6/2022	2	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.3493932	40.78822963	11T 554891E 4515452N
GS03_SH	6/6/2022	3	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.349298	40.78828385	11T 554899E 4515458N
GS03_SH	6/6/2022	4	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.3491929	40.78827949	11T 554908E 4515458N
GS03_SH	6/6/2022	5	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			yes	NA	Deer mouse			-116.3490987	40.78829733	11T 554916E 4515460N
GS03_SH	6/6/2022	6	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			yes	NA	Deer mouse			-116.3490364	40.78834749	11T 554921E 4515465N
GS03_SH	6/6/2022	7	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.3491518	40.78837326	11T 554912E 4515468N
GS03_SH	6/6/2022	8	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.3492997	40.78832867	11T 554899E 4515463N
GS03_SH	6/6/2022	9	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.3494432	40.78829305	11T 554887E 4515459N
GS03_SH	6/6/2022	10	AustinLinville	MichaelRobison	05:10	05:15	50	5	0-25%	None	no			no			Intact		-116.3495751	40.78827326	11T 554876E 4515457N
GS03_SH	6/7/2022	1	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			Intact		-116.3494904	40.78824192	11T 554883E 4515453N
GS03_SH	6/7/2022	2	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			Intact		-116.3494019	40.78824982	11T 554891E 4515454N
GS03_SH	6/7/2022	3	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			Intact		-116.3493243	40.78827401	11T 554897E 4515457N
GS03_SH	6/7/2022	4	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			Intact		-116.3491975	40.78828046	11T 554908E 4515458N
GS03_SH	6/7/2022	5	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			FalseClose		-116.3490933	40.78829148	11T 554917E 4515459N
GS03_SH	6/7/2022	6	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			yes	NA	Deer mouse			-116.3490383	40.78836948	11T 554921E 4515468N
GS03_SH	6/7/2022	7	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			Intact		-116.3491526	40.78837749	11T 554912E 4515469N
GS03_SH	6/7/2022	8	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			Intact		-116.3493056	40.78833998	11T 554899E 4515464N
GS03_SH	6/7/2022	9	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			no			Intact		-116.3494514	40.78828785	11T 554886E 4515458N
GS03_SH	6/7/2022	10	AustinLinville	MichaelRobison	06:18	06:25	46	5	0-25%	None	no			yes	NA	Deer mouse			-116.3495641	40.78826305	11T 554877E 4515456N
GS04_SH	6/4/2022	1	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.343173	40.78849576	11T 555416E 4515486N
GS04_SH	6/4/2022	2	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3430428	40.78853627	11T 555427E 4515490N
GS04_SH	6/4/2022	3	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3429386	40.78856868	11T 555436E 4515494N
GS04_SH	6/4/2022	4	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3428008	40.78866665	11T 555447E 4515505N
GS04_SH	6/4/2022	5	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3427438	40.78876631	11T 555452E 4515516N
GS04_SH	6/4/2022	6	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			FalseClose		-116.3427727	40.78877795	11T 555450E 4515517N
GS04_SH	6/4/2022	7	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3428334	40.7886807	11T 555445E 4515506N
GS04_SH	6/4/2022	8	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3429158	40.78864405	11T 555438E 4515502N
GS04_SH	6/4/2022	9	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3430375	40.78858103	11T 555427E 4515495N
GS04_SH	6/4/2022	10	AustinLinville	MichaelRobison	05:22	05:28	56	5	50-75%	None	no			no			Intact		-116.3431543	40.78852862	11T 555418E 4515489N
GS04_SH	6/5/2022	1	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3431676	40.78849458	11T 555417E 4515485N
GS04_SH	6/5/2022	2	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3430371	40.78853524	11T 555427E 4515490N
GS04_SH	6/5/2022	3	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3429307	40.78857424	11T 555436E 4515494N
GS04_SH	6/5/2022	4	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3427871	40.78867323	11T 555448E 4515505N
GS04_SH	6/5/2022	5	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3427381	40.7887647	11T 555453E 4515516N
GS04_SH	6/5/2022	6	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3427682	40.78877956	11T 555450E 4515517N
GS04_SH	6/5/2022	7	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3428271	40.78867854	11T 555445E 4515506N
GS04_SH	6/5/2022	8	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3429195	40.78863415	11T 555437E 4515501N
GS04_SH	6/5/2022	9	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3430356	40.78858863	11T 555428E 4515496N
GS04_SH	6/5/2022	10	AustinLinville	MichaelRobison	05:19	05:24	54	2	75-100%	Rain	yes	Rain	0.07in	no			Intact		-116.3431444	40.78852926	11T 555418E 4515489N
GS04_SH	6/6/2022	1	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3431584	40.78849979	11T 555417E 4515486N
GS04_SH	6/6/2022	2	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3430313	40.78853694	11T 555428E 4515490N
GS04_SH	6/6/2022	3	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3429209	40.78857338	11T 555437E 4515494N
GS04_SH	6/6/2022	4	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3427779	40.7886741	11T 555449E 4515506N
GS04_SH	6/6/2022	5	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3427362	40.7887625	11T 555453E 4515515N
GS04_SH	6/6/2022	6	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3427671	40.78877367	11T 555450E 4515517N
GS04_SH	6/6/2022	7	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3428197	40.78867415	11T 555446E 4515506N
GS04_SH	6/6/2022	8	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3429015	40.78864089	11T 555439E 4515502N
GS04_SH	6/6/2022	9	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3430309	40.78857657	11T 555428E 4515495N
GS04_SH	6/6/2022	10	AustinLinville	MichaelRobison	05:17	05:23	49	5	0-25%	None	no			no			Intact		-116.3431662	40.78851609	11T 555417E 4515488N

Trap Location	Date	Trap ID	Surveyor 1	Surveyor 2	Start Time	End Time	Temperature (°F)	Wind Speed (mph)	Cloud Cover	Precipitation	Precipitation since last check?	Precipitation Type	Estimated Amount	Live capture?	Sample ID	Species	Trap Status	Comments	Longitude	Latitude	UTM Location
GS04_SH	6/7/2022	1	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3431567	40.78850087	11T 555417E 4515486N
GS04_SH	6/7/2022	2	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3430399	40.78852261	11T 555427E 4515489N
GS04_SH	6/7/2022	3	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3429406	40.78857137	11T 555436E 4515494N
GS04_SH	6/7/2022	4	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3427723	40.78867601	11T 555450E 4515506N
GS04_SH	6/7/2022	5	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3427331	40.78875898	11T 555453E 4515515N
GS04_SH	6/7/2022	6	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3427781	40.78877396	11T 555449E 4515517N
GS04_SH	6/7/2022	7	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3428755	40.78865885	11T 555441E 4515504N
GS04_SH	6/7/2022	8	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.342915	40.78863731	11T 555438E 4515501N
GS04_SH	6/7/2022	9	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3430354	40.78858293	11T 555428E 4515495N
GS04_SH	6/7/2022	10	AustinLinville	MichaelRobison	06:28	06:34	46	5	0-25%	None	no			no			Intact		-116.3431528	40.78853269	11T 555418E 4515490N

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS01_SH	0642316

Photo No.	Date:
1	6/3/2022

Direction Photo Taken:
North

Description:
Overview of the GS01_SH trapping site.



Photo No.	Date:
2	6/3/2022

Direction Photo Taken:
East

Description:
Overview of the GS01_SH trapping site.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS01_SH	0642316

Photo No.	Date:
3	6/3/2022

Direction Photo Taken:
West

Description:
Overview of the GS01_SH trapping site.



Photo No.	Date:
4	6/3/2022

Direction Photo Taken:
South

Description:
Overview of the GS01_SH trapping site.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS01_SH	0642316

Photo No.	Date:
5	6/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 1 within the GS01_SH transect.



Photo No.	Date:
6	6/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 2 within the GS01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS01_SH	0642316

Photo No.	Date:
7	6/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 3 within the GS01_SH transect.



Photo No.	Date:
8	6/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 4 within the GS01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS01_SH	0642316

Photo No.	Date:
9	6/3/2022

Direction Photo Taken:
Northeast

Description:
Close view of trap 5 within the GS01_SH transect.



Photo No.	Date:
10	6/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 6 within the GS01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS01_SH	0642316

Photo No.	Date:
11	6/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 7 within the GS01_SH transect.



Photo No.	Date:
12	6/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 8 within the GS01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS01_SH	0642316

Photo No.	Date:
13	6/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 9 within the GS01_SH transect.



Photo No.	Date:
14	6/3/2022

Direction Photo Taken:
Southwest

Description:
Close view of trap 10 within the GS01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS02_SH	0642316

Photo No.	Date:
15	6/3/2022

Direction Photo Taken:
North

Description:
Overview of the GS02_SH trapping site.



Photo No.	Date:
16	6/3/2022

Direction Photo Taken:
East

Description:
Overview of the GS02_SH trapping site.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS02_SH	0642316

Photo No.	Date:
17	6/3/2022

Direction Photo Taken:
South

Description:
Overview of the GS02_SH trapping site.



Photo No.	Date:
18	6/3/2022

Photo Taken:
West

Description:
Overview of the GS02_SH trapping site.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS02_SH	0642316

Photo No.	Date:
19	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 1 within the GS02_SH transect.



Photo No.	Date:
20	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 2 within the GS02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS02_SH	0642316

Photo No.	Date:
21	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 3 within the GS02_SH transect.



Photo No.	Date:
22	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 4 within the GS02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS02_SH	0642316

Photo No.	Date:
23	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 5 within the GS02_SH transect.



Photo No.	Date:
24	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 6 within the GS02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS02_SH	0642316

Photo No.	Date:
25	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 7 within the GS02_SH transect.



Photo No.	Date:
26	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 8 within the GS02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS02_SH	0642316

Photo No.	Date:
27	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 9 within the GS02_SH transect.



Photo No.	Date:
28	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 10 within the GS02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS03_SH	0642316

Photo No.	Date:
29	6/3/2022

Photo Taken:
North

Description:
Overview of the GS03_SH trapping site.



Photo No.	Date:
30	6/3/2022

Photo Taken:
East

Description:
Overview of the GS03_SH trapping site.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS03_SH	0642316

Photo No.	Date:
31	6/3/2022

Photo Taken:
South

Description:
Overview of the GS03_SH trapping site.



Photo No.	Date:
32	6/3/2022

Photo Taken:
West

Description:
Overview of the GS03_SH trapping site.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS03_SH	0642316

Photo No.	Date:
33	6/3/2022

Photo Taken:
East

Description:
Close view of trap 1 within the GS03_SH transect.



Photo No.	Date:
34	6/3/2022

Photo Taken:
East

Description:
Close view of trap 2 within the GS03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS03_SH	0642316

Photo No.	Date:
35	6/3/2022

Photo Taken:
East

Description:
Close view of trap 3 within the GS03_SH transect.



Photo No.	Date:
36	6/3/2022

Photo Taken:
East

Description:
Close view of trap 4 within the GS03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS03_SH	0642316

Photo No.	Date:
37	6/3/2022

Photo Taken:
East

Description:
Close view of trap 5 within the GS03_SH transect.



Photo No.	Date:
38	6/3/2022

Photo Taken:
West

Description:
Close view of trap 6 within the GS03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS03_SH	0642316

Photo No.	Date:
39	6/3/2022

Photo Taken:
West

Description:
Close view of trap 7 within the GS03_SH transect.



Photo No.	Date:
40	6/3/2022

Photo Taken:
West

Description:
Close view of trap 8 within the GS03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS03_SH	0642316

Photo No.	Date:
41	6/3/2022

Photo Taken:
West

Description:
Close view of trap 9 within the GS03_SH transect.



Photo No.	Date:
42	6/3/2022

Photo Taken:
West

Description:
Close view of trap 10 within the GS03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS04_SH	0642316

Photo No.	Date:
43	6/3/2022

Photo Taken:
North

Description:
Overview of the GS04_SH trapping area.



Photo No.	Date:
44	6/3/2022

Photo Taken:
East

Description:
Overview of the GS04_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS04_SH	0642316

Photo No.	Date:
45	6/3/2022

Photo Taken:
South

Description:
Overview of the GS04_SH trapping area.



Photo No.	Date:
46	6/3/2022

Photo Taken:
West

Description:
Overview of the GS04_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS04_SH	0642316

Photo No.	Date:
47	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 1 within the GS04_SH transect.



Photo No.	Date:
48	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 2 within the GS04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS04_SH	0642316

Photo No.	Date:
49	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 3 within the GS04_SH transect.



Photo No.	Date:
50	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 4 within the GS04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS04_SH	0642316

Photo No.	Date:
51	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 5 within the GS04_SH transect.



Photo No.	Date:
52	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 6 within the GS04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS04_SH	0642316

Photo No.	Date:
53	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 7 within the GS04_SH transect.



Photo No.	Date:
54	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 8 within the GS04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	GS04_SH	0642316

Photo No.	Date:
55	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 9 within the GS04_SH transect.



Photo No.	Date:
56	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 10 within the GS04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA01_SH	0642316

Photo No.	Date:
57	6/3/2022

Photo Taken:
North

Description:
Overview of the CA01_SH trapping area.



Photo No.	Date:
58	6/3/2022

Photo Taken:
East

Description:
Overview of the CA01_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA01_SH	0642316

Photo No.	Date:
59	6/3/2022

Photo Taken:
South

Description:
Overview of the CA01_SH trapping area.



Photo No.	Date:
60	6/3/2022

Photo Taken:
West

Description:
Overview of the CA01_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA01_SH	0642316

Photo No.	Date:
61	6/3/2022

Photo Taken:
North

Description:
Close view of trap 1 within the CA01_SH transect.



Photo No.	Date:
62	6/3/2022

Photo Taken:
North

Description:
Close view of trap 2 within the CA01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA01_SH	0642316

Photo No.	Date:
63	6/3/2022

Photo Taken:
North

Description:
Close view of trap 3 within the CA01_SH transect.



Photo No.	Date:
64	6/3/2022

Photo Taken:
North

Description:
Close view of trap 4 within the CA01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA01_SH	0642316

Photo No.	Date:
65	6/3/2022

Photo Taken:
North

Description:
Close view of trap 5 within the CA01_SH transect.



Photo No.	Date:
66	6/3/2022

Photo Taken:
South

Description:
Close view of trap 6 within the CA01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA01_SH	0642316

Photo No.	Date:
67	6/3/2022

Photo Taken:
South

Description:
Close view of trap 7 within the CA01_SH transect.



Photo No.	Date:
68	6/3/2022

Photo Taken:
South

Description:
Close view of trap 8 within the CA01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA01_SH	0642316

Photo No.	Date:
69	6/3/2022

Photo Taken:
South

Description:
Close view of trap 9 within the CA01_SH transect.



Photo No.	Date:
70	6/3/2022

Photo Taken:
South

Description:
Close view of trap 10 within the CA01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA02_SH	0642316

Photo No.	Date:
71	6/3/2022

Photo Taken:
North

Description:
Overview of the CA02_SH trapping area.



Photo No.	Date:
72	6/3/2022

Photo Taken:
East

Description:
Overview of the CA02_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA02_SH	0642316

Photo No.	Date:
73	6/3/2022

Photo Taken:
South

Description:
Overview of the CA02_SH trapping area.



Photo No.	Date:
74	6/3/2022

Photo Taken:
West

Description:
Overview of the CA02_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA02_SH	0642316

Photo No.	Date:
75	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 1 within the CA02_SH transect.



Photo No.	Date:
76	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 2 within the CA02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA02_SH	0642316

Photo No.	Date:
77	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 3 within the CA02_SH transect.



Photo No.	Date:
78	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 4 within the CA02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA02_SH	0642316

Photo No.	Date:
79	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 5 within the CA02_SH transect.



Photo No.	Date:
80	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 6 within the CA02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA02_SH	0642316

Photo No.	Date:
81	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 7 within the CA02_SH transect.



Photo No.	Date:
82	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 8 within the CA02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA02_SH	0642316

Photo No.	Date:
83	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 9 within the CA02_SH transect.



Photo No.	Date:
84	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 10 within the CA02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA03_SH_Alt	0642316

Photo No.	Date:
85	6/3/2022

Photo Taken:
North

Description:
Overview of the CA03_SH_Alt trapping area.



Photo No.	Date:
86	6/3/2022

Photo Taken:
East

Description:
Overview of the CA03_SH_Alt trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA03_SH_Alt	0642316

Photo No.	Date:
87	6/3/2022

Photo Taken:
South

Description:
Overview of the CA03_SH_Alt trapping area.



Photo No.	Date:
88	6/3/2022

Photo Taken:
West

Description:
Overview of the CA03_SH_Alt trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA03_SH_Alt	0642316

Photo No.	Date:
89	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 1 within the CA03_SH_Alt transect.



Photo No.	Date:
90	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 2 within the CA03_SH_Alt transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA03_SH_Alt	0642316

Photo No.	Date:
91	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 3 within the CA03_SH_Alt transect.



Photo No.	Date:
92	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 4 within the CA03_SH_Alt transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA03_SH_Alt	0642316

Photo No.	Date:
93	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 5 within the CA03_SH_Alt transect.



Photo No.	Date:
94	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 6 within the CA03_SH_Alt transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA03_SH_Alt	0642316

Photo No.	Date:
95	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 7 within the CA03_SH_Alt transect.



Photo No.	Date:
96	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 8 within the CA03_SH_Alt transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA03_SH_Alt	0642316

Photo No.	Date:
97	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 9 within the CA03_SH_Alt transect.



Photo No.	Date:
98	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 10 within the CA03_SH_Alt transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA05_SH_Alt	0642316

Photo No.	Date:
99	6/3/2022

Photo Taken:
North

Description:
Overview of the CA05_SH_Alt trapping area.



Photo No.	Date:
100	6/3/2022

Photo Taken:
East

Description:
Overview of the CA05_SH_Alt trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA05_SH_Alt	0642316

Photo No.	Date:
101	6/3/2022

Photo Taken:
South

Description:
Overview of the CA05_SH_Alt trapping area.



Photo No.	Date:
102	6/3/2022

Photo Taken:
West

Description:
Overview of the CA05_SH_Alt trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA06_SH	0642316

Photo No.	Date:
103	6/3/2022

Photo Taken:
North

Description:
Overview of the CA06_SH trapping area.



Photo No.	Date:
104	6/3/2022

Photo Taken:
East

Description:
Overview of the CA06_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA06_SH	0642316

Photo No.	Date:
105	6/3/2022

Photo Taken:
South

Description:
Overview of the CA06_SH trapping area.



Photo No.	Date:
106	6/3/2022

Photo Taken:
West

Description:
Overview of the CA06_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA06_SH	0642316

Photo No.	Date:
107	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 1 within the CA06_SH transect.



Photo No.	Date:
108	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 2 within the CA06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA06_SH	0642316

Photo No.	Date:
109	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 3 within the CA06_SH transect.



Photo No.	Date:
110	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 4 within the CA06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA06_SH	0642316

Photo No.	Date:
111	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 5 within the CA06_SH transect.



Photo No.	Date:
112	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 6 within the CA06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA06_SH	0642316

Photo No.	Date:
113	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 7 within the CA06_SH transect.



Photo No.	Date:
114	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 8 within the CA06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA06_SH	0642316

Photo No.	Date:
115	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 9 within the CA06_SH transect.



Photo No.	Date:
116	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 10 within the CA06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA07_SH	0642316

Photo No.	Date:
117	6/3/2022

Photo Taken:
North

Description:
Overview of the CA07_SH trapping area.



Photo No.	Date:
118	6/3/2022

Photo Taken:
East

Description:
Overview of the CA07_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA07_SH	0642316

Photo No.	Date:
119	6/3/2022

Photo Taken:
South

Description:
Overview of the CA07_SH trapping area.



Photo No.	Date:
120	6/3/2022

Photo Taken:
West

Description:
Overview of the CA07_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA07_SH	0642316

Photo No.	Date:
121	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 1 within the CA07_SH transect.



Photo No.	Date:
122	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 2 within the CA07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA07_SH	0642316

Photo No.	Date:
123	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 3 within the CA07_SH transect.



Photo No.	Date:
124	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 4 within the CA07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA07_SH	0642316

Photo No.	Date:
125	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 5 within the CA07_SH transect.



Photo No.	Date:
126	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 6 within the CA07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA07_SH	0642316

Photo No.	Date:
127	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 7 within the CA07_SH transect.



Photo No.	Date:
128	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 8 within the CA07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CA07_SH	0642316

Photo No.	Date:
129	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 9 within the CA07_SH transect.



Photo No.	Date:
130	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 10 within the CA07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
131	6/3/2022

Photo Taken:
North

Description:
Overview of the CV10_SH transect.



Photo No.	Date:
132	6/3/2022

Photo Taken:
East

Description:
Overview of the CV10_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV01_SH	0642316

Photo No.	Date:
133	6/3/2022

Photo Taken:
North

Description:
Overview of the CV01_SH trapping area.



Photo No.	Date:
134	6/3/2022

Photo Taken:
East

Description:
Overview of the CV01_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV01_SH	0642316

Photo No.	Date:
135	6/3/2022

Photo Taken:
South

Description:
Overview of the CV01_SH trapping area.



Photo No.	Date:
136	6/3/2022

Photo Taken:
West

Description:
Overview of the CV01_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV01_SH	0642316

Photo No.	Date:
137	6/3/2022

Photo Taken:
East

Description:
Close view of trap 1 within the CV01_SH transect.



Photo No.	Date:
138	6/3/2022

Photo Taken:
East

Description:
Close view of trap 2 within the CV01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV01_SH	0642316

Photo No.	Date:
139	6/3/2022

Photo Taken:
East

Description:
Close view of trap 3 within the CV01_SH transect.



Photo No.	Date:
140	6/3/2022

Photo Taken:
East

Description:
Close view of trap 4 within the CV01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV01_SH	0642316

Photo No.	Date:
141	6/3/2022

Photo Taken:
East

Description:
Close view of trap 5 within the CV01_SH transect.



Photo No.	Date:
142	6/3/2022

Photo Taken:
West

Description:
Close view of trap 6 within the CV01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV01_SH	0642316

Photo No.	Date:
143	6/3/2022

Photo Taken:
West

Description:
Close view of trap 7 within the CV01_SH transect.



Photo No.	Date:
144	6/3/2022

Photo Taken:
West

Description:
Close view of trap 8 within the CV01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV01_SH	0642316

Photo No.	Date:
145	6/3/2022

Photo Taken:
West

Description:
Close view of trap 9 within the CV01_SH transect.



Photo No.	Date:
146	6/3/2022

Photo Taken:
West

Description:
Close view of trap 10 within the CV01_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV02_SH	0642316

Photo No.	Date:
147	6/3/2022

Photo Taken:
North

Description:
Overview of the CV02_SH trapping area.



Photo No.	Date:
148	6/3/2022

Photo Taken:
East

Description:
Overview of the CV02_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV02_SH	0642316

Photo No.	Date:
149	6/3/2022

Photo Taken:
South

Description:
Overview of the CV02_SH trapping area.



Photo No.	Date:
150	6/3/2022

Photo Taken:
West

Description:
Overview of the CV02_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV02_SH	0642316

Photo No.	Date:
151	6/3/2022

Photo Taken:
West

Description:
Close view of trap 1 within the CV02_SH transect.



Photo No.	Date:
152	6/3/2022

Photo Taken:
West

Description:
Close view of trap 1 within the CV02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV02_SH	0642316

Photo No.	Date:
153	6/3/2022

Photo Taken:
West

Description:
Close view of trap 3 within the CV02_SH transect.



Photo No.	Date:
154	6/3/2022

Photo Taken:
West

Description:
Close view of trap 4 within the CV02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV02_SH	0642316

Photo No.	Date:
155	6/3/2022

Photo Taken:
West

Description:
Close view of trap 5 within the CV02_SH transect.



Photo No.	Date:
156	6/3/2022

Photo Taken:
East

Description:
Close view of trap 6 within the CV02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV02_SH	0642316

Photo No.	Date:
157	6/3/2022

Photo Taken:
East

Description:
Close view of trap 7 within the CV02_SH transect.



Photo No.	Date:
158	6/3/2022

Photo Taken:
East

Description:
Close view of trap 8 within the CV02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV02_SH	0642316

Photo No.	Date:
159	6/3/2022

Photo Taken:
East

Description:
Close view of trap 9 within the CV02_SH transect.



Photo No.	Date:
160	6/3/2022

Photo Taken:
East

Description:
Close view of trap 10 within the CV02_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV03_SH	0642316

Photo No.	Date:
161	6/3/2022

Photo Taken:
North

Description:
Overview of the CV03_SH trapping area.



Photo No.	Date:
162	6/3/2022

Photo Taken:
East

Description:
Overview of the CV03_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV03_SH	0642316

Photo No.	Date:
163	6/3/2022

Photo Taken:
South

Description:
Overview of the CV03_SH trapping area.



Photo No.	Date:
164	6/3/2022

Photo Taken:
West

Description:
Overview of the CV03_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV03_SH	0642316

Photo No.	Date:
165	6/3/2022

Photo Taken:
West

Description:
Close view of trap 1 within the CV03_SH transect.



Photo No.	Date:
166	6/3/2022

Photo Taken:
West

Description:
Close view of trap 2 within the CV03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV03_SH	0642316

Photo No.	Date:
167	6/3/2022

Photo Taken:
West

Description:
Close view of trap 3 within the CV03_SH transect.



Photo No.	Date:
168	6/3/2022

Photo Taken:
West

Description:
Close view of trap 4 within the CV03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV03_SH	0642316

Photo No.	Date:
169	6/3/2022

Photo Taken:
West

Description:
Close view of trap 5 within the CV03_SH transect.



Photo No.	Date:
170	6/3/2022

Photo Taken:
West

Description:
Close view of trap 6 within the CV03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV03_SH	0642316

Photo No.	Date:
171	6/3/2022

Photo Taken:
West

Description:
Close view of trap 7 within the CV03_SH transect.



Photo No.	Date:
172	6/3/2022

Photo Taken:
West

Description:
Close view of trap 8 within the CV03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV03_SH	0642316

Photo No.	Date:
173	6/3/2022

Photo Taken:
West

Description:
Close view of trap 9 within the CV03_SH transect.



Photo No.	Date:
174	6/3/2022

Photo Taken:
West

Description:
Close view of trap 10 within the CV03_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV04_SH	0642316

Photo No.	Date:
175	6/3/2022

Photo Taken:
North

Description:
Overview of the CV04_SH trapping area.



Photo No.	Date:
176	6/3/2022

Photo Taken:
East

Description:
Overview of the CV04_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV04_SH	0642316

Photo No.	Date:
177	6/3/2022

Photo Taken:
South

Description:
Overview of the CV04_SH trapping area.



Photo No.	Date:
178	6/3/2022

Photo Taken:
West

Description:
Overview of the CV04_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV04_SH	0642316

Photo No.	Date:
179	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 1 within the CV04_SH transect.



Photo No.	Date:
180	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 2 within the CV04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV04_SH	0642316

Photo No.	Date:
181	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 3 within the CV04_SH transect.



Photo No.	Date:
182	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 4 within the CV04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV04_SH	0642316

Photo No.	Date:
183	6/3/2022

Photo Taken:
Southwest

Description:
Close view of trap 5 within the CV04_SH transect.



Photo No.	Date:
184	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 6 within the CV04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV04_SH	0642316

Photo No.	Date:
185	6/3/2022

Photo Taken:
Northeast

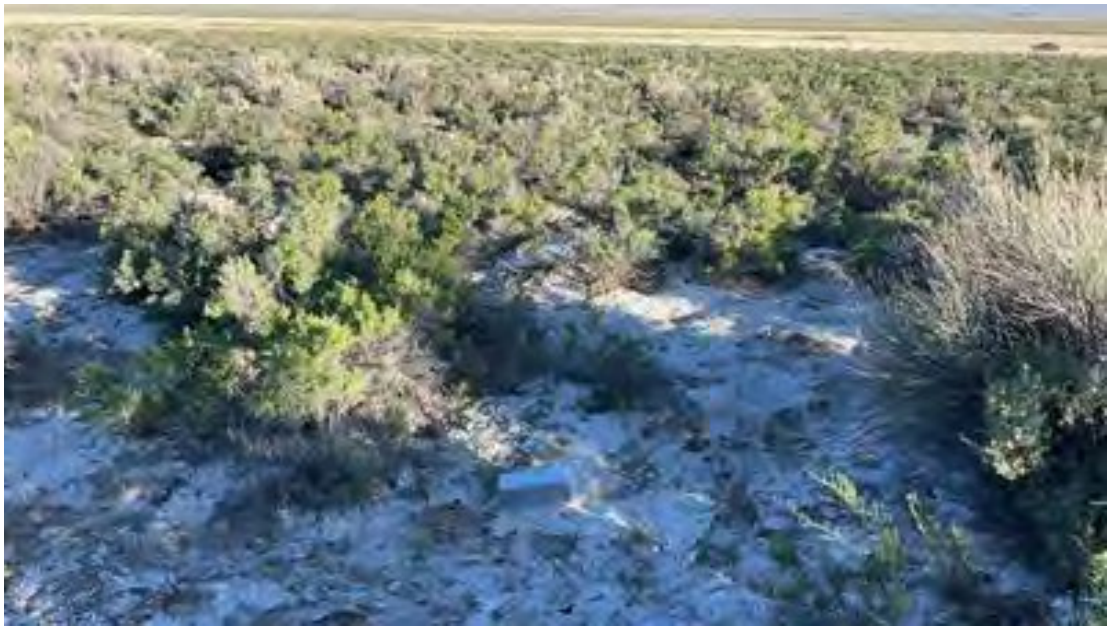
Description:
Close view of trap 7 within the CV04_SH transect.



Photo No.	Date:
186	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 8 within the CV04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV04_SH	0642316

Photo No.	Date:
187	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 9 within the CV04_SH transect.



Photo No.	Date:
188	6/3/2022

Photo Taken:
Northeast

Description:
Close view of trap 10 within the CV04_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV05_SH	0642316

Photo No.	Date:
189	6/3/2022

Photo Taken:
North

Description:
Overview of the CV05_SH trapping area.



Photo No.	Date:
190	6/3/2022

Photo Taken:
East

Description:
Overview of the CV05_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV05_SH	0642316

Photo No.	Date:
191	6/3/2022

Photo Taken:
South

Description:
Overview of the CV05_SH trapping area.



Photo No.	Date:
192	6/3/2022

Photo Taken:
West

Description:
Overview of the CV05_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV05_SH	0642316

Photo No.	Date:
193	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 1 within the CV05_SH transect.



Photo No.	Date:
194	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 2 within the CV05_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV05_SH	0642316

Photo No.	Date:
195	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 3 within the CV05_SH transect.



Photo No.	Date:
196	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 4 within the CV05_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV05_SH	0642316

Photo No.	Date:
197	6/3/2022

Photo Taken:
Southeast

Description:
Close view of trap 5 within the CV05_SH transect.



Photo No.	Date:
198	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 6 within the CV05_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV05_SH	0642316

Photo No.	Date:
199	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 7 within the CV05_SH transect.



Photo No.	Date:
200	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 8 within the CV05_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV05_SH	0642316

Photo No.	Date:
201	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 9 within the CV05_SH transect.



Photo No.	Date:
202	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 10 within the CV05_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV06_SH	0642316

Photo No.	Date:
203	6/3/2022

Photo Taken:
North

Description:
Overview of the CV06_SH trapping area.



Photo No.	Date:
204	6/3/2022

Photo Taken:
East

Description:
Overview of the CV06_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV06_SH	0642316

Photo No.	Date:
205	6/3/2022

Photo Taken:
South

Description:
Overview of the CV06_SH trapping area.



Photo No.	Date:
206	6/3/2022

Photo Taken:
West

Description:
Overview of the CV06_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV06_SH	0642316

Photo No.	Date:
207	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 1 within the CV06_SH transect.



Photo No.	Date:
208	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 2 within the CV06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV06_SH	0642316

Photo No.	Date:
209	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 3 within the CV06_SH transect.



Photo No.	Date:
210	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 4 within the CV06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV06_SH	0642316

Photo No.	Date:
211	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 5 within the CV06_SH transect.



Photo No.	Date:
212	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 6 within the CV06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV06_SH	0642316

Photo No.	Date:
213	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 7 within the CV06_SH transect.



Photo No.	Date:
214	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 8 within the CV06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV06_SH	0642316

Photo No.	Date:
215	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 9 within the CV06_SH transect.



Photo No.	Date:
216	6/3/2022

Photo Taken:
Northwest

Description:
Close view of trap 10 within the CV06_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV07_SH	0642316

Photo No.	Date:
217	6/3/2022

Photo Taken:
North

Description:
Overview of the CV07_SH trapping area.



Photo No.	Date:
218	6/3/2022

Photo Taken:
East

Description:
Overview of the CV07_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV07_SH	0642316

Photo No.	Date:
219	6/3/2022

Photo Taken:
South

Description:
Overview of the CV07_SH trapping area.



Photo No.	Date:
220	6/3/2022

Photo Taken:
West

Description:
Overview of the CV07_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV07_SH	0642316

Photo No.	Date:
221	6/3/2022

Photo Taken:
West

Description:
Close view of trap 1 within the CV07_SH transect.



Photo No.	Date:
222	6/3/2022

Photo Taken:
West

Description:
Close view of trap 2 within the CV07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV07_SH	0642316

Photo No.	Date:
223	6/3/2022

Photo Taken:
West

Description:
Close view of trap 3 within the CV07_SH transect.



Photo No.	Date:
224	6/3/2022

Photo Taken:
West

Description:
Close view of trap 4 within the CV07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV07_SH	0642316

Photo No.	Date:
225	6/3/2022

Photo Taken:
West

Description:
Close view of trap 5 within the CV07_SH transect.



Photo No.	Date:
226	6/3/2022

Photo Taken:
East

Description:
Close view of trap 6 within the CV07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV07_SH	0642316

Photo No.	Date:
227	6/3/2022

Photo Taken:
East

Description:
Close view of trap 7 within the CV07_SH transect.



Photo No.	Date:
228	6/3/2022

Photo Taken:
East

Description:
Close view of trap 8 within the CV07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV07_SH	0642316

Photo No.	Date:
229	6/3/2022

Photo Taken:
East

Description:
Close view of trap 9 within the CV07_SH transect.



Photo No.	Date:
230	6/3/2022

Photo Taken:
East

Description:
Close view of trap 10 within the CV07_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV08_SH	0642316

Photo No.	Date:
231	6/3/2022

Photo Taken:
North

Description:
Overview of the CV08_SH trapping area.



Photo No.	Date:
232	6/3/2022

Photo Taken:
East

Description:
Overview of the CV08_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV08_SH	0642316

Photo No.	Date:
233	6/3/2022

Photo Taken:
South

Description:
Overview of the CV08_SH trapping area.



Photo No.	Date:
234	6/3/2022

Photo Taken:
West

Description:
Overview of the CV08_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV08_SH	0642316

Photo No.	Date:
235	6/3/2022

Photo Taken:
North

Description:
Close view of trap 1 within the CV08_SH transect.



Photo No.	Date:
236	6/3/2022

Photo Taken:
North

Description:
Close view of trap 2 within the CV08_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV08_SH	0642316

Photo No.	Date:
237	6/3/2022

Photo Taken:
North

Description:
Close view of trap 3 within the CV08_SH transect.



Photo No.	Date:
238	6/3/2022

Photo Taken:
North

Description:
Close view of trap 4 within the CV08_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV08_SH	0642316

Photo No.	Date:
239	6/3/2022

Photo Taken:
North

Description:
Close view of trap 5 within the CV08_SH transect.



Photo No.	Date:
240	6/3/2022

Photo Taken:
South

Description:
Close view of trap 6 within the CV08_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV08_SH	0642316

Photo No.	Date:
241	6/3/2022

Photo Taken:
South

Description:
Close view of trap 7 within the CV08_SH transect.



Photo No.	Date:
242	6/3/2022

Photo Taken:
South

Description:
Close view of trap 8 within the CV08_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV08_SH	0642316

Photo No.	Date:
243	6/3/2022

Photo Taken:
South

Description:
Close view of trap 9 within the CV08_SH transect.



Photo No.	Date:
244	6/3/2022

Photo Taken:
South

Description:
Close view of trap 10 within the CV08_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV09_SH	0642316

Photo No.	Date:
245	6/3/2022

Photo Taken:
North

Description:
Overview of the CV09_SH trapping area.



Photo No.	Date:
246	6/3/2022

Photo Taken:
East

Description:
Overview of the CV09_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV09_SH	0642316

Photo No.	Date:
247	6/3/2022

Photo Taken:
South

Description:
Overview of the CV09_SH trapping area.



Photo No.	Date:
248	6/3/2022

Photo Taken:
West

Description:
Overview of the CV09_SH trapping area.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV09_SH	0642316

Photo No.	Date:
249	6/3/2022

Photo Taken:
East

Description:
Close view of trap 1 within the CV09_SH transect.



Photo No.	Date:
250	6/3/2022

Photo Taken:
East

Description:
Close view of trap 2 within the CV09_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV09_SH	0642316

Photo No.	Date:
251	6/3/2022

Photo Taken:
East

Description:
Close view of trap 3 within the CV09_SH transect.



Photo No.	Date:
252	6/3/2022

Photo Taken:
East

Description:
Close view of trap 4 within the CV09_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV09_SH	0642316

Photo No.	Date:
253	6/3/2022

Photo Taken:
East

Description:
Close view of trap 5 within the CV09_SH transect.



Photo No.	Date:
254	6/3/2022

Photo Taken:
South

Description:
Close view of trap 6 within the CV09_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV09_SH	0642316

Photo No.	Date:
255	6/3/2022

Photo Taken:
South

Description:
Close view of trap 7 within the CV09_SH transect.



Photo No.	Date:
256	6/3/2022

Photo Taken:
South

Description:
Close view of trap 8 within the CV09_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV09_SH	0642316

Photo No.	Date:
257	6/3/2022

Photo Taken:
South

Description:
Close view of trap 9 within the CV09_SH transect.



Photo No.	Date:
258	6/3/2022

Photo Taken:
South

Description:
Close view of trap 10 within the CV09_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
259	6/3/2022

Photo Taken:
South

Description:
Overview of the CV10_SH transect.



Photo No.	Date:
260	6/3/2022

Photo Taken:
West

Description:
Overview of the CV10_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
261	6/3/2022

Photo Taken:
South

Description:
Overview of the CV10_SH transect.



Photo No.	Date:
262	6/3/2022

Photo Taken:
West

Description:
Overview of the CV10_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
263	6/3/2022

Photo Taken:
East

Description:
Close view of trap 1 within the CV10_SH transect.



Photo No.	Date:
264	6/3/2022

Photo Taken:
East

Description:
Close view of trap 2 within the CV10_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
265	6/3/2022

Photo Taken:
East

Description:
Close view of trap 3 within the CV10_SH transect.



Photo No.	Date:
266	6/3/2022

Photo Taken:
East

Description:
Close view of trap 4 within the CV10_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
267	6/3/2022

Photo Taken:
East

Description:
Close view of trap 5 within the CV10_SH transect.



Photo No.	Date:
268	6/3/2022

Photo Taken:
West

Description:
Close view of trap 6 within the CV10_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
269	6/3/2022

Photo Taken:
West

Description:
Close view of trap 7 within the CV10_SH transect.



Photo No.	Date:
270	6/3/2022

Photo Taken:
West

Description:
Close view of trap 8 within the CV10_SH transect.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	CV10_SH	0642316

Photo No.	Date:
271	6/3/2022

Photo Taken:
West

Description:
Close view of trap 9 within the CV10_SH transect.



Photo No.	Date:
272	6/3/2022

Photo Taken:
West

Description:
Close view of trap 10 within the CV10_SH transect.



APPENDIX D
AMPHIBIANS DATA

D-1. Detailed Amphibian Egg Mass Survey Results

D-2. Detailed Amphibian Call Baiting Survey Results

D-3. Photographic Log

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D.1. Detailed Amphibian Egg Mass Survey Results

Site ID	Location Description	Date	Temperature (C)	Wind	Waterbody Descriptions				Substrate	Waterbody Type	Species Observed	Species Type	Area surveyed with emergent vegetation (%)	Emergent Vegetation Species	Notes
					Depth (cm.)	Orgin	Drainage	Flow							
AMP#1	Southwest of Carlin, within seasonally flooded area of Humboldt River floodplain	4/20/2022	18.3	Calm	14	Manmade	Occasional	None	Silt/Mud	Marsh	No	NA	25-50	Residual bulrush and cattails	Dry for northern portion (300 ft.) of transect. Upland vegetation includes greasewood and rabbitbrush.
AMP#2	South of Carlin, a seasonal wetland	4/19/2022	11	Strong	0	Natural	Occasional	None	Silt/Mud	Marsh	No	NA	>50	Bulrush	Dry drainage, saturated soil, leads to open waterbody; Upland: big sagebrush, greasewood, rabbitbrush
AMP#3	South of Carlin in a seasonal wetland; an ephemeral stream fed by perennial	4/19/2022	11	Strong	50	Natural	Permanent	Slow	Silt/Mud	Marsh	Yes	American bullfrog (metamorph stage)	>50	Bulrush	Meandering ephemeral stream along transect, flow towards perennial stream, dry for 40 meters upstream
AMP#12	Adjacent to the Humboldt River, southwest of Carlin and within the seasonally flooded area of the Humboldt River floodplain.	4/20/2022	17.2	Light	12	Natural	Occasional	None	Silt/Mud	Marsh	No	NA	>50	Sedges, bulrush, and cattails	Transect dry for 800 feet away from Humbold River, adult American bullfrog and likely American bullfrog tadpoles observed in Humboldt River (outside of the survey area).

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
1	04/19/2022

Direction Photo Taken:
South

Description:
Start location of AMP#2



Photo No.	Date:
2	04/19/2022

Direction Photo Taken:
Northeast

Description:
End location of AMP#2



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
3	04/19/2022

Direction Photo Taken:
Northeast

Description:
Start location of AMP#3



Photo No.	Date:
4	04/19/2022

Direction Photo Taken:
Southwest

Description:
End location of AMP#3



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
5	04/20/2022

Direction Photo Taken:
Southwest

Description:
Start location of AMP#12



Photo No.	Date:
6	04/20/2022

Direction Photo Taken:
Southeast

Description:
End location of AMP#12



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
7	04/20/2022

Direction Photo Taken:
Southeast

Description:
Start location of AMP#1



APPENDIX E
SPRINGSNAILS DATA

E-1. Detailed Springsnail Trapping Survey Results

E-2. Photographic Log

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E.1. Detailed Springsnail Trapping Survey Results

Springsnail Survey

Start Time: 8:30:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	**N**	

Site: Goldstrike **Date:** 5/19/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 549114.58	Elevation:	Notes:	Also known as Rodeo Creek
GS01	-	-		N: 4536440.65	1,561 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Gravel, Cobbles, and Sand	N/A
				2	Gravel, Cobbles, and Sand	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Completely dry stream bed with no soil saturation present. Little vegetation observed, cheatgrass has dominated the area. Sagebrush dominant within the floodplain.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
0														
Total Occupied Lengh (m)	-	-	-	-	-	-	-	BRTE	-	-	-	-	-	-
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	N	**N/A**	
Ungulate Use	**Y**	N	N/A	Cattle disturbance throughout, paths up banks causing erosion.
Off-trail OHV Use	Y	N	**N/A**	
Wildfire	Y	N	**N/A**	
Human Disturbance	Y	N	**N/A**	
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	N	**N/A**	
Riparian Invasive Spp.	**Y**	N	N/A	Cheatgrass prevalent throughout survey area.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

N/A



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball) Cobble = 64mm (tennis ball) Gravel = 2mm (match head) Sand = 1.5-0.1mm Silt = <0.1mm	L = Little/no flow; mostly stagnant M = Moderate flow; moves fine particles H = High Flow w/ turbulance; strong riff

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails — LEMI = duckweed
SA*sp* = willow — FIAL = filamentous algae
BRTE = cheatgrass

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 9:14:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	N	

Site: Goldstrike **Date:** 5/19/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 548001.34	Elevation:	Notes:	Also known as Boulder Creek
GS02	-	-		N: 4536269.88	1,559 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Cobbles, Gravel	N/A
				2	Cobbles, Gravel	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Completely dry stream bed with no soil saturation. Some bank erosion noticeable, and cattle disturbance apparent. Cheatgrass and common mullein within creek bed and sagebrush dominant in the floodplain area.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
0	-	-	-	-	-	-	-	BRTE	-	-	-	-	-	-
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	N	**N/A**	
Ungulate Use	**Y**	N	N/A	Cattle disturbance and tracks through floodplain and across creek.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	N	**N/A**	
Human Disturbance	Y	N	**N/A**	
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	N	**N/A**	
Riparian Invasive Spp.	**Y**	N	N/A	Cheatgrass and common mullein in creek bed.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

N/A



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball) Cobble = 64mm (tennis ball) Gravel = 2mm (match head) Sand = 1.5-0.1mm Silt = <0.1mm	L = Little/no flow; mostly stagnant M = Moderate flow; moves fine particles H = High Flow w/ turbulance; strong riff

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails — LEMI = duckweed
SA*sp* = willow — FIAL = filamentous algae
BRTE = cheatgrass

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 10:21:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	N	

Site: Goldstrike **Date:** 5/19/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)		Elevation:	Notes:	Also known as Welches Creek
GS03	-	-	E: 554672.45	N: 4515598.19	1,505 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Gravel, Cobble, Live Vegetation, Silt	N/A
				2	Gravel, Cobble, Live Vegetation, Silt	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	Yes	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Narrow streambed, predominently silt and mud substrate with a wide floodplain. Meandering bends with steep and barren banks leading up to sagebrush dominant landscape.

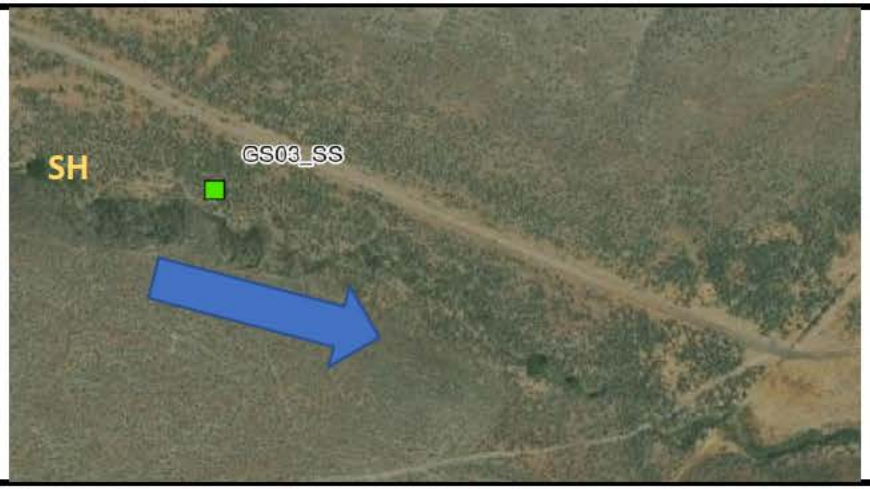
Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
640	1	3.5	M	Clear	23	8.75	-	LEMI	20	60	0	0	20	0
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	**N**	N/A	
Ungulate Use	**Y**	N	N/A	Cattle trails and paths along and through water.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	**N**	N/A	
Human Disturbance	Y	**N**	N/A	
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	**N**	N/A	
Riparian Invasive Spp.	**Y**	N	N/A	Cheatgrass prevalent along banks, thistle and mustards scattered throughout.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

Northwest



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball)	L = Little/no flow; mostly stagnant
Cobble = 64mm (tennis ball)	M = Moderate flow; moves fine particles
Gravel = 2mm (match head)	H = High Flow w/ turbulance; strong riff
Sand = 1.5-0.1mm	
Silt = <0.1mm	

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails
SA*sp* = willow
BRTE = cheatgrass
LEMI = duckweed
FIAL = filamentous algae

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 10:57:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	**N**	

Site: Goldstrike **Date:** 5/19/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 554673.45	Elevation:	Notes:	Also known as Welches Creek
GS04	-	-		N: 4515599.64	1,505 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Gravel, Cobble, Live Vegetation, Silt, Sand	N/A
				2	Gravel, Cobble, Live Vegetation, Silt, Sand	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	Slugs observed.

Springsnail Survey: Habitat Data

Habitat Description:

Narrow bodied stream, and the downstream reach of Welches Creek. Upstream portion is more gravel and rock based substrate and gets more silt and clay based downstream. Bunch grasses along banks and cheatgrass, with sagebrush up the banks and into the plains. Bank erosion extensive upstream.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
1000	0.75	5	M	Clear	25	8.5	-	LEMI	10	60	0	10	20	0
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	N	**N/A**	
Ungulate Use	**Y**	N	N/A	Cattle disturbance visible, but only old sign.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	N	**N/A**	
Human Disturbance	Y	N	**N/A**	
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	**N**	N/A	
Riparian Invasive Spp.	**Y**	N	N/A	Cheatgrass along banks and thistle in floodplain area.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

Northwest



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball)	L = Little/no flow; mostly stagnant
Cobble = 64mm (tennis ball)	M = Moderate flow; moves fine particles
Gravel = 2mm (match head)	H = High Flow w/ turbulance; strong riff
Sand = 1.5-0.1mm	
Silt = <0.1mm	

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails
SA*sp* = willow
BRTE = cheatgrass
LEMI = duckweed
FIAL = filamentous algae

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 7:53:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	**N**	

Site: Carlin **Date:** 5/20/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 571551.33	Elevation:	Notes:	Also known as Warm Spring
CA01	-	-		N: 4503982.29	1,515 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
Yes	10 sec	0.1 meter	231 meters	1	Cobbles, Live Vegetation, Gravel, Sand	201
				2	Cobbles, Live Vegetation, Gravel, Silt	195

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
Land snails	No	No	No	No	Yes	No	No	No	Stonefly larvae, water striders, water pennies

Springsnail Survey: Habitat Data

Habitat Description:

Spring emerges from hillside and has some man-made alterations, including a piped section and a walking bridge over spring downstream. Lined with fencing around the upstream portion, resulting in little degradation from cattle. Spring flows directly into a natural and seaonally flooded wetland.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
231	3	10	H	Clear	20	8	581	TY*sp*	0	10	5	40	40	5
Total Occupied Lengh (m)														
231														

Evidence of Habitat Disturbance	Present			Notes
Springhead Modification	**Y**	N	N/A	Piped out from ground.
Ungulate Use	**Y**	N	N/A	Very minimal cattle disturbance noted.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	**N**	N/A	
Human Disturbance	**Y**	N	N/A	Fencing around northwest side of spring, and walking bridge near springhead.
Oil, Gas, Mineral, Geothermal	Y	**N**	N/A	
Aquatic Invasive Spp.	Y	**N**	N/A	
Riparian Invasive Spp.	Y	**N**	N/A	
Drought	**Y**	N	N/A	
Other	Y	**N**	N/A	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect (Direction of Flow)

East



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate	Common Vegetation Species Codes (First two letters of genus and first two letters of species; unless otherwise noted)	
Boulder = 600mm (beach ball) Cobble = 64mm (tennis ball) Gravel = 2mm (match head) Sand = 1.5-0.1mm Silt = <0.1mm	L = Little/no flow; mostly stagnant M = Moderate flow; moves fine particles H = High Flow w/ turbulance; strong riff	TY*sp* = cattails SA*sp* = willow BRTE = cheatgrass	LEMI = duckweed FIAL = filamentous algae
		Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
		EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 10:20:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	N	

Site: Carlin **Date:** 5/20/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	Rheocrene	**Helocrene**

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 574046.57	Elevation:	Notes:	-
CA02	-	-		N: 4506244.51	1,491 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Dead vegetation	N/A
				2	Dead vegetation	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Wetland area with no water present. Residual cattail and bulrush covered survey area making soil saturation hard to determine. Some willow species and Russian olive shrubs scattered throughout floodplain. The Humboldt River is adjacent to the survey area.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
0	-	-	-	-	-	-	-	TY*sp*	-	-	-	-	-	-
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	**N**	N/A	
Ungulate Use	**Y**	N	N/A	Cattle disturbance throughout survey area.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	N	**N/A**	
Human Disturbance	Y	**N**	N/A	
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	**N**	N/A	
Riparian Invasive Spp.	**Y**	N	N/A	Cattail and bulrush dominated the wetland, Russian olive shrubs scattered throughout.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

N/A



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball) Cobble = 64mm (tennis ball) Gravel = 2mm (match head) Sand = 1.5-0.1mm Silt = <0.1mm	L = Little/no flow; mostly stagnant M = Moderate flow; moves fine particles H = High Flow w/ turbulance; strong riff

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails — LEMI = duckweed
SA*sp* = willow — FIAL = filamentous algae
BRTE = cheatgrass

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 9:41:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	N	

Site: Carlin **Date:** 5/20/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	**Limnocrene**	Rheocrene	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 574457.86	Elevation:	Notes:	-
CA03	-	-		N: 4506218.10	1,491 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Silt, Dead Vegetation	N/A
				2	Silt, Dead Vegetation	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Pooled water north of spring location with water seeping throughout the wetland area. Survey area dominated by willow species and bulrush at the pooled section. Directly adjactent to the Union Pacific Railroad.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
17	5	2	L	510	13.6	7.4	510	TY*sp*	0	70	0	30	0	0
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	N	**N/A**	The pooled section could be altered, but no obvious indicators.
Ungulate Use	**Y**	N	N/A	Cattle paths throughout the floodplain.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	**N**	N/A	
Human Disturbance	**Y**	N	N/A	Directly adjacent to the railroad tracks.
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	**N**	N/A	
Riparian Invasive Spp.	**Y**	N	N/A	Russian olive scattered but not dominant; established areas of cheatgrass.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

Southeast



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball) Cobble = 64mm (tennis ball) Gravel = 2mm (match head) Sand = 1.5-0.1mm Silt = <0.1mm	L = Little/no flow; mostly stagnant M = Moderate flow; moves fine particles H = High Flow w/ turbulance; strong riff

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails
SA*sp* = willow
BRTE = cheatgrass
LEMI = duckweed
FIAL = filamentous algae

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 9:40:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	**N**	

Site: Carlin **Date:** 5/20/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 574452.58	Elevation:	Notes:	Also known as Mary's Creek
CA04	-	-		N: 4506222.59	1,493 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Silt, Sand, Dead Vegetation	N/A
				2	Silt, Sand, Dead Vegetation	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Stream south of Carlin that feeds into the Humboldt River. Dominant vegetation includes willow species along banks and floodplain.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
165	5	15	M	Clear	14	8.3	477	SA*sp*	0	40	15	5	40	0
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	**N**	N/A	
Ungulate Use	**Y**	N	N/A	Cattle present on adjacent field.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	N	**N/A**	
Human Disturbance	**Y**	N	N/A	Fencing to the east for cattle.
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	**N**	N/A	
Riparian Invasive Spp.	**Y**	N	N/A	Cheatgrass in floodplain area and Russian olive.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

Southeast



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball) Cobble = 64mm (tennis ball) Gravel = 2mm (match head) Sand = 1.5-0.1mm Silt = <0.1mm	L = Little/no flow; mostly stagnant M = Moderate flow; moves fine particles H = High Flow w/ turbulance; strong riff

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails — LEMI = duckweed
SA*sp* = willow — FIAL = filamentous algae
BRTE = cheatgrass

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 11:07:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	N	

Site: Crescent Valley **Date:** 5/18/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	**BLM**	Tribal	Military	Private	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 542515.87	Elevation:	Notes:	Also known as Cottonwood Creek Diversion
CV01_SS	-	-		N: 4461474.57	1,469 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Sand, Silt	N/A
				2	Sand, Silt	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Between agriculture fields at Dean's Ranch. The creek was completely dry with no soil saturation. Pipes were exposed in creek bed for water diversion, likely for adjacent farms.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
0	-	-	-	-	-	-	-	BRTE	-	-	-	-	-	-
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	**Y**	N	N/A	Entire spring has been manipulated and modified through water diversion.
Ungulate Use	**Y**	N	N/A	Cattle were present in the floodplain area as well as paths along the creek bed.
Off-trail OHV Use	**Y**	N	N/A	Two-track roads along the creek bed on both sides.
Wildfire	Y	N	**N/A**	
Human Disturbance	**Y**	N	N/A	Water diversion for agricultural use.
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	N	**N/A**	
Riparian Invasive Spp.	**Y**	N	N/A	Invasive cheatgrass prevalent throughout survey area.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc).

Spring Run Aspect (Direction of Flow)

N/A



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball) Cobble = 64mm (tennis ball) Gravel = 2mm (match head) Sand = 1.5-0.1mm Silt = <0.1mm	L = Little/no flow; mostly stagnant M = Moderate flow; moves fine particles H = High Flow w/ turbulance; strong riff

Common Vegetation Species Codes (First two letters of genus and first two letters of species; unless otherwise noted)	
TY*sp* = cattails	LEMI = duckweed
SA*sp* = willow	FIAL = filamentous algae
BRTE = cheatgrass	
Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 12:23:00 PM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	**N**	

Site: Crescent Valley **Date:** 5/18/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)		Elevation:	Notes:
CV02_SS	-	-	E: 541501.05	N: 4460214.27	1,469 meters	Also known as Brock Creek Diversion

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Cobble, Sand, Silt, Dead Vegetation, Gravel	N/A
				2	Cobble, Sand, Silt, Dead Vegetation, Gravel	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Altered waterbody in a channel, very narrow and slow flowing water. Mostly barren banks and no real floodplain due to alterations. Cheatgrass, common muellin, and stinging nettle with sagebrush beyond the channel. Little to no emergent vegetation.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
330	1	6	M	Clear	26	10	-	FIAL	0	60	0	0	40	0
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	**Y**	N	N/A	Waterbody altered for diversion.
Ungulate Use	**Y**	N	N/A	Cattle disturbance apparent, mostly outside of the water.
Off-trail OHV Use	Y	N	**N/A**	
Wildfire	Y	**N**	N/A	
Human Disturbance	Y	N	**N/A**	
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	**N**	N/A	
Riparian Invasive Spp.	**Y**	N	N/A	Cheatgrass, stinging nettle and common muellin throughout.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

Northwest



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball)	L = Little/no flow; mostly stagnant
Cobble = 64mm (tennis ball)	M = Moderate flow; moves fine particles
Gravel = 2mm (match head)	H = High Flow w/ turbulance; strong riff
Sand = 1.5-0.1mm	
Silt = <0.1mm	

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails LEMI = duckweed
SA*sp* = willow FIAL = filamentous algae
BRTE = cheatgrass

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

Springsnail Survey

Start Time: 9:50:00 AM

Survey Protocols Completed	#1	#2	#3
Collection made?	Y	N	

Site: Crescent Valley **Date:** 5/19/2022 **Recorder:** Sean Basilio **Observer:** Kelsey Uligian

Landowner:	NPS	USFWS	BLM	Tribal	Military	**Private**	Other	Spring Type:	Limnocrene	**Rheocrene**	Helocrene

Spring Name or ID Code	Allotment	Field Office	UTMs (NAD83)	E: 533196.94	Elevation:	Notes:	Also known as Indian Creek
CV03	-	-		N: 4461653.25	1,465 meters		

Springsnails	Time to 1st Springsnail	Distance from Springhead to: 1st Encounter	Last Encounter	Observer	Substrate Searched (Underline where springsnails were found)	Count of Springsnails (10min searched)
No	N/A	-	-	1	Cobble, Gravel, Silt	N/A
				2	Cobble, Gravel, Silt	N/A

Other Snails	Fish	Amphipods	Crayfish	Amphibians	EPT*	Aquatic Beetles	Odonata Larvae	Other Mollusks	Other
No	No	No	No	No	No	No	No	No	-

Springsnail Survey: Habitat Data

Habitat Description:

Dry stream bed between irrigation pivots. Lots of invasive species growing in creek bed and along banks. Cattle disturbance apparent throughout.

Spring Run Physical Measurements			Water Quality Parameters					Dominant Vegetation*	Substrate Composition (as Percent Cover)					
Total Wetted Length of Run (m)	Width (m)	Depth (cm)	Flow*	Turbidity	Temp (C)	pH	Cond (uS)	Species or Type	Clay	Silt	Sand	Gravel	Cobble	Boulder
0	-	-	-	-	-	-	-	BRTE	-	-	-	-	-	-
Total Occupied Lengh (m)														
0														

Evidence of Habitat Disturbance	Present*			Notes
Springhead Modification	Y	N	**N/A**	
Ungulate Use	**Y**	N	N/A	Cattle disturbance and paths apparent throughout creek bed and along banks.
Off-trail OHV Use	Y	**N**	N/A	
Wildfire	Y	N	**N/A**	
Human Disturbance	Y	N	**N/A**	
Oil, Gas, Mineral, Geothermal	Y	N	**N/A**	
Aquatic Invasive Spp.	Y	N	**N/A**	
Riparian Invasive Spp.	**Y**	N	N/A	Cheatgrass, thistle and mustard.
Drought	**Y**	N	N/A	
Other	Y	N	**N/A**	

Sketch of Spring (Identify spring head [SH], path of spring run flowing downslope, end of water, other features like pooled water, spring box, etc.)

Spring Run Aspect
(Direction of Flow)

N/A



*Definitions

Substrate Composition Approximate Size Comparison	Spring Flow Qualitative Estimate
Boulder = 600mm (beach ball)	L = Little/no flow; mostly stagnant
Cobble = 64mm (tennis ball)	M = Moderate flow; moves fine particles
Gravel = 2mm (match head)	H = High Flow w/ turbulance; strong riff
Sand = 1.5-0.1mm	
Silt = <0.1mm	

Common Vegetation Species Codes
(First two letters of genus and first two letters of species; unless otherwise noted)

TY*sp* = cattails LEMI = duckweed
SA*sp* = willow FIAL = filamentous algae
BRTE = cheatgrass

Spr. Type	Limnocrene: Pool --> Channel; Rheocrene: Channel; Helocrene: Pool
EPT	Ephemeroptera, Trichoptera, and/or Plecoptera

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Goldstrike Survey Area	0642316

Photo No.	Date:
1	05/19/2022

Direction Photo Taken:
Northeast

Description:
Start location of GS01, facing upstream.



Photo No.	Date:
2	05/19/2022

Direction Photo Taken:
Southwest

Description:
Start location of GS01, looking downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Goldstrike Survey Area	0642316

Photo No.	Date:
3	05/19/2022

Direction Photo Taken:
North

Description:
Start location of GS02, facing upstream.



Photo No.	Date:
4	05/19/2022

Direction Photo Taken:
South

Description:
Start location of GS02, facing downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Goldstrike Survey Area	0642316

Photo No.	Date:
5	05/19/2022

Direction Photo Taken:
Southeast

Description:
Start location of GS03, facing upstream.



Photo No.	Date:
6	05/19/2022

Direction Photo Taken:
Northwest

Description:
Start location of GS03, facing downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Goldstrike Survey Area	0642316

Photo No.	Date:
7	05/19/2022

Direction Photo Taken:
Southeast

Description:
Start location of GS04, facing upstream.



Photo No.	Date:
8	05/19/2022

Direction Photo Taken:
Northwest

Description:
Start location of GS04, facing downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
9	05/20/2022

Direction Photo Taken:
Southwest

Description:
Start location of CA01, looking upstream.



Photo No.	Date:
10	05/20/2022

Direction Photo Taken:
Northeast

Description:
Start location of CA01, looking downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
11	05/20/2022

Direction Photo Taken:
West

Description:
Mid-point location of CA01, facing upstream.



Photo No.	Date:
12	05/20/2022

Direction Photo Taken:
East

Description:
Mid-point location of CA01, facing downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
13	05/20/2022

Direction Photo Taken:
Northwest

Description:
End location of CA01, facing upstream



Photo No.	Date:
14	05/20/2022

Direction Photo Taken:
Southeast

Description:
End location of CA01, facing downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
15	05/20/2022

Direction Photo Taken:
N/A

Description:
Close view of observed springsnails attached to channel substrate at location CA01



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
16	05/20/2022

Direction Photo Taken:
West

Description:
Start location of CA02, looking upstream.



Photo No.	Date:
17	05/20/2022

Direction Photo Taken:
East

Description:
Start location of CA02, looking downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
18	05/20/2022

Direction Photo Taken:
South

Description:
Start location of CA03, looking upstream.



Photo No.	Date:
19	05/20/2022

Direction Photo Taken:
North

Description:
Start location of CA03, looking downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Carlin Survey Area	0642316

Photo No.	Date:
20	05/20/2022

Direction Photo Taken:
Nroth

Description:
Start location of CA04, looking upstream.



Photo No.	Date:
21	05/20/2022

Direction Photo Taken:
South

Description:
Start location of CA04, looking downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Crescent Valley Survey Area	0642316

Photo No.	Date:
22	05/18/2022

Direction Photo Taken:
East

Description:
Start location of CV01, looking upstream.



Photo No.	Date:
23	05/18/2022

Direction Photo Taken:
West

Description:
Start location of CV01, looking downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Crescent Valley Survey Area	0642316

Photo No.	Date:
24	05/18/2022

Direction Photo Taken:
Southeast

Description:
Start location of CV02, looking upstream.



Photo No.	Date:
25	05/18/2022

Direction Photo Taken:
Northwest

Description:
Start location of CV02, looking downstream.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.:
Nevada Gold Mines	Crescent Valley Survey Area	0642316

Photo No.	Date:
26	05/18/2022

Direction Photo Taken:
Northwest

Description:
Start location of CV03, looking upstream.



Photo No.	Date:
27	05/18/2022

Direction Photo Taken:
Southeast

Description:
Start location of CV03, looking downstream.





Noise Monitoring Report: Year 1 and Year 2 Baseline Studies

Ore Transportation Project

29 March 2023

Project No.: 0642316

The business of sustainability

ERM

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Acronyms and Abbreviations

BLM	Bureau of Land Management
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
dBZ	unweighted decibel
ERM	ERM-West, Inc.
GPS	geographic positioning system
IFC	International Finance Corporation
L_{10}	Noise level exceeded 10 percent of the time
L_{50}	Noise level exceeded 50 percent of the time
L_{90}	Noise level exceeded 90 percent of the time
L_{eq}	Equivalent sound level
L_{min}	Minimum sound level
L_{max}	Maximum sound level
LF_{min}	Fast minimum sound level
LF_{max}	Fast maximum sound level
LS_{min}	Slow minimum sound level
LS_{max}	Slow maximum sound level
Ldn	Day-night sound level: average noise level over a 24-hour period
Mb	millibar
mph	miles per hour
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NGM	Nevada Gold Mines, LLC
Project	Ore Transportation Project
RMP	Resource Management Plan

1 INTRODUCTION

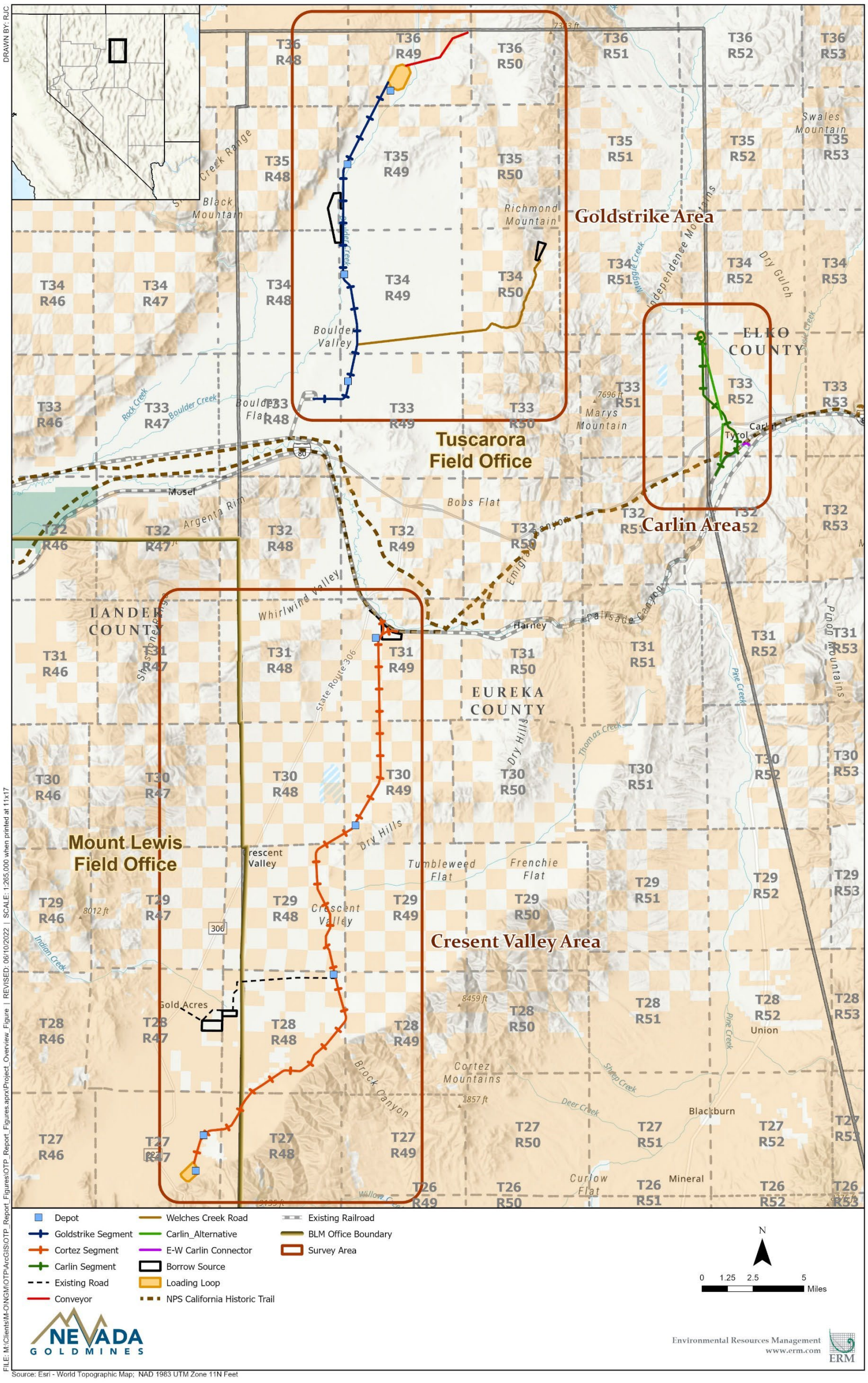
Nevada Gold Mines, LLC (NGM) contracted ERM-West, Inc. (ERM) to conduct a noise baseline study for the Ore Transportation Project (herein referred to as the "Project") and prepare a noise monitoring report for review by the Bureau of Land Management (BLM) and Nevada Department of Wildlife (NDOW). This Noise Monitoring Report is a supplemental document to the 2021 and 2022 NGM Biological Baseline Reports and provides a detailed methodology of the noise monitoring study for the Project. Noise monitoring was completed to assess baseline ambient noise levels along the proposed Project route and up to a 4-mile buffer of the Project (Project Area). Noise levels were assessed for both human and wildlife receptors—specifically Greater Sage-grouse (*Centrocercus urophasianus*; hereafter referred to as sage-grouse), bats, amphibians, and the Golden Eagle (*Aquila chrysaetos*). Noise monitoring for wildlife receptors was completed using protocols approved by BLM and NDOW. The data collected during the noise baseline study will be used in the future National Environmental Policy Act (NEPA) analysis of potential Project-related noise impacts on wildlife and the human environment. The noise baseline study was divided into two working seasons, each including a desktop and field assessment. The first season of the study was completed in September 2021 and included human receptors, bats, and amphibians; the second season was completed in April 2022 and included Golden Eagles and sage-grouse.

1.1 Project Location and Setting

The Project is located in Elko, Eureka, and Lander counties, Nevada, and includes approximately 2,660 acres (1,077 hectares) of public lands administered by the Elko and Battle Mountain BLM Nevada District Offices, and approximately 3,962 acres (1,603 hectares) of privately owned lands as shown on E-W = east to west; NPS = National Park Service

Figure 1. The Project Area is within 0.5 mile of two human populated areas: Beowawe and Carlin. Land uses in the Project Area include BLM-managed undeveloped land, agricultural, residential, mining/industrial, and transportation corridors, such as existing roadways and railroad lines.

Existing ambient noise sources consist of vehicular traffic along Interstate 80 and other roadways; rail traffic along the Union Pacific Railway mainline; human activity in residential areas; noise from agricultural and mining activities; and natural sources, such as wind and wildlife.



E-W = east to west; NPS = National Park Service

Figure 1: Project Overview

1.2 Noise Regulatory Framework

1.2.1 Federal, State, and Local Noise Ordinances

BLM Resource Management Plans (RMPs) applicable to the Project are the 1987 Elko RMP (BLM 1987a), the 1987 Shoshone-Eureka RMP (BLM 1987b), and amendments to those plans. The RMPs guide BLM management decisions and actions to manage the public lands based on multiple-use and sustained yield, unless otherwise specified by law. ERM did not identify any noise criterion applicable to the Project within these RMPs.

ERM did not identify any Nevada state-level noise ordinances to which the Project would be subject. Elko County restricts loud or unusual noises that could be qualified as disturbing the peace under Elko County, Nevada, Ordinances Chapter 7, Section 7-1-7. Similarly, Lander County restricts loud or unusual noise that would maliciously or willfully disturb the peace under Lander County, Nevada, Ordinances Chapter 9, Section 9.08.020. Based on their descriptions, these ordinances would not apply to Project activities.

In addition to these noise regulations to protect human receptors, multiple state and federal laws prohibit the injury of, or disturbance to, protected wildlife species. The *Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment* limits noise from discretionary activities (during construction, operation, and maintenance) to 10 decibels (dB) above ambient sound levels at least 0.25 mile from active and pending leks, from 2 hours before to 2 hours after sunrise and sunset during the breeding season (BLM 2015). These laws also require an assessment of a project's potential impacts on protected species, including noise impacts associated with construction and operation, which will be completed at a later date. These data may also be used in assessing impacts on non-listed wildlife species during the NEPA analysis.

The noise monitoring procedures for human receptors were based on International Finance Corporation's (IFC) *Environmental, Health, and Safety Guidelines* for baseline noise assessments (IFC 2007). The noise monitoring procedures for wildlife receptors were based on the NDOW February 2018 sage-grouse noise monitoring recommendations (NDOW 2018) and the 2020 *Interim Sage-Grouse Noise Protocol Clarifications* (NDOW 2020).

2 PROJECT DESCRIPTION

The Project consists of constructing a new railway and conveyor system to haul ore from the Cortez District north to the Gold Quarry and Goldstrike Mines for processing. The purpose of the Project is to improve safety by reducing over-the-road haulage on public highways, reduce potential air and greenhouse gas emissions, and allow for optimized processing. Project specifics include the following:

- New private rail line to be constructed from Cortez to Beowawe, where it would connect to the existing Union Pacific Railroad to travel east or west;
- New siding and rail line would be constructed near Carlin to travel north to Gold Quarry;
- New private railway will be built from the T.S. Power Plant to the east and extend north through Boulder Valley to Goldstrike; and
- Loading/Unloading facilities, such as stockpiles, rail loops, and conveyors.

This rail system includes temporary borrow source areas and temporary depots (construction laydown yards). The depots and borrow sources would be reclaimed after construction is complete. The Project includes the railway and conveyors, existing roads, five borrow sources, and 9 depot locations as shown on Figure 1.

3 SCOPE OF WORK

A baseline ambient noise assessment was completed to provide data that will be used to assess potential noise impacts associated with Project construction and operation on human and wildlife receptors. The first season of noise baseline studies was conducted from July through September 2021, and the second season of noise baseline studies was conducted from February through April 2022. The noise baseline studies were divided into two working seasons to collect data during sensitive periods (i.e., March 1 to June 30 for sage-grouse) and to avoid excess disturbance to eagles during sensitive nesting periods (late February to late May).

To identify noise-sensitive[1] areas, ERM conducted a desktop assessment that:

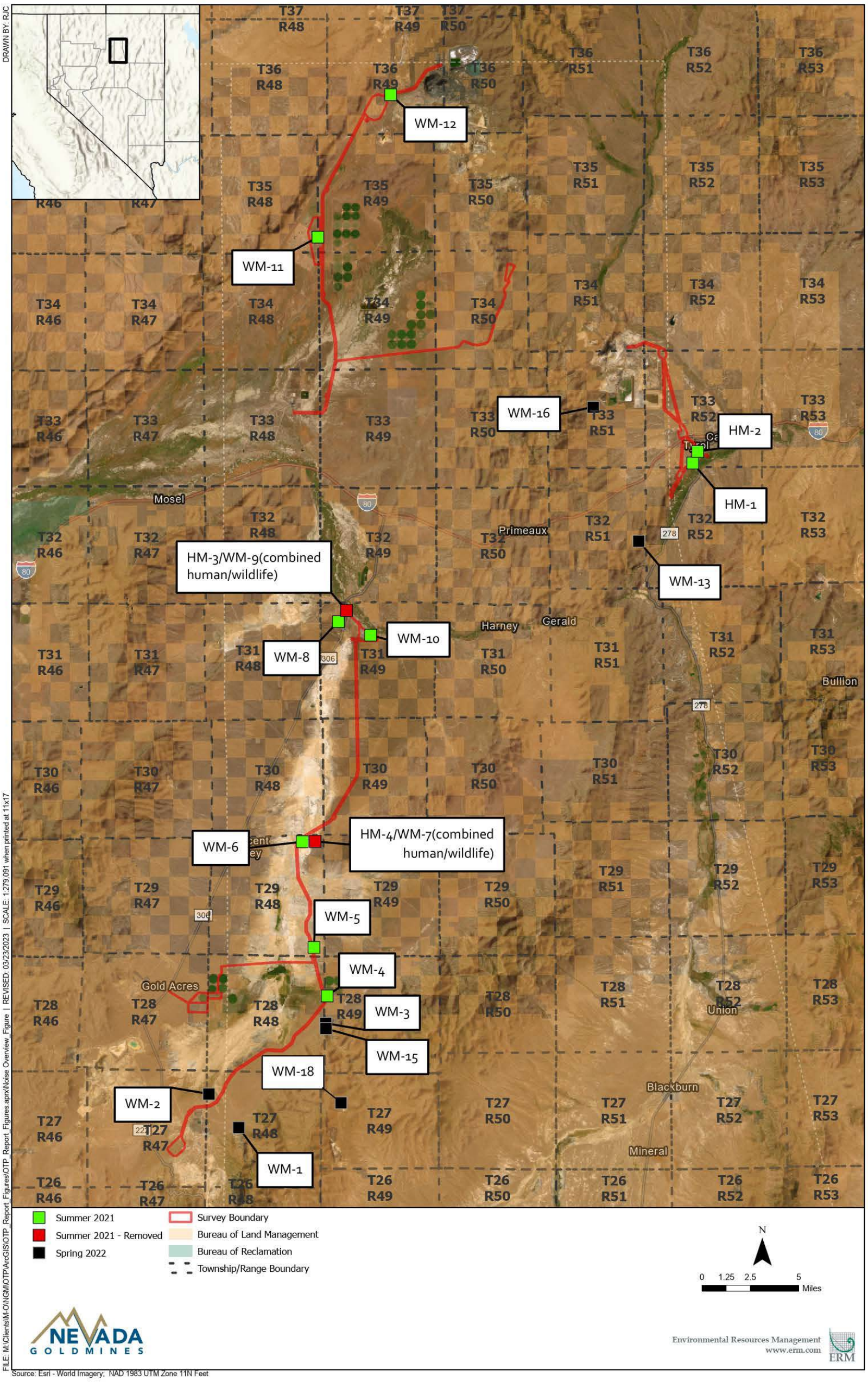
- Reviewed aerial imagery;
- Reviewed NDOW, Nevada Natural Heritage Program, and BLM wildlife data; and
- Assessed National Wetlands Inventory, National Hydrography Dataset, U.S. Geological Survey Seeps and Springs data, and U.S. Geological Survey caves and shafts data.

ERM established noise monitoring locations for wildlife based on the following items:

- 0.5-mile buffer for general species impacts and human impacts;
- 2-mile buffer for Golden Eagle nests (based on data from NDOW);
- 4-mile buffer for sage-grouse leks (based on data from NDOW);
- Documented occurrences of bats (based on data from Nevada Natural Heritage Program and BLM); and
- Water features capable of supporting amphibian species.

Once the desktop analysis was completed, individual noise monitoring locations were selected and approved by BLM and NDOW.

[1] A noise-sensitive property includes real property normally used for sleeping or as schools, churches, hospitals, or public libraries. Property used for industrial or agricultural activities is not considered noise-sensitive property.



Note: Combined Human and Wildlife Receptors HM-3/WM-9 and HM-4/WM-7 were removed from this study due to invalid data. See Section 4.3 for more information.

Figure 2: Noise Monitoring Locations

3.1 Noise Monitoring—Human Receptors

This section describes the noise monitoring procedures for human receptors. A desktop assessment using the most recent available aerial imagery identified residential properties within 0.5 mile of the Project to inform placement of the human receptor monitors. Human receptor monitoring sites were placed next to residential properties in locations with similar topography and proximity to the Project while remaining publicly accessible. Monitoring protocols followed the IFC (2007) guidelines.

3.1.1 Noise Monitoring Locations

Table 1 provides the two noise monitoring locations for human receptors along with a description of the selection criteria used in choosing the monitoring location. These monitoring locations are presented on Figure 2.

Table 1: Noise Monitoring Locations—Human Receptors

Site ID	Description	Latitude	Longitude
HM-1	Carlin – Tomera Subdivision	40.69886	-116.13436
HM-2	West Carlin – six residences	40.70742	-116.12939

3.1.2 Measurement Schedule

Noise measurements were collected at each of the identified measurement locations in one 48-hour measurement period (Table 2).

Table 2: Noise Monitoring Recording Overview—Human Receptors

Location	Start Time	End Time	Duration (hours)
HM-1	7/7/2021 9:20 a.m.	7/9/2021 1:31 a.m.	40:11:30 (1.7 days)
HM-2	7/9/2021 9:53 a.m.	7/11/2021 9:53 a.m.	48:00:00 (2 days)

The measurement period for HM-1 extended 40 hours rather than the planned 48-hours due to an issue with the instrument battery. ERM is confident that the 40-hour measurement duration, which covers both day-time and night-time periods, is a suitable representation of the soundscape in the area and that additional data is not needed in this location.

3.1.3 Equipment

The following equipment was used to conduct background sound level measurements:

- Type 1 sound level meter with 1/3 octave band analyzer (Larson-Davis 824)
- Weather-proof windscreen
- Camera tripod
- Sound level meter calibrator
- Geographic positioning system (GPS) or phone capable of documenting latitude and longitude
- Camera

3.1.4 Measurement Procedures

Prior to beginning the measurement period, the sound level meter was programmed to record at 1-minute intervals for the duration of the 48-hour measurement period. The sound level meter was set to slow response and recorded unweighted 1/3 octave band sound pressure level (12.5 to 20,000 hertz); equivalent sound pressure level (L_{eq}); minimum sound pressure level (L_{min}); maximum sound pressure level (L_{max}); and the 10, 50, and 90 percent exceedance sound pressure levels (L_{10}, L_{50}, L_{90}) in A-weighted decibels (dBA). The sound level meter was field-calibrated before and after the measurement period.

The sound level meter microphone was fastened to a tripod approximately 5 feet above the ground and at least 10 feet from any reflective surface (e.g., house, building wall, solid fence) to avoid changes surfaces may cause to the soundscape. Then, the microphone was fitted with a weather-proof windscreen. The sound level meter was placed inside an environmental enclosure, which was locked and secured to a sturdy object. Photographs were taken of the sound level meter setup as viewed from each cardinal direction and are provided in Appendix A.

During the initial setup, field personnel recorded meteorological data, including wind speed and direction, temperature, relative humidity, barometric pressure, and cloud coverage. Following the measurement period, sound level data was downloaded from the sound level meter. Calibration certificates were scanned upon completion of the monitoring event and are shown in Appendix B.

3.2 Noise Monitoring—Wildlife Receptors

This section describes the noise monitoring procedures for wildlife receptors. Monitoring protocols for wildlife followed established protocols from NDOW and were approved by BLM.

3.2.1 Noise Monitoring Locations

Table 3 provides the 14 noise monitoring locations for wildlife receptors during the 2021 and 2022 field seasons, along with a description of the selection criteria used in choosing the monitoring location. These monitoring locations are presented on Figure 2.

Table 3: Noise Monitoring Locations—Wildlife Receptors

Site ID	Description	Monitoring Year	Latitude	Longitude
WM-1	Mill Creek bats and amphibians	2022	40.20398	-116.58408
WM-2	Cooks Creek	2022	40.22916	-116.61301
WM-3	Cottonwoods bats and eagle nests	2022	40.28161	-116.49862
WM-4	Intermittent stream	2021	40.30215	-116.49694
WM-5	Spring	2021	40.33838	-116.50963
WM-6	Amphibians/Bats	2021	40.41892	-116.52117
WM-8	Bat cave	2021	40.58213	-116.48397
WM-10	Bat/Water Features	2021	40.57172	-116.45235
WM-11	Boulder Creek	2021	40.87011	-116.50204
WM-12	Boulder Creek / Waters near mining activities	2021	40.98307	-116.42973
WM-13	Palisade sage-grouse lek 3	2022	40.64070	-116.18803
WM-15	New Brock Canyon eagle nests	2022	40.27760	-116.49840
WM-16	Mary's Mountain sage-grouse lek 2	2022	40.74118	-116.23172
WM-18	New Brock Canyon sage-grouse lek	2022	40.21701	-116.48363

3.2.2 Measurement Schedule

Noise measurements for the wildlife receptors were collected at each of the identified locations in 10- to 14-day measurements. Equipment battery and recording status were checked 1 week into the measuring period at each location.

Table 4: Noise Monitoring Recording Overview—Wildlife Receptors

Location	Start Time	End Time	Duration (hours)
WM-1	2/7/2022 10:42 a.m.	2/20/2022 1:54 p.m.	315:11 (13 days)
WM-2	4/1/2022 10:21 a.m.	4/15/2022 8:42 a.m.	334:21 (14 days)
WM-3	2/8/2022 11:58 a.m.	2/22/2022 8:08 a.m.	292:38 (12.5 days)
WM-4	7/12/2021 5:24 p.m.	7/22/2021 4:04 p.m.	238:40 (10 days)
WM-5	8/24/2021 12:23 p.m.	9/5/2021 9:00 a.m.	284:37 (12 days)
WM-6	7/8/2021 4:00 p.m.	7/18/2021 9:13 p.m.	245:13 (10 days)
WM-8	8/23/2021 11:57 a.m.	8/30/2021 10:55 a.m.	166:58 (7 days)
WM-10	8/23/2021 12:46 p.m.	9/3/2021 2:00 a.m.	253:14 (10 days)
WM-11	8/23/2021 4:52 p.m.	9/5/2021 12:53 p.m.	308:01 (13 days)
WM-12	8/23/2021 5:33 p.m.	8/30/2021 10:11 p.m.	172:38 (7 days)
WM-13	4/5/2022 12:45 p.m.	4/19/2022 8:32 a.m.	331:47 (14 days)
WM-15	2/8/2022 12:21 p.m.	2/22/2022 8:37 a.m.	332:15 (14 days)
WM-16	4/5/2022 7:49 a.m.	4/19/2022 6:35 a.m.	334:45 (14 days)
WM-18	4/4/2022 12:34 p.m.	4/18/2022 2:48 a.m.	297:51 (12.5 days)

Seven days of data were collected at WM-8 and WM-12 due to battery issues. After further discussion with BLM and NDOW, it was determined that 7 days of data were sufficient to characterize baseline sound conditions in these locations.

3.2.3 Equipment

The following equipment was used to conduct the background sound level measurements:

- Type 1 sound level meter with 1/3 octave band analyzer (Larson-Davis 813C with low-noise microphone, or similar)
- Two or three 12-volt lithium-ion batteries
- Digital recorder with separate dedicated microphone
- Weather-proof windscreens for sound level meter and recorder microphones
- Stakes to secure microphones
- Sound level meter calibrator
- GPS or phone capable of documenting latitude and longitude
- Camera

3.2.4 Measurement Procedures

Before the measurement period began, the sound level meter was programmed to record at 1-second intervals for the 14-day recording period. Per NDOW guidance, the sound level meter was set to fast response and recorded unweighted 1/3 octave band sound pressure level; equivalent sound pressure level (L_{eq}); minimum sound pressure level (L_{min}), maximum sound pressure level (L_{max}) dBA, C-weighted decibels (dBC), and unweighted decibels (dBZ); and the 10, 50, and 90 percent exceedance sound pressure levels (L_{10}, L_{50}, L_{90}) in dBA. The sound level meter was field-calibrated before and after the measurement period. The microphone was fitted with a weather-proof windscreen and fastened to a stake so that the top of the microphone was approximately 1 foot above the ground. The sound level meter was outfitted with two to three external lithium-ion batteries based on availability and placed inside an environmental enclosure, which was locked and secured to a sturdy object. An additional digital sound logger (recorder) was used to record sound during the 14-day monitoring event. Photographs were taken of the sound level meter setup as viewed from each cardinal direction and are provided in Appendix A.

Prior to beginning the measurement period, field personnel took record of meteorological data, including wind speed and direction, temperature, relative humidity, barometric pressure, and cloud coverage.

Field personal visited each location 1 week into the measuring period to check the equipment. During these visits, the batteries and storage capacity were checked to verify whether enough data was being recorded to satisfy the 10- to 14-day monitoring period. No changes to the monitoring setup were made during these visits. To minimize disturbance to sage-grouse leks, these 1-week visits were not made during the noise monitoring surveys at locations WM-13, WM-15, WM-16, and WM-18.

Following the measurement period, sound level data was downloaded from the sound level meters. The calibration certificate on the sound meters were scanned upon completion of the monitoring event and are shown in Appendix B.

4 DEVIATIONS FROM PROCEDURES

4.1 Calibration Corrections

After the noise surveys were complete, ERM discovered that there were calibration issues associated with some of the meters used for these measurements. The problems with the calibrations were caused by discrepancies between the Casella meters and the calibrators' settings that resulted in inaccurately low values at some locations and inaccurately high values at others. Measurements that were discovered to have this issue were corrected by retroactively re-calibrating the data based on earlier, accurate calibrations that were recorded on the meters.

To re-calibrate the data, accurate calibration values that were recorded on the meter from previous calibrations were subtracted from the calibration value used for the measurement period. This calculation provided values that could be added or subtracted from all the sound-level metrics. The values used to re-calibrate each monitoring location's data are included in Table 1 of Appendix C.

4.2 Noise Floor Corrections

Sound level meters have a lower measurement limit that is referred to as the "noise floor." When sound levels are within 10 dB of the noise floor, the electrical noise of the instrument influences decibel readings. When this occurs, actual environmental sound levels are lower than the level reported (Ambrose and Florian 2020). Thus, corrections were made to all wildlife sound-level metrics that came within 10 dB of the noise floor.

The noise floor of each system used was determined by selecting the lowest of the following values:

- The lowest Lmin value, measured over the monitoring period, found for 2 consecutive hours (e.g., 04/01/2019, 2100 hours Lmin = 4.0 dBA and 04/01/2019 2200 hours Lmin = 4.0 dBA),
- The lowest Lmin value, measured over the monitoring period, found at five or more individual, non-consecutive times during the monitoring period (e.g., five hourly averages spread across the monitoring period where the Lmin = 4.0 dBA),
- The manufacturer specification (Larson-Davis 831C sound level meters and microphones used in this study have a noise floor of approximately 6.5 dBA).

Once the noise floor value was determined, 0.1 dBA was subtracted from that value to ensure the correction was conservative. This correction was applied to each sound-level metric reported except for the unweighted 1/3 octave band metrics. The noise floor value and noise floor correction used for each monitoring location's data are also included in Table 1 of Appendix C.

4.3 Removal of HM-3/WM-9 and HM-4/WM-7 Monitoring Locations

ERM conducted noise monitoring at two locations that have since been removed from this noise report. Human receptor monitoring locations HM-3 and HM-4 were combined with wildlife receptor monitoring locations WM-9 and WM-7, respectively, to minimize disturbance to wildlife in the area and optimize equipment use. These monitoring locations were selected due to their similar topographies and proximity to the Project.

During data processing, it was discovered that some of the metrics reported in the analytics software for these monitoring locations were default values, signaling invalid data. It was concluded that HM-3/WM-9 and HM-4/WM-7 contained corrupt data that were unable to be recovered by ERM or by the equipment vendor/noise program developer. The cause of the corrupt data was due to a fault related to the hardware in addition to software limitations.

As the data for monitoring locations (1) HM-3/WM-9 and (2) HM-4/WM-7 were considered unreliable in the context of this noise study, these two combined monitoring locations and associated data were removed from this report.

ERM and NDOW have confirmed that data obtained from other monitoring locations in the vicinity (WM-6 and WM-8) sufficiently represents noise levels of the human and wildlife receptors associated with HM-3/WM-9 and HM-4/WM-7.

5 REPORTING

Noise data collected for human receptors are reported following the parameters described in Section 3.1, Noise Monitoring—Human Receptors, as an average of the 48-hour data collection period. Noise data collected for the wildlife receptors are reported following the parameters described in Section 3.2 Noise Monitoring—Wildlife Receptors, based on NDOW's *Acoustic Impacts and Greater Sage-grouse: A Review of Current Science, Sound Measurement Protocols, and Management Recommendations* (NDOW 2018).

Noise measurements were taken to establish baseline ambient noise conditions at monitoring positions near the proposed Project.

Weather conditions observed at each monitoring location during equipment setup are summarized in Table 5.

Table 5: Weather Data

Location	Season	Wind Speed (mph)	Wind Direction	Temp (°F)	Barometric Pressure (Mb)	Humidity (%)
HM-1	Summer 2021	2	SE	82	1009	22
HM-2	Summer 2021	2	W	84	1018	12
WM-1	Winter 2022	5	NE	17	856	52
WM-2	Spring 2022.	0	NA	44	843	38
WM-3	Winter 2022	3	SW	42	856	43
WM-4	Summer 2021	15	NW	104	1004	8
WM-5	Summer 2021	1	SE	81	1011	18
WM-6	Summer 2021	2	SE	100	844	15
WM-8	Summer 2021	2	SW	81	1007	22
WM-10	Summer 2021	2	SW	82	1007	20
WM-11	Summer 2021	2	SW	88	1007	22
WM-12	Summer 2021	5	SW	89	1007	19
WM-13	Spring 2022	25	NW	47	846	27
WM-15	Winter 2022	3	SW	42	856	43
WM-16	Spring 2022	20	NE	36	845	52
WM-18	Spring 2022	38	SW	60	837	31

Source: Weather Underground 2022

The human receptors' overall A-weighted equivalent sound levels (Leq) were 59.5 at HM-1 and 50.9 at HM-2.

Wildlife receptors' Leq values ranged from 24.4 to 51.1 dBA and averaged approximately 40.5 dBA (Table 6 and Table 7, respectively). Of the wildlife receptors, WM-16 had the highest levels of noise and WM-5 had the lowest. dBC and dBZ for wildlife receptors are presented in Table 8 and Table 9, respectively.

Maximum noise levels were typically recorded during daytime hours (7 a.m. to 10 p.m.), except for WM-18, where the maximum sound level was recorded at 12:54 a.m. There was no clear pattern for when minimum noise levels were typical to occur, as approximately half of the monitoring locations had minimum noise levels occur during daytime hours and the other half during night-time hours.

Hourly sound-level data for each wildlife monitoring location can be found in Appendix D. Daily sound level data for each wildlife monitoring location can be found in Appendix E. Further analyse was done for sound levels during sensitive times of day for sage grouse. Summary sound level data between 4 a.m. and 9 a.m. (the hours 0400 and 0900) for each wildlife monitoring location is reported in Appendix F. Appendix G shows summary sound level data between 6 p.m. and 8 p.m. (the hours 1800 and 1000) per the *Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment* requirement (BLM 2015).

Table 6: Statistical Noise Monitoring Summary—Human Receptors (A-weighted Data)

Location	L_{eq} (dBA)	L_{dn} (dBA)	LS_{min} (dBA)	LSmax (dBA)	L_{10} (dBA)	L_{50} (dBA)	L_{90} (dBA)
HM-1	59.5	64.5	20.5	95.3	74.9	54.3	47.0
HM-2	50.9	59.0	20.6	84.4	64.4	50.6	44.7

Table 7: Statistical Noise Monitoring Summary—Wildlife Receptors (A-weighted Data)

Location	L_{eq} (dBA)	L_{dn} (dBA)	LF_{min} (dBA)	LF_{max} (dBA)	L_{10} (dBA)	L_{50} (dBA)	L_{90} (dBA)
WM-1	45.6	47.7	11.0	97.0	38.0	30.0	23.3
WM-2	40.4	41.9	0.0	85.7	35.9	27.6	18.3
WM-3	33.4	35.0	3.0	87.9	29.4	19.8	13.5
WM-4	43.3	47.0	8.0	85.3	44.8	34.7	20.5
WM-5	24.4	26.8	0.0	84.2	26.5	11.7	8.7
WM-6	42.8	45.1	14.0	83.4	40.4	25.7	19.0
WM-8	45.1	54.2	0.0	83.7	35.4	21.5	11.0
WM-10	33.1	37.7	0.0	79.6	34.6	19.0	10.3
WM-11	42.6	45.7	0.0	84.0	40.0	26.7	18.2
WM-12	31.4	35.5	12.9	82.1	30.1	26.9	24.6
WM-13	51.1	54.8	0.0	97.2	44.0	28.8	18.8
WM-15	46.4	54.0	0.0	95.0	39.9	22.7	9.3
WM-16	45.6	47.7	11.0	97.0	38.0	30.0	23.3
WM-18	40.4	41.9	0.0	85.7	35.9	27.6	18.3

Table 8: Statistical Noise Monitoring Summary—Wildlife Receptors (C-weighted Data)

Location	Leq (dBC)	LFmin (dBC)		LFmax (dBC)
WM-1		67.1	28.6	102.8
WM-2		62.9	22.8	99.0
WM-3		53.9	22.8	92.9
WM-4		59.6	21.8	97.0
WM-5		41.7	12.5	89.2
WM-6		69.1	26.6	102.9
WM-8		61.2	16.8	92.0
WM-10		44.9	17.3	87.9
WM-11		69.7	20.8	100.3
WM-12		55.7	23.4	98.3
WM-13		66.4	24.6	97.5
WM-15		65.2	0.0	106.4
WM-16		67.1	28.6	102.8
WM-18		62.9	22.8	99.0

Table 9: Statistical Noise Monitoring Summary—Wildlife Receptors (Unweighted Data)

Location	Leq (dBZ)	LFmin (dBZ)		LFmax (dBZ)
WM-1		75.9	33.6	105.7
WM-2		81.0	29.8	107.0
WM-3		71.5	22.5	105.5
WM-4		75.6	27.4	106.8
WM-5		59.9	18.1	100.7

Location	Leq (dBZ)	LFmin (dBZ)	LFmax (dBZ)
WM-6	85.5	34.5	114.1
WM-8	68.5	22.9	103.6
WM-10	61.1	23.6	103.3
WM-11	82.9	28.0	106.3
WM-12	70.5	28.0	105.2
WM-13	81.4	31.8	105.5
WM-15	79.3	10.1	114.7
WM-16	75.9	33.6	105.7
WM-18	81.0	29.8	107.0

The data summarized in this report will serve as a baseline noise assessment for the Project. An impact assessment will be performed when Project plans and alternatives have been finalized to estimate the impacts that Project-related construction and operation could have on human and wildlife receptors in the Project Area using the baseline data collected in 2021 and 2022.

6 REFERENCES

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_____. 2020. *Interim Sage-Grouse Noise Protocol Clarifications.* March.

APPENDIX A PHOTOGRAPHIC LOG



Human Monitor 1 – Facing North

Carlin, NV 89822 - Coordinates: Lat: 40.69889 Lon: -116.1342

July 2021



Human Monitor 1 – Facing East

Carlin, NV 89822 - Coordinates: Lat: 40.69889 Lon: -116.1342	July 2021



Human Monitor 1 – Facing South

Carlin, NV 89822 - Coordinates: Lat: 40.69889 Lon: -116.1342

July 2021



Human Monitor 1 – Facing West

Carlin, NV 89822 - Coordinates: Lat: 40.69889 Lon: -116.1342

July 2021



Human Monitor 2 – Facing North

Carlin, NV 89822 – Coordinates: Lat: 40.70614 Lon: -116.12804 | July 2021



Human Monitor 2 – Facing East

Carlin, NV 89822 – Coordinates: Lat: 40.70614 Lon: -116.12804

July 2021



Human Monitor 2 – Facing South

Carlin, NV 89822 – Coordinates: Lat: 40.70614 Lon: -116.12804

July 2021



Human Monitor 2 – Facing West

Carlin, NV 89822 – Coordinates: Lat: 40.70614 Lon: -116.12804

July 2021



Wildlife Monitor 1 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.20398 Lon: -116.58408 | February 2022



Wildlife Monitor 1 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.20398 Lon: -116.58408

February 2022



Wildlife Monitor 1 – Facing South

Crescent Valley, NV 89821 – Coordinates: Lat: 40.20398 Lon: -116.58408

February 2022



Wildlife Monitor 1 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.20398 Lon: -116.58408 | February 2022



Wildlife Monitor 2 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.22916 Lon: -116.61301

April 2022



Wildlife Monitor 2 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.22916 Lon: -116.61301

April 2022



Wildlife Monitor 2 – Facing South

Crescent Valley, NV 89821 – Coordinates: Lat: 40.22916 Lon: -116.61301

April 2022



Wildlife Monitor 2 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.22916 Lon: -116.61301

April 2022



Wildlife Monitor 3 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.28161 Lon: -116.49862

February 2022



Wildlife Monitor 3 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.28161 Lon: -116.49862

February 2022



Wildlife Monitor 3 – Facing South

Crescent Valley, NV 89821 – Coordinates: Lat: 40.28161 Lon: -116.49862

February 2022



Wildlife Monitor 3 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.28161 Lon: -116.49862

February 2022



Wildlife Monitor 4 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.30215 Lon: -116.49694

July 2021



Wildlife Monitor 4 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.30215 Lon: -116.49694

July 2021



Wildlife Monitor 4 – Facing South

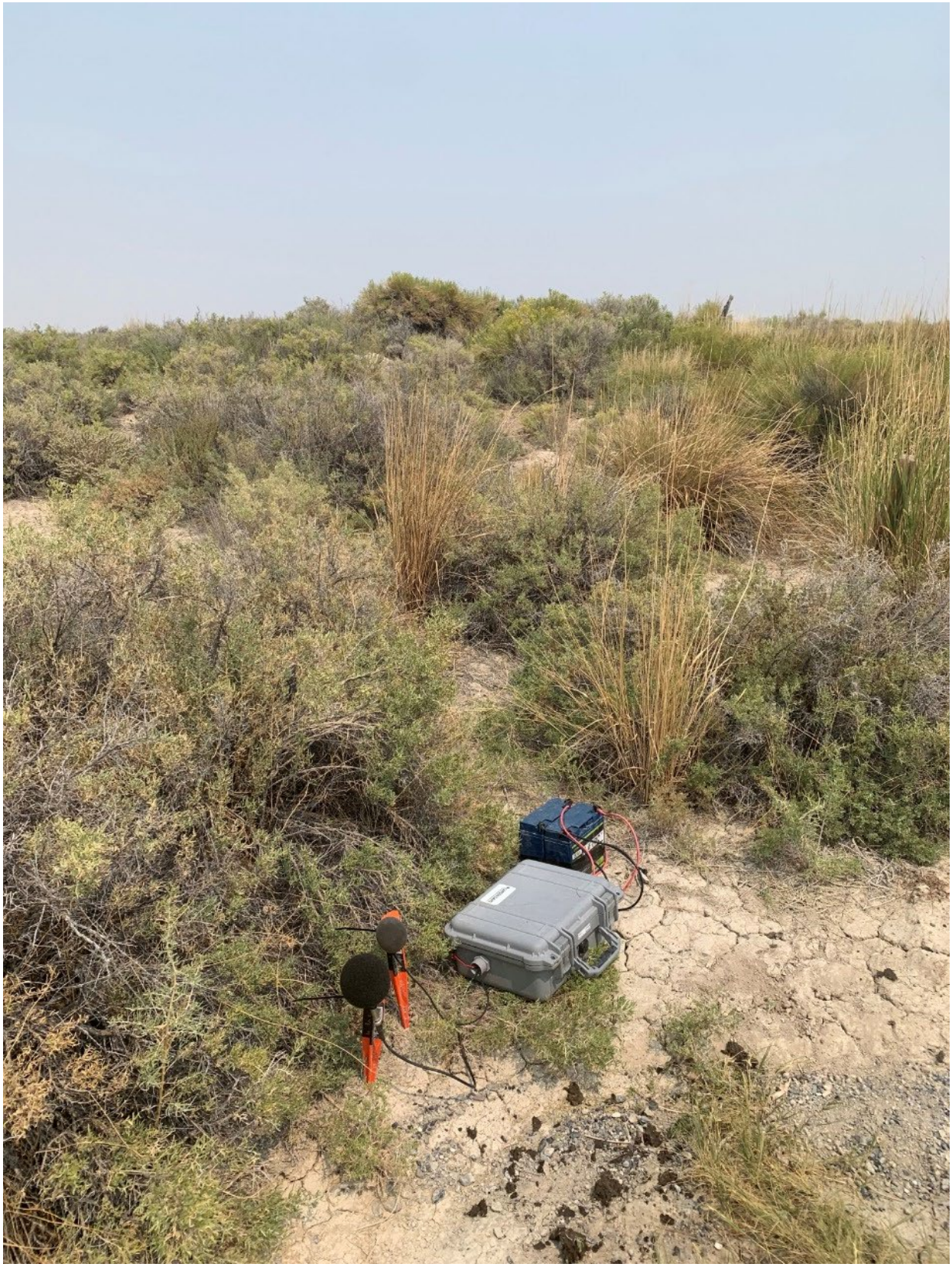
Crescent Valley, NV 89821 – Coordinates: Lat: 40.30215 Lon: -116.49694 | July 2021



Wildlife Monitor 4 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.30215 Lon: -116.49694

July 2021



Wildlife Monitor 5 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.33838 Lon: -116.50963 | July 2021



Wildlife Monitor 5 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.33838 Lon: -116.50963 | July 2021



Wildlife Monitor 5 – Facing South

Crescent Valley, NV 89821 – Coordinates: Lat: 40.33838 Lon: -116.50963	July 2021



Wildlife Monitor 5 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.33838 Lon: -116.50963

July 2021



Wildlife Monitor 6 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.41892 Lon: -116.52117

July 2021



Wildlife Monitor 6 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.41892 Lon: -116.52117

July 2021



Wildlife Monitor 6 – Facing South

Crescent Valley, NV 89821 – Coordinates: Lat: 40.41892 Lon: -116.52117

July 2021



Wildlife Monitor 6 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.41892 Lon: -116.52117

July 2021



Wildlife Monitor 8 – Facing North

Beowawe, NV – Coordinates: Lat: 40.582 Lon: -116.48411	July 2021



Wildlife Monitor 8 – Facing East

Beowawe, NV – Coordinates: Lat: 40.582 Lon: -116.48411

July 2021



Wildlife Monitor 8 – Facing South

Beowawe, NV – Coordinates: Lat: 40.582 Lon: -116.48411

July 2021



Wildlife Monitor 8 – Facing West

Beowawe, NV – Coordinates: Lat: 40.582 Lon: -116.48411	July 2021



Wildlife Monitor 10 – Facing North

Beowawe, NV – Coordinates: Lat: 40.57187 Lon: -116.45221	July 2021



Wildlife Monitor 10 – Facing East

Beowawe, NV – Coordinates: Lat: 40.57187 Lon: -116.45221	July 2021



Wildlife Monitor 10 – Facing South

Beowawe, NV – Coordinates: Lat: 40.57187 Lon: -116.45221

July 2021



Wildlife Monitor 10 – Facing West

Beowawe, NV – Coordinates: Lat: 40.57187 Lon: -116.45221

July 2021



Wildlife Monitor 11 – Facing North

Shoshone, NV - Coordinates: Lat: 40.87011 Lon: -116.50204

July 2021



Wildlife Monitor 11 – Facing East

Shoshone, NV - Coordinates: Lat: 40.87011 Lon: -116.50204	July 2021



Wildlife Monitor 11 – Facing South

Shoshone, NV - Coordinates: Lat: 40.87011 Lon: -116.50204	July 2021



Wildlife Monitor 11 – Facing West

Shoshone, NV - Coordinates: Lat: 40.87011 Lon: -116.50204	July 2021



Wildlife Monitor 12 – Facing North

Shoshone, NV – Coordinates: Lat: 40.98307 Lon: -116.42973	July 2021



Wildlife Monitor 12 – Facing East

Shoshone, NV – Coordinates: Lat: 40.98307 Lon: -116.42973	July 2021



Wildlife Monitor 12 – Facing South

Shoshone, NV – Coordinates: Lat: 40.98307 Lon: -116.42973	July 2021



Wildlife Monitor 12 – Facing West

Shoshone, NV – Coordinates: Lat: 40.98307 Lon: -116.42973	July 2021



Wildlife Monitor 13 – Facing North

Carlin, NV 89822 – Coordinates: Lat: 40.6407 Lon: -116.188047 | April 2022



Wildlife Monitor 13 – Facing East

Carlin, NV 89822 – Coordinates: Lat: 40.6407 Lon: -116.188047

April 2022



Wildlife Monitor 13 – Facing South

Carlin, NV 89822 – Coordinates: Lat: 40.6407 Lon: -116.188047 | April 2022



Wildlife Monitor 13 – Facing West

Carlin, NV 89822 – Coordinates: Lat: 40.6407 Lon: -116.188047

April 2022



Wildlife Monitor 15 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.277602 Lon: -116.498408

February 2022



Wildlife Monitor 15 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.277602 Lon: -116.498408

February 2022



Wildlife Monitor 15 – Facing South

Crescent Valley, NV 89821 – Coordinates: Lat: 40.277602 Lon: -116.498408

February 2022



Wildlife Monitor 15 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.277602 Lon: -116.498408

February 2022



Wildlife Monitor 16 – Facing North

Carlin, NV 89822 – Coordinates: Lat: 40.741189 Lon: -116.231728

April 2022



Wildlife Monitor 16 – Facing East

Carlin, NV 89822 – Coordinates: Lat: 40.741189 Lon: -116.231728	April 2022



Wildlife Monitor 16 – Facing South

Carlin, NV 89822 – Coordinates: Lat: 40.741189 Lon: -116.231728

April 2022



Wildlife Monitor 16 – Facing West

Carlin, NV 89822 – Coordinates: Lat: 40.741189 Lon: -116.231728	April 2022



Wildlife Monitor 18 – Facing North

Crescent Valley, NV 89821 – Coordinates: Lat: 40.217012 Lon: -116.483639

April 2022



Wildlife Monitor 18 – Facing East

Crescent Valley, NV 89821 – Coordinates: Lat: 40.217012 Lon: -116.483639

April 2022



Wildlife Monitor 18 – Facing South

Crescent Valley, NV 89821 – Coordinates: Lat: 40.217012 Lon: -116.483639

April 2022



Wildlife Monitor 18 – Facing West

Crescent Valley, NV 89821 – Coordinates: Lat: 40.217012 Lon: -116.483639

April 2022

APPENDIX B CALIBRATION CERTIFICATES

Calibration Certificate

Certificate Number 2021004034
Customer:
LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	10115	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	8 Apr 2021		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***			
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Temperature***	23.48	°C	± 0.25 °C
		Humidity	51.9	%RH	± 2.0 %RH
		Static Pressure	85.71	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 036756 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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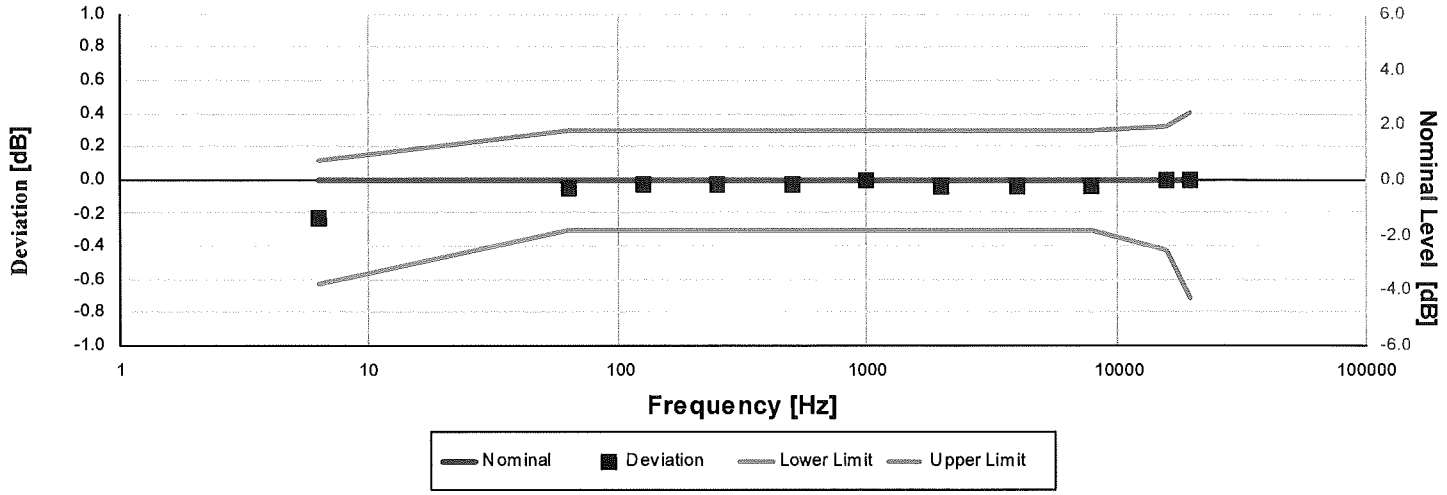
Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2021-01-05	2022-01-05	007118

Z-weight Filter Response

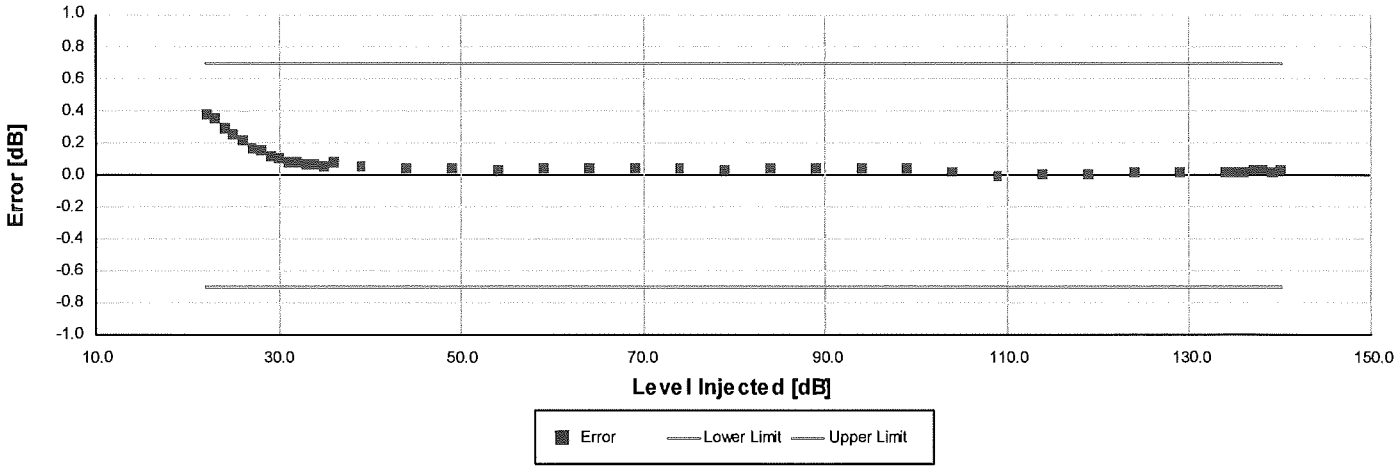


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.23	-0.23	-0.63	0.12	0.15	Pass
63.10	-0.05	-0.05	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.03	-0.03	-0.30	0.30	0.15	Pass
501.19	-0.03	-0.03	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.03	-0.03	-0.30	0.30	0.15	Pass
15,848.93	0.00	0.00	-0.42	0.32	0.15	Pass
19,952.62	0.00	0.00	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



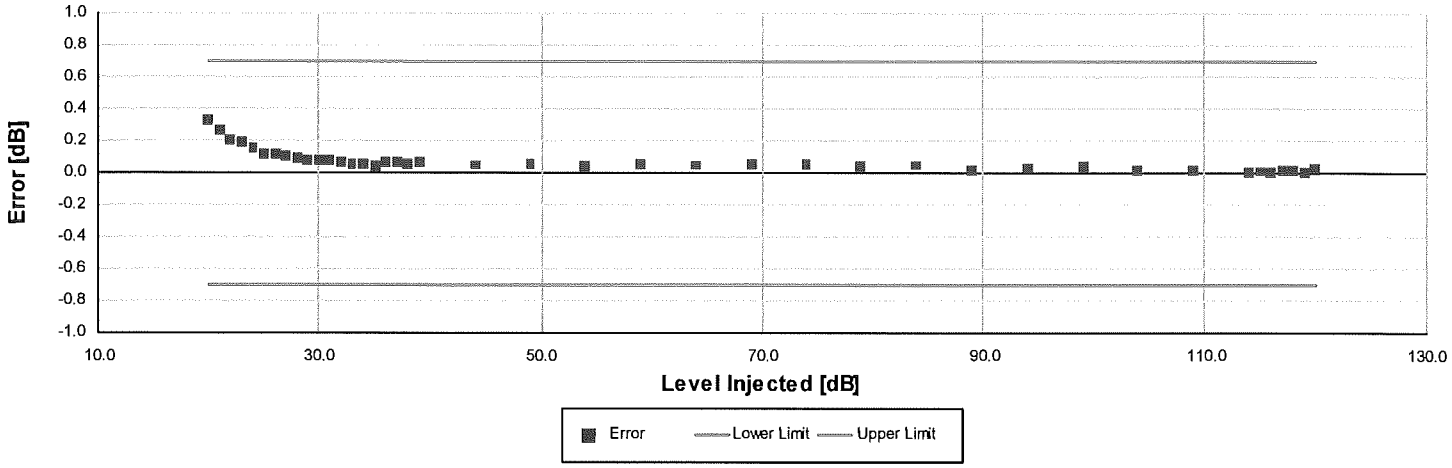
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
22.00	0.38	-0.70	0.70	0.16	Pass
23.00	0.35	-0.70	0.70	0.16	Pass
24.00	0.29	-0.70	0.70	0.16	Pass
25.00	0.25	-0.70	0.70	0.16	Pass
26.00	0.21	-0.70	0.70	0.16	Pass
27.00	0.17	-0.70	0.70	0.16	Pass
28.00	0.15	-0.70	0.70	0.16	Pass
29.00	0.12	-0.70	0.70	0.18	Pass
30.00	0.10	-0.70	0.70	0.17	Pass
31.00	0.08	-0.70	0.70	0.17	Pass
32.00	0.08	-0.70	0.70	0.17	Pass
33.00	0.07	-0.70	0.70	0.16	Pass
34.00	0.06	-0.70	0.70	0.16	Pass
35.00	0.06	-0.70	0.70	0.16	Pass
36.00	0.08	-0.70	0.70	0.16	Pass
39.00	0.06	-0.70	0.70	0.16	Pass
44.00	0.04	-0.70	0.70	0.16	Pass
49.00	0.04	-0.70	0.70	0.16	Pass
54.00	0.04	-0.70	0.70	0.16	Pass
59.00	0.05	-0.70	0.70	0.16	Pass
64.00	0.04	-0.70	0.70	0.16	Pass
69.00	0.04	-0.70	0.70	0.16	Pass
74.00	0.05	-0.70	0.70	0.16	Pass
79.00	0.03	-0.70	0.70	0.16	Pass
84.00	0.04	-0.70	0.70	0.16	Pass
89.00	0.04	-0.70	0.70	0.16	Pass
94.00	0.04	-0.70	0.70	0.16	Pass
99.00	0.04	-0.70	0.70	0.16	Pass
104.00	0.02	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
124.00	0.01	-0.70	0.70	0.15	Pass
129.00	0.02	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass
135.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
136.00	0.02	-0.70	0.70	0.15	Pass
137.00	0.03	-0.70	0.70	0.15	Pass
138.00	0.03	-0.70	0.70	0.15	Pass
139.00	0.02	-0.70	0.70	0.15	Pass
140.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.33	-0.70	0.70	0.17	Pass
21.00	0.26	-0.70	0.70	0.16	Pass
22.00	0.21	-0.70	0.70	0.16	Pass
23.00	0.19	-0.70	0.70	0.16	Pass
24.00	0.15	-0.70	0.70	0.16	Pass
25.00	0.12	-0.70	0.70	0.16	Pass
26.00	0.12	-0.70	0.70	0.19	Pass
27.00	0.11	-0.70	0.70	0.18	Pass
28.00	0.09	-0.70	0.70	0.19	Pass
29.00	0.08	-0.70	0.70	0.18	Pass
30.00	0.08	-0.70	0.70	0.17	Pass
31.00	0.07	-0.70	0.70	0.17	Pass
32.00	0.06	-0.70	0.70	0.17	Pass
33.00	0.05	-0.70	0.70	0.16	Pass
34.00	0.06	-0.70	0.70	0.16	Pass
35.00	0.04	-0.70	0.70	0.16	Pass
36.00	0.07	-0.70	0.70	0.16	Pass
37.00	0.06	-0.70	0.70	0.16	Pass
38.00	0.06	-0.70	0.70	0.16	Pass
39.00	0.06	-0.70	0.70	0.16	Pass
44.00	0.05	-0.70	0.70	0.16	Pass
49.00	0.05	-0.70	0.70	0.16	Pass
54.00	0.04	-0.70	0.70	0.16	Pass
59.00	0.05	-0.70	0.70	0.16	Pass
64.00	0.05	-0.70	0.70	0.16	Pass
69.00	0.05	-0.70	0.70	0.16	Pass
74.00	0.05	-0.70	0.70	0.16	Pass
79.00	0.04	-0.70	0.70	0.16	Pass
84.00	0.05	-0.70	0.70	0.16	Pass
89.00	0.02	-0.70	0.70	0.16	Pass
94.00	0.03	-0.70	0.70	0.16	Pass
99.00	0.04	-0.70	0.70	0.16	Pass
104.00	0.02	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.01	-0.70	0.70	0.15	Pass
115.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.00	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.01	-0.70	0.70	0.15	Pass
120.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.92	134.57	136.57	0.15	Pass
		Positive Pulse	135.90	134.57	136.57	0.15	Pass
	30	Negative Pulse	135.08	134.57	136.57	0.15	Pass
		Positive Pulse	135.10	134.57	136.57	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.27	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.24	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.15	± 1.00	0.15 ‡	Pass
	10	-0.18	± 1.50	0.15 ‡	Pass
108.00	3	-0.15	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.16	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.07	93.92	94.12	0.15	Pass
0 dB Gain, Linearity	28.14	27.32	28.72	0.16	Pass
20 dB Gain	94.03	93.92	94.12	0.15	Pass
20 dB Gain, Linearity	23.22	22.32	23.72	0.16	Pass
OBA High Range	94.02	93.20	94.80	0.15	Pass
OBA Normal Range	94.03	93.92	94.12	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.56	9.00	Pass
C-weight Noise Floor	12.04	15.00	Pass
Z-weight Noise Floor	21.74	25.00	Pass

-- End of measurement results--

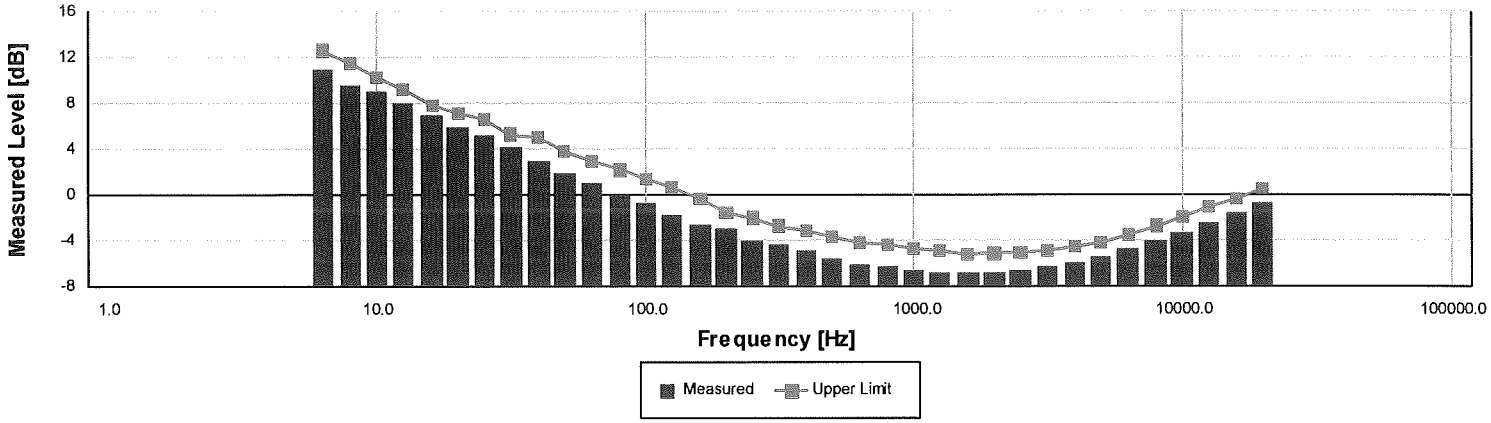
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.49	137.20	138.80	0.15	Pass
THD	-75.78		-60.00	1.30 ‡	Pass
THD+N	-74.83		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.04	12.60	Pass
8.00	9.64	11.50	Pass
10.00	8.99	10.20	Pass
12.50	7.98	9.20	Pass
16.00	6.90	7.90	Pass
20.00	5.95	7.20	Pass
25.00	5.14	6.60	Pass
31.50	4.13	5.30	Pass
40.00	3.04	5.00	Pass
50.00	1.84	3.80	Pass
63.00	1.04	3.00	Pass
80.00	-0.06	2.20	Pass
100.00	-0.70	1.40	Pass
125.00	-1.71	0.70	Pass
160.00	-2.56	-0.40	Pass
200.00	-3.03	-1.50	Pass
250.00	-3.97	-2.00	Pass
315.00	-4.31	-2.70	Pass
400.00	-4.85	-3.10	Pass
500.00	-5.48	-3.70	Pass
630.00	-5.99	-4.10	Pass
800.00	-6.16	-4.30	Pass
1,000.00	-6.59	-4.70	Pass
1,250.00	-6.69	-4.80	Pass
1,600.00	-6.81	-5.20	Pass
2,000.00	-6.74	-5.10	Pass
2,500.00	-6.57	-5.00	Pass
3,150.00	-6.30	-4.80	Pass
4,000.00	-5.84	-4.50	Pass
5,000.00	-5.32	-4.10	Pass
6,300.00	-4.67	-3.40	Pass
8,000.00	-4.00	-2.70	Pass
10,000.00	-3.23	-1.90	Pass
12,500.00	-2.42	-1.10	Pass
16,000.00	-1.53	-0.30	Pass
20,000.00	-0.61	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED
Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Calibration Certificate

Certificate Number 2021006796

Customer:

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	10505	***Technician***	Eric Olson		
Test Results	**Pass**	***Calibration Date***	8 Jun 2021		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***			
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.2R1	***Temperature***	23.63	°C	± 0.25 °C
		Humidity	52.7	%RH	± 2.0 %RH
		Static Pressure	85.68	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 036756 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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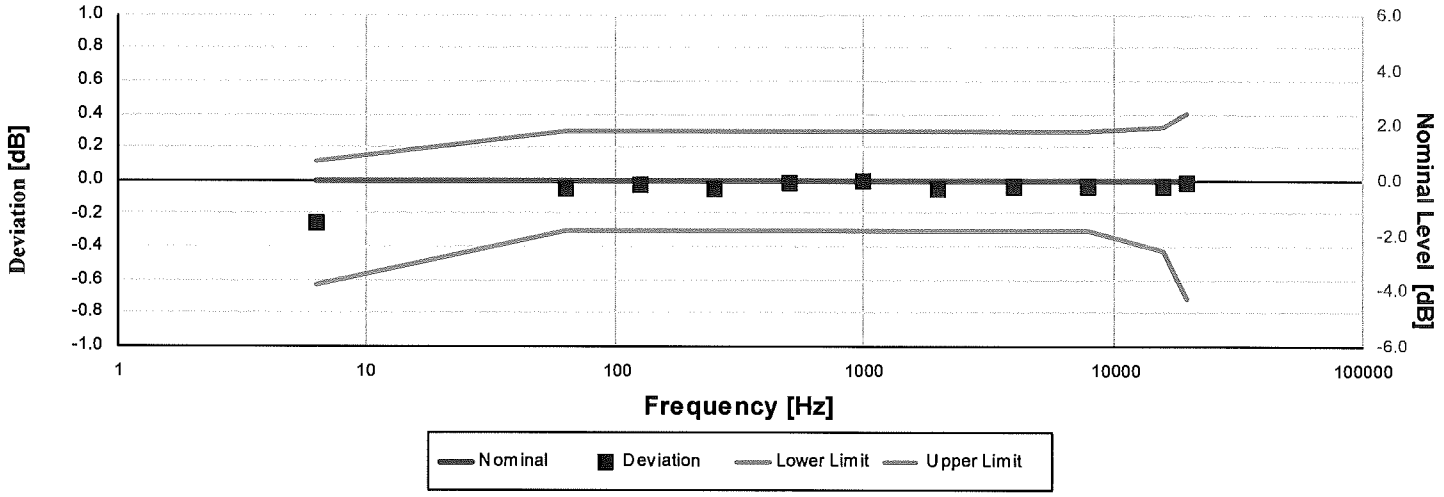
Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-H Temperature Probe	2021-02-04	2022-08-04	006767
SRS DS360 Ultra Low Distortion Generator	2020-08-19	2021-08-19	007167

Z-weight Filter Response

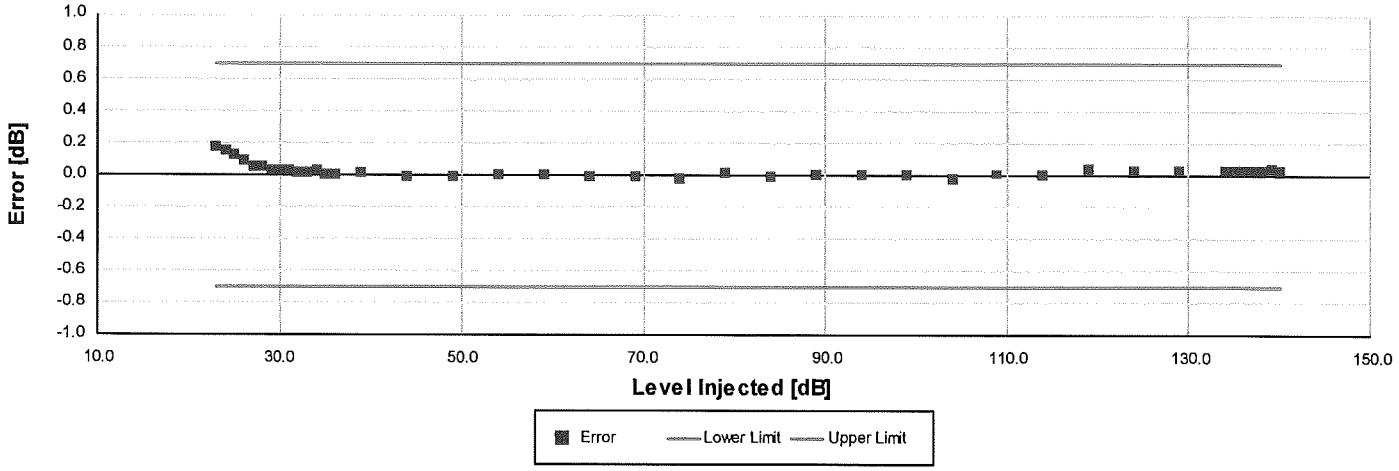


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.26	-0.26	-0.63	0.12	0.15	Pass
63.10	-0.05	-0.05	-0.30	0.30	0.15	Pass
125.89	-0.02	-0.02	-0.30	0.30	0.15	Pass
251.19	-0.05	-0.05	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.03	-0.03	-0.30	0.30	0.15	Pass
15,848.93	-0.03	-0.03	-0.42	0.32	0.15	Pass
19,952.62	-0.02	-0.02	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



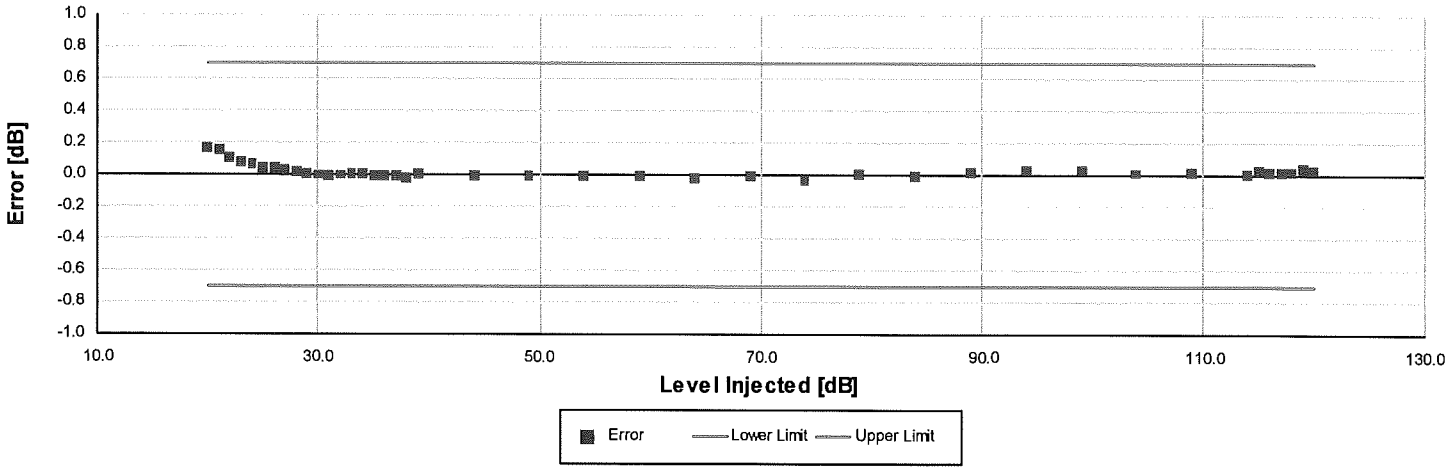
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
23.00	0.19	-0.70	0.70	0.16	Pass
24.00	0.15	-0.70	0.70	0.16	Pass
25.00	0.13	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.05	-0.70	0.70	0.16	Pass
28.00	0.06	-0.70	0.70	0.16	Pass
29.00	0.03	-0.70	0.70	0.18	Pass
30.00	0.03	-0.70	0.70	0.17	Pass
31.00	0.03	-0.70	0.70	0.17	Pass
32.00	0.02	-0.70	0.70	0.17	Pass
33.00	0.02	-0.70	0.70	0.16	Pass
34.00	0.02	-0.70	0.70	0.16	Pass
35.00	0.01	-0.70	0.70	0.16	Pass
36.00	0.01	-0.70	0.70	0.16	Pass
39.00	0.01	-0.70	0.70	0.16	Pass
44.00	0.00	-0.70	0.70	0.16	Pass
49.00	0.00	-0.70	0.70	0.16	Pass
54.00	0.00	-0.70	0.70	0.16	Pass
59.00	0.00	-0.70	0.70	0.16	Pass
64.00	-0.01	-0.70	0.70	0.16	Pass
69.00	0.00	-0.70	0.70	0.16	Pass
74.00	-0.02	-0.70	0.70	0.16	Pass
79.00	0.01	-0.70	0.70	0.16	Pass
84.00	0.00	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.00	-0.70	0.70	0.16	Pass
99.00	0.00	-0.70	0.70	0.16	Pass
104.00	-0.02	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
124.00	0.03	-0.70	0.70	0.15	Pass
129.00	0.03	-0.70	0.70	0.15	Pass
134.00	0.03	-0.70	0.70	0.15	Pass
135.00	0.03	-0.70	0.70	0.15	Pass
136.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	0.03	-0.70	0.70	0.15	Pass
138.00	0.03	-0.70	0.70	0.15	Pass
139.00	0.04	-0.70	0.70	0.15	Pass
140.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.17	-0.70	0.70	0.17	Pass
21.00	0.15	-0.70	0.70	0.16	Pass
22.00	0.10	-0.70	0.70	0.16	Pass
23.00	0.08	-0.70	0.70	0.16	Pass
24.00	0.07	-0.70	0.70	0.16	Pass
25.00	0.04	-0.70	0.70	0.16	Pass
26.00	0.04	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	0.00	-0.70	0.70	0.17	Pass
31.00	-0.01	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	0.01	-0.70	0.70	0.16	Pass
34.00	0.01	-0.70	0.70	0.16	Pass
35.00	-0.01	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
37.00	-0.01	-0.70	0.70	0.16	Pass
38.00	-0.02	-0.70	0.70	0.16	Pass
39.00	0.00	-0.70	0.70	0.16	Pass
44.00	-0.01	-0.70	0.70	0.16	Pass
49.00	-0.01	-0.70	0.70	0.16	Pass
54.00	-0.01	-0.70	0.70	0.16	Pass
59.00	-0.01	-0.70	0.70	0.16	Pass
64.00	-0.02	-0.70	0.70	0.16	Pass
69.00	-0.01	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	0.00	-0.70	0.70	0.16	Pass
84.00	-0.01	-0.70	0.70	0.16	Pass
89.00	0.01	-0.70	0.70	0.16	Pass
94.00	0.02	-0.70	0.70	0.16	Pass
99.00	0.03	-0.70	0.70	0.16	Pass
104.00	0.01	-0.70	0.70	0.15	Pass
109.00	0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.01	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
120.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	136.04	134.72	136.72	0.15	Pass
		Positive Pulse	136.05	134.72	136.72	0.15	Pass
	30	Negative Pulse	135.22	134.72	136.72	0.15	Pass
		Positive Pulse	135.23	134.72	136.72	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	0.00	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	-0.08	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.14	± 1.00	0.15 ‡	Pass
	10	-0.10	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.17	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.99	93.89	94.09	0.15	Pass
0 dB Gain, Linearity	28.05	27.29	28.69	0.16	Pass
20 dB Gain	94.00	93.89	94.09	0.15	Pass
20 dB Gain, Linearity	23.05	22.29	23.69	0.16	Pass
OBA High Range	93.99	93.20	94.80	0.15	Pass
OBA Normal Range	93.99	93.89	94.09	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	4.08	9.00	Pass
C-weight Noise Floor	9.28	15.00	Pass
Z-weight Noise Floor	18.83	25.00	Pass

-- End of measurement results--

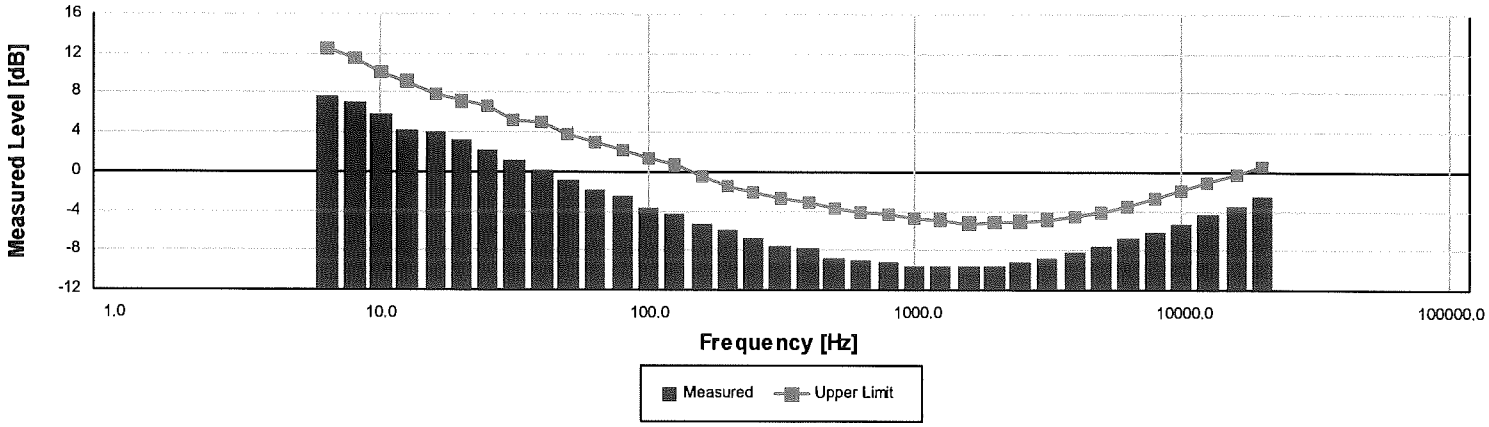
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.65	137.20	138.80	0.15	Pass
THD	-81.37		-60.00	1.30 ‡	Pass
THD+N	-79.75		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	7.66	12.60	Pass
8.00	7.09	11.50	Pass
10.00	5.95	10.20	Pass
12.50	4.27	9.20	Pass
16.00	3.97	7.90	Pass
20.00	3.26	7.20	Pass
25.00	2.23	6.60	Pass
31.50	1.12	5.30	Pass
40.00	0.22	5.00	Pass
50.00	-0.93	3.80	Pass
63.00	-1.77	3.00	Pass
80.00	-2.50	2.20	Pass
100.00	-3.71	1.40	Pass
125.00	-4.32	0.70	Pass
160.00	-5.24	-0.40	Pass
200.00	-5.89	-1.50	Pass
250.00	-6.61	-2.00	Pass
315.00	-7.48	-2.70	Pass
400.00	-7.76	-3.10	Pass
500.00	-8.66	-3.70	Pass
630.00	-8.98	-4.10	Pass
800.00	-9.22	-4.30	Pass
1,000.00	-9.57	-4.70	Pass
1,250.00	-9.57	-4.80	Pass
1,600.00	-9.62	-5.20	Pass
2,000.00	-9.45	-5.10	Pass
2,500.00	-9.14	-5.00	Pass
3,150.00	-8.68	-4.80	Pass
4,000.00	-8.13	-4.50	Pass
5,000.00	-7.50	-4.10	Pass
6,300.00	-6.78	-3.40	Pass
8,000.00	-6.02	-2.70	Pass
10,000.00	-5.19	-1.90	Pass
12,500.00	-4.32	-1.10	Pass
16,000.00	-3.37	-0.30	Pass
20,000.00	-2.42	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Eric Olson*

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LARSON DAVIS
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Calibration Certificate

Certificate Number 2021004036

Customer:

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716-684-0001

Model Number	831C	***Procedure Number***	D0001.8378
Serial Number	10420	***Technician***	Ron Harris
Test Results	**Pass**	***Calibration Date***	8 Apr 2021
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***	
		Temperature	23.87 °C ± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Humidity***	50.9 %RH ± 2.0 %RH
		Static Pressure	85.72 kPa ± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 029590 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used

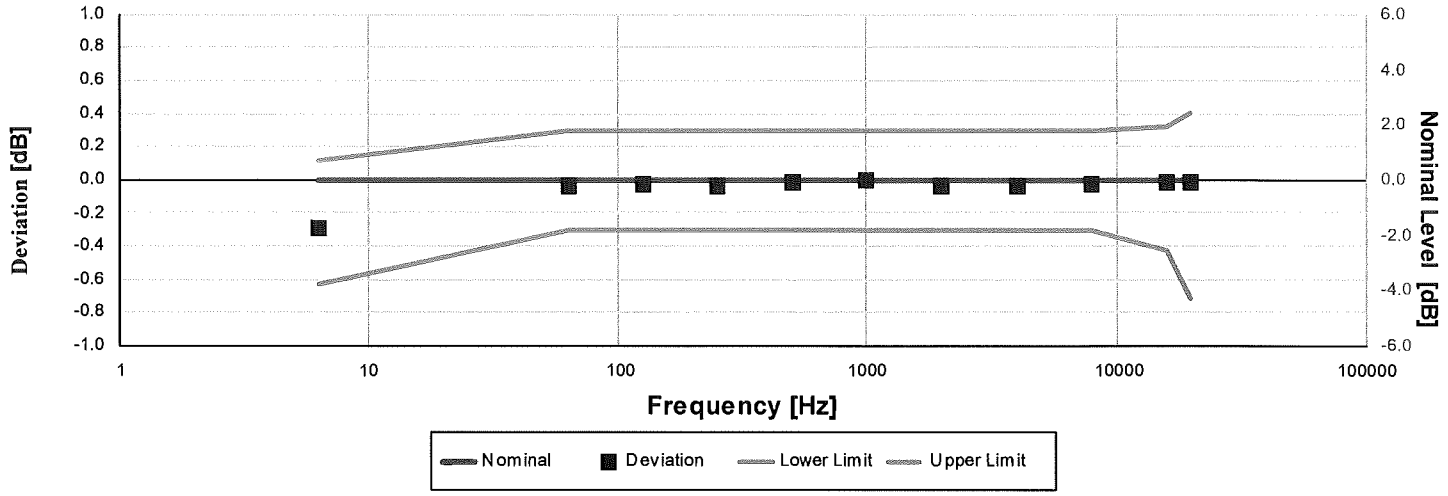
Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2020-08-19	2021-08-19	007167

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Z-weight Filter Response

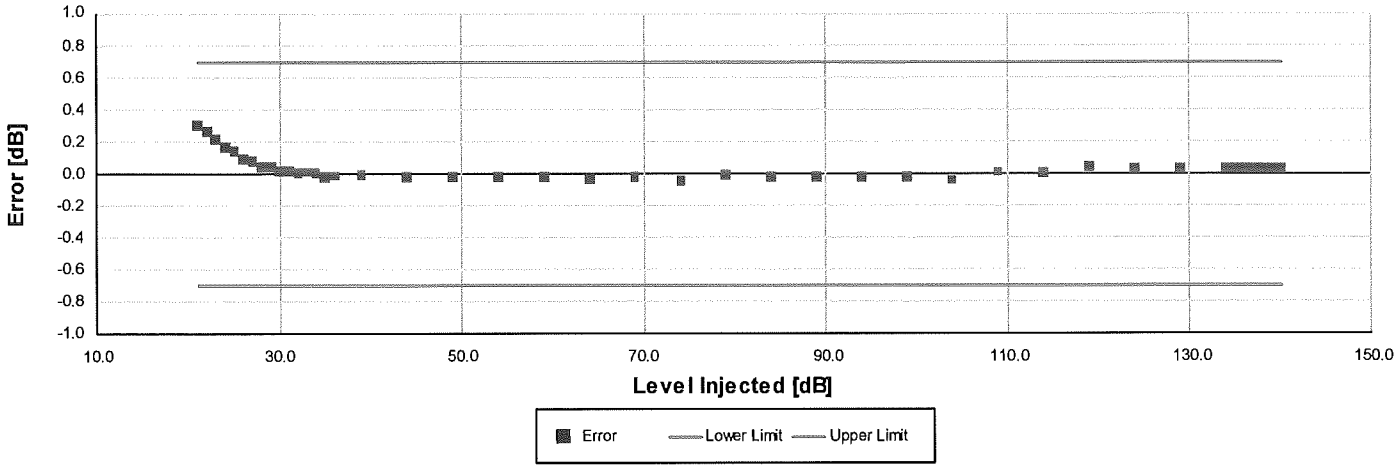


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.29	-0.29	-0.63	0.12	0.15	Pass
63.10	-0.04	-0.04	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.03	-0.03	-0.30	0.30	0.15	Pass
501.19	-0.01	-0.01	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.02	-0.02	-0.30	0.30	0.15	Pass
15,848.93	-0.01	-0.01	-0.42	0.32	0.15	Pass
19,952.62	-0.01	-0.01	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.30	-0.70	0.70	0.16	Pass
22.00	0.26	-0.70	0.70	0.16	Pass
23.00	0.21	-0.70	0.70	0.16	Pass
24.00	0.17	-0.70	0.70	0.16	Pass
25.00	0.14	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.08	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.18	Pass
30.00	0.02	-0.70	0.70	0.17	Pass
31.00	0.02	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	0.01	-0.70	0.70	0.16	Pass
34.00	0.01	-0.70	0.70	0.16	Pass
35.00	-0.02	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
39.00	-0.01	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.02	-0.70	0.70	0.16	Pass
64.00	-0.03	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.01	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
124.00	0.02	-0.70	0.70	0.15	Pass
129.00	0.03	-0.70	0.70	0.15	Pass
134.00	0.03	-0.70	0.70	0.15	Pass

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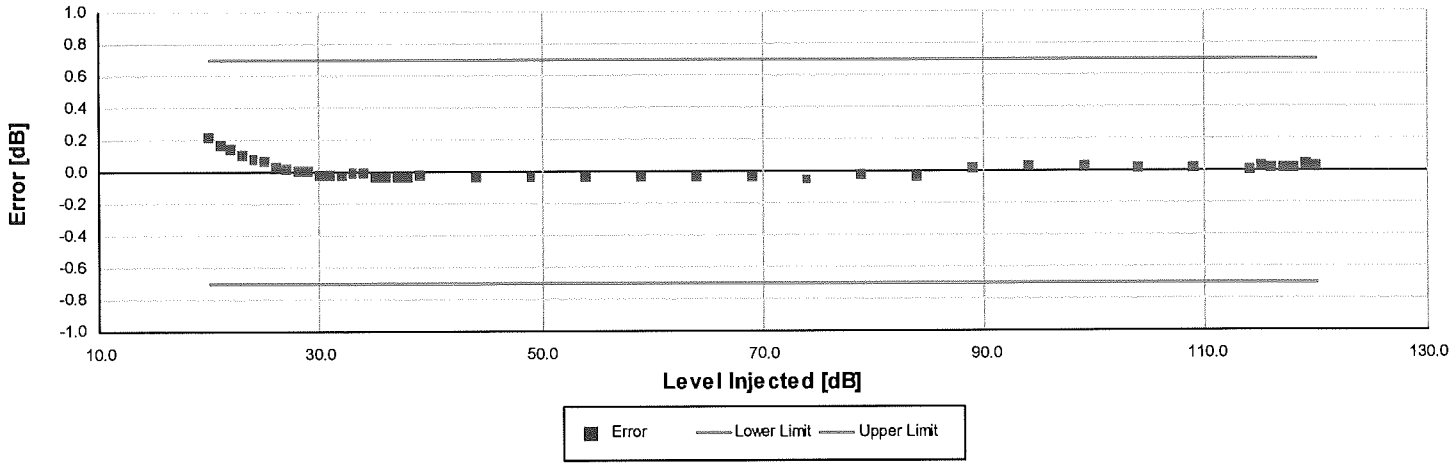
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Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.03	-0.70	0.70	0.15	Pass
136.00	0.03	-0.70	0.70	0.15	Pass
137.00	0.03	-0.70	0.70	0.15	Pass
138.00	0.03	-0.70	0.70	0.15	Pass
139.00	0.03	-0.70	0.70	0.15	Pass
140.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.21	-0.70	0.70	0.17	Pass
21.00	0.16	-0.70	0.70	0.16	Pass
22.00	0.14	-0.70	0.70	0.16	Pass
23.00	0.10	-0.70	0.70	0.16	Pass
24.00	0.07	-0.70	0.70	0.16	Pass
25.00	0.06	-0.70	0.70	0.16	Pass
26.00	0.03	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	-0.02	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.03	-0.70	0.70	0.17	Pass
33.00	-0.01	-0.70	0.70	0.16	Pass
34.00	-0.01	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.03	-0.70	0.70	0.16	Pass
37.00	-0.04	-0.70	0.70	0.16	Pass
38.00	-0.04	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.03	-0.70	0.70	0.16	Pass
49.00	-0.03	-0.70	0.70	0.16	Pass
54.00	-0.03	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.03	-0.70	0.70	0.16	Pass
74.00	-0.05	-0.70	0.70	0.16	Pass
79.00	-0.02	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	0.02	-0.70	0.70	0.16	Pass
94.00	0.03	-0.70	0.70	0.16	Pass
99.00	0.03	-0.70	0.70	0.16	Pass
104.00	0.01	-0.70	0.70	0.15	Pass
109.00	0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.01	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
120.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.97	134.63	136.63	0.15	Pass
		Positive Pulse	135.97	134.63	136.63	0.15	Pass
	30	Negative Pulse	135.11	134.63	136.63	0.15	Pass
		Positive Pulse	135.15	134.63	136.63	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.26	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	0.01	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.09	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.08	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.08	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.97	93.89	94.09	0.15	Pass
0 dB Gain, Linearity	28.07	27.29	28.69	0.16	Pass
20 dB Gain	94.01	93.89	94.09	0.15	Pass
20 dB Gain, Linearity	23.06	22.29	23.69	0.16	Pass
OBA High Range	93.99	93.20	94.80	0.15	Pass
OBA Normal Range	93.99	93.89	94.09	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.40	9.00	Pass
C-weight Noise Floor	12.02	15.00	Pass
Z-weight Noise Floor	22.09	25.00	Pass

-- End of measurement results--

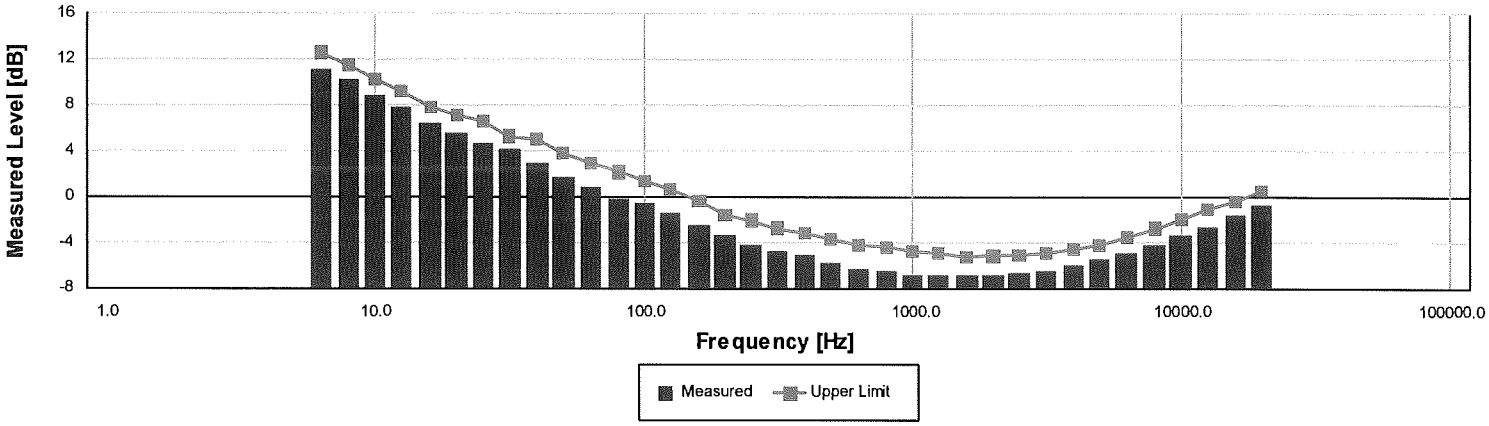
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.52	137.20	138.80	0.15	Pass
THD	-79.14		-60.00	1.30 ‡	Pass
THD+N	-77.81		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.18	12.60	Pass
8.00	10.25	11.50	Pass
10.00	8.92	10.20	Pass
12.50	7.89	9.20	Pass
16.00	6.39	7.90	Pass
20.00	5.60	7.20	Pass
25.00	4.70	6.60	Pass
31.50	4.11	5.30	Pass
40.00	2.97	5.00	Pass
50.00	1.73	3.80	Pass
63.00	0.92	3.00	Pass
80.00	-0.10	2.20	Pass
100.00	-0.54	1.40	Pass
125.00	-1.40	0.70	Pass
160.00	-2.49	-0.40	Pass
200.00	-3.32	-1.50	Pass
250.00	-4.13	-2.00	Pass
315.00	-4.64	-2.70	Pass
400.00	-5.07	-3.10	Pass
500.00	-5.69	-3.70	Pass
630.00	-6.19	-4.10	Pass
800.00	-6.37	-4.30	Pass
1,000.00	-6.72	-4.70	Pass
1,250.00	-6.77	-4.80	Pass
1,600.00	-6.83	-5.20	Pass
2,000.00	-6.84	-5.10	Pass
2,500.00	-6.66	-5.00	Pass
3,150.00	-6.35	-4.80	Pass
4,000.00	-5.89	-4.50	Pass
5,000.00	-5.42	-4.10	Pass
6,300.00	-4.79	-3.40	Pass
8,000.00	-4.12	-2.70	Pass
10,000.00	-3.34	-1.90	Pass
12,500.00	-2.52	-1.10	Pass
16,000.00	-1.63	-0.30	Pass
20,000.00	-0.70	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED
Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Calibration Certificate

Certificate Number 2021001067

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	10731	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	27 Jan 2021		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***			
		Temperature	23.56	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.5.1R0	***Humidity***	51.8	%RH	± 2.0 %RH
		Static Pressure	86.31	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 036756 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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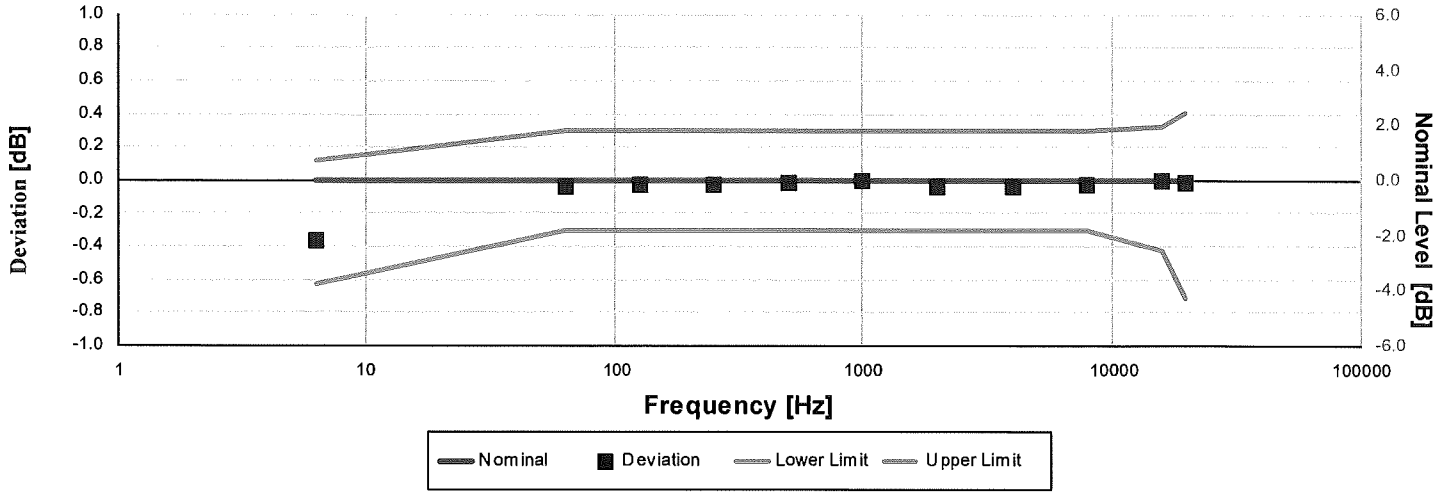
Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2020-08-19	2021-08-19	007167

Z-weight Filter Response

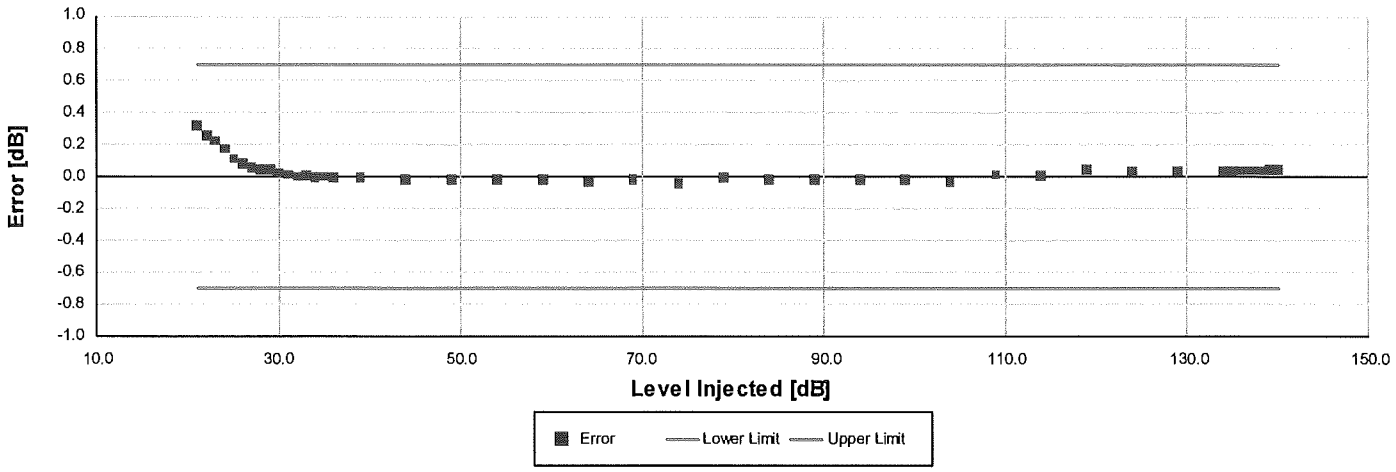


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.36	-0.36	-0.63	0.12	0.15	Pass
63.10	-0.04	-0.04	-0.30	0.30	0.15	Pass
125.89	-0.02	-0.02	-0.30	0.30	0.15	Pass
251.19	-0.03	-0.03	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.02	-0.02	-0.30	0.30	0.15	Pass
15,848.93	-0.01	-0.01	-0.42	0.32	0.15	Pass
19,952.62	-0.01	-0.01	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



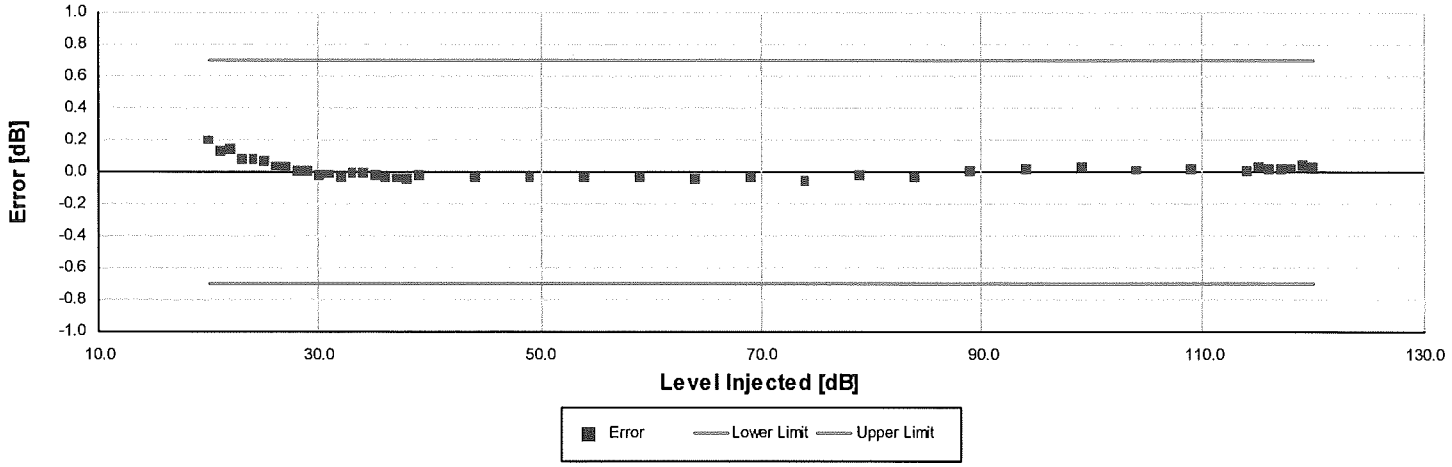
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.32	-0.70	0.70	0.16	Pass
22.00	0.26	-0.70	0.70	0.16	Pass
23.00	0.22	-0.70	0.70	0.16	Pass
24.00	0.17	-0.70	0.70	0.16	Pass
25.00	0.11	-0.70	0.70	0.16	Pass
26.00	0.08	-0.70	0.70	0.16	Pass
27.00	0.06	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.05	-0.70	0.70	0.18	Pass
30.00	0.02	-0.70	0.70	0.17	Pass
31.00	0.01	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	0.01	-0.70	0.70	0.16	Pass
34.00	0.00	-0.70	0.70	0.16	Pass
35.00	0.00	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
39.00	0.00	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.02	-0.70	0.70	0.16	Pass
64.00	-0.03	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.01	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
124.00	0.03	-0.70	0.70	0.15	Pass
129.00	0.03	-0.70	0.70	0.15	Pass
134.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.03	-0.70	0.70	0.15	Pass
136.00	0.04	-0.70	0.70	0.15	Pass
137.00	0.04	-0.70	0.70	0.15	Pass
138.00	0.04	-0.70	0.70	0.15	Pass
139.00	0.04	-0.70	0.70	0.15	Pass
140.00	0.04	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.20	-0.70	0.70	0.17	Pass
21.00	0.13	-0.70	0.70	0.16	Pass
22.00	0.14	-0.70	0.70	0.16	Pass
23.00	0.08	-0.70	0.70	0.16	Pass
24.00	0.07	-0.70	0.70	0.16	Pass
25.00	0.06	-0.70	0.70	0.16	Pass
26.00	0.03	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	0.00	-0.70	0.70	0.19	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	-0.03	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.03	-0.70	0.70	0.17	Pass
33.00	-0.01	-0.70	0.70	0.16	Pass
34.00	-0.01	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.03	-0.70	0.70	0.16	Pass
37.00	-0.04	-0.70	0.70	0.16	Pass
38.00	-0.04	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.03	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.03	-0.70	0.70	0.16	Pass
74.00	-0.06	-0.70	0.70	0.16	Pass
79.00	-0.02	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	0.01	-0.70	0.70	0.16	Pass
94.00	0.02	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	0.01	-0.70	0.70	0.15	Pass
109.00	0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.01	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
120.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.98	134.65	136.65	0.15	Pass
		Positive Pulse	135.99	134.65	136.65	0.15	Pass
	30	Negative Pulse	135.16	134.65	136.65	0.15	Pass
		Positive Pulse	135.16	134.65	136.65	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.09	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.17	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	-0.08	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.26	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	-0.25	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.97	93.89	94.09	0.15	Pass
0 dB Gain, Linearity	28.07	27.29	28.69	0.16	Pass
20 dB Gain	94.01	93.89	94.09	0.15	Pass
20 dB Gain, Linearity	23.06	22.29	23.69	0.16	Pass
OBA High Range	93.99	93.20	94.80	0.15	Pass
OBA Normal Range	93.99	93.89	94.09	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.37	9.00	Pass
C-weight Noise Floor	12.19	15.00	Pass
Z-weight Noise Floor	21.91	25.00	Pass

-- End of measurement results--

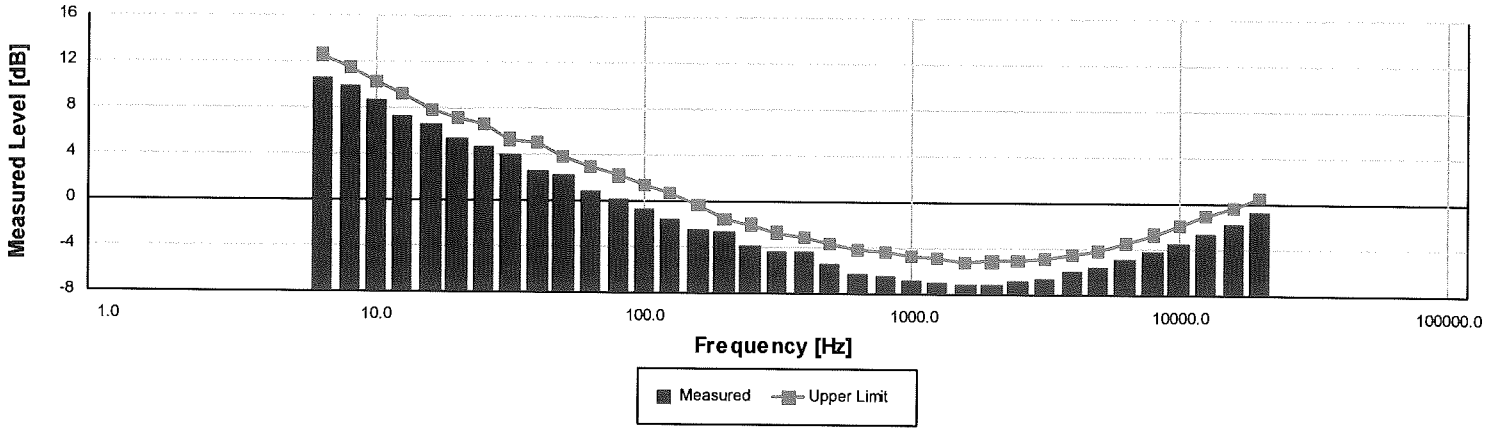
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.54	137.20	138.80	0.15	Pass
THD	-79.28		-60.00	1.30 ‡	Pass
THD+N	-77.82		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.60	12.60	Pass
8.00	9.97	11.50	Pass
10.00	8.69	10.20	Pass
12.50	7.33	9.20	Pass
16.00	6.58	7.90	Pass
20.00	5.32	7.20	Pass
25.00	4.70	6.60	Pass
31.50	4.02	5.30	Pass
40.00	2.58	5.00	Pass
50.00	2.29	3.80	Pass
63.00	0.94	3.00	Pass
80.00	0.11	2.20	Pass
100.00	-0.71	1.40	Pass
125.00	-1.48	0.70	Pass
160.00	-2.35	-0.40	Pass
200.00	-2.67	-1.50	Pass
250.00	-3.86	-2.00	Pass
315.00	-4.41	-2.70	Pass
400.00	-4.39	-3.10	Pass
500.00	-5.45	-3.70	Pass
630.00	-6.19	-4.10	Pass
800.00	-6.41	-4.30	Pass
1,000.00	-6.77	-4.70	Pass
1,250.00	-6.90	-4.80	Pass
1,600.00	-7.08	-5.20	Pass
2,000.00	-7.05	-5.10	Pass
2,500.00	-6.83	-5.00	Pass
3,150.00	-6.52	-4.80	Pass
4,000.00	-5.92	-4.50	Pass
5,000.00	-5.50	-4.10	Pass
6,300.00	-4.92	-3.40	Pass
8,000.00	-4.18	-2.70	Pass
10,000.00	-3.40	-1.90	Pass
12,500.00	-2.55	-1.10	Pass
16,000.00	-1.67	-0.30	Pass
20,000.00	-0.74	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED
Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Calibration Certificate

Certificate Number 2020013908

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati,OH 45215,United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	10534	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	15 Dec 2020		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***			
		Temperature	23.09	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.5.1R0	***Humidity***	53.1	%RH	± 2.0 %RH
		Static Pressure	86.74	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 029590 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with precedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

No Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 available.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3 cover only a limited subset of the specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

Periodic tests were performed in accordance with precedures from IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3.

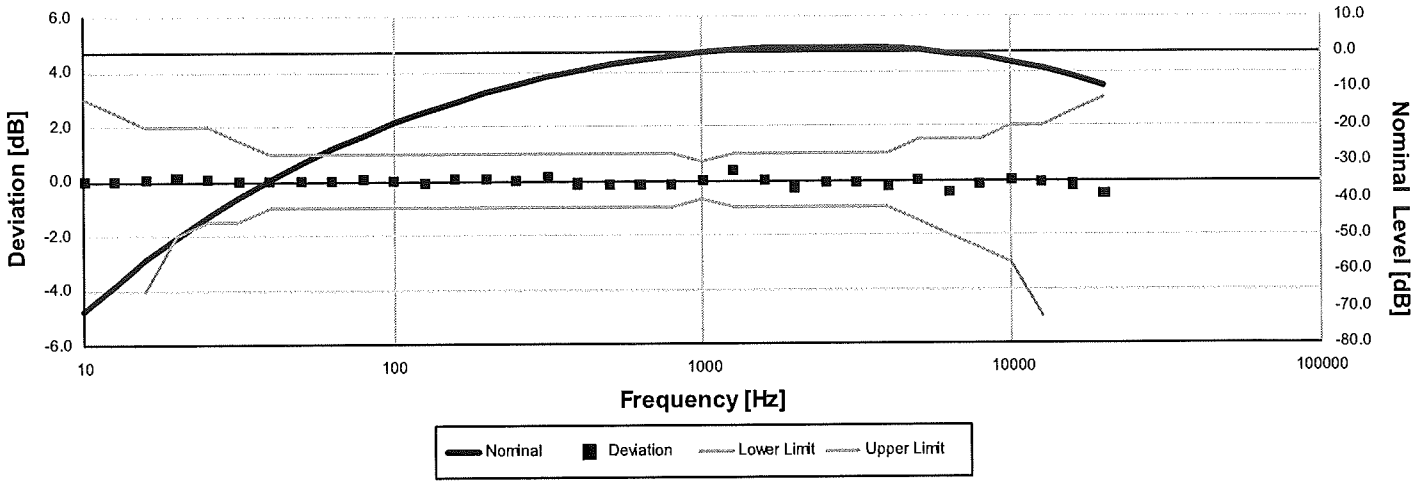
No Pattern approval for IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 available.

The filter submitted for testing successfully completed the periodic tests of IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the filter to the full specifications of IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of filter fully conformed to the class 1 specifications in IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 and (b) because the periodic tests of IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3 cover only a limited subset of the specifications in IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2020-01-17	2021-01-17	007118

A-weight Filter Response



Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-70.42	-0.02	-inf	3.00	0.25	Pass
12.59	-63.38	0.02	-inf	2.50	0.25	Pass
15.85	-56.62	0.08	-4.00	2.00	0.25	Pass
19.95	-50.35	0.15	-2.00	2.00	0.25	Pass
25.12	-44.64	0.06	-1.50	2.00	0.25	Pass
31.62	-39.38	0.02	-1.50	1.50	0.25	Pass
39.81	-34.59	0.01	-1.00	1.00	0.25	Pass
50.12	-30.19	0.01	-1.00	1.00	0.25	Pass
63.10	-26.17	0.03	-1.00	1.00	0.25	Pass
79.43	-22.44	0.06	-1.00	1.00	0.25	Pass
100.00	-19.10	0.00	-1.00	1.00	0.25	Pass
125.89	-16.14	-0.04	-1.00	1.00	0.25	Pass
158.49	-13.30	0.10	-1.00	1.00	0.25	Pass
199.53	-10.85	0.05	-1.00	1.00	0.25	Pass
251.19	-8.60	0.00	-1.00	1.00	0.25	Pass
316.23	-6.47	0.13	-1.00	1.00	0.25	Pass
398.11	-4.90	-0.10	-1.00	1.00	0.25	Pass
501.19	-3.34	-0.14	-1.00	1.00	0.25	Pass
630.96	-2.06	-0.16	-1.00	1.00	0.25	Pass
794.33	-0.94	-0.14	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.95	0.35	-1.00	1.00	0.25	Pass
1,584.89	1.01	0.01	-1.00	1.00	0.25	Pass
1,995.26	0.95	-0.25	-1.00	1.00	0.25	Pass
2,511.89	1.20	-0.10	-1.00	1.00	0.25	Pass
3,162.28	1.16	-0.04	-1.00	1.00	0.25	Pass
3,981.07	0.77	-0.23	-1.00	1.00	0.25	Pass
5,011.87	0.48	-0.02	-1.50	1.50	0.25	Pass
6,309.57	-0.53	-0.43	-2.00	1.50	0.25	Pass
7,943.28	-1.26	-0.16	-2.50	1.50	0.25	Pass
10,000.00	-2.47	0.03	-3.00	2.00	0.25	Pass
12,589.25	-4.38	-0.08	-5.00	2.00	0.25	Pass
15,848.93	-6.77	-0.17	-16.00	2.50	0.25	Pass
19,952.62	-9.78	-0.48	-inf	3.00	0.25	Pass

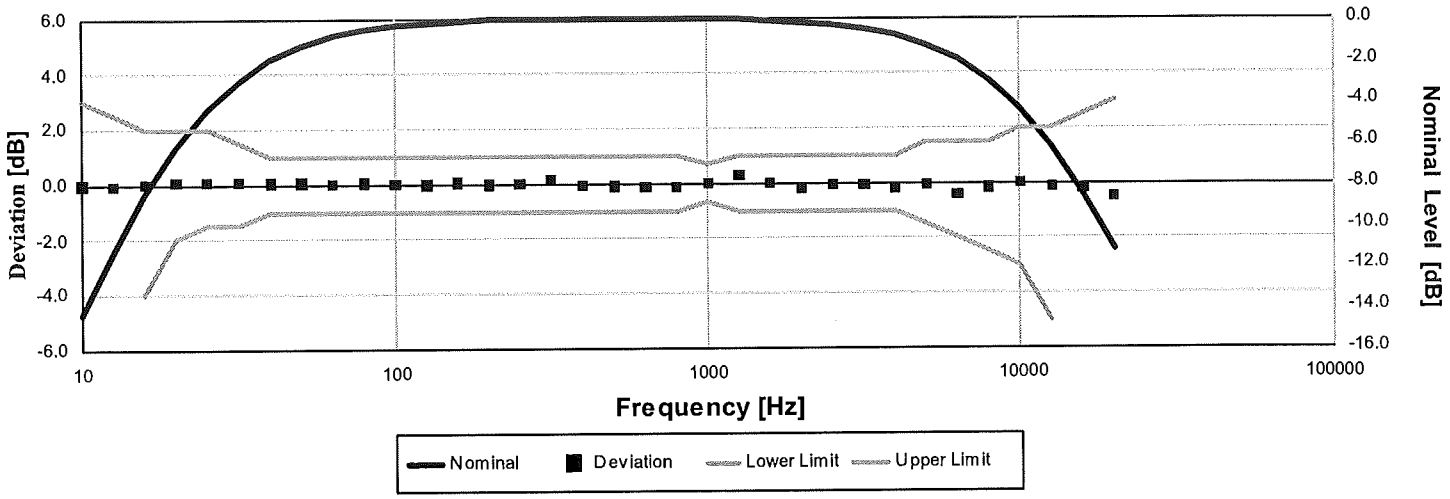
-- End of measurement results--

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo,UT 84601,United States
716-684-0001

ACCREDITED Cert. #3622.01

LARSON DAVIS
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C-weight Filter Response

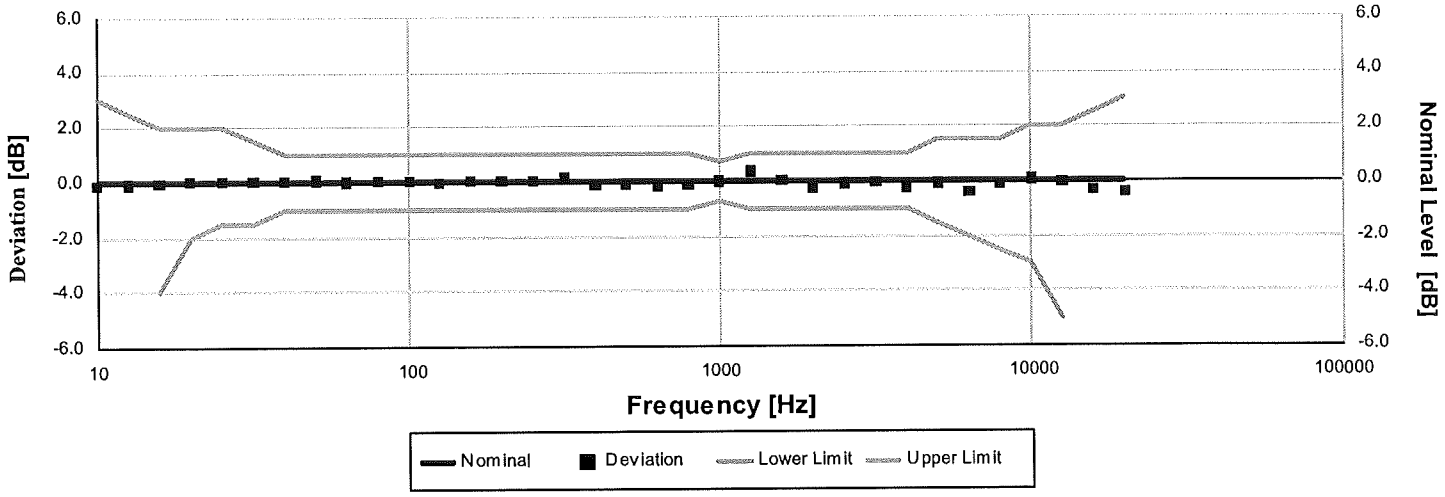


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-14.32	-0.02	-inf	3.00	0.25	Pass
12.59	-11.25	-0.05	-inf	2.50	0.25	Pass
15.85	-8.47	0.03	-4.00	2.00	0.25	Pass
19.95	-6.14	0.06	-2.00	2.00	0.25	Pass
25.12	-4.33	0.07	-1.50	2.00	0.25	Pass
31.62	-2.93	0.07	-1.50	1.50	0.25	Pass
39.81	-1.96	0.04	-1.00	1.00	0.25	Pass
50.12	-1.25	0.05	-1.00	1.00	0.25	Pass
63.10	-0.80	0.00	-1.00	1.00	0.25	Pass
79.43	-0.45	0.05	-1.00	1.00	0.25	Pass
100.00	-0.28	0.02	-1.00	1.00	0.25	Pass
125.89	-0.22	-0.02	-1.00	1.00	0.25	Pass
158.49	-0.05	0.05	-1.00	1.00	0.25	Pass
199.53	-0.02	-0.02	-1.00	1.00	0.25	Pass
251.19	0.02	0.02	-1.00	1.00	0.25	Pass
316.23	0.16	0.16	-1.00	1.00	0.25	Pass
398.11	-0.07	-0.07	-1.00	1.00	0.25	Pass
501.19	-0.09	-0.09	-1.00	1.00	0.25	Pass
630.96	-0.13	-0.13	-1.00	1.00	0.25	Pass
794.33	-0.11	-0.11	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.32	0.32	-1.00	1.00	0.25	Pass
1,584.89	-0.07	0.03	-1.00	1.00	0.25	Pass
1,995.26	-0.43	-0.23	-1.00	1.00	0.25	Pass
2,511.89	-0.37	-0.07	-1.00	1.00	0.25	Pass
3,162.28	-0.55	-0.05	-1.00	1.00	0.25	Pass
3,981.07	-1.02	-0.22	-1.00	1.00	0.25	Pass
5,011.87	-1.36	-0.06	-1.50	1.50	0.25	Pass
6,309.57	-2.41	-0.41	-2.00	1.50	0.25	Pass
7,943.28	-3.16	-0.16	-2.50	1.50	0.25	Pass
10,000.00	-4.39	0.01	-3.00	2.00	0.25	Pass
12,589.25	-6.31	-0.11	-5.00	2.00	0.25	Pass
15,848.93	-8.70	-0.20	-16.00	2.50	0.25	Pass
19,952.62	-11.71	-0.51	-inf	3.00	0.25	Pass

-- End of measurement results--

Z-weight Filter Response



Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-0.12	-0.12	-inf	3.00	0.25	Pass
12.59	-0.07	-0.07	-inf	2.50	0.25	Pass
15.85	-0.03	-0.03	-4.00	2.00	0.25	Pass
19.95	0.03	0.03	-2.00	2.00	0.25	Pass
25.12	0.01	0.01	-1.50	2.00	0.25	Pass
31.62	0.03	0.03	-1.50	1.50	0.25	Pass
39.81	0.01	0.01	-1.00	1.00	0.25	Pass
50.12	0.06	0.06	-1.00	1.00	0.25	Pass
63.10	0.00	0.00	-1.00	1.00	0.25	Pass
79.43	0.05	0.05	-1.00	1.00	0.25	Pass
100.00	0.01	0.01	-1.00	1.00	0.25	Pass
125.89	-0.05	-0.05	-1.00	1.00	0.25	Pass
158.49	0.04	0.04	-1.00	1.00	0.25	Pass
199.53	0.03	0.03	-1.00	1.00	0.25	Pass
251.19	0.04	0.04	-1.00	1.00	0.25	Pass
316.23	0.14	0.14	-1.00	1.00	0.25	Pass
398.11	-0.10	-0.10	-1.00	1.00	0.25	Pass
501.19	-0.11	-0.11	-1.00	1.00	0.25	Pass
630.96	-0.15	-0.15	-1.00	1.00	0.25	Pass
794.33	-0.12	-0.12	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.35	0.35	-1.00	1.00	0.25	Pass
1,584.89	0.02	0.02	-1.00	1.00	0.25	Pass
1,995.26	-0.26	-0.26	-1.00	1.00	0.25	Pass
2,511.89	-0.08	-0.08	-1.00	1.00	0.25	Pass
3,162.28	-0.06	-0.06	-1.00	1.00	0.25	Pass
3,981.07	-0.22	-0.22	-1.00	1.00	0.25	Pass
5,011.87	-0.09	-0.09	-1.50	1.50	0.25	Pass
6,309.57	-0.41	-0.41	-2.00	1.50	0.25	Pass
7,943.28	-0.12	-0.12	-2.50	1.50	0.25	Pass
10,000.00	0.07	0.07	-3.00	2.00	0.25	Pass
12,589.25	-0.06	-0.06	-5.00	2.00	0.25	Pass
15,848.93	-0.31	-0.31	-16.00	2.50	0.25	Pass
19,952.62	-0.38	-0.38	-inf	3.00	0.25	Pass

-- End of measurement results--

High Level Stability

Electrical signal test of high level stability performed according to IEC 61672-3:2013 21 and ANSI S1.4-2014 Part 3: 21 for compliance to IEC 61672-1:2013 5.15 and ANSI S1.4-2014 Part 1: 5.15

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
High Level Stability	0.00	-0.10	0.10	0.01 ‡	Pass

-- End of measurement results--

Long-Term Stability

Electrical signal test of long term stability performed according to IEC 61672-3:2013 15 and ANSI S1.4-2014 Part 3: 15 for compliance to ISC 61672-1:2013 5.14 and ANSI S1.4-2014 Part 1: 5.14

Test Duration [min]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
34	0.02	-0.10	0.10	0.02 ‡	Pass

-- End of measurement results--

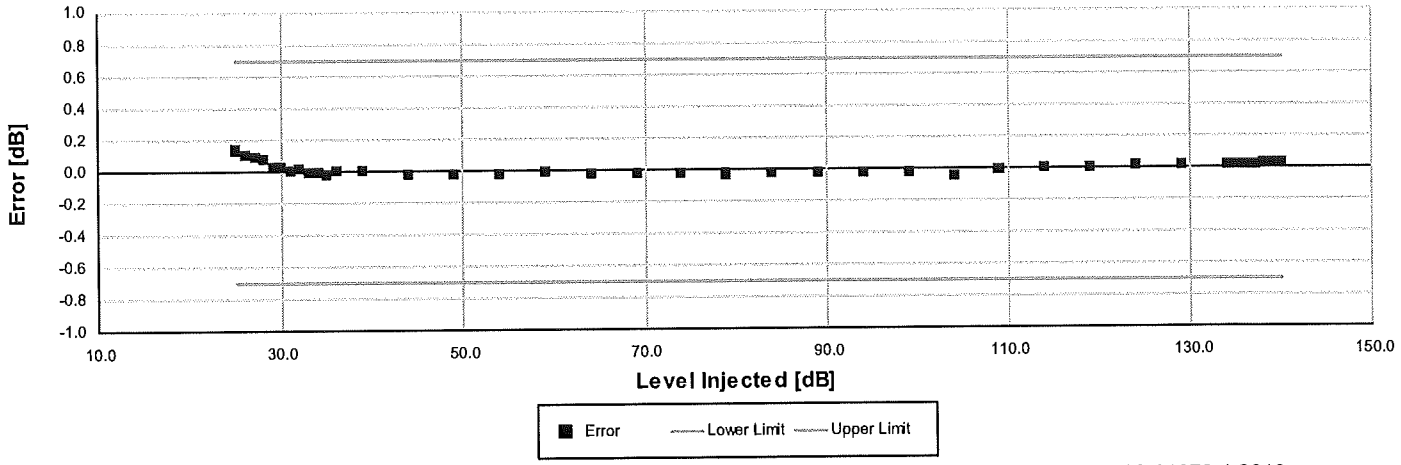
1 kHz Reference Levels

Frequency weightings and time weightings at 1 kHz (reference is A weighted Fast) performed according to IEC 61672-3:2013 14 and ANSI S1.4-2014 Part 3: 14 for compliance to IEC 61672-1:2013 5.5.9 and 5.8.3 and ANSI S1.4-2014 Part 1: 5.5.9 and 5.8.3

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
C weight	114.01	113.81	114.21	0.15	Pass
Z weight	114.00	113.81	114.21	0.15	Pass
Slow	114.01	113.91	114.11	0.15	Pass
Impulse	114.01	113.91	114.11	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



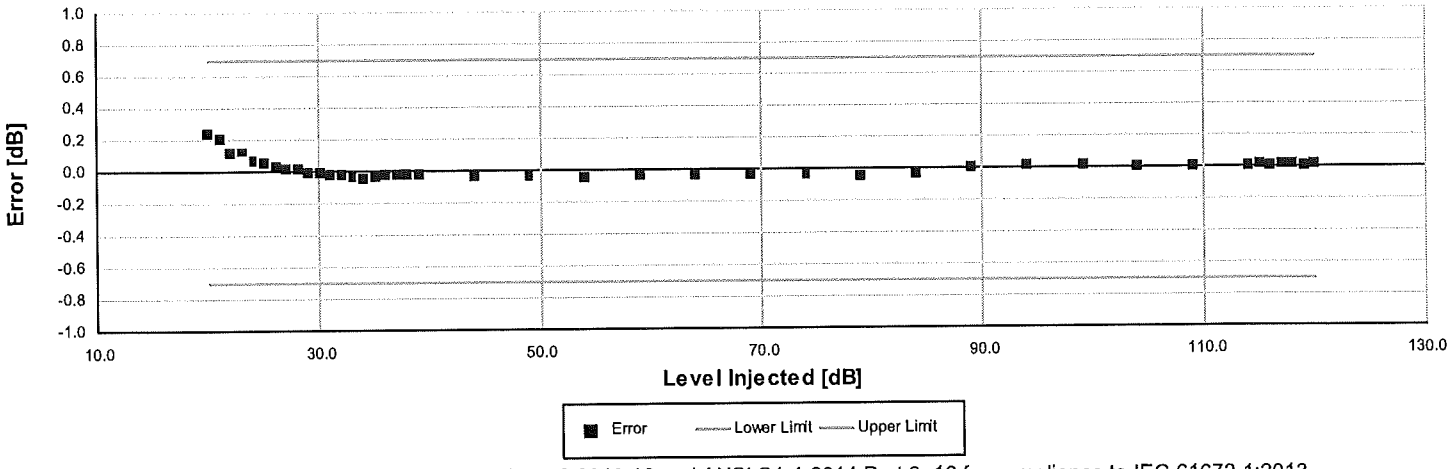
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
25.00	0.14	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.09	-0.70	0.70	0.16	Pass
28.00	0.08	-0.70	0.70	0.16	Pass
29.00	0.03	-0.70	0.70	0.18	Pass
30.00	0.04	-0.70	0.70	0.17	Pass
31.00	0.01	-0.70	0.70	0.17	Pass
32.00	0.01	-0.70	0.70	0.17	Pass
33.00	0.00	-0.70	0.70	0.16	Pass
34.00	-0.01	-0.70	0.70	0.16	Pass
35.00	-0.02	-0.70	0.70	0.16	Pass
36.00	0.01	-0.70	0.70	0.16	Pass
39.00	0.00	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.01	-0.70	0.70	0.16	Pass
64.00	-0.02	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.02	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
124.00	0.01	-0.70	0.70	0.15	Pass
129.00	0.02	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass
135.00	0.02	-0.70	0.70	0.15	Pass
136.00	0.01	-0.70	0.70	0.15	Pass
137.00	0.02	-0.70	0.70	0.15	Pass
138.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	0.02	-0.70	0.70	0.15	Pass
140.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.24	-0.70	0.70	0.17	Pass
21.00	0.20	-0.70	0.70	0.16	Pass
22.00	0.12	-0.70	0.70	0.16	Pass
23.00	0.12	-0.70	0.70	0.16	Pass
24.00	0.06	-0.70	0.70	0.16	Pass
25.00	0.05	-0.70	0.70	0.16	Pass
26.00	0.02	-0.70	0.70	0.19	Pass
27.00	0.01	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	-0.01	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.02	-0.70	0.70	0.17	Pass
33.00	-0.03	-0.70	0.70	0.16	Pass
34.00	-0.04	-0.70	0.70	0.16	Pass
35.00	-0.04	-0.70	0.70	0.16	Pass
36.00	-0.02	-0.70	0.70	0.16	Pass
37.00	-0.02	-0.70	0.70	0.16	Pass
38.00	-0.02	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.03	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.03	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.04	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.02	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.00	-0.70	0.70	0.15	Pass
117.00	0.01	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
120.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

Slow Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200	-7.59	-7.92	-6.92	0.15	Pass
	2	-27.19	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Fast Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-1.09	-1.48	-0.48	0.15	Pass
	2.00	-18.30	-19.49	-16.99	0.16	Pass
	0.25	-27.53	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Sound Exposure Level

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-7.04	-7.49	-6.49	0.15	Pass
	2.00	-27.07	-28.49	-25.99	0.15	Pass
	0.25	-36.18	-39.02	-35.02	0.15	Pass

-- End of measurement results--

Peak C-weight

C-weighted peak sound level performed according to IEC 61672-3:2013 19 and ANSI S1.4-2014 Part 3: 19 for compliance to IEC 61672-1:2013 5.13 and ANSI S1.4-2014 Part 1: 5.13

Level [dB]	Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	31.50	138.08	135.50	139.50	0.15	Pass
135.00	500.00	138.51	137.50	139.50	0.15	Pass
135.00	8,000.00	137.67	136.40	140.40	0.15	Pass
135.00, Negative	500.00	137.04	136.40	138.40	0.15	Pass
135.00, Positive	500.00	137.17	136.40	138.40	0.15	Pass

-- End of measurement results--

Peak Z-weight

Z-weighted peak sound level performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration[µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
136.00	100	Negative Pulse	135.96	133.88	137.88	0.15	Pass
	100	Positive Pulse	136.09	134.01	138.01	0.15	Pass
126.00	100	Negative Pulse	125.95	123.87	127.87	0.15	Pass
	100	Positive Pulse	126.08	124.00	128.00	0.15	Pass
116.00	100	Negative Pulse	115.96	113.88	117.88	0.15	Pass
	100	Positive Pulse	116.09	114.01	118.01	0.15	Pass
106.00	100	Negative Pulse	105.94	103.86	107.86	0.15	Pass
	100	Positive Pulse	106.09	104.00	108.00	0.15	Pass

-- End of measurement results--

Overload Detector

Overload indication performed according to IEC 61672-3:2013 20 and ANSI S1.4-2014 Part 3: 20 for compliance to IEC 61672-1:2013 5.11, IEC 60804:2000 9.3.5, IEC 61252:2002 11, ANSI S1.4 (R2006) 5.8, and ANSI S1.4-2014 Part 1: 5.11, ANSI S1.25 (R2007) 7.6, ANSI S1.43 (R2007) 7

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
Positive	140.90	140.00	142.00	0.16	Pass
Negative	140.90	140.00	142.00	0.16	Pass
Difference	0.00	-1.50	1.50	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.77	134.43	136.43	0.15	Pass
		Positive Pulse	135.91	134.56	136.56	0.15	Pass
	30	Negative Pulse	134.95	134.43	136.43	0.15	Pass
		Positive Pulse	135.05	134.56	136.56	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.22	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.14	± 1.00	0.15 ‡	Pass
	10	-0.25	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.09	± 1.50	0.15 ‡	Pass
108.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.07	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Tone Burst

2kHz tone burst tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Tone burst response measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15	Pass
	5	OVLD	± 1.00	0.15	Pass
128.00	3	-0.09	± 0.50	0.15	Pass
	5	-0.02	± 1.00	0.15	Pass
118.00	3	-0.07	± 0.50	0.15	Pass
	5	-0.07	± 1.00	0.15	Pass
108.00	3	-0.06	± 0.50	0.15	Pass
	5	0.01	± 1.00	0.15	Pass

-- End of measurement results--

Impulse Detector - Repeat

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Repitition Rate [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	100.00	-2.85	-3.71	-1.71	0.15	Pass
	20.00	-7.79	-9.57	-5.57	0.20	Pass
	2.00	-8.98	-10.76	-6.76	0.16	Pass
Step	2.00	4.95	4.00	6.00	0.16	Pass

-- End of measurement results--

Impulse Detector - Single

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	20.00	-3.75	-5.11	-2.11	0.15	Pass
	5.00	-8.88	-10.76	-6.76	0.15	Pass
	2.00	-12.61	-14.55	-10.55	0.16	Pass
Step	2.00	10.01	9.00	11.00	0.16	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.01	93.92	94.12	0.15	Pass
0 dB Gain, Linearity	28.09	27.32	28.72	0.16	Pass
20 dB Gain	94.03	93.92	94.12	0.15	Pass
20 dB Gain, Linearity	23.07	22.32	23.72	0.16	Pass
OBA High Range	94.02	93.20	94.80	0.15	Pass
OBA Normal Range	94.01	93.92	94.12	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.44	9.00	Pass
C-weight Noise Floor	12.19	15.00	Pass
Z-weight Noise Floor	21.81	25.00	Pass

-- End of measurement results--

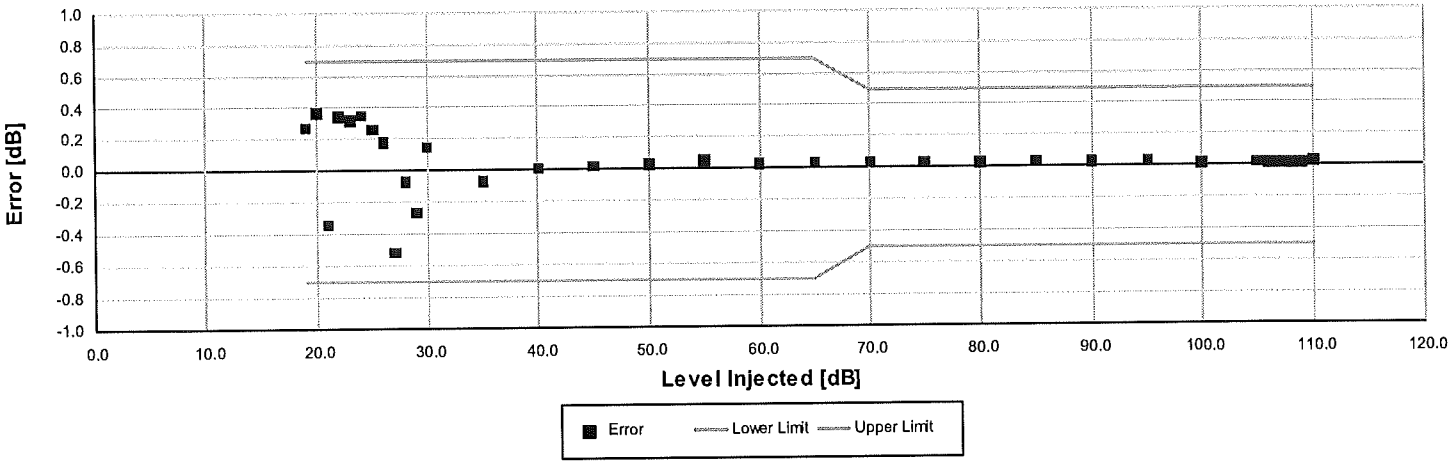
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.49	137.20	138.80	0.15	Pass
THD	-78.85		-60.00	1.30 ‡	Pass
THD+N	-77.57		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 31.50 Hz

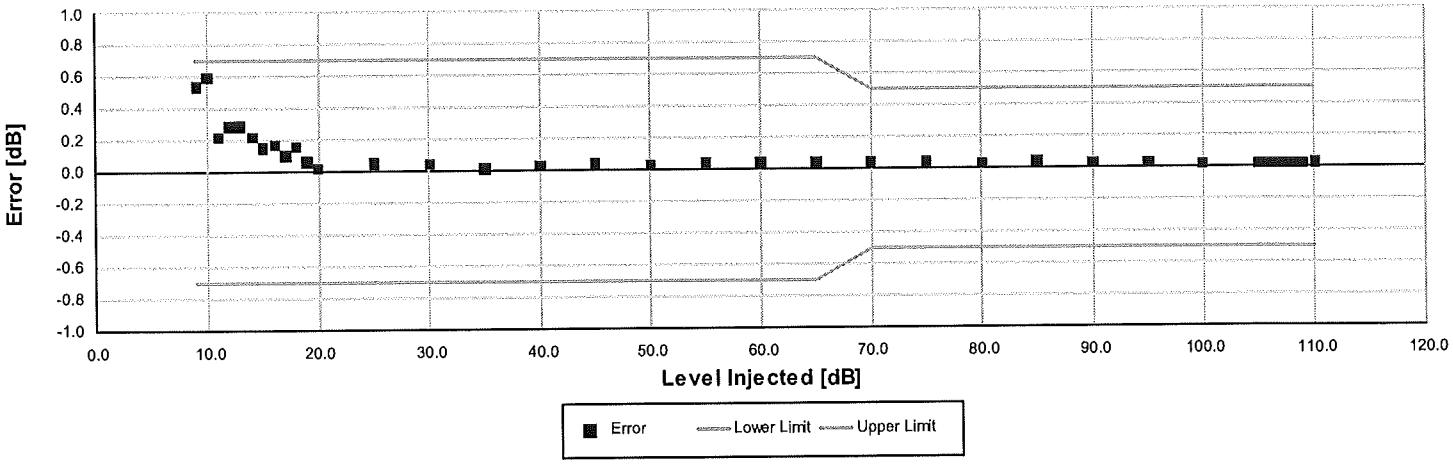


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
19.00	0.27	-0.70	0.70	0.17	Pass
20.00	0.37	-0.70	0.70	0.17	Pass
21.00	-0.34	-0.70	0.70	0.16	Pass
22.00	0.34	-0.70	0.70	0.16	Pass
23.00	0.32	-0.70	0.70	0.16	Pass
24.00	0.35	-0.70	0.70	0.16	Pass
25.00	0.26	-0.70	0.70	0.16	Pass
26.00	0.18	-0.70	0.70	0.16	Pass
27.00	-0.52	-0.70	0.70	0.16	Pass
28.00	-0.07	-0.70	0.70	0.16	Pass
29.00	-0.27	-0.70	0.70	0.16	Pass
30.00	0.15	-0.70	0.70	0.16	Pass
35.00	-0.07	-0.70	0.70	0.16	Pass
40.00	0.01	-0.70	0.70	0.16	Pass
45.00	0.02	-0.70	0.70	0.16	Pass
50.00	0.03	-0.70	0.70	0.16	Pass
55.00	0.06	-0.70	0.70	0.16	Pass
60.00	0.03	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.03	-0.50	0.50	0.16	Pass
80.00	0.03	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.03	-0.50	0.50	0.16	Pass
95.00	0.03	-0.50	0.50	0.16	Pass
100.00	0.02	-0.50	0.50	0.15	Pass
105.00	0.02	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.02	-0.50	0.50	0.15	Pass
108.00	0.02	-0.50	0.50	0.15	Pass
109.00	0.02	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 1,000.00 Hz

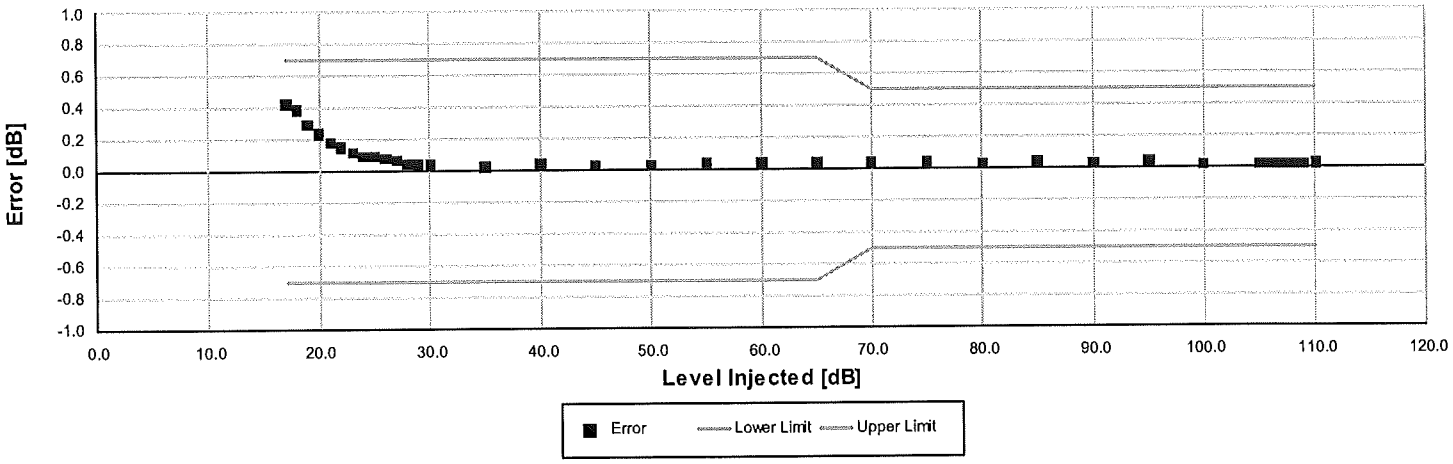


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
9.00	0.54	-0.70	0.70	0.19	Pass
10.00	0.60	-0.70	0.70	0.19	Pass
11.00	0.22	-0.70	0.70	0.18	Pass
12.00	0.29	-0.70	0.70	0.18	Pass
13.00	0.29	-0.70	0.70	0.18	Pass
14.00	0.22	-0.70	0.70	0.18	Pass
15.00	0.15	-0.70	0.70	0.17	Pass
16.00	0.17	-0.70	0.70	0.17	Pass
17.00	0.10	-0.70	0.70	0.17	Pass
18.00	0.16	-0.70	0.70	0.17	Pass
19.00	0.06	-0.70	0.70	0.17	Pass
20.00	0.02	-0.70	0.70	0.17	Pass
25.00	0.05	-0.70	0.70	0.16	Pass
30.00	0.05	-0.70	0.70	0.16	Pass
35.00	0.01	-0.70	0.70	0.16	Pass
40.00	0.03	-0.70	0.70	0.16	Pass
45.00	0.04	-0.70	0.70	0.16	Pass
50.00	0.03	-0.70	0.70	0.16	Pass
55.00	0.04	-0.70	0.70	0.16	Pass
60.00	0.04	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.03	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.03	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.03	-0.50	0.50	0.16	Pass
95.00	0.03	-0.50	0.50	0.16	Pass
100.00	0.02	-0.50	0.50	0.15	Pass
105.00	0.02	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.02	-0.50	0.50	0.15	Pass
108.00	0.02	-0.50	0.50	0.15	Pass
109.00	0.02	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 16,000.00 Hz

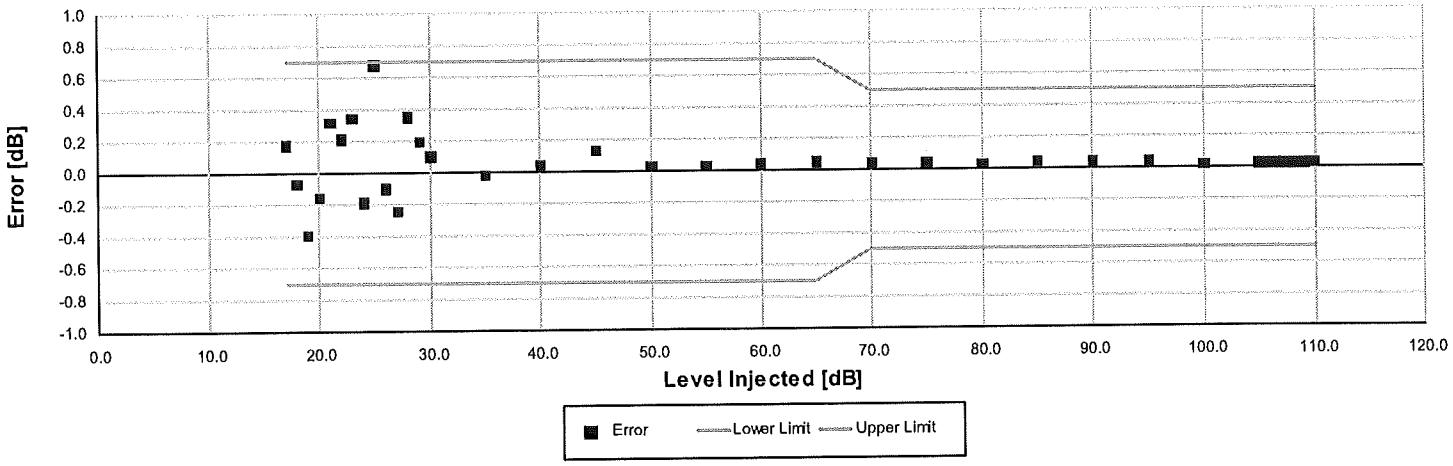


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
17.00	0.43	-0.70	0.70	0.17	Pass
18.00	0.39	-0.70	0.70	0.17	Pass
19.00	0.29	-0.70	0.70	0.17	Pass
20.00	0.24	-0.70	0.70	0.17	Pass
21.00	0.18	-0.70	0.70	0.16	Pass
22.00	0.15	-0.70	0.70	0.16	Pass
23.00	0.12	-0.70	0.70	0.16	Pass
24.00	0.09	-0.70	0.70	0.16	Pass
25.00	0.09	-0.70	0.70	0.16	Pass
26.00	0.08	-0.70	0.70	0.16	Pass
27.00	0.07	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.16	Pass
30.00	0.03	-0.70	0.70	0.16	Pass
35.00	0.03	-0.70	0.70	0.16	Pass
40.00	0.04	-0.70	0.70	0.16	Pass
45.00	0.03	-0.70	0.70	0.16	Pass
50.00	0.03	-0.70	0.70	0.16	Pass
55.00	0.04	-0.70	0.70	0.16	Pass
60.00	0.04	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.03	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.03	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.02	-0.50	0.50	0.15	Pass
105.00	0.02	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.02	-0.50	0.50	0.15	Pass
108.00	0.02	-0.50	0.50	0.15	Pass
109.00	0.02	-0.50	0.50	0.15	Pass
110.00	0.02	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/3 Octave Log Linearity: 31.50 Hz

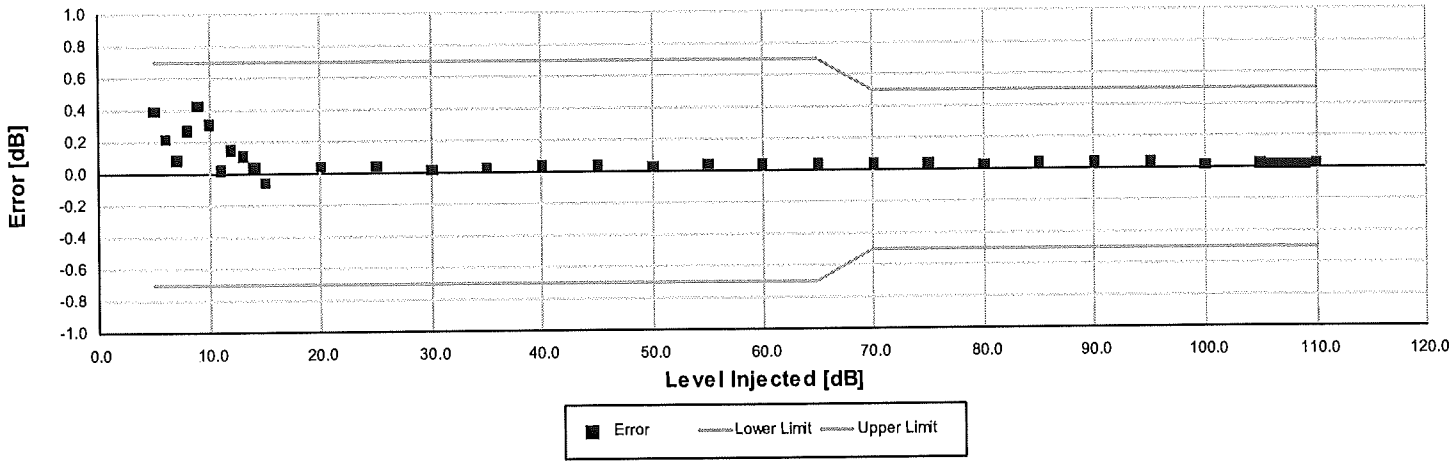


1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
17.00	0.17	-0.70	0.70	0.17	Pass
18.00	-0.07	-0.70	0.70	0.17	Pass
19.00	-0.39	-0.70	0.70	0.17	Pass
20.00	-0.16	-0.70	0.70	0.17	Pass
21.00	0.32	-0.70	0.70	0.16	Pass
22.00	0.21	-0.70	0.70	0.16	Pass
23.00	0.34	-0.70	0.70	0.16	Pass
24.00	-0.19	-0.70	0.70	0.16	Pass
25.00	0.67	-0.70	0.70	0.16	Pass
26.00	-0.10	-0.70	0.70	0.16	Pass
27.00	-0.25	-0.70	0.70	0.16	Pass
28.00	0.35	-0.70	0.70	0.16	Pass
29.00	0.19	-0.70	0.70	0.16	Pass
30.00	0.10	-0.70	0.70	0.16	Pass
35.00	-0.02	-0.70	0.70	0.16	Pass
40.00	0.03	-0.70	0.70	0.16	Pass
45.00	0.13	-0.70	0.70	0.16	Pass
50.00	0.03	-0.70	0.70	0.16	Pass
55.00	0.03	-0.70	0.70	0.16	Pass
60.00	0.04	-0.70	0.70	0.16	Pass
65.00	0.05	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.03	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.03	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.02	-0.50	0.50	0.15	Pass
105.00	0.02	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.02	-0.50	0.50	0.15	Pass
108.00	0.02	-0.50	0.50	0.15	Pass
109.00	0.02	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/3 Octave Log Linearity: 1,000.00 Hz

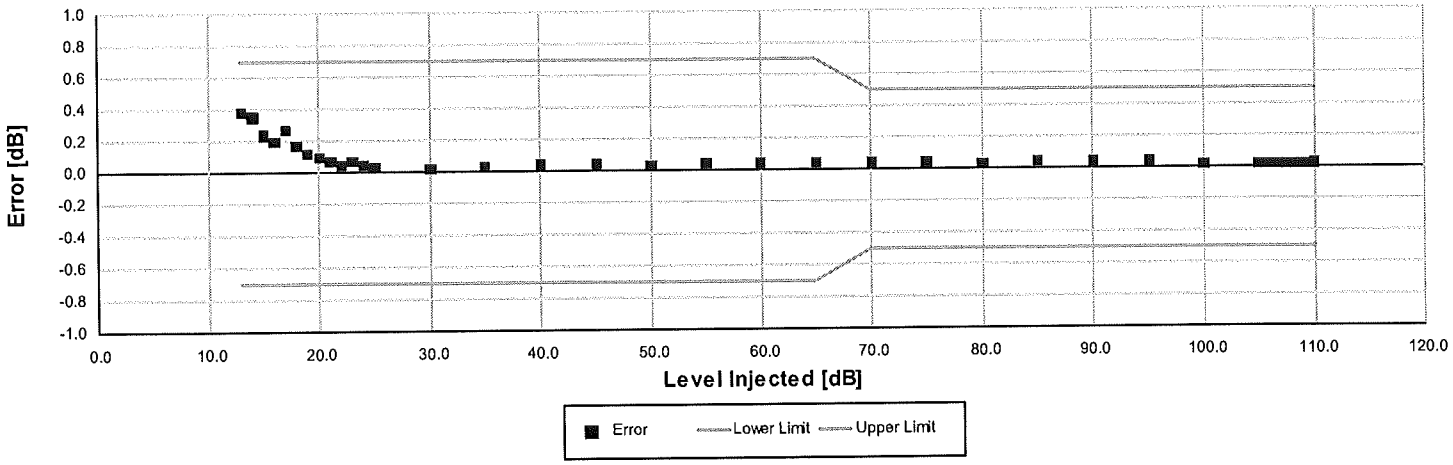


1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
5.00	0.39	-0.70	0.70	0.21	Pass
6.00	0.22	-0.70	0.70	0.21	Pass
7.00	0.08	-0.70	0.70	0.20	Pass
8.00	0.27	-0.70	0.70	0.19	Pass
9.00	0.43	-0.70	0.70	0.19	Pass
10.00	0.31	-0.70	0.70	0.19	Pass
11.00	0.02	-0.70	0.70	0.18	Pass
12.00	0.15	-0.70	0.70	0.18	Pass
13.00	0.11	-0.70	0.70	0.18	Pass
14.00	0.03	-0.70	0.70	0.18	Pass
15.00	-0.06	-0.70	0.70	0.17	Pass
20.00	0.04	-0.70	0.70	0.17	Pass
25.00	0.04	-0.70	0.70	0.16	Pass
30.00	0.01	-0.70	0.70	0.16	Pass
35.00	0.03	-0.70	0.70	0.16	Pass
40.00	0.03	-0.70	0.70	0.16	Pass
45.00	0.03	-0.70	0.70	0.16	Pass
50.00	0.03	-0.70	0.70	0.16	Pass
55.00	0.04	-0.70	0.70	0.16	Pass
60.00	0.04	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.03	-0.50	0.50	0.16	Pass
75.00	0.03	-0.50	0.50	0.16	Pass
80.00	0.03	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.03	-0.50	0.50	0.16	Pass
95.00	0.03	-0.50	0.50	0.16	Pass
100.00	0.02	-0.50	0.50	0.15	Pass
105.00	0.02	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.02	-0.50	0.50	0.15	Pass
108.00	0.02	-0.50	0.50	0.15	Pass
109.00	0.02	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/3 Octave Log Linearity: 16,000.00 Hz



1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
13.00	0.38	-0.70	0.70	0.18	Pass
14.00	0.35	-0.70	0.70	0.18	Pass
15.00	0.23	-0.70	0.70	0.17	Pass
16.00	0.19	-0.70	0.70	0.17	Pass
17.00	0.27	-0.70	0.70	0.17	Pass
18.00	0.17	-0.70	0.70	0.17	Pass
19.00	0.11	-0.70	0.70	0.17	Pass
20.00	0.09	-0.70	0.70	0.17	Pass
21.00	0.07	-0.70	0.70	0.16	Pass
22.00	0.04	-0.70	0.70	0.16	Pass
23.00	0.07	-0.70	0.70	0.16	Pass
24.00	0.04	-0.70	0.70	0.16	Pass
25.00	0.03	-0.70	0.70	0.16	Pass
30.00	0.01	-0.70	0.70	0.16	Pass
35.00	0.03	-0.70	0.70	0.16	Pass
40.00	0.04	-0.70	0.70	0.16	Pass
45.00	0.03	-0.70	0.70	0.16	Pass
50.00	0.03	-0.70	0.70	0.16	Pass
55.00	0.04	-0.70	0.70	0.16	Pass
60.00	0.04	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.03	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.03	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.02	-0.50	0.50	0.15	Pass
105.00	0.02	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.02	-0.50	0.50	0.15	Pass
108.00	0.02	-0.50	0.50	0.15	Pass
109.00	0.02	-0.50	0.50	0.15	Pass
110.00	0.02	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity

1/1 octave level linearity measured according to IEC 61260-3:2016 11.9 and ANSI S1.11-2016 Part 3: 11.9

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB, Normal Range, 31.5 Hz	79.51	79.01	80.01	0.16	Pass
0 dB, Normal Range, 1000.0 Hz	79.53	79.03	80.03	0.16	Pass
0 dB, Normal Range, 16000.0 Hz	79.54	79.04	80.04	0.16	Pass
0 dB, High Range, 31.5 Hz	109.51	109.02	110.02	0.15	Pass
0 dB, High Range, 1000.0 Hz	109.53	109.04	110.04	0.15	Pass
0 dB, High Range, 16000.0 Hz	109.54	109.05	110.05	0.15	Pass
20 dB, Normal Range, 31.5 Hz	59.49	58.99	59.99	0.16	Pass
20 dB, Normal Range, 1000.0 Hz	59.52	59.01	60.01	0.16	Pass
20 dB, Normal Range, 16000.0 Hz	59.53	59.02	60.02	0.16	Pass
20 dB, High Range, 31.5 Hz	89.51	89.01	90.01	0.16	Pass
20 dB, High Range, 1000.0 Hz	89.53	89.03	90.03	0.16	Pass
20 dB, High Range, 16000.0 Hz	89.54	89.04	90.04	0.16	Pass

-- End of measurement results--

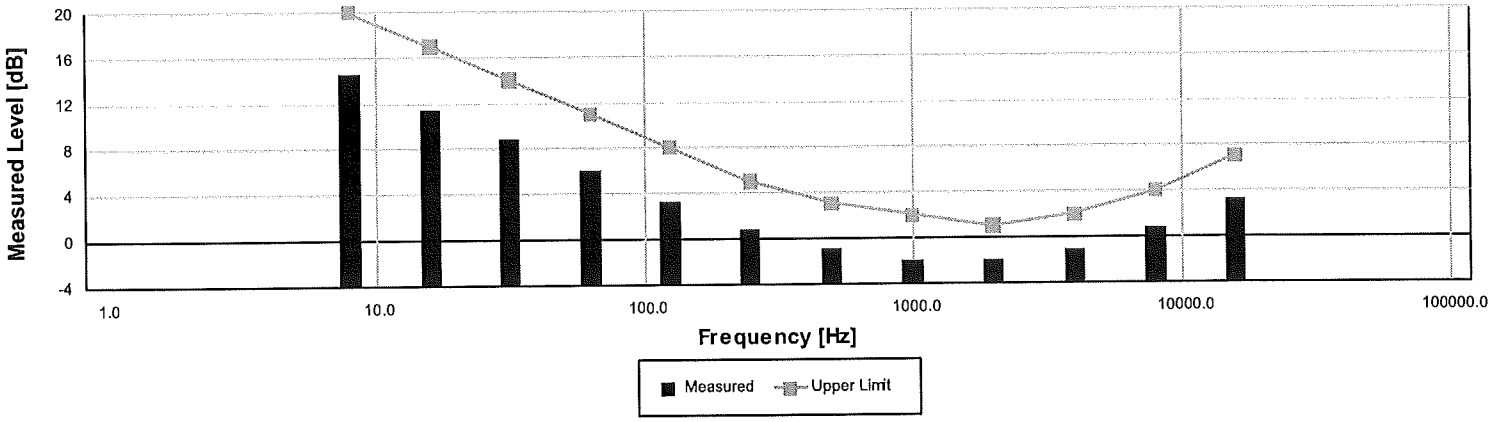
1/3 Octave Log Linearity

1/3 octave level linearity measured according to IEC 61260-3:2016 11.9 and ANSI S1.11-2016 Part 3: 11.9

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB, Normal Range, 31.5 Hz	79.51	79.01	80.01	0.16	Pass
0 dB, Normal Range, 1000.0 Hz	79.53	79.03	80.03	0.16	Pass
0 dB, Normal Range, 16000.0 Hz	79.54	79.04	80.04	0.16	Pass
0 dB, High Range, 31.5 Hz	109.51	109.02	110.02	0.15	Pass
0 dB, High Range, 1000.0 Hz	109.53	109.04	110.04	0.15	Pass
0 dB, High Range, 16000.0 Hz	109.54	109.05	110.05	0.15	Pass
20 dB, Normal Range, 31.5 Hz	59.50	58.99	59.99	0.16	Pass
20 dB, Normal Range, 1000.0 Hz	59.52	59.01	60.01	0.16	Pass
20 dB, Normal Range, 16000.0 Hz	59.53	59.02	60.02	0.16	Pass
20 dB, High Range, 31.5 Hz	89.51	89.01	90.01	0.16	Pass
20 dB, High Range, 1000.0 Hz	89.53	89.03	90.03	0.16	Pass
20 dB, High Range, 16000.0 Hz	89.54	89.04	90.04	0.16	Pass

-- End of measurement results--

1/1-Octave Self-Generated Noise

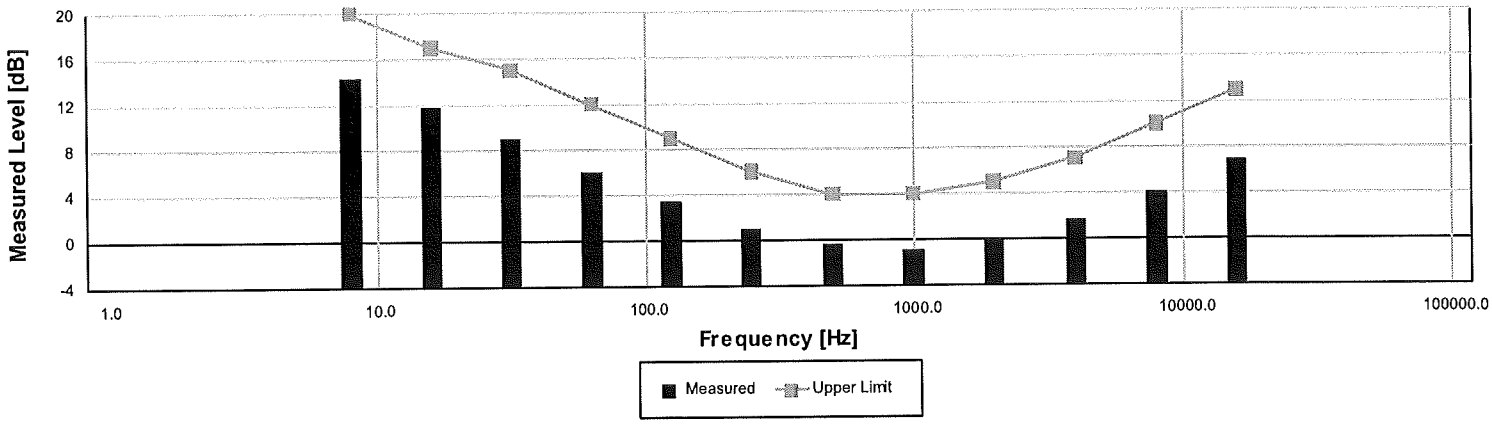


The SLM is set to normal range and 20 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
8.00	14.61	20.00	Pass
16.00	11.45	17.00	Pass
31.50	8.81	14.00	Pass
63.00	5.95	11.00	Pass
125.00	3.26	8.00	Pass
250.00	0.91	5.00	Pass
500.00	-0.86	3.00	Pass
1,000.00	-1.87	2.00	Pass
2,000.00	-2.03	1.00	Pass
4,000.00	-1.06	2.00	Pass
8,000.00	0.78	4.00	Pass
16,000.00	3.25	7.00	Pass

-- End of measurement results--

1/1-Octave Self-Generated Noise

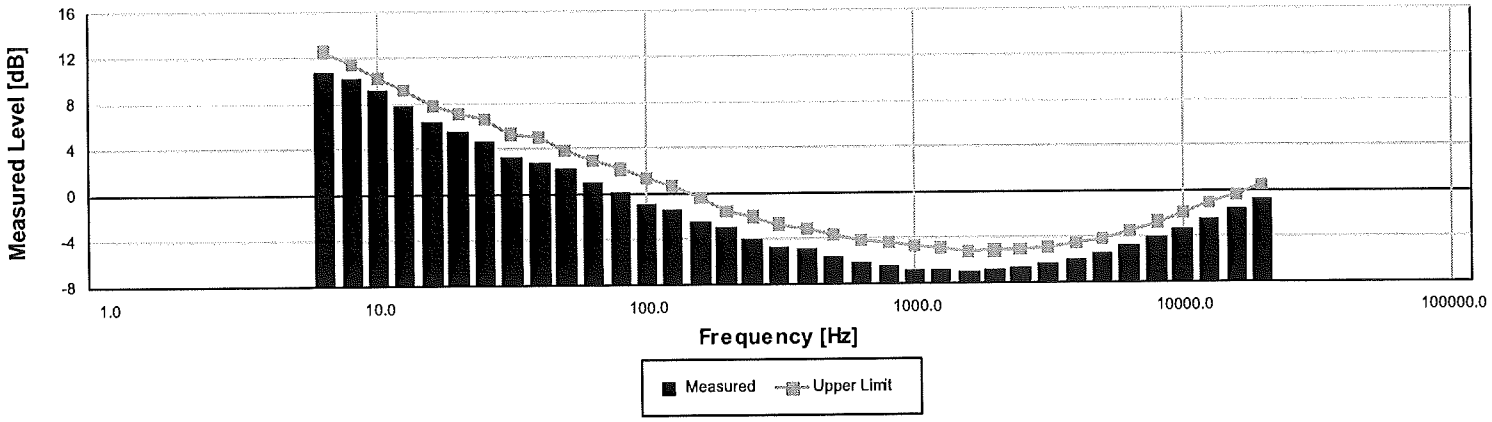


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
8.00	14.36	20.00	Pass
16.00	11.71	17.00	Pass
31.50	8.94	15.00	Pass
63.00	6.03	12.00	Pass
125.00	3.41	9.00	Pass
250.00	1.03	6.00	Pass
500.00	-0.36	4.00	Pass
1,000.00	-0.88	4.00	Pass
2,000.00	-0.08	5.00	Pass
4,000.00	1.67	7.00	Pass
8,000.00	4.07	10.00	Pass
16,000.00	6.88	13.00	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise

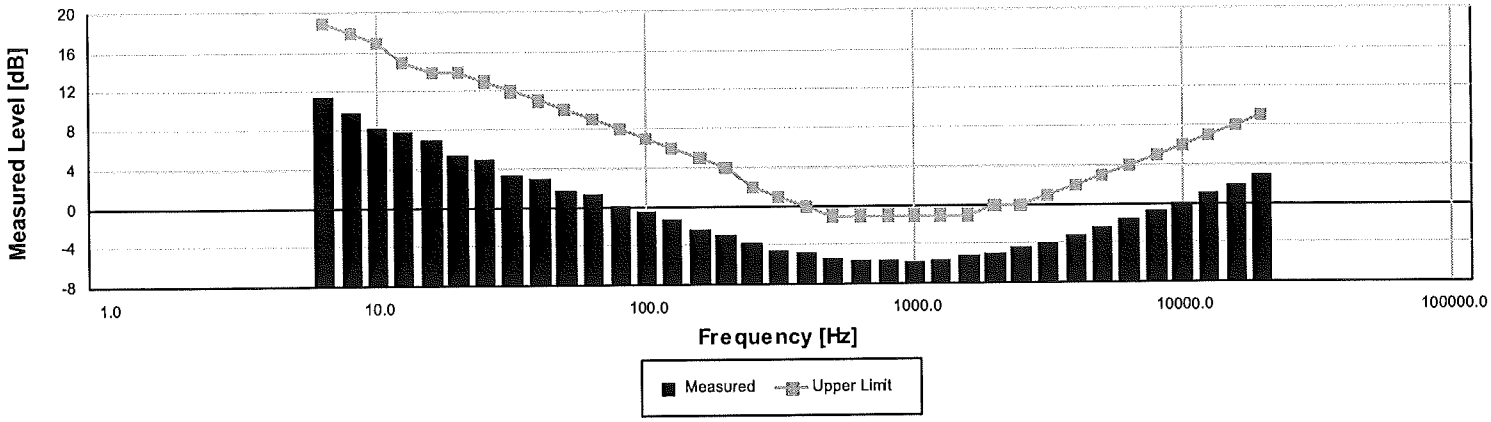


The SLM is set to normal range and 20 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.81	12.60	Pass
8.00	10.25	11.50	Pass
10.00	9.30	10.20	Pass
12.50	7.76	9.20	Pass
16.00	6.46	7.90	Pass
20.00	5.61	7.20	Pass
25.00	4.70	6.60	Pass
31.50	3.25	5.30	Pass
40.00	2.83	5.00	Pass
50.00	2.24	3.80	Pass
63.00	1.12	3.00	Pass
80.00	0.23	2.20	Pass
100.00	-0.86	1.40	Pass
125.00	-1.38	0.70	Pass
160.00	-2.36	-0.40	Pass
200.00	-3.03	-1.50	Pass
250.00	-4.03	-2.00	Pass
315.00	-4.68	-2.70	Pass
400.00	-4.91	-3.10	Pass
500.00	-5.58	-3.70	Pass
630.00	-6.14	-4.10	Pass
800.00	-6.34	-4.30	Pass
1,000.00	-6.76	-4.70	Pass
1,250.00	-6.76	-4.80	Pass
1,600.00	-6.87	-5.20	Pass
2,000.00	-6.79	-5.10	Pass
2,500.00	-6.62	-5.00	Pass
3,150.00	-6.26	-4.80	Pass
4,000.00	-5.88	-4.50	Pass
5,000.00	-5.37	-4.10	Pass
6,300.00	-4.74	-3.40	Pass
8,000.00	-4.06	-2.70	Pass
10,000.00	-3.27	-1.90	Pass
12,500.00	-2.46	-1.10	Pass
16,000.00	-1.57	-0.30	Pass
20,000.00	-0.66	0.60	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise

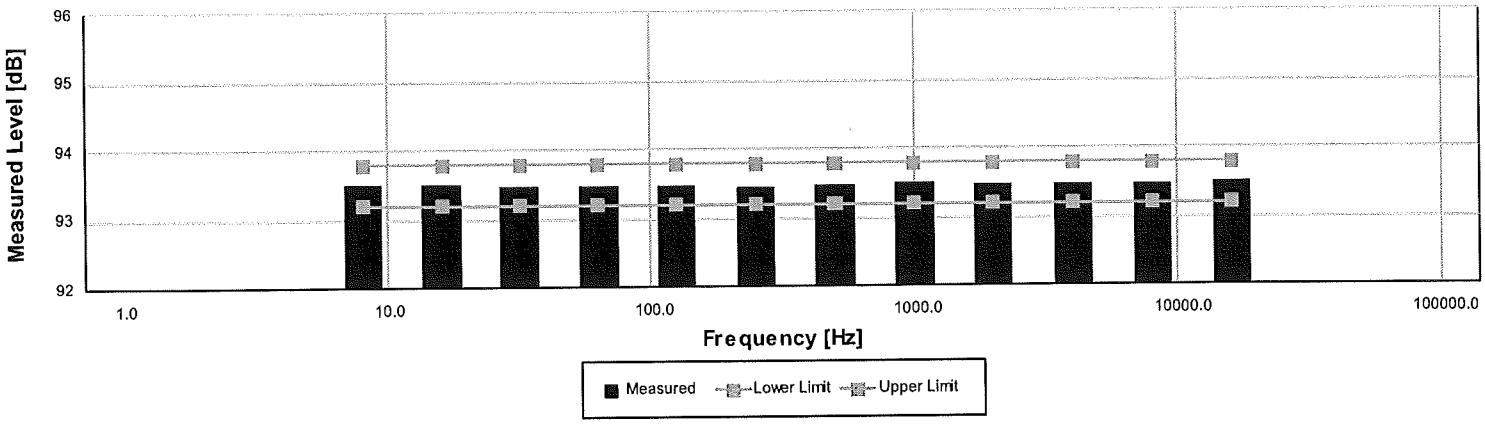


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.44	19.00	Pass
8.00	9.94	18.00	Pass
10.00	8.15	17.00	Pass
12.50	7.78	15.00	Pass
16.00	6.98	14.00	Pass
20.00	5.45	14.00	Pass
25.00	4.99	13.00	Pass
31.50	3.34	12.00	Pass
40.00	3.05	11.00	Pass
50.00	1.76	10.00	Pass
63.00	1.41	9.00	Pass
80.00	0.22	8.00	Pass
100.00	-0.55	7.00	Pass
125.00	-1.33	6.00	Pass
160.00	-2.25	5.00	Pass
200.00	-2.89	4.00	Pass
250.00	-3.82	2.00	Pass
315.00	-4.46	1.00	Pass
400.00	-4.73	0.00	Pass
500.00	-5.33	-1.00	Pass
630.00	-5.45	-1.00	Pass
800.00	-5.52	-1.00	Pass
1,000.00	-5.69	-1.00	Pass
1,250.00	-5.49	-1.00	Pass
1,600.00	-5.21	-1.00	Pass
2,000.00	-4.92	0.00	Pass
2,500.00	-4.41	0.00	Pass
3,150.00	-3.83	1.00	Pass
4,000.00	-3.12	2.00	Pass
5,000.00	-2.40	3.00	Pass
6,300.00	-1.55	4.00	Pass
8,000.00	-0.71	5.00	Pass
10,000.00	0.17	6.00	Pass
12,500.00	1.09	7.00	Pass
16,000.00	2.05	8.00	Pass
20,000.00	3.01	9.00	Pass

-- End of measurement results--

1/1-Octave Relative Attenuation

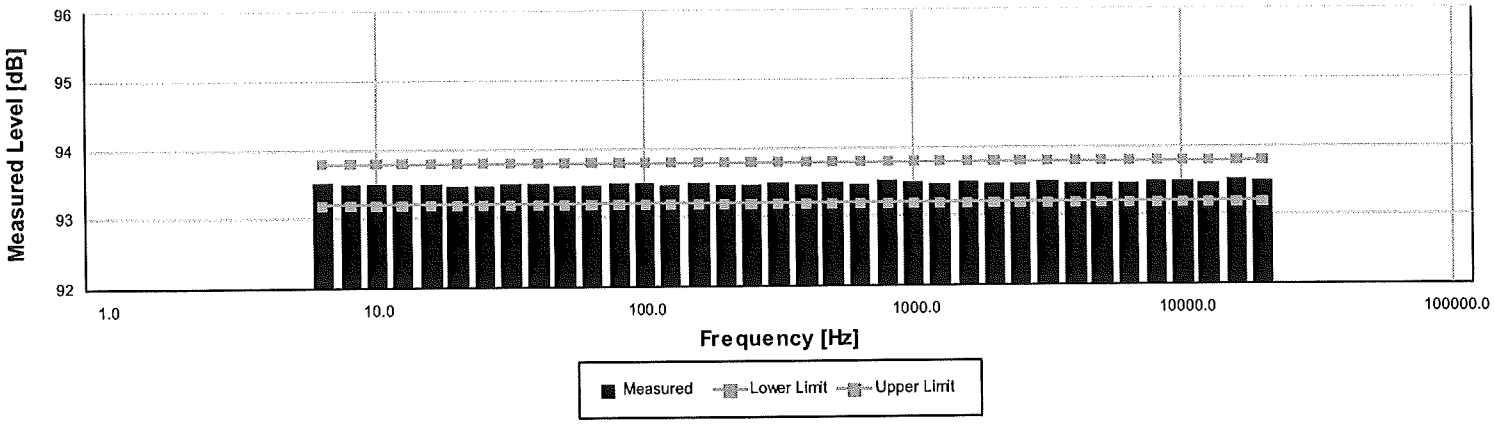


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 10.2 and ANSI S1.11-2016 Part 3 10.2 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10.

Frequency [Hz]	Measured Level [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
8.00	93.50	93.20	93.80	0.15	Pass
16.00	93.51	93.20	93.80	0.15	Pass
31.50	93.49	93.20	93.80	0.15	Pass
63.00	93.47	93.20	93.80	0.15	Pass
125.00	93.48	93.20	93.80	0.15	Pass
250.00	93.47	93.20	93.80	0.15	Pass
500.00	93.48	93.20	93.80	0.15	Pass
1,000.00	93.51	93.20	93.80	0.15	Pass
2,000.00	93.47	93.20	93.80	0.15	Pass
4,000.00	93.48	93.20	93.80	0.15	Pass
8,000.00	93.49	93.20	93.80	0.15	Pass
16,000.00	93.52	93.20	93.80	0.15	Pass

-- End of measurement results--

1/3-Octave Relative Attenuation

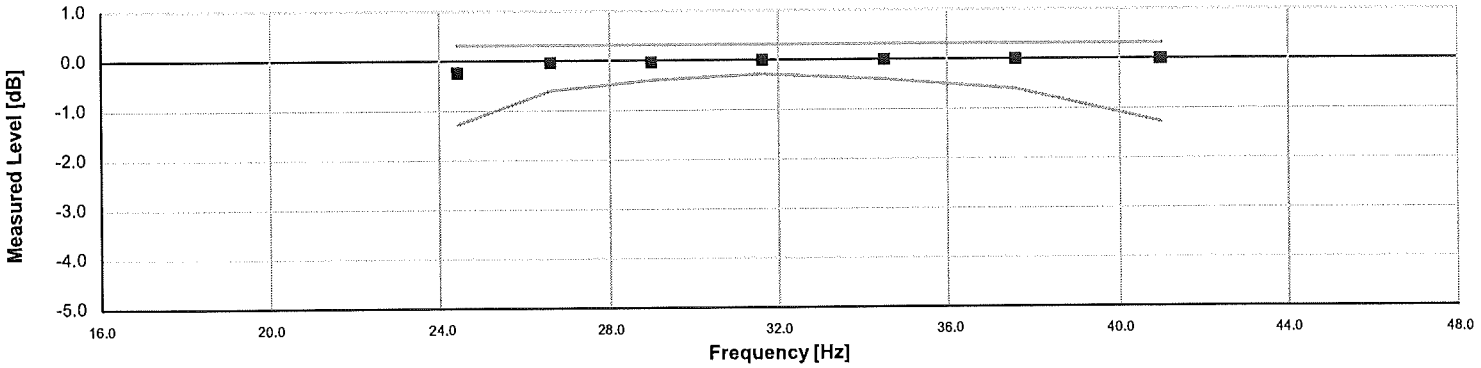


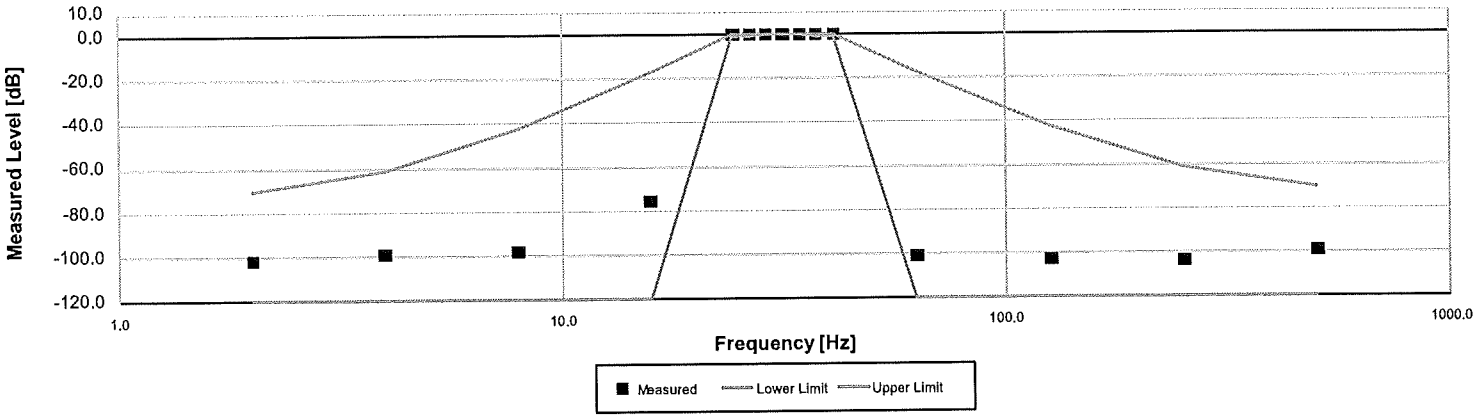
The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 10.2 and ANSI S1.11-2016 Part 3 10.2 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10.

Frequency [Hz]	Measured Level [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.30	93.52	93.20	93.80	0.15	Pass
8.00	93.50	93.20	93.80	0.15	Pass
10.00	93.51	93.20	93.80	0.15	Pass
12.50	93.49	93.20	93.80	0.15	Pass
16.00	93.51	93.20	93.80	0.15	Pass
20.00	93.48	93.20	93.80	0.15	Pass
25.00	93.47	93.20	93.80	0.15	Pass
31.50	93.49	93.20	93.80	0.15	Pass
40.00	93.48	93.20	93.80	0.15	Pass
50.00	93.48	93.20	93.80	0.15	Pass
63.00	93.47	93.20	93.80	0.15	Pass
80.00	93.50	93.20	93.80	0.15	Pass
100.00	93.50	93.20	93.80	0.15	Pass
125.00	93.48	93.20	93.80	0.15	Pass
160.00	93.50	93.20	93.80	0.15	Pass
200.00	93.47	93.20	93.80	0.15	Pass
250.00	93.47	93.20	93.80	0.15	Pass
315.00	93.49	93.20	93.80	0.15	Pass
400.00	93.48	93.20	93.80	0.15	Pass
500.00	93.48	93.20	93.80	0.15	Pass
630.00	93.48	93.20	93.80	0.15	Pass
800.00	93.51	93.20	93.80	0.15	Pass
1,000.00	93.51	93.20	93.80	0.15	Pass
1,250.00	93.47	93.20	93.80	0.15	Pass
1,600.00	93.50	93.20	93.80	0.15	Pass
2,000.00	93.47	93.20	93.80	0.15	Pass
2,500.00	93.47	93.20	93.80	0.15	Pass
3,150.00	93.49	93.20	93.80	0.15	Pass
4,000.00	93.48	93.20	93.80	0.15	Pass
5,000.00	93.48	93.20	93.80	0.15	Pass
6,300.00	93.47	93.20	93.80	0.15	Pass
8,000.00	93.49	93.20	93.80	0.15	Pass
10,000.00	93.49	93.20	93.80	0.15	Pass
12,500.00	93.47	93.20	93.80	0.15	Pass
16,000.00	93.52	93.20	93.80	0.15	Pass
20,000.00	93.51	93.20	93.80	0.15	Pass

-- End of measurement results--

1/1 Octave Filter: 31.5 Hz



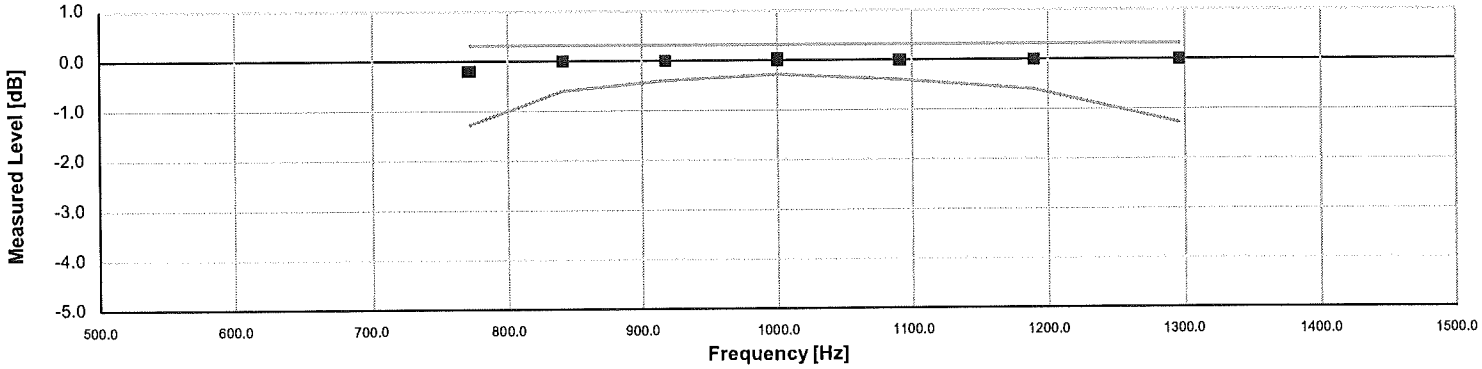


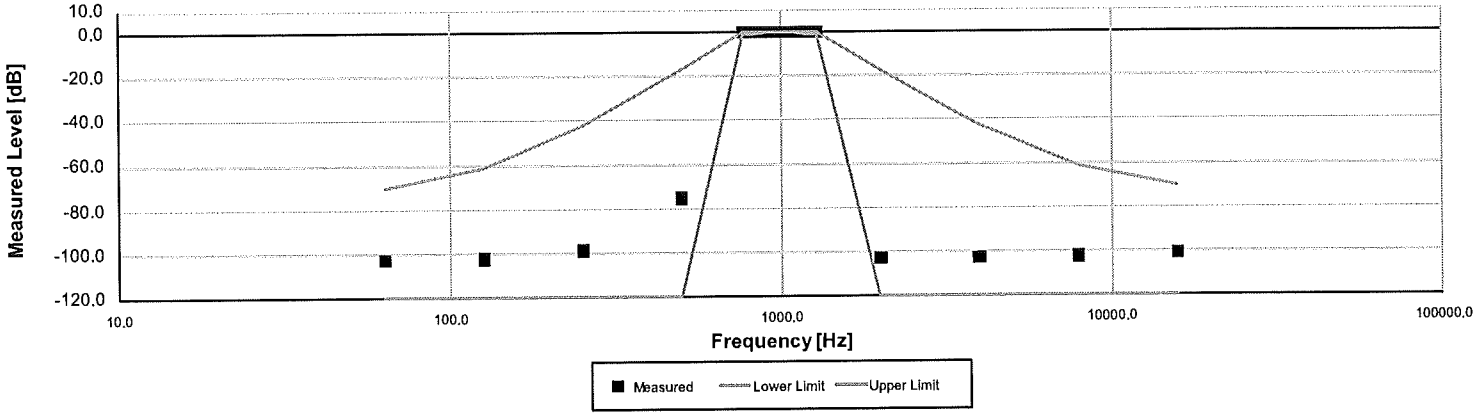
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
2.00	-101.93	-inf	-70.00	4.70	Pass
3.98	-98.82	-inf	-61.00	3.70	Pass
7.94	-97.79	-inf	-42.00	4.80	Pass
15.85	-75.28	-inf	-17.50	1.30	Pass
24.41	-0.26	-1.30	0.30	0.15	Pass
26.61	-0.04	-0.60	0.30	0.15	Pass
29.01	-0.04	-0.40	0.30	0.15	Pass
31.62	-0.02	-0.30	0.30	0.15	Pass
34.47	-0.01	-0.40	0.30	0.15	Pass
37.58	0.00	-0.60	0.30	0.15	Pass
40.97	0.00	-1.30	0.30	0.15	Pass
63.10	-101.04	-inf	-17.50	1.50	Pass
125.89	-102.37	-inf	-42.00	2.00	Pass
251.19	-103.60	-inf	-61.00	1.60	Pass
501.19	-99.04	-inf	-70.00	1.00	Pass

-- End of measurement results--

1/1 Octave Filter: 1 kHz



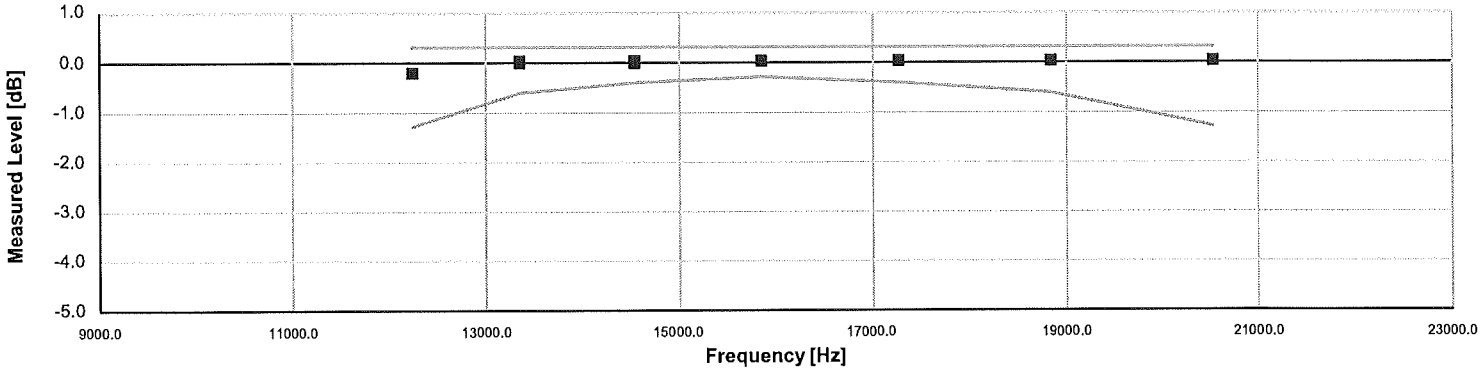


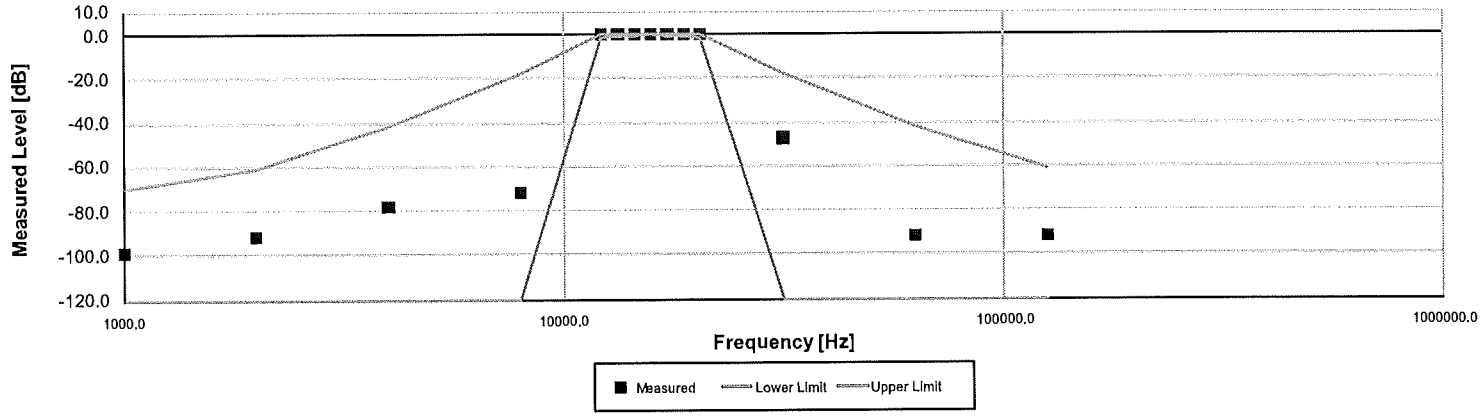
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
63.10	-102.40	-inf	-70.00	1.10	Pass
125.89	-102.17	-inf	-61.00	1.60	Pass
251.19	-98.49	-inf	-42.00	1.50	Pass
501.19	-75.11	-inf	-17.50	0.15	Pass
771.79	-0.22	-1.30	0.30	0.15	Pass
841.40	-0.02	-0.60	0.30	0.15	Pass
917.28	-0.01	-0.40	0.30	0.15	Pass
1,000.00	0.00	-0.30	0.30	0.15	Pass
1,090.18	-0.03	-0.40	0.30	0.15	Pass
1,188.50	-0.02	-0.60	0.30	0.15	Pass
1,295.69	0.00	-1.30	0.30	0.15	Pass
1,995.26	-102.33	-inf	-17.50	0.35	Pass
3,981.07	-102.60	-inf	-42.00	0.40	Pass
7,943.28	-102.20	-inf	-61.00	0.54	Pass
15,848.93	-100.52	-inf	-70.00	0.53	Pass

-- End of measurement results--

1/1 Octave Filter: 16 kHz



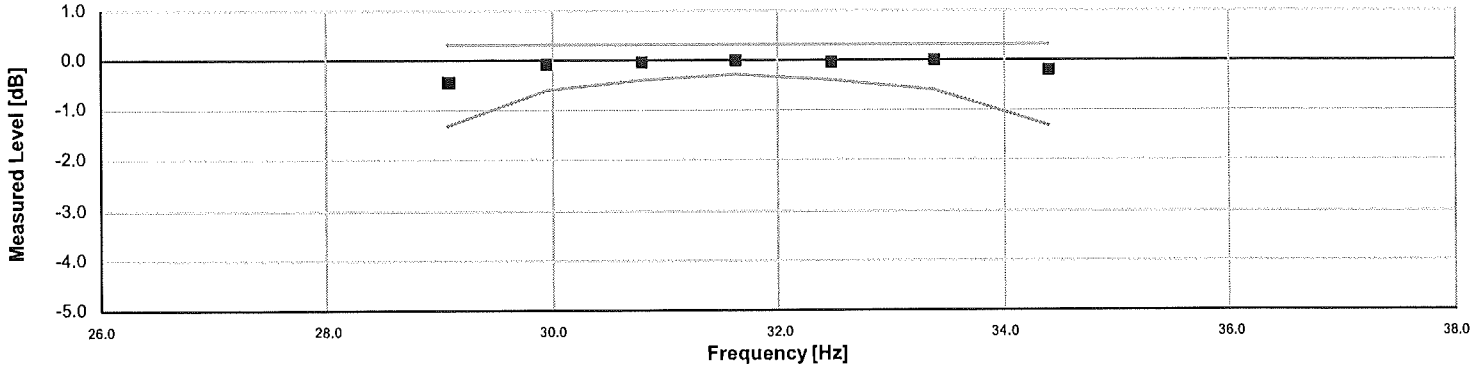


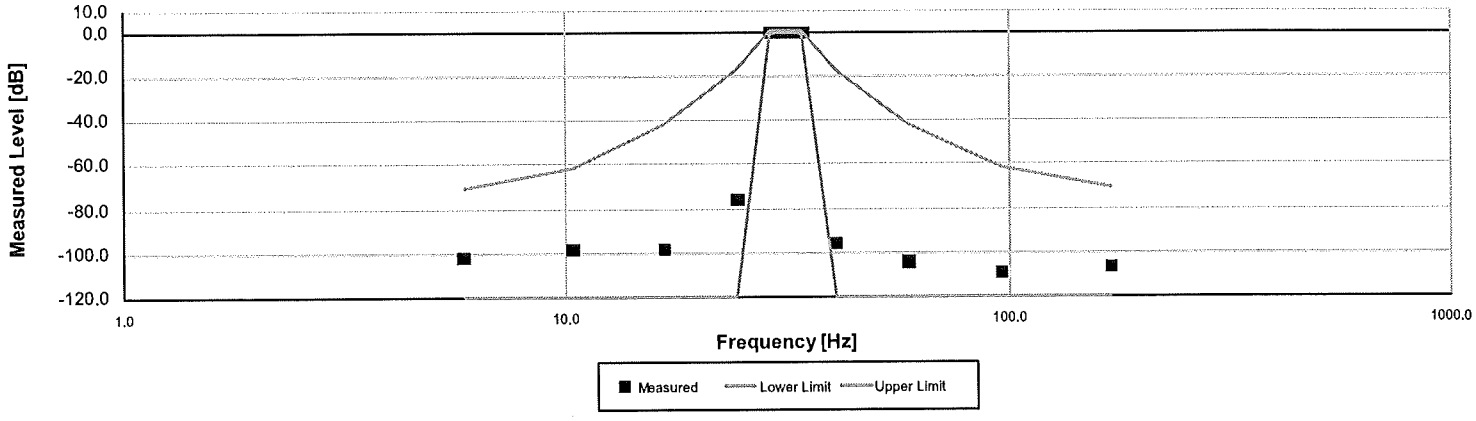
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
1,000.00	-99.03	-inf	-70.00	1.80	Pass
1,995.26	-91.40	-inf	-61.00	0.87	Pass
3,981.07	-78.10	-inf	-42.00	1.40	Pass
7,943.28	-71.73	-inf	-17.50	0.16	Pass
12,232.07	-0.23	-1.30	0.30	0.15	Pass
13,335.21	0.00	-0.60	0.30	0.15	Pass
14,537.84	0.00	-0.40	0.30	0.15	Pass
15,848.93	0.01	-0.30	0.30	0.15	Pass
17,278.26	0.02	-0.40	0.30	0.15	Pass
18,836.49	0.02	-0.60	0.30	0.15	Pass
20,535.25	0.04	-1.30	0.30	0.15	Pass
31,622.78	-47.12	-inf	-17.50	0.16	Pass
63,095.73	-91.85	-inf	-42.00	0.26	Pass
125,892.54	-91.83	-inf	-61.00	0.51	Pass

-- End of measurement results--

1/3 Octave Filter: 31.5 Hz



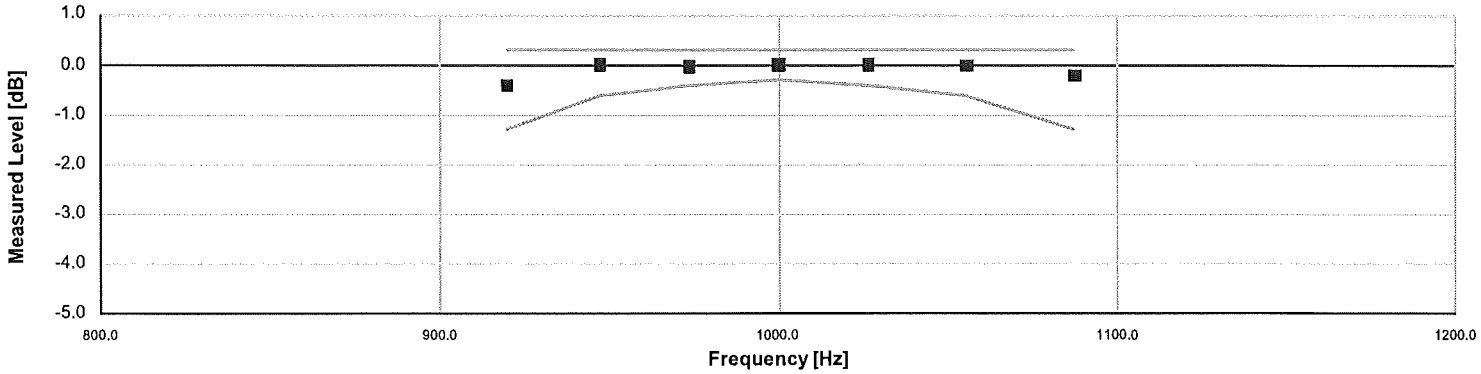


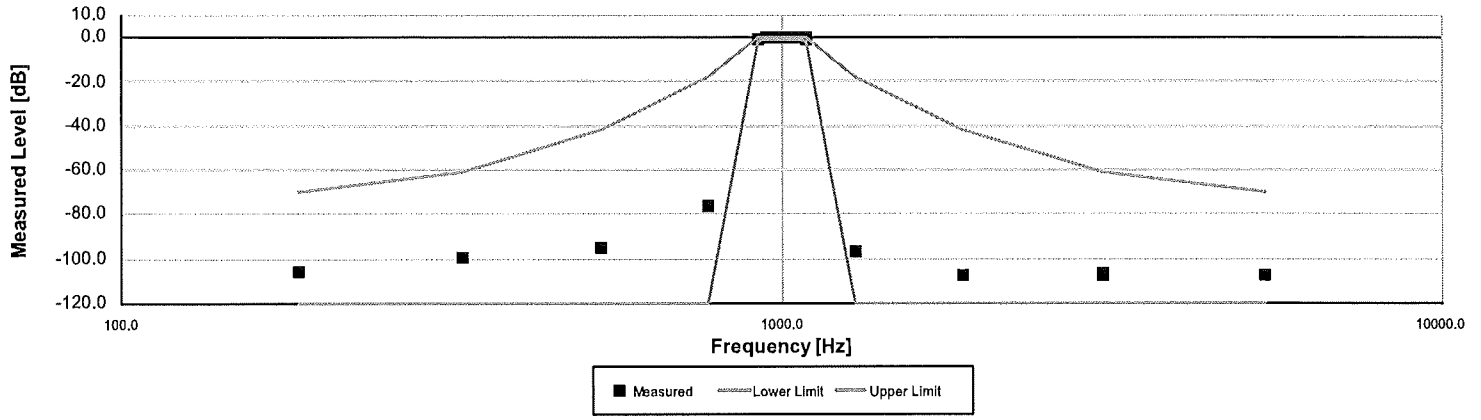
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
5.86	-101.84	-inf	-70.00	4.90	Pass
10.36	-98.53	-inf	-61.00	4.70	Pass
16.81	-98.63	-inf	-42.00	2.90	Pass
24.43	-75.89	-inf	-17.50	0.23	Pass
29.08	-0.45	-1.30	0.30	0.15	Pass
29.95	-0.08	-0.60	0.30	0.15	Pass
30.80	-0.05	-0.40	0.30	0.15	Pass
31.62	-0.02	-0.30	0.30	0.15	Pass
32.47	-0.03	-0.40	0.30	0.15	Pass
33.39	-0.02	-0.60	0.30	0.15	Pass
34.39	-0.21	-1.30	0.30	0.15	Pass
40.93	-95.68	-inf	-17.50	0.31	Pass
59.51	-104.11	-inf	-42.00	2.10	Pass
96.56	-109.42	-inf	-61.00	1.70	Pass
170.51	-106.41	-inf	-70.00	2.20	Pass

-- End of measurement results--

1/3 Octave Filter: 1 kHz



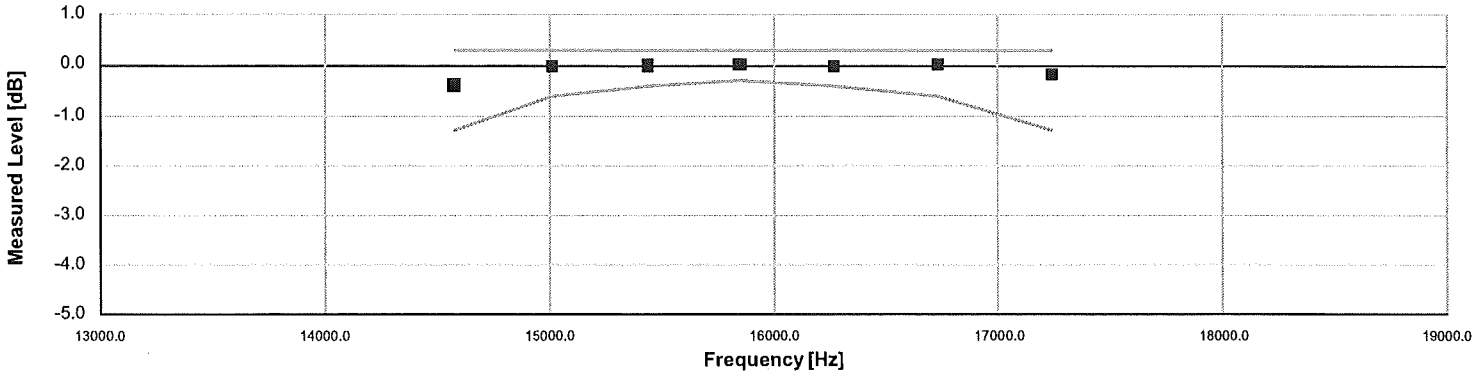


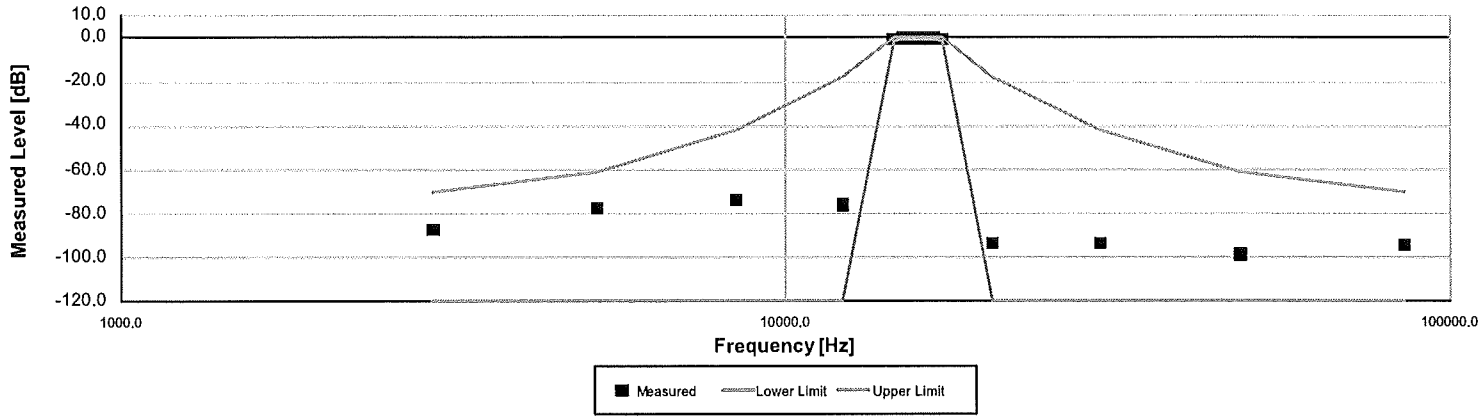
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
185.46	-105.66	-inf	-70.00	2.30	Pass
327.48	-99.50	-inf	-61.00	1.50	Pass
531.43	-95.18	-inf	-42.00	1.00	Pass
772.57	-76.20	-inf	-17.50	0.16	Pass
919.58	-0.40	-1.30	0.30	0.15	Pass
947.19	0.01	-0.60	0.30	0.15	Pass
974.02	-0.04	-0.40	0.30	0.15	Pass
1,000.00	0.01	-0.30	0.30	0.15	Pass
1,026.67	0.00	-0.40	0.30	0.15	Pass
1,055.75	-0.01	-0.60	0.30	0.15	Pass
1,087.46	-0.22	-1.30	0.30	0.15	Pass
1,294.37	-96.66	-inf	-17.50	0.22	Pass
1,881.73	-107.69	-inf	-42.00	0.41	Pass
3,053.65	-107.19	-inf	-61.00	0.38	Pass
5,391.95	-107.52	-inf	-70.00	0.43	Pass

-- End of measurement results--

1/3 Octave Filter: 16 kHz





The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
2,939.37	-86.94	-inf	-70.00	2.10	Pass
5,190.16	-76.98	-inf	-61.00	1.30	Pass
8,422.54	-73.48	-inf	-42.00	2.10	Pass
12,244.48	-75.92	-inf	-17.50	0.16	Pass
14,574.31	-0.40	-1.30	0.30	0.15	Pass
15,011.95	-0.01	-0.60	0.30	0.15	Pass
15,437.16	0.00	-0.40	0.30	0.15	Pass
15,848.93	0.02	-0.30	0.30	0.15	Pass
16,271.69	-0.01	-0.40	0.30	0.15	Pass
16,732.58	0.02	-0.60	0.30	0.15	Pass
17,235.03	-0.18	-1.30	0.30	0.15	Pass
20,514.45	-93.19	-inf	-17.50	0.32	Pass
29,823.37	-93.14	-inf	-42.00	0.69	Pass
48,397.12	-98.32	-inf	-61.00	0.36	Pass
85,456.63	-94.36	-inf	-70.00	0.35	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

Calibration Certificate

Certificate Number 2021003244

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	10172	***Technician***	Jason Grace		
Test Results	**Pass**	***Calibration Date***	24 Mar 2021		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***			
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Temperature***	23.5	°C	± 0.25 °C
		Humidity	51.8	%RH	± 2.0 %RH
		Static Pressure	85.72	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 015279 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

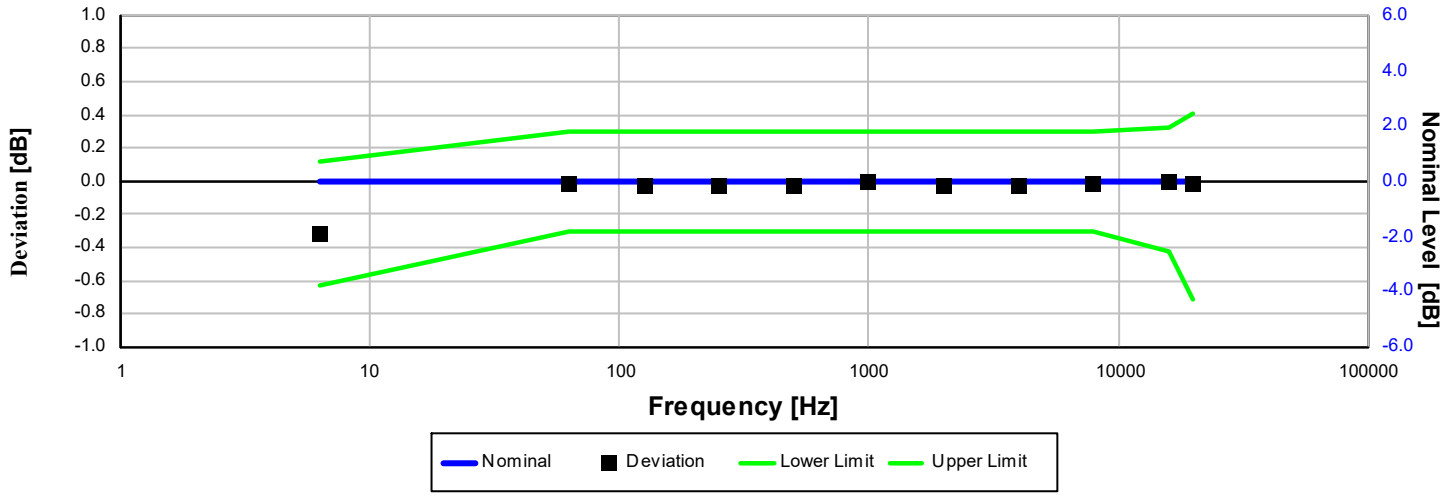
This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
SRS DS360 Ultra Low Distortion Generator	2021-03-09	2022-03-09	006311
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943

Z-weight Filter Response

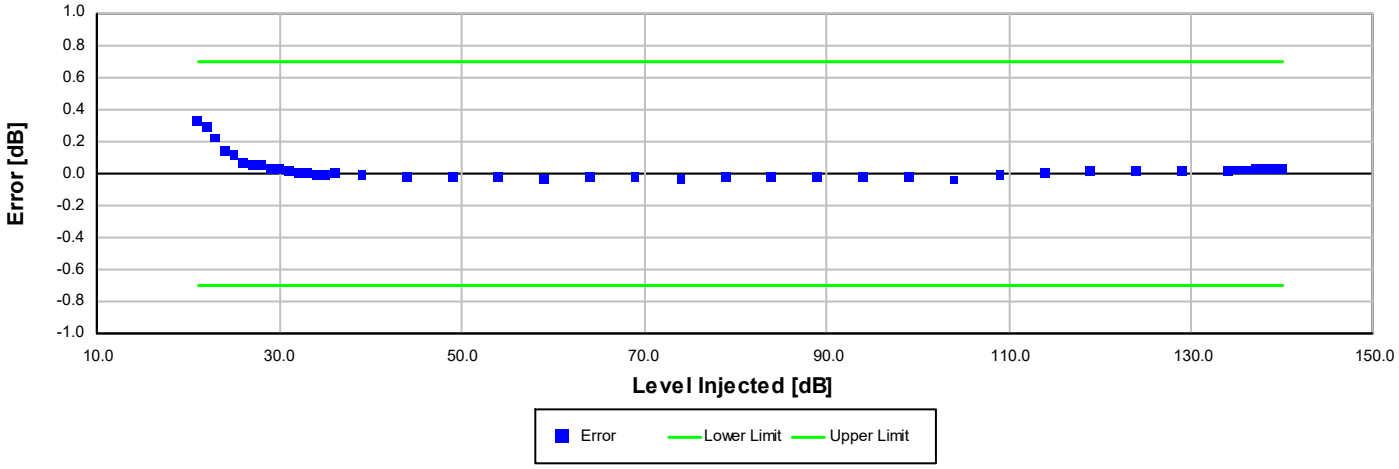


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.32	-0.32	-0.63	0.12	0.15	Pass
63.10	-0.02	-0.02	-0.30	0.30	0.15	Pass
125.89	-0.02	-0.02	-0.30	0.30	0.15	Pass
251.19	-0.03	-0.03	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.03	-0.03	-0.30	0.30	0.15	Pass
3,981.07	-0.03	-0.03	-0.30	0.30	0.15	Pass
7,943.28	-0.02	-0.02	-0.30	0.30	0.15	Pass
15,848.93	0.00	0.00	-0.42	0.32	0.15	Pass
19,952.62	-0.01	-0.01	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



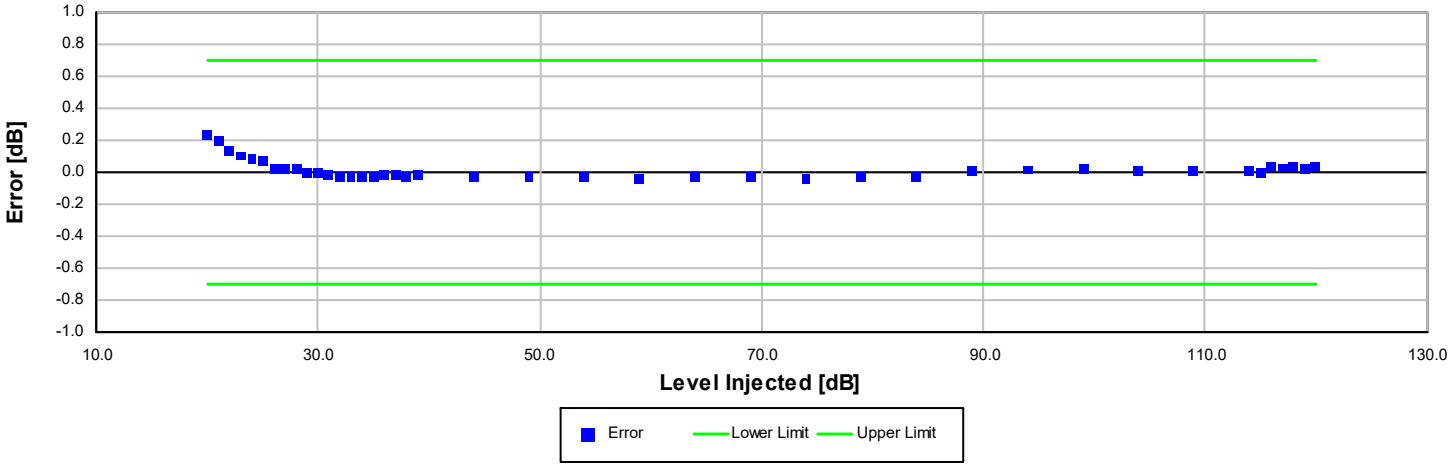
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.33	-0.70	0.70	0.16	Pass
22.00	0.29	-0.70	0.70	0.16	Pass
23.00	0.22	-0.70	0.70	0.16	Pass
24.00	0.14	-0.70	0.70	0.16	Pass
25.00	0.12	-0.70	0.70	0.16	Pass
26.00	0.06	-0.70	0.70	0.16	Pass
27.00	0.06	-0.70	0.70	0.16	Pass
28.00	0.06	-0.70	0.70	0.16	Pass
29.00	0.03	-0.70	0.70	0.18	Pass
30.00	0.03	-0.70	0.70	0.17	Pass
31.00	0.01	-0.70	0.70	0.17	Pass
32.00	0.01	-0.70	0.70	0.17	Pass
33.00	0.00	-0.70	0.70	0.16	Pass
34.00	-0.01	-0.70	0.70	0.16	Pass
35.00	-0.01	-0.70	0.70	0.16	Pass
36.00	0.00	-0.70	0.70	0.16	Pass
39.00	0.00	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.02	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.02	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.01	-0.70	0.70	0.15	Pass
124.00	0.02	-0.70	0.70	0.15	Pass
129.00	0.02	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.02	-0.70	0.70	0.15	Pass
136.00	0.02	-0.70	0.70	0.15	Pass
137.00	0.03	-0.70	0.70	0.15	Pass
138.00	0.03	-0.70	0.70	0.15	Pass
139.00	0.03	-0.70	0.70	0.15	Pass
140.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.23	-0.70	0.70	0.17	Pass
21.00	0.19	-0.70	0.70	0.16	Pass
22.00	0.13	-0.70	0.70	0.16	Pass
23.00	0.10	-0.70	0.70	0.16	Pass
24.00	0.08	-0.70	0.70	0.16	Pass
25.00	0.06	-0.70	0.70	0.16	Pass
26.00	0.01	-0.70	0.70	0.19	Pass
27.00	0.01	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	-0.01	-0.70	0.70	0.18	Pass
30.00	-0.01	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.03	-0.70	0.70	0.17	Pass
33.00	-0.03	-0.70	0.70	0.16	Pass
34.00	-0.04	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.02	-0.70	0.70	0.16	Pass
37.00	-0.03	-0.70	0.70	0.16	Pass
38.00	-0.03	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.03	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.04	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.04	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.01	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.00	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.02	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.01	-0.70	0.70	0.15	Pass
120.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	132.85	131.11	133.11	0.15	Pass
		Positive Pulse	134.27	132.83	134.83	0.15	Pass
	30	Negative Pulse	131.78	131.11	133.11	0.15	Pass
		Positive Pulse	133.36	132.83	134.83	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.14	± 1.00	0.15 ‡	Pass
	10	-0.19	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	-0.07	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.27	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.24	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.00	93.91	94.11	0.15	Pass
0 dB Gain, Linearity	28.08	27.31	28.71	0.16	Pass
20 dB Gain	94.03	93.91	94.11	0.15	Pass
20 dB Gain, Linearity	23.12	22.31	23.71	0.16	Pass
OBA High Range	94.01	93.20	94.80	0.15	Pass
OBA Normal Range	94.01	93.91	94.11	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.24	9.00	Pass
C-weight Noise Floor	12.40	15.00	Pass
Z-weight Noise Floor	22.06	25.00	Pass

-- End of measurement results--

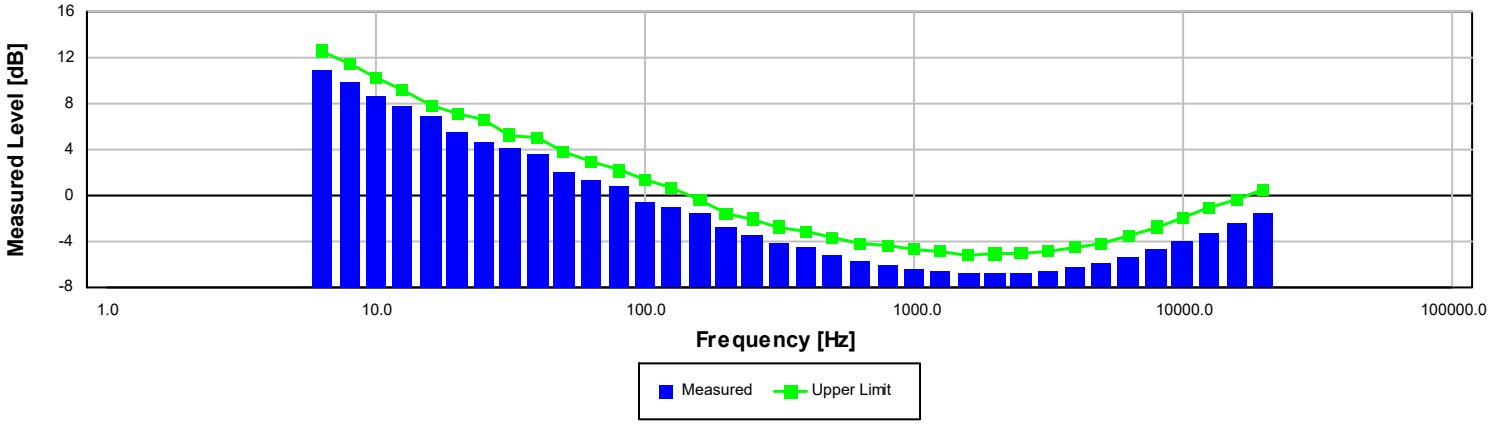
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.49	137.20	138.80	0.15	Pass
THD	-80.54		-60.00	1.30 ‡	Pass
THD+N	-78.99		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.05	12.60	Pass
8.00	9.95	11.50	Pass
10.00	8.79	10.20	Pass
12.50	7.88	9.20	Pass
16.00	6.95	7.90	Pass
20.00	5.62	7.20	Pass
25.00	4.75	6.60	Pass
31.50	4.21	5.30	Pass
40.00	3.62	5.00	Pass
50.00	2.18	3.80	Pass
63.00	1.41	3.00	Pass
80.00	0.81	2.20	Pass
100.00	-0.48	1.40	Pass
125.00	-0.95	0.70	Pass
160.00	-1.50	-0.40	Pass
200.00	-2.80	-1.50	Pass
250.00	-3.42	-2.00	Pass
315.00	-4.17	-2.70	Pass
400.00	-4.53	-3.10	Pass
500.00	-5.17	-3.70	Pass
630.00	-5.70	-4.10	Pass
800.00	-6.11	-4.30	Pass
1,000.00	-6.35	-4.70	Pass
1,250.00	-6.53	-4.80	Pass
1,600.00	-6.77	-5.20	Pass
2,000.00	-6.78	-5.10	Pass
2,500.00	-6.75	-5.00	Pass
3,150.00	-6.55	-4.80	Pass
4,000.00	-6.21	-4.50	Pass
5,000.00	-5.82	-4.10	Pass
6,300.00	-5.30	-3.40	Pass
8,000.00	-4.72	-2.70	Pass
10,000.00	-4.05	-1.90	Pass
12,500.00	-3.30	-1.10	Pass
16,000.00	-2.47	-0.30	Pass
20,000.00	-1.59	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: Jason Grace

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

Calibration Certificate

Certificate Number 2021003380
Customer:
The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11445	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	26 Mar 2021		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.32	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Humidity***	50.9	%RH	± 2.0 %RH
		Static Pressure	85.16	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 071087 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

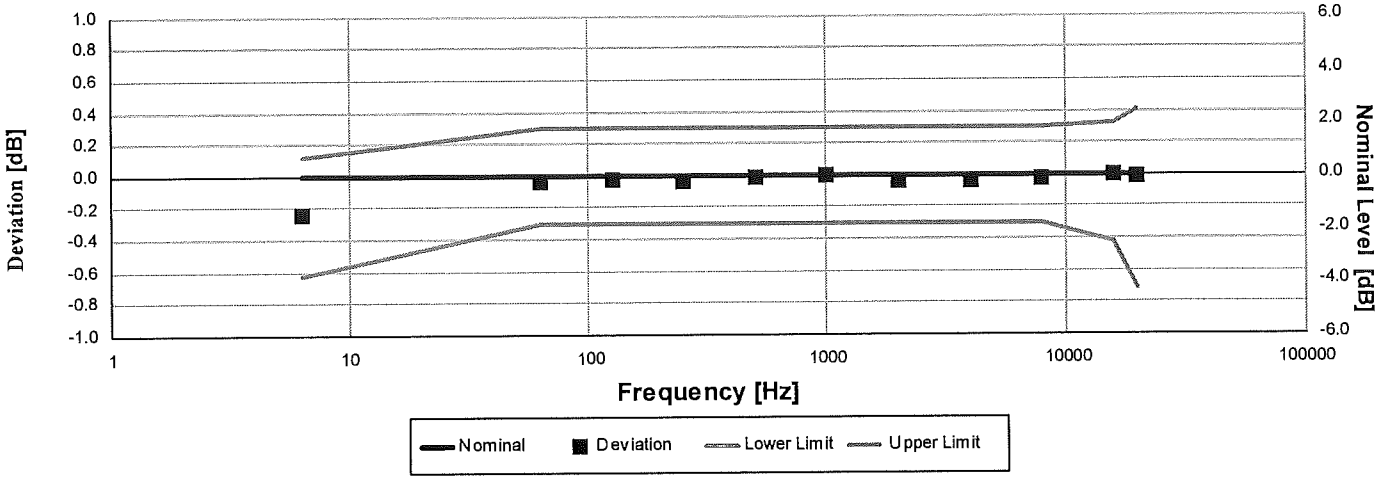
This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2020-08-19	2021-08-19	007167

Z-weight Filter Response

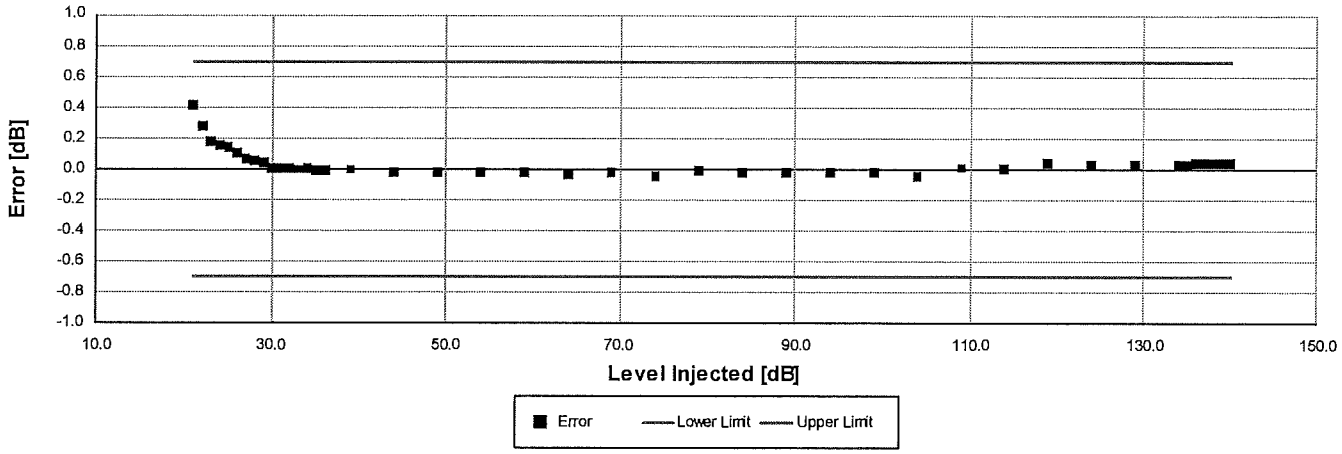


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.24	-0.24	-0.63	0.12	0.15	Pass
63.10	-0.04	-0.04	-0.30	0.30	0.15	Pass
125.89	-0.02	-0.02	-0.30	0.30	0.15	Pass
251.19	-0.03	-0.03	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.02	-0.02	-0.30	0.30	0.15	Pass
15,848.93	-0.01	-0.01	-0.42	0.32	0.15	Pass
19,952.62	-0.01	-0.01	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

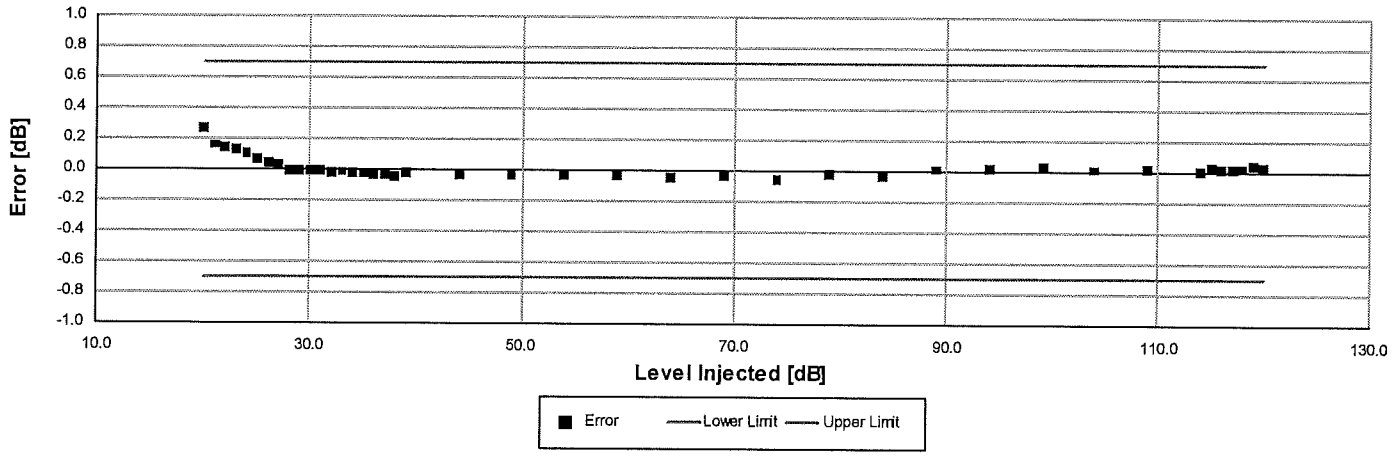
Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.41	-0.70	0.70	0.16	Pass
22.00	0.28	-0.70	0.70	0.16	Pass
23.00	0.18	-0.70	0.70	0.16	Pass
24.00	0.16	-0.70	0.70	0.16	Pass
25.00	0.14	-0.70	0.70	0.16	Pass
26.00	0.11	-0.70	0.70	0.16	Pass
27.00	0.07	-0.70	0.70	0.16	Pass
28.00	0.06	-0.70	0.70	0.16	Pass
29.00	0.05	-0.70	0.70	0.18	Pass
30.00	0.01	-0.70	0.70	0.17	Pass
31.00	0.01	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	0.00	-0.70	0.70	0.16	Pass
34.00	0.01	-0.70	0.70	0.16	Pass
35.00	-0.01	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
39.00	0.00	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.02	-0.70	0.70	0.16	Pass
64.00	-0.03	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.01	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
124.00	0.03	-0.70	0.70	0.15	Pass
129.00	0.03	-0.70	0.70	0.15	Pass
134.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.03	-0.70	0.70	0.15	Pass
136.00	0.04	-0.70	0.70	0.15	Pass
137.00	0.04	-0.70	0.70	0.15	Pass
138.00	0.04	-0.70	0.70	0.15	Pass
139.00	0.04	-0.70	0.70	0.15	Pass
140.00	0.04	-0.70	0.70	0.15	Pass

-- End of measurement results--

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.26	-0.70	0.70	0.17	Pass
21.00	0.16	-0.70	0.70	0.16	Pass
22.00	0.14	-0.70	0.70	0.16	Pass
23.00	0.13	-0.70	0.70	0.16	Pass
24.00	0.10	-0.70	0.70	0.16	Pass
25.00	0.07	-0.70	0.70	0.16	Pass
26.00	0.05	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	-0.01	-0.70	0.70	0.19	Pass
29.00	-0.01	-0.70	0.70	0.18	Pass
30.00	-0.01	-0.70	0.70	0.17	Pass
31.00	-0.01	-0.70	0.70	0.17	Pass
32.00	-0.02	-0.70	0.70	0.17	Pass
33.00	-0.02	-0.70	0.70	0.16	Pass
34.00	-0.02	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.03	-0.70	0.70	0.16	Pass
37.00	-0.04	-0.70	0.70	0.16	Pass
38.00	-0.04	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.04	-0.70	0.70	0.16	Pass
64.00	-0.05	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.06	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	0.01	-0.70	0.70	0.16	Pass
94.00	0.02	-0.70	0.70	0.16	Pass
99.00	0.03	-0.70	0.70	0.16	Pass
104.00	0.01	-0.70	0.70	0.15	Pass
109.00	0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.02	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
120.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.97	134.63	136.63	0.15	Pass
		Positive Pulse	135.98	134.64	136.64	0.15	Pass
	30	Negative Pulse	135.14	134.63	136.63	0.15	Pass
		Positive Pulse	135.13	134.64	136.64	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.26	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.16	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.15	± 1.00	0.15 ‡	Pass
	10	-0.02	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	0.00	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.97	93.89	94.09	0.15	Pass
0 dB Gain, Linearity	28.02	27.29	28.69	0.16	Pass
20 dB Gain	94.01	93.89	94.09	0.15	Pass
20 dB Gain, Linearity	23.10	22.29	23.69	0.16	Pass
OBA High Range	93.99	93.20	94.80	0.15	Pass
OBA Normal Range	93.99	93.89	94.09	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.99	9.00	Pass
C-weight Noise Floor	11.99	15.00	Pass
Z-weight Noise Floor	22.13	25.00	Pass

-- End of measurement results--

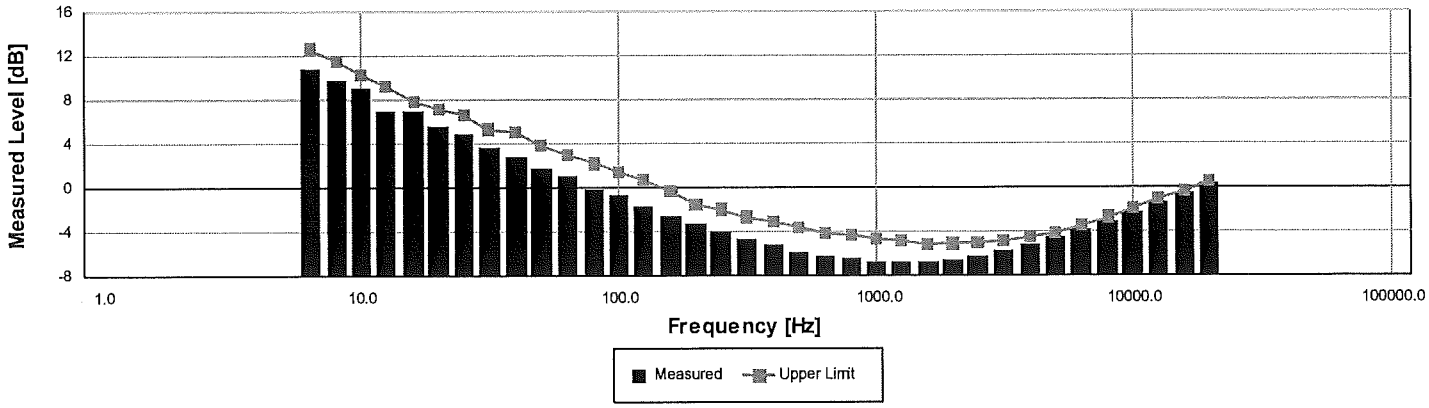
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.53	137.20	138.80	0.15	Pass
THD	-77.53		-60.00	1.30 ‡	Pass
THD+N	-76.38		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.70	12.60	Pass
8.00	9.77	11.50	Pass
10.00	9.07	10.20	Pass
12.50	6.91	9.20	Pass
16.00	7.05	7.90	Pass
20.00	5.56	7.20	Pass
25.00	4.87	6.60	Pass
31.50	3.60	5.30	Pass
40.00	2.85	5.00	Pass
50.00	1.77	3.80	Pass
63.00	1.10	3.00	Pass
80.00	-0.13	2.20	Pass
100.00	-0.75	1.40	Pass
125.00	-1.65	0.70	Pass
160.00	-2.54	-0.40	Pass
200.00	-3.22	-1.50	Pass
250.00	-3.97	-2.00	Pass
315.00	-4.64	-2.70	Pass
400.00	-5.15	-3.10	Pass
500.00	-5.88	-3.70	Pass
630.00	-6.32	-4.10	Pass
800.00	-6.38	-4.30	Pass
1,000.00	-6.75	-4.70	Pass
1,250.00	-6.74	-4.80	Pass
1,600.00	-6.70	-5.20	Pass
2,000.00	-6.54	-5.10	Pass
2,500.00	-6.20	-5.00	Pass
3,150.00	-5.78	-4.80	Pass
4,000.00	-5.19	-4.50	Pass
5,000.00	-4.58	-4.10	Pass
6,300.00	-3.87	-3.40	Pass
8,000.00	-3.14	-2.70	Pass
10,000.00	-2.31	-1.90	Pass
12,500.00	-1.46	-1.10	Pass
16,000.00	-0.59	-0.30	Pass
20,000.00	0.29	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED
Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Calibration Certificate

Certificate Number 2021003820

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11465	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	5 Apr 2021		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.78	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Humidity***	50.8	%RH	± 2.0 %RH
		Static Pressure	84.62	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 036756 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

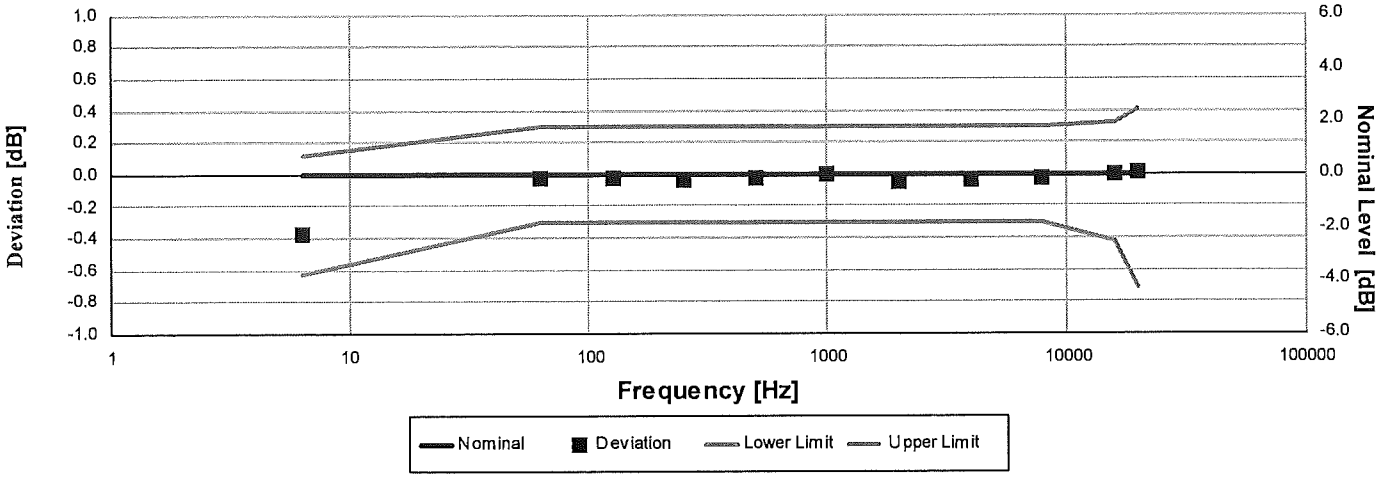
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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2020-04-14	2021-04-14	007635

Z-weight Filter Response

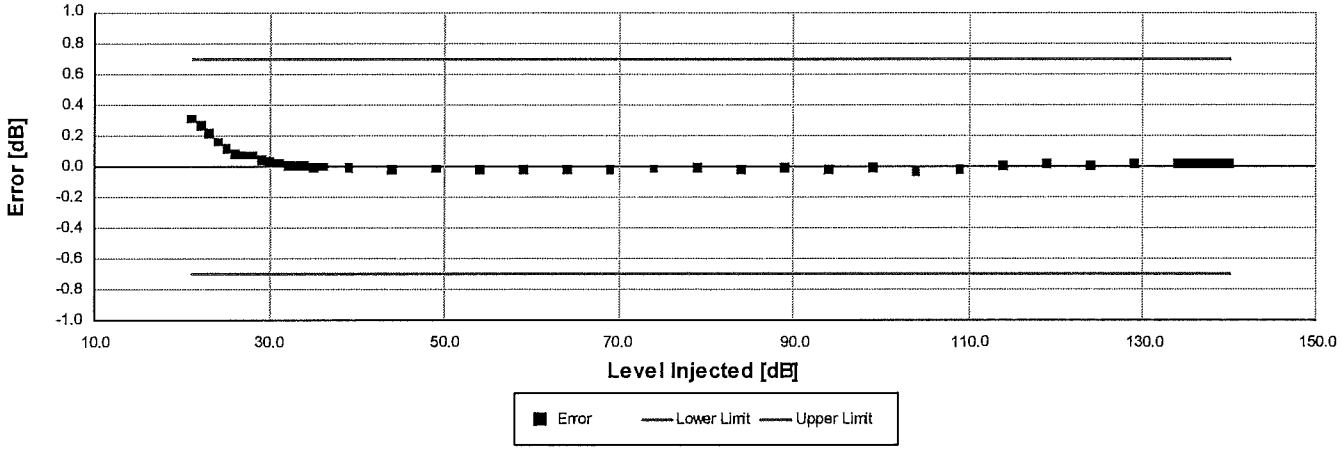


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.37	-0.37	-0.63	0.12	0.15	Pass
63.10	-0.03	-0.03	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.04	-0.04	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.02	-0.02	-0.30	0.30	0.15	Pass
15,848.93	0.00	0.00	-0.42	0.32	0.15	Pass
19,952.62	0.01	0.01	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



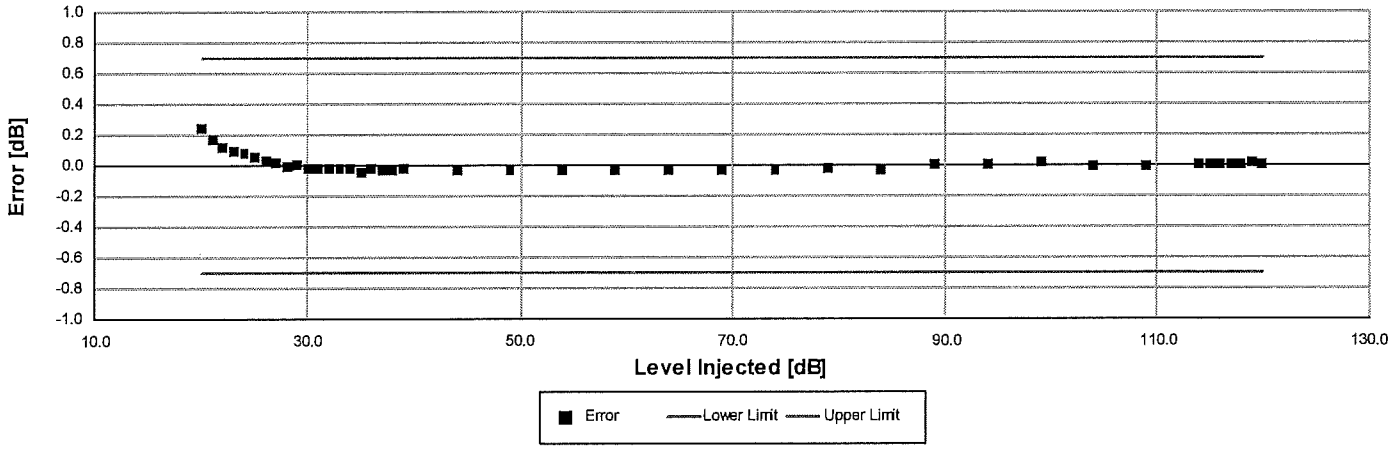
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.31	-0.70	0.70	0.16	Pass
22.00	0.26	-0.70	0.70	0.16	Pass
23.00	0.21	-0.70	0.70	0.16	Pass
24.00	0.16	-0.70	0.70	0.16	Pass
25.00	0.12	-0.70	0.70	0.16	Pass
26.00	0.08	-0.70	0.70	0.16	Pass
27.00	0.07	-0.70	0.70	0.16	Pass
28.00	0.07	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.18	Pass
30.00	0.03	-0.70	0.70	0.17	Pass
31.00	0.02	-0.70	0.70	0.17	Pass
32.00	0.01	-0.70	0.70	0.17	Pass
33.00	0.01	-0.70	0.70	0.16	Pass
34.00	0.01	-0.70	0.70	0.16	Pass
35.00	-0.01	-0.70	0.70	0.16	Pass
36.00	0.00	-0.70	0.70	0.16	Pass
39.00	-0.01	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.01	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.02	-0.70	0.70	0.16	Pass
64.00	-0.02	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.01	-0.70	0.70	0.16	Pass
79.00	0.00	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.01	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.01	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	-0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.02	-0.70	0.70	0.15	Pass
124.00	0.00	-0.70	0.70	0.15	Pass
129.00	0.02	-0.70	0.70	0.15	Pass
134.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.02	-0.70	0.70	0.15	Pass
136.00	0.02	-0.70	0.70	0.15	Pass
137.00	0.02	-0.70	0.70	0.15	Pass
138.00	0.02	-0.70	0.70	0.15	Pass
139.00	0.02	-0.70	0.70	0.15	Pass
140.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.24	-0.70	0.70	0.17	Pass
21.00	0.17	-0.70	0.70	0.16	Pass
22.00	0.12	-0.70	0.70	0.16	Pass
23.00	0.09	-0.70	0.70	0.16	Pass
24.00	0.07	-0.70	0.70	0.16	Pass
25.00	0.05	-0.70	0.70	0.16	Pass
26.00	0.02	-0.70	0.70	0.19	Pass
27.00	0.01	-0.70	0.70	0.18	Pass
28.00	0.00	-0.70	0.70	0.19	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	-0.02	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.02	-0.70	0.70	0.17	Pass
33.00	-0.02	-0.70	0.70	0.16	Pass
34.00	-0.02	-0.70	0.70	0.16	Pass
35.00	-0.05	-0.70	0.70	0.16	Pass
36.00	-0.03	-0.70	0.70	0.16	Pass
37.00	-0.03	-0.70	0.70	0.16	Pass
38.00	-0.03	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.03	-0.70	0.70	0.16	Pass
54.00	-0.03	-0.70	0.70	0.16	Pass
59.00	-0.04	-0.70	0.70	0.16	Pass
64.00	-0.03	-0.70	0.70	0.16	Pass
69.00	-0.03	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.02	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.01	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	-0.01	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.00	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.00	-0.70	0.70	0.15	Pass
117.00	0.01	-0.70	0.70	0.15	Pass
118.00	0.01	-0.70	0.70	0.15	Pass
119.00	0.02	-0.70	0.70	0.15	Pass
120.00	0.01	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.99	134.68	136.68	0.15	Pass
		Positive Pulse	135.94	134.64	136.64	0.15	Pass
	30	Negative Pulse	135.13	134.68	136.68	0.15	Pass
		Positive Pulse	135.10	134.64	136.64	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	-0.17	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.09	± 1.00	0.15 ‡	Pass
	10	-0.22	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.07	± 0.50	0.15 ‡	Pass
	5	-0.07	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.08	± 0.50	0.15 ‡	Pass
	5	-0.07	± 1.00	0.15 ‡	Pass
	10	0.04	± 1.50	0.15 ‡	Pass
108.00	3	-0.08	± 0.50	0.15 ‡	Pass
	5	-0.05	± 1.00	0.15 ‡	Pass
	10	0.07	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.01	93.91	94.11	0.15	Pass
0 dB Gain, Linearity	28.11	27.31	28.71	0.16	Pass
20 dB Gain	94.03	93.91	94.11	0.15	Pass
20 dB Gain, Linearity	23.09	22.31	23.71	0.16	Pass
OBA High Range	94.01	93.20	94.80	0.15	Pass
OBA Normal Range	94.01	93.91	94.11	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.32	9.00	Pass
C-weight Noise Floor	12.00	15.00	Pass
Z-weight Noise Floor	22.00	25.00	Pass

-- End of measurement results--

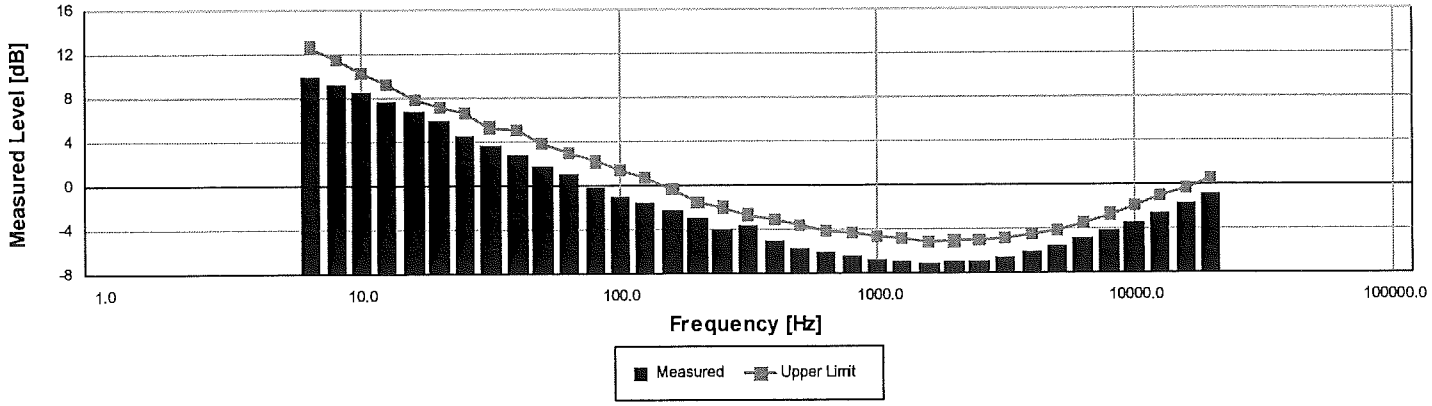
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.54	137.20	138.80	0.15	Pass
THD	-75.33		-60.00	1.30 ‡	Pass
THD+N	-74.46		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	9.92	12.60	Pass
8.00	9.19	11.50	Pass
10.00	8.54	10.20	Pass
12.50	7.60	9.20	Pass
16.00	6.81	7.90	Pass
20.00	5.89	7.20	Pass
25.00	4.59	6.60	Pass
31.50	3.60	5.30	Pass
40.00	2.83	5.00	Pass
50.00	1.67	3.80	Pass
63.00	1.09	3.00	Pass
80.00	-0.08	2.20	Pass
100.00	-0.98	1.40	Pass
125.00	-1.62	0.70	Pass
160.00	-2.27	-0.40	Pass
200.00	-2.86	-1.50	Pass
250.00	-4.06	-2.00	Pass
315.00	-3.69	-2.70	Pass
400.00	-5.03	-3.10	Pass
500.00	-5.79	-3.70	Pass
630.00	-6.16	-4.10	Pass
800.00	-6.49	-4.30	Pass
1,000.00	-6.82	-4.70	Pass
1,250.00	-6.99	-4.80	Pass
1,600.00	-7.04	-5.20	Pass
2,000.00	-7.01	-5.10	Pass
2,500.00	-6.91	-5.00	Pass
3,150.00	-6.58	-4.80	Pass
4,000.00	-6.06	-4.50	Pass
5,000.00	-5.58	-4.10	Pass
6,300.00	-4.93	-3.40	Pass
8,000.00	-4.19	-2.70	Pass
10,000.00	-3.47	-1.90	Pass
12,500.00	-2.65	-1.10	Pass
16,000.00	-1.74	-0.30	Pass
20,000.00	-0.82	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED
Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Calibration Certificate

Certificate Number 2021003828

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11466	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	6 Apr 2021		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.33	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Humidity***	52.4	%RH	± 2.0 %RH
		Static Pressure	85.63	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 029590 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

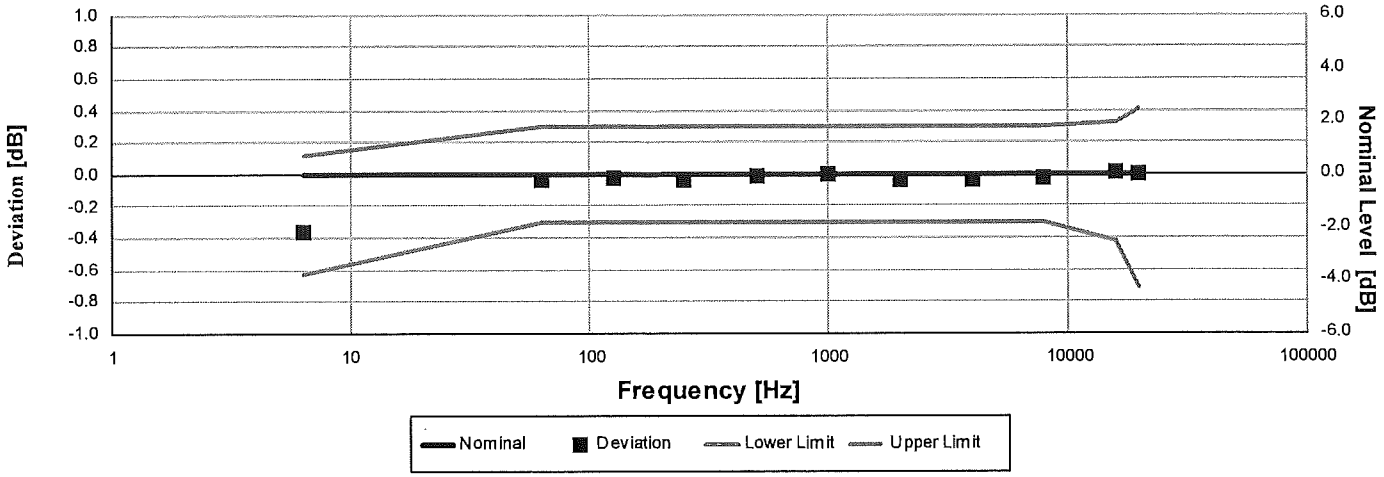
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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2021-01-05	2022-01-05	007118

Z-weight Filter Response

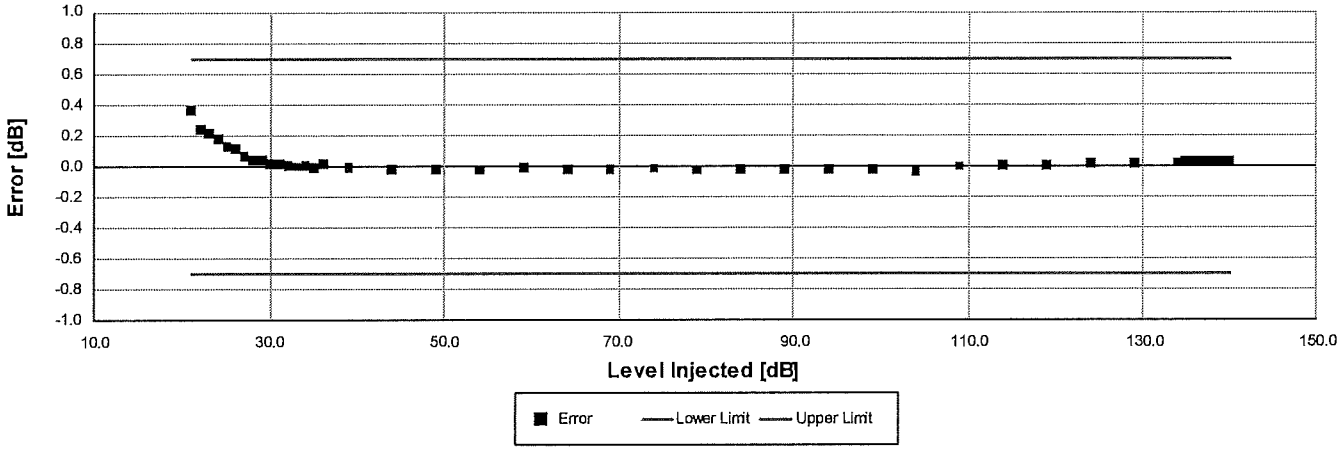


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.36	-0.36	-0.63	0.12	0.15	Pass
63.10	-0.04	-0.04	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.04	-0.04	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.03	-0.03	-0.30	0.30	0.15	Pass
15,848.93	0.01	0.01	-0.42	0.32	0.15	Pass
19,952.62	0.00	0.00	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



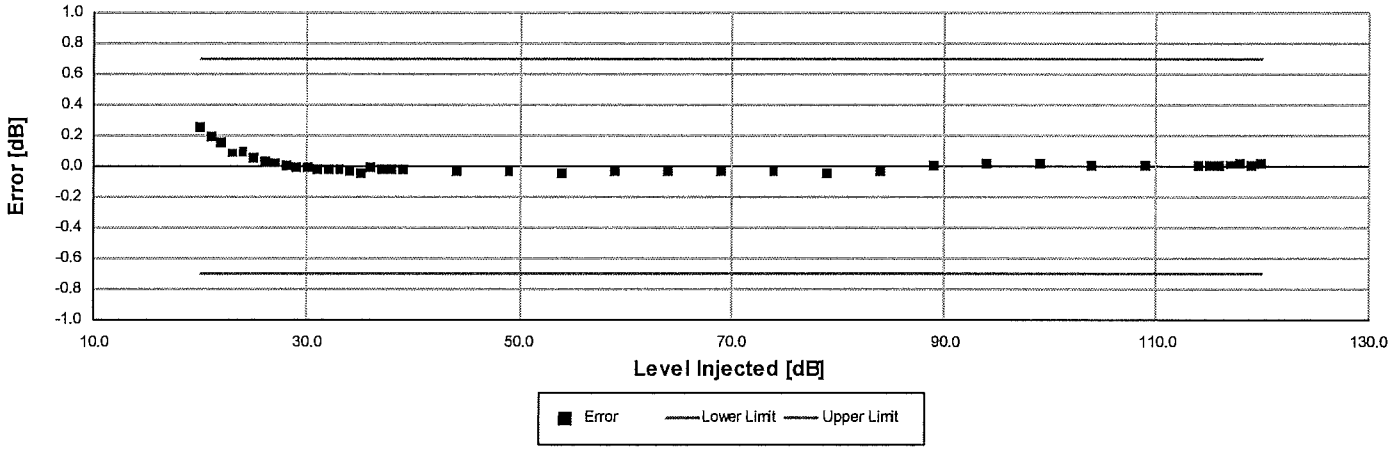
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.36	-0.70	0.70	0.16	Pass
22.00	0.25	-0.70	0.70	0.16	Pass
23.00	0.21	-0.70	0.70	0.16	Pass
24.00	0.18	-0.70	0.70	0.16	Pass
25.00	0.13	-0.70	0.70	0.16	Pass
26.00	0.12	-0.70	0.70	0.16	Pass
27.00	0.07	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.18	Pass
30.00	0.02	-0.70	0.70	0.17	Pass
31.00	0.02	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	0.00	-0.70	0.70	0.16	Pass
34.00	0.00	-0.70	0.70	0.16	Pass
35.00	-0.01	-0.70	0.70	0.16	Pass
36.00	0.02	-0.70	0.70	0.16	Pass
39.00	-0.01	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.03	-0.70	0.70	0.16	Pass
59.00	-0.01	-0.70	0.70	0.16	Pass
64.00	-0.02	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.01	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.03	-0.70	0.70	0.15	Pass
109.00	0.00	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
124.00	0.02	-0.70	0.70	0.15	Pass
129.00	0.02	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.03	-0.70	0.70	0.15	Pass
136.00	0.03	-0.70	0.70	0.15	Pass
137.00	0.03	-0.70	0.70	0.15	Pass
138.00	0.03	-0.70	0.70	0.15	Pass
139.00	0.03	-0.70	0.70	0.15	Pass
140.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.25	-0.70	0.70	0.17	Pass
21.00	0.19	-0.70	0.70	0.16	Pass
22.00	0.15	-0.70	0.70	0.16	Pass
23.00	0.08	-0.70	0.70	0.16	Pass
24.00	0.09	-0.70	0.70	0.16	Pass
25.00	0.05	-0.70	0.70	0.16	Pass
26.00	0.03	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	-0.01	-0.70	0.70	0.18	Pass
30.00	-0.01	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.02	-0.70	0.70	0.17	Pass
33.00	-0.03	-0.70	0.70	0.16	Pass
34.00	-0.03	-0.70	0.70	0.16	Pass
35.00	-0.04	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
37.00	-0.02	-0.70	0.70	0.16	Pass
38.00	-0.02	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.04	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.01	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	0.00	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.00	-0.70	0.70	0.15	Pass
117.00	0.01	-0.70	0.70	0.15	Pass
118.00	0.01	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
120.00	0.01	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.93	134.58	136.58	0.15	Pass
		Positive Pulse	135.91	134.58	136.58	0.15	Pass
	30	Negative Pulse	135.10	134.58	136.58	0.15	Pass
		Positive Pulse	135.08	134.58	136.58	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.10	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.25	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.14	± 1.00	0.15 ‡	Pass
	10	-0.27	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.08	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.01	93.92	94.12	0.15	Pass
0 dB Gain, Linearity	28.07	27.32	28.72	0.16	Pass
20 dB Gain	94.03	93.92	94.12	0.15	Pass
20 dB Gain, Linearity	23.10	22.32	23.72	0.16	Pass
OBA High Range	94.02	93.20	94.80	0.15	Pass
OBA Normal Range	94.02	93.92	94.12	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.43	9.00	Pass
C-weight Noise Floor	12.11	15.00	Pass
Z-weight Noise Floor	21.45	25.00	Pass

-- End of measurement results--

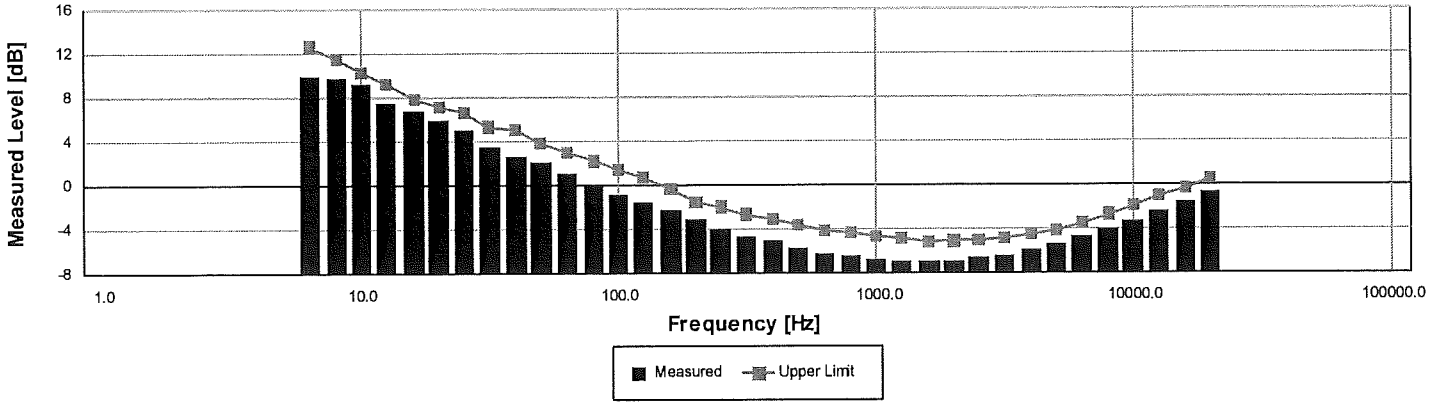
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.50	137.20	138.80	0.15	Pass
THD	-78.55		-60.00	1.30 ‡	Pass
THD+N	-77.30		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	9.85	12.60	Pass
8.00	9.69	11.50	Pass
10.00	9.28	10.20	Pass
12.50	7.41	9.20	Pass
16.00	6.74	7.90	Pass
20.00	5.93	7.20	Pass
25.00	5.03	6.60	Pass
31.50	3.44	5.30	Pass
40.00	2.70	5.00	Pass
50.00	2.08	3.80	Pass
63.00	1.11	3.00	Pass
80.00	0.07	2.20	Pass
100.00	-0.86	1.40	Pass
125.00	-1.57	0.70	Pass
160.00	-2.31	-0.40	Pass
200.00	-3.03	-1.50	Pass
250.00	-4.00	-2.00	Pass
315.00	-4.70	-2.70	Pass
400.00	-5.01	-3.10	Pass
500.00	-5.70	-3.70	Pass
630.00	-6.19	-4.10	Pass
800.00	-6.42	-4.30	Pass
1,000.00	-6.81	-4.70	Pass
1,250.00	-6.92	-4.80	Pass
1,600.00	-6.93	-5.20	Pass
2,000.00	-6.89	-5.10	Pass
2,500.00	-6.64	-5.00	Pass
3,150.00	-6.35	-4.80	Pass
4,000.00	-5.91	-4.50	Pass
5,000.00	-5.36	-4.10	Pass
6,300.00	-4.75	-3.40	Pass
8,000.00	-4.03	-2.70	Pass
10,000.00	-3.28	-1.90	Pass
12,500.00	-2.46	-1.10	Pass
16,000.00	-1.59	-0.30	Pass
20,000.00	-0.66	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Calibration Certificate

Certificate Number 2021003827
Customer:
The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11467	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	6 Apr 2021		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.26	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Humidity***	52.5	%RH	± 2.0 %RH
		Static Pressure	85.63	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 036756 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

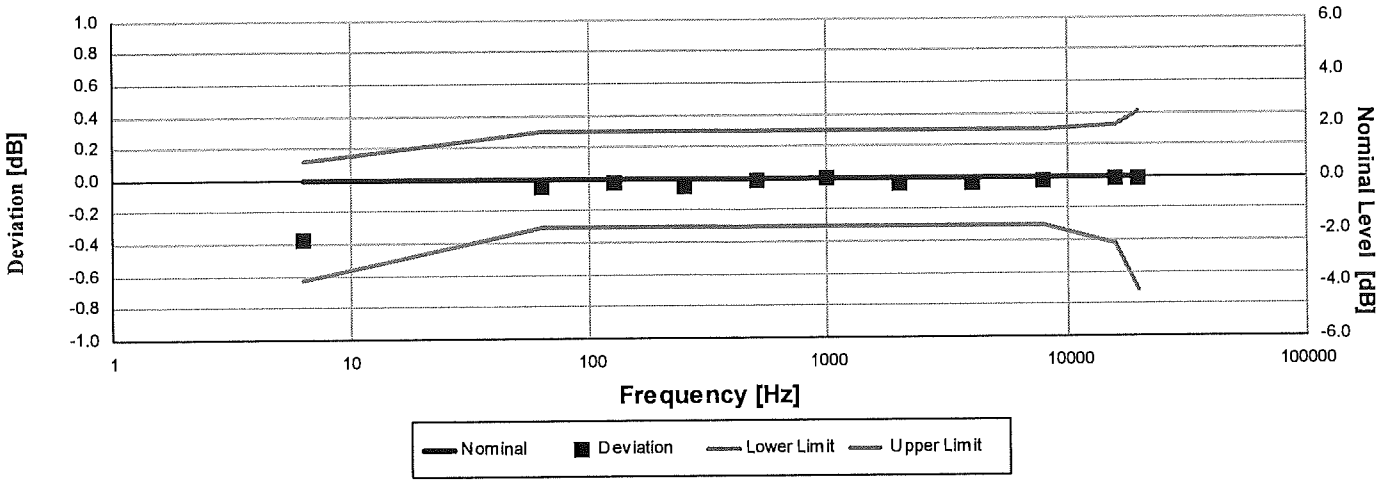
This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2020-08-19	2021-08-19	007167

Z-weight Filter Response

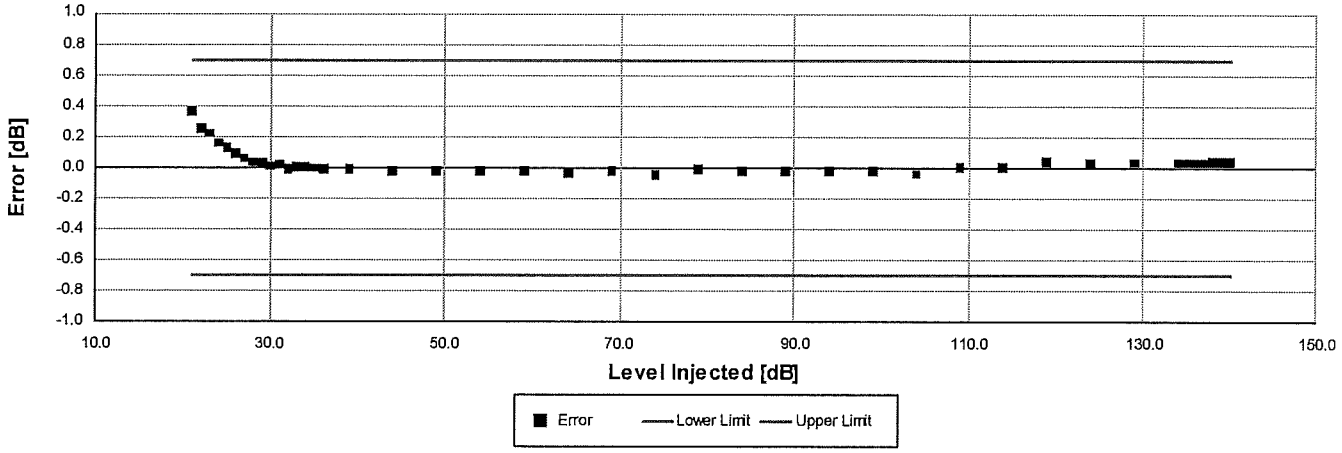


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 8.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.38	-0.38	-0.63	0.12	0.15	Pass
63.10	-0.05	-0.05	-0.30	0.30	0.15	Pass
125.89	-0.02	-0.02	-0.30	0.30	0.15	Pass
251.19	-0.05	-0.05	-0.30	0.30	0.15	Pass
501.19	-0.01	-0.01	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.03	-0.03	-0.30	0.30	0.15	Pass
15,848.93	-0.01	-0.01	-0.42	0.32	0.15	Pass
19,952.62	-0.01	-0.01	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



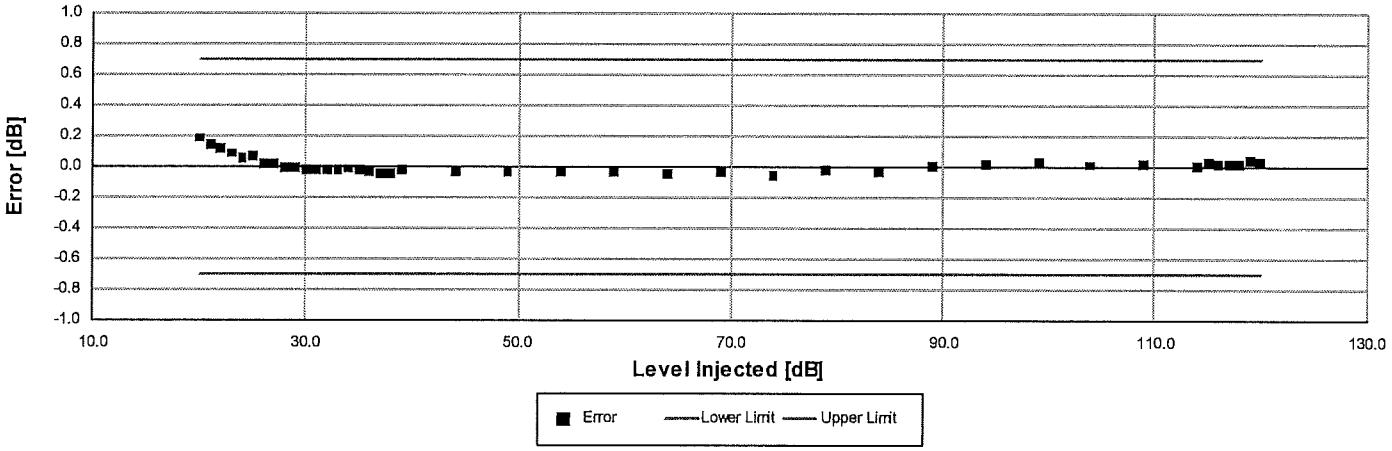
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.36	-0.70	0.70	0.16	Pass
22.00	0.25	-0.70	0.70	0.16	Pass
23.00	0.22	-0.70	0.70	0.16	Pass
24.00	0.16	-0.70	0.70	0.16	Pass
25.00	0.12	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.06	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.03	-0.70	0.70	0.18	Pass
30.00	0.01	-0.70	0.70	0.17	Pass
31.00	0.02	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	0.01	-0.70	0.70	0.16	Pass
34.00	0.00	-0.70	0.70	0.16	Pass
35.00	0.00	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
39.00	-0.01	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.02	-0.70	0.70	0.16	Pass
59.00	-0.02	-0.70	0.70	0.16	Pass
64.00	-0.03	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.01	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
124.00	0.03	-0.70	0.70	0.15	Pass
129.00	0.04	-0.70	0.70	0.15	Pass
134.00	0.04	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.04	-0.70	0.70	0.15	Pass
136.00	0.04	-0.70	0.70	0.15	Pass
137.00	0.04	-0.70	0.70	0.15	Pass
138.00	0.04	-0.70	0.70	0.15	Pass
139.00	0.04	-0.70	0.70	0.15	Pass
140.00	0.04	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.18	-0.70	0.70	0.17	Pass
21.00	0.15	-0.70	0.70	0.16	Pass
22.00	0.12	-0.70	0.70	0.16	Pass
23.00	0.08	-0.70	0.70	0.16	Pass
24.00	0.06	-0.70	0.70	0.16	Pass
25.00	0.06	-0.70	0.70	0.16	Pass
26.00	0.02	-0.70	0.70	0.19	Pass
27.00	0.01	-0.70	0.70	0.18	Pass
28.00	-0.01	-0.70	0.70	0.19	Pass
29.00	-0.01	-0.70	0.70	0.18	Pass
30.00	-0.03	-0.70	0.70	0.17	Pass
31.00	-0.03	-0.70	0.70	0.17	Pass
32.00	-0.03	-0.70	0.70	0.17	Pass
33.00	-0.02	-0.70	0.70	0.16	Pass
34.00	-0.02	-0.70	0.70	0.16	Pass
35.00	-0.02	-0.70	0.70	0.16	Pass
36.00	-0.03	-0.70	0.70	0.16	Pass
37.00	-0.04	-0.70	0.70	0.16	Pass
38.00	-0.04	-0.70	0.70	0.16	Pass
39.00	-0.03	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.04	-0.70	0.70	0.16	Pass
64.00	-0.05	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.06	-0.70	0.70	0.16	Pass
79.00	-0.02	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	0.01	-0.70	0.70	0.16	Pass
94.00	0.02	-0.70	0.70	0.16	Pass
99.00	0.03	-0.70	0.70	0.16	Pass
104.00	0.01	-0.70	0.70	0.15	Pass
109.00	0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.01	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
120.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.98	134.64	136.64	0.15	Pass
		Positive Pulse	135.98	134.64	136.64	0.15	Pass
	30	Negative Pulse	135.15	134.64	136.64	0.15	Pass
		Positive Pulse	135.08	134.64	136.64	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.18	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	-0.07	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 5.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.26	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.16	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.97	93.89	94.09	0.15	Pass
0 dB Gain, Linearity	28.05	27.29	28.69	0.16	Pass
20 dB Gain	94.00	93.89	94.09	0.15	Pass
20 dB Gain, Linearity	23.09	22.29	23.69	0.16	Pass
OBA High Range	93.99	93.20	94.80	0.15	Pass
OBA Normal Range	93.99	93.89	94.09	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.36	9.00	Pass
C-weight Noise Floor	12.14	15.00	Pass
Z-weight Noise Floor	21.80	25.00	Pass

-- End of measurement results--

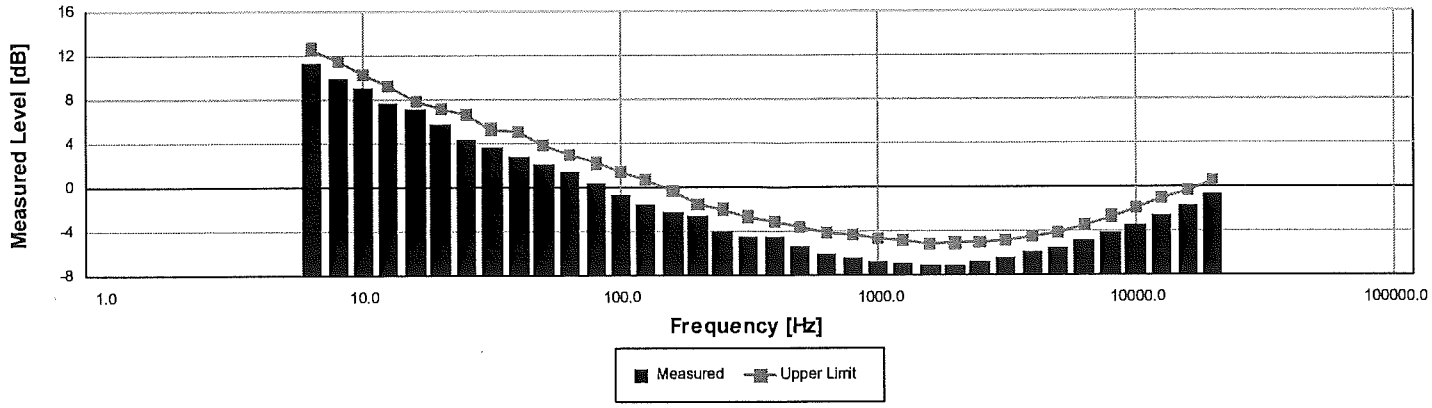
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.54	137.20	138.80	0.15	Pass
THD	-79.43		-60.00	1.30 ‡	Pass
THD+N	-77.94		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.35	12.60	Pass
8.00	9.96	11.50	Pass
10.00	9.04	10.20	Pass
12.50	7.74	9.20	Pass
16.00	7.05	7.90	Pass
20.00	5.70	7.20	Pass
25.00	4.40	6.60	Pass
31.50	3.72	5.30	Pass
40.00	2.81	5.00	Pass
50.00	2.02	3.80	Pass
63.00	1.32	3.00	Pass
80.00	0.30	2.20	Pass
100.00	-0.60	1.40	Pass
125.00	-1.61	0.70	Pass
160.00	-2.31	-0.40	Pass
200.00	-2.61	-1.50	Pass
250.00	-3.98	-2.00	Pass
315.00	-4.58	-2.70	Pass
400.00	-4.52	-3.10	Pass
500.00	-5.39	-3.70	Pass
630.00	-6.03	-4.10	Pass
800.00	-6.44	-4.30	Pass
1,000.00	-6.70	-4.70	Pass
1,250.00	-6.92	-4.80	Pass
1,600.00	-7.06	-5.20	Pass
2,000.00	-7.09	-5.10	Pass
2,500.00	-6.81	-5.00	Pass
3,150.00	-6.48	-4.80	Pass
4,000.00	-5.91	-4.50	Pass
5,000.00	-5.52	-4.10	Pass
6,300.00	-4.92	-3.40	Pass
8,000.00	-4.18	-2.70	Pass
10,000.00	-3.38	-1.90	Pass
12,500.00	-2.58	-1.10	Pass
16,000.00	-1.66	-0.30	Pass
20,000.00	-0.73	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Calibration Certificate

Certificate Number 2021003818
Customer:
The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11470	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	5 Apr 2021		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.86	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.0R0	***Humidity***	52.9	%RH	± 2.0 %RH
		Static Pressure	84.64	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 029590 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

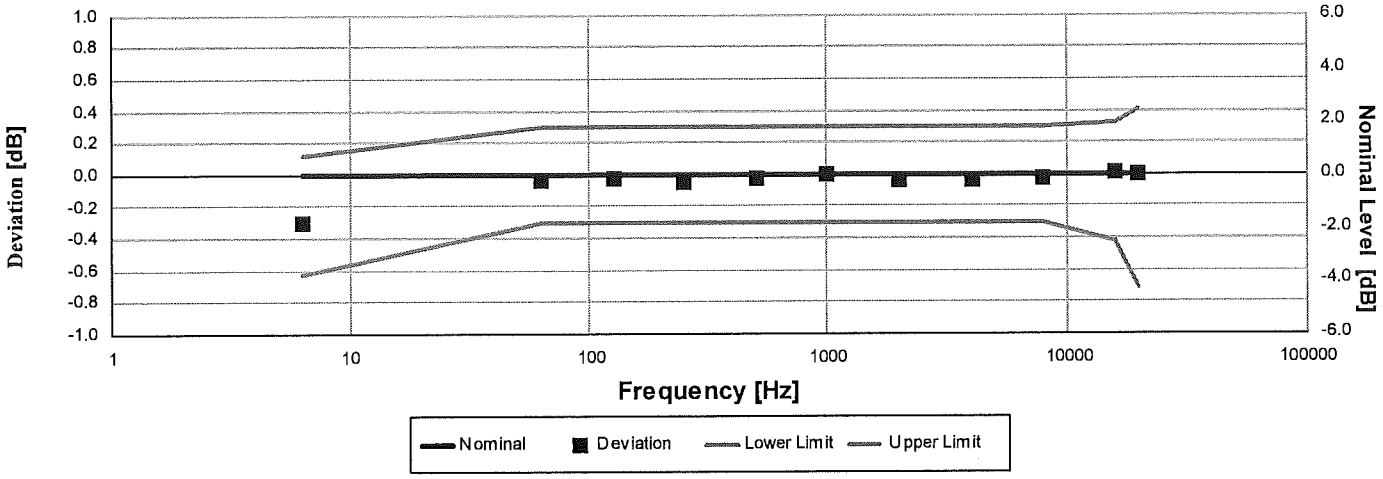
This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-S Humidity/Temperature Sensor	2020-05-12	2021-05-12	006943
SRS DS360 Ultra Low Distortion Generator	2021-01-05	2022-01-05	007118

Z-weight Filter Response

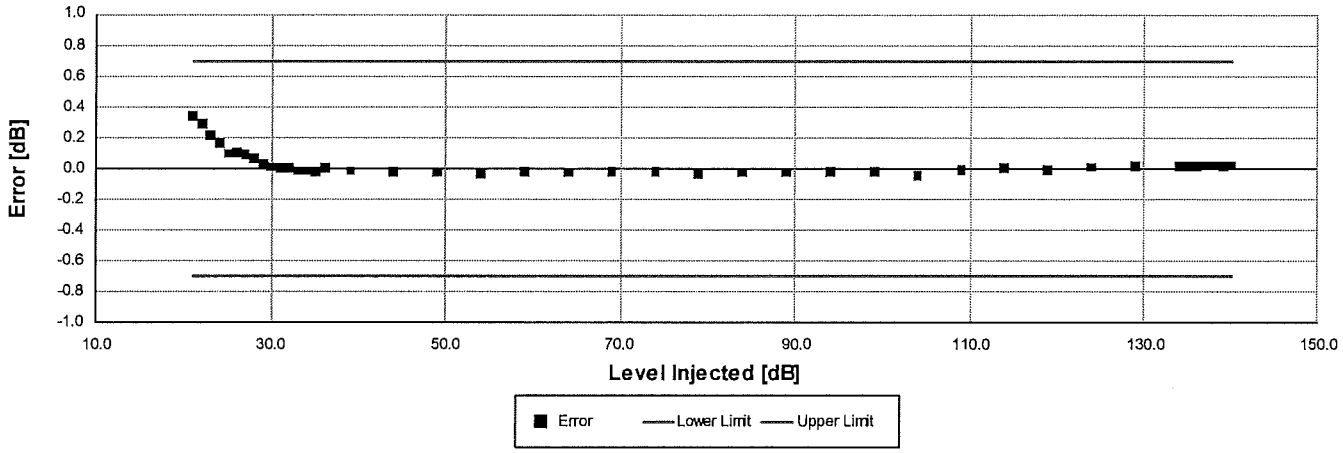


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.31	-0.31	-0.63	0.12	0.15	Pass
63.10	-0.04	-0.04	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.04	-0.04	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.03	-0.03	-0.30	0.30	0.15	Pass
15,848.93	0.01	0.01	-0.42	0.32	0.15	Pass
19,952.62	0.00	0.00	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



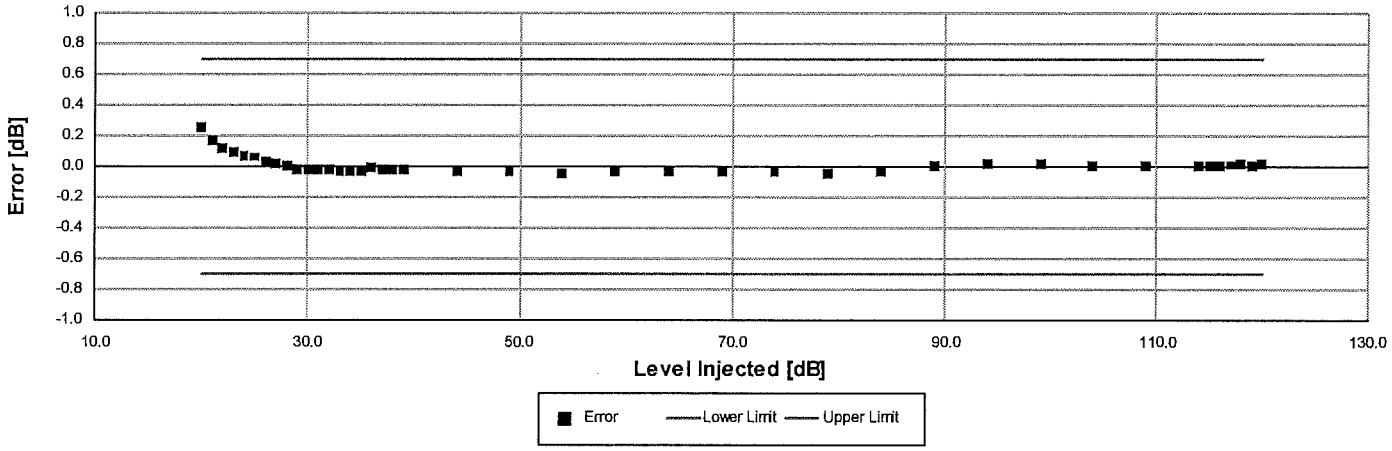
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.34	-0.70	0.70	0.16	Pass
22.00	0.29	-0.70	0.70	0.16	Pass
23.00	0.22	-0.70	0.70	0.16	Pass
24.00	0.17	-0.70	0.70	0.16	Pass
25.00	0.10	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.09	-0.70	0.70	0.16	Pass
28.00	0.06	-0.70	0.70	0.16	Pass
29.00	0.03	-0.70	0.70	0.18	Pass
30.00	0.01	-0.70	0.70	0.17	Pass
31.00	0.01	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	-0.01	-0.70	0.70	0.16	Pass
34.00	-0.01	-0.70	0.70	0.16	Pass
35.00	-0.02	-0.70	0.70	0.16	Pass
36.00	0.00	-0.70	0.70	0.16	Pass
39.00	-0.01	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.03	-0.70	0.70	0.16	Pass
54.00	-0.03	-0.70	0.70	0.16	Pass
59.00	-0.02	-0.70	0.70	0.16	Pass
64.00	-0.03	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.02	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	-0.03	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
124.00	0.01	-0.70	0.70	0.15	Pass
129.00	0.01	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	0.02	-0.70	0.70	0.15	Pass
136.00	0.02	-0.70	0.70	0.15	Pass
137.00	0.02	-0.70	0.70	0.15	Pass
138.00	0.02	-0.70	0.70	0.15	Pass
139.00	0.02	-0.70	0.70	0.15	Pass
140.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.25	-0.70	0.70	0.17	Pass
21.00	0.17	-0.70	0.70	0.16	Pass
22.00	0.11	-0.70	0.70	0.16	Pass
23.00	0.09	-0.70	0.70	0.16	Pass
24.00	0.06	-0.70	0.70	0.16	Pass
25.00	0.06	-0.70	0.70	0.16	Pass
26.00	0.02	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	0.00	-0.70	0.70	0.19	Pass
29.00	-0.02	-0.70	0.70	0.18	Pass
30.00	-0.02	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.02	-0.70	0.70	0.17	Pass
33.00	-0.03	-0.70	0.70	0.16	Pass
34.00	-0.04	-0.70	0.70	0.16	Pass
35.00	-0.04	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
37.00	-0.02	-0.70	0.70	0.16	Pass
38.00	-0.03	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.03	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.03	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.04	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.01	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	0.00	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.00	-0.70	0.70	0.15	Pass
117.00	0.01	-0.70	0.70	0.15	Pass
118.00	0.01	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
120.00	0.01	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.91	134.58	136.58	0.15	Pass
		Positive Pulse	135.93	134.59	136.59	0.15	Pass
	30	Negative Pulse	135.08	134.58	136.58	0.15	Pass
		Positive Pulse	135.06	134.59	136.59	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.15	± 1.00	0.15 ‡	Pass
	10	-0.01	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.16	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.14	± 1.00	0.15 ‡	Pass
	10	-0.18	± 1.50	0.15 ‡	Pass
108.00	3	-0.15	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	0.00	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.01	93.92	94.12	0.15	Pass
0 dB Gain, Linearity	28.09	27.32	28.72	0.16	Pass
20 dB Gain	94.03	93.92	94.12	0.15	Pass
20 dB Gain, Linearity	23.09	22.32	23.72	0.16	Pass
OBA High Range	94.02	93.20	94.80	0.15	Pass
OBA Normal Range	94.02	93.92	94.12	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.49	9.00	Pass
C-weight Noise Floor	12.07	15.00	Pass
Z-weight Noise Floor	21.87	25.00	Pass

-- End of measurement results--

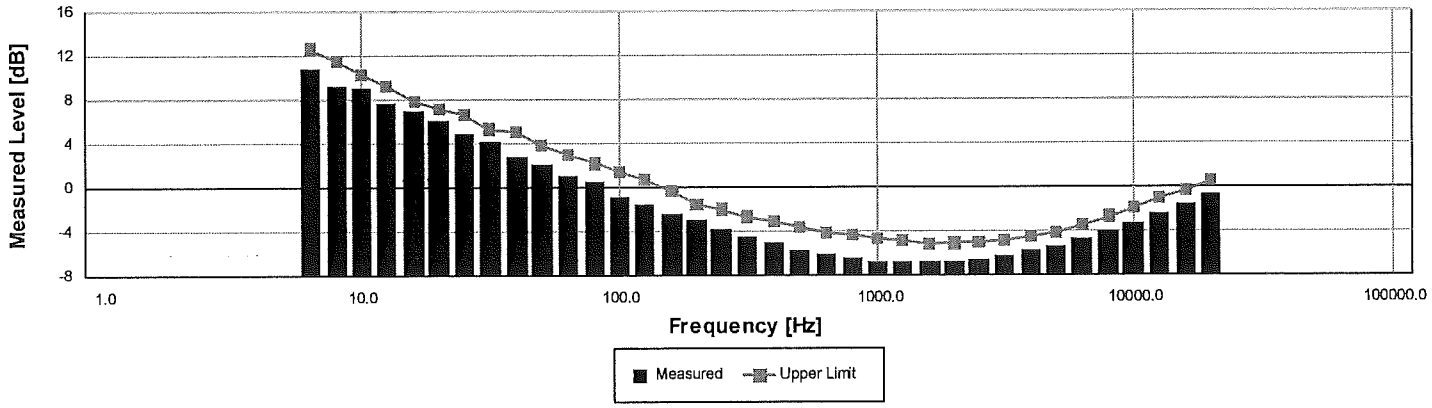
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.50	137.20	138.80	0.15	Pass
THD	-78.55		-60.00	1.30 ‡	Pass
THD+N	-77.28		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.87	12.60	Pass
8.00	9.22	11.50	Pass
10.00	9.05	10.20	Pass
12.50	7.62	9.20	Pass
16.00	6.92	7.90	Pass
20.00	6.05	7.20	Pass
25.00	4.97	6.60	Pass
31.50	4.16	5.30	Pass
40.00	2.83	5.00	Pass
50.00	2.04	3.80	Pass
63.00	1.09	3.00	Pass
80.00	0.45	2.20	Pass
100.00	-0.78	1.40	Pass
125.00	-1.59	0.70	Pass
160.00	-2.39	-0.40	Pass
200.00	-3.00	-1.50	Pass
250.00	-3.89	-2.00	Pass
315.00	-4.53	-2.70	Pass
400.00	-5.03	-3.10	Pass
500.00	-5.72	-3.70	Pass
630.00	-6.15	-4.10	Pass
800.00	-6.41	-4.30	Pass
1,000.00	-6.70	-4.70	Pass
1,250.00	-6.77	-4.80	Pass
1,600.00	-6.82	-5.20	Pass
2,000.00	-6.69	-5.10	Pass
2,500.00	-6.54	-5.00	Pass
3,150.00	-6.24	-4.80	Pass
4,000.00	-5.81	-4.50	Pass
5,000.00	-5.32	-4.10	Pass
6,300.00	-4.70	-3.40	Pass
8,000.00	-4.02	-2.70	Pass
10,000.00	-3.26	-1.90	Pass
12,500.00	-2.42	-1.10	Pass
16,000.00	-1.56	-0.30	Pass
20,000.00	-0.64	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

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Provo, UT 84601, United States
716-684-0001

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Microphones

~ Certificate of Calibration and Compliance ~

Microphone Model: 377B02 Serial Number: 311563 Manufacturer: PCB

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCIe-6351	1896F08	CA1918	10/19/20	10/19/21
Larson Davis	PRM915	146	CA2115	4/13/21	4/13/22
Larson Davis	PRM902	4394	CA1244	6/30/20	6/30/21
Larson Davis	PRM916	128	CA1553	10/14/20	10/14/21
Larson Davis	CAL250	5026	CA1278	1/26/21	1/26/22
Larson Davis	2201	151	CA2073	11/24/20	11/24/21
Bruel & Kjaer	4192	3259547	CA3214	1/21/21	1/21/22
Larson Davis	GPRM902	5281	CA1595	12/8/20	12/8/21
Newport	iTHX-SD/N	1080002	CA1511	2/4/21	2/4/22
Larson Davis	PRA951-4	234	CA1154	11/11/20	11/11/21
Larson Davis	PRM915	136	CA1434	10/14/20	10/14/21
0	0	0	0	not required	not required
0	0	0	0	not required	not required
0	0	0	0	not required	not required
0	0	0	0	not required	not required

Frequency sweep performed with B&K UA0033 electrostatic actuator.

Condition of Unit

As Found: In Tolerance

As Left: In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. Open Circuit Sensitivity is measured using the insertion voltage method following procedure AT603-5.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/-0.20 dB.
7. Unit calibrated per ACS-20.

Technician: Leonard Lukasik Date: May 19, 2021

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ID:CAL112-3704274381.381+0

~ Calibration Report ~

Microphone Model: 377B02 Serial Number: 311563 Description: 1/2" Free-Field Microphone

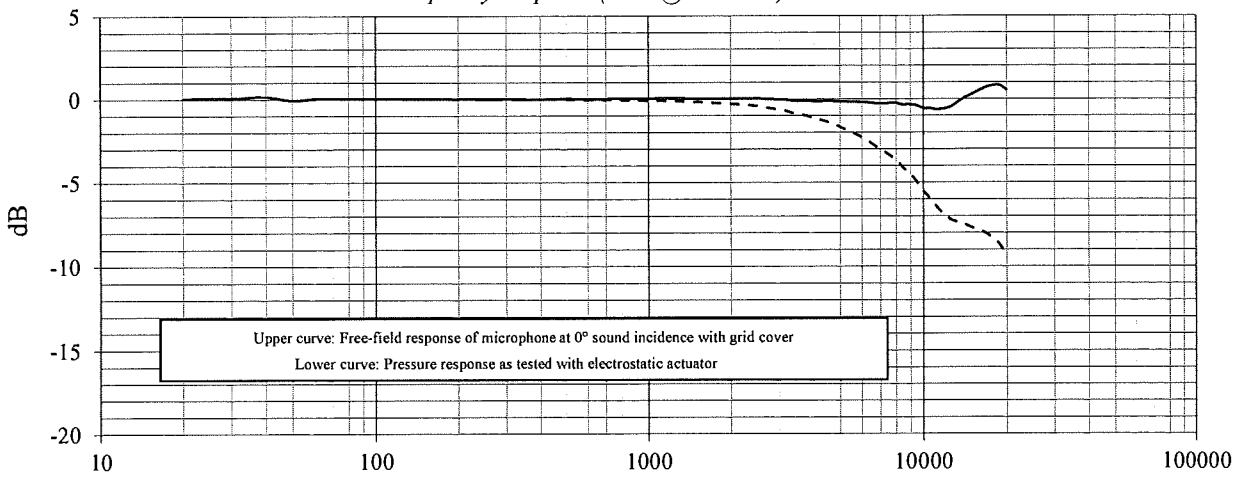
Calibration Data

Open Circuit Sensitivity @ 251.2 Hz: 56.17 mV/Pa
-25.01 dB re 1V/Pa

Polarization Voltage, External: 0 V
Capacitance: 12.8 pF

Temperature: 73 °F (23°C) Ambient Pressure: 1002 mbar Relative Humidity: 37 %

Frequency Response (0 dB @ 251.2 Hz)



Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)	Freq (Hz)	Lower (dB)	Upper (dB)
20.0	0.03	0.03	1679	-0.22	0.01	7499	-3.34	-0.27	-	-	-
25.1	0.08	0.08	1778	-0.24	0.01	7943	-3.64	-0.25	-	-	-
31.6	0.09	0.09	1884	-0.25	0.03	8414	-4.08	-0.35	-	-	-
39.8	0.16	0.16	1995	-0.29	0.02	8913	-4.45	-0.34	-	-	-
50.1	-0.06	-0.06	2114	-0.32	0.02	9441	-4.91	-0.39	-	-	-
63.1	0.05	0.05	2239	-0.33	0.04	10000	-5.51	-0.56	-	-	-
79.4	0.03	0.03	2371	-0.39	0.02	10593	-5.98	-0.58	-	-	-
100.0	0.03	0.03	2512	-0.42	0.04	11220	-6.50	-0.64	-	-	-
125.9	0.02	0.02	2661	-0.51	0.00	11885	-6.91	-0.59	-	-	-
158.5	0.02	0.02	2818	-0.57	-0.01	12589	-7.23	-0.46	-	-	-
199.5	0.01	0.01	2985	-0.64	-0.02	13335	-7.37	-0.18	-	-	-
251.2	0.00	0.00	3162	-0.72	-0.04	14125	-7.51	0.08	-	-	-
316.2	-0.01	0.01	3350	-0.84	-0.10	14962	-7.69	0.28	-	-	-
398.1	-0.01	-0.01	3548	-0.93	-0.11	15849	-7.85	0.50	-	-	-
501.2	-0.02	0.02	3758	-1.00	-0.10	16788	-8.03	0.69	-	-	-
631.0	-0.05	-0.01	3981	-1.13	-0.13	17783	-8.31	0.80	-	-	-
794.3	-0.06	0.04	4217	-1.25	-0.14	18837	-8.70	0.81	-	-	-
1000.0	-0.10	0.02	4467	-1.36	-0.13	19953	-9.39	0.54	-	-	-
1059.3	-0.09	0.04	4732	-1.50	-0.13	-	-	-	-	-	-
1122.0	-0.10	0.05	5012	-1.69	-0.16	-	-	-	-	-	-
1188.5	-0.11	0.04	5309	-1.88	-0.18	-	-	-	-	-	-
1258.9	-0.12	0.04	5623	-2.06	-0.18	-	-	-	-	-	-
1333.5	-0.14	0.04	5957	-2.26	-0.19	-	-	-	-	-	-
1412.5	-0.17	0.03	6310	-2.51	-0.22	-	-	-	-	-	-
1496.2	-0.18	0.02	6683	-2.79	-0.27	-	-	-	-	-	-
1584.9	-0.18	0.03	7080	-3.06	-0.28	-	-	-	-	-	-

Technician: Leonard Lukasik Date: May 19, 2021

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~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150263

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
Bruel & Kjaer	4189	2470615	CA-1730	12/05/2019	03/04/2021
PCB	377B02	165403	CA-2455	06/05/2020	06/04/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 03/02/2021

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~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150263

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

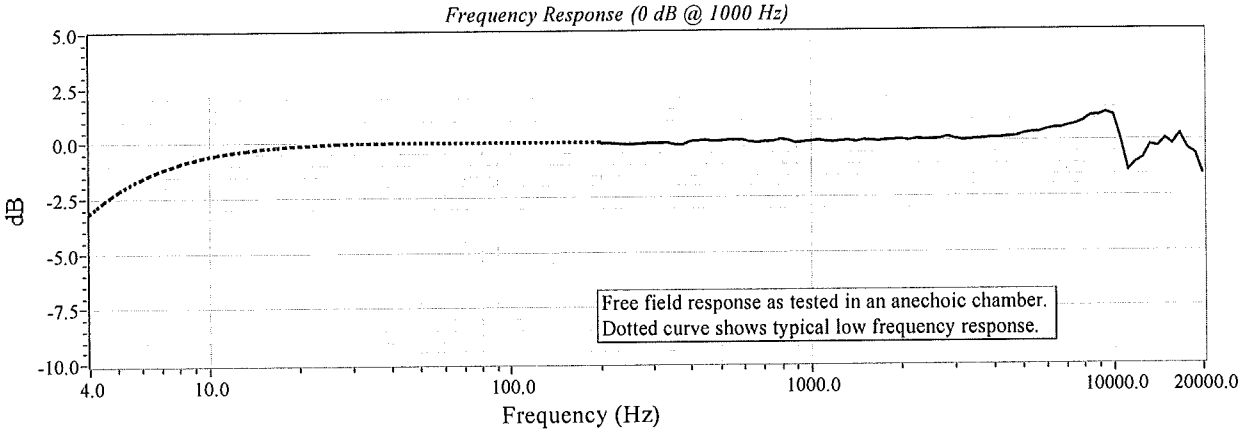
Calibration Data

System Sensitivity @ 1000 Hz: 428.54 mV/Pa
-7.36 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 5.07 dB(A) re 20 µPA

Temperature: 79 °F (26 °C) Ambient Pressure: 1000.2 Relative Humidity: 30.7 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	-0.06	562.34	0.07	1584.89	0.03	4466.84	0.17	12589.25	-0.83
211.35	-0.06	595.66	0.07	1678.80	-0.00	4731.51	0.19	13335.21	-0.23
223.87	-0.07	630.96	-0.02	1778.28	0.04	5011.87	0.30	14125.37	-0.29
237.14	-0.09	668.34	-0.05	1883.65	0.05	5308.84	0.36	14962.36	0.06
251.19	-0.10	707.95	-0.00	1995.26	0.08	5623.41	0.36	15848.93	-0.19
266.07	-0.09	749.89	0.01	2113.49	0.04	5956.62	0.47	16788.04	0.26
281.84	-0.07	794.33	0.11	2238.72	0.10	6309.57	0.55	17782.79	-0.39
298.54	-0.06	841.39	0.06	2371.37	0.05	6683.44	0.56	18836.49	-0.62
316.23	-0.06	891.25	-0.07	2511.89	0.06	7079.46	0.67	19952.62	-1.56
334.96	-0.03	944.06	-0.04	2660.72	0.10	7498.94	0.73		
354.81	-0.12	1000.00	0.00	2818.38	0.18	7943.28	0.89		
375.84	-0.13	1059.25	0.04	2985.38	0.10	8413.95	1.10		
398.11	0.01	1122.02	-0.01	3162.28	0.04	8912.51	1.13		
421.70	0.04	1188.50	-0.03	3349.65	0.04	9440.61	1.26		
446.68	0.07	1258.92	0.01	3548.13	0.08	10000.00	1.13		
473.15	0.03	1333.52	0.03	3758.37	0.09	10592.54	-0.01		
501.19	0.04	1412.54	-0.01	3981.07	0.13	11220.18	-1.37		
530.88	0.07	1496.24	0.05	4216.97	0.13	11885.02	-1.02		

Technician: Leonard Lukasik Date: 03/02/2021

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Microphone Model: 378A04 **Serial Number:** 150264

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
Bruel & Kjaer	4189	2470615	CA-1730	12/05/2019	03/04/2021
PCB	377B02	165403	CA-2455	06/05/2020	06/04/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 03/02/2021

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~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150264

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

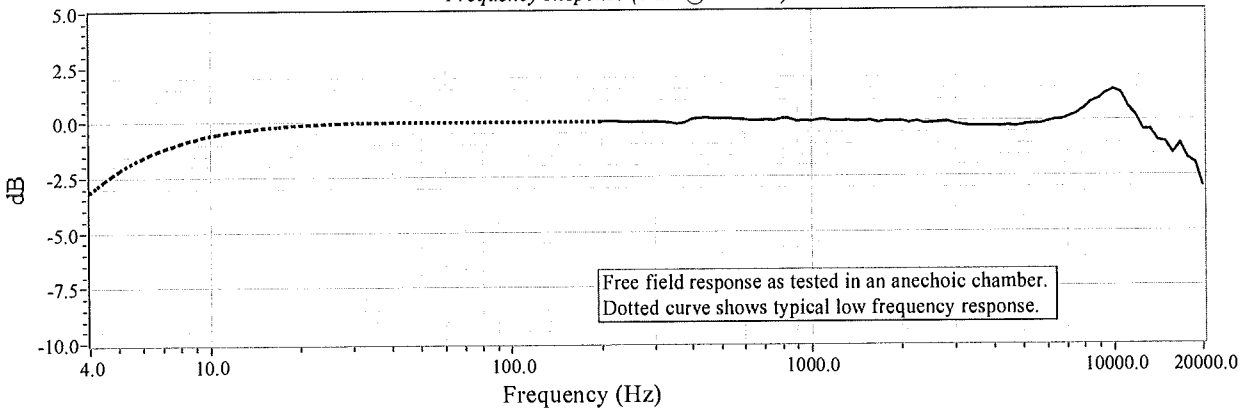
Calibration Data

System Sensitivity @ 1000 Hz: 437.80 mV/Pa
-7.17 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 4.88 dB(A) re 20 µPA

Temperature: 79 °F (26 °C) Ambient Pressure: 1000.2 Relative Humidity: 30.7 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	0.02	562.34	0.10	1584.89	0.01	4466.84	-0.24	12589.25	-0.43
211.35	0.02	595.66	0.09	1678.80	-0.07	4731.51	-0.27	13335.21	-0.44
223.87	0.01	630.96	0.03	1778.28	0.00	5011.87	-0.20	14125.37	-0.93
237.14	-0.01	668.34	0.03	1883.65	-0.04	5308.84	-0.17	14962.36	-1.01
251.19	-0.03	707.95	0.06	1995.26	-0.01	5623.41	-0.16	15848.93	-1.51
266.07	-0.02	749.89	0.02	2113.49	-0.09	5956.62	-0.08	16788.04	-1.08
281.84	-0.02	794.33	0.11	2238.72	-0.01	6309.57	0.01	17782.79	-1.74
298.54	-0.01	841.39	0.11	2371.37	-0.12	6683.44	0.03	18836.49	-1.96
316.23	-0.03	891.25	0.00	2511.89	-0.10	7079.46	0.16	19952.62	-3.03
334.96	-0.05	944.06	0.02	2660.72	-0.08	7498.94	0.28		
354.81	-0.12	1000.00	0.00	2818.38	-0.05	7943.28	0.52		
375.84	-0.07	1059.25	0.05	2985.38	-0.13	8413.95	0.81		
398.11	0.10	1122.02	0.05	3162.28	-0.21	8912.51	0.97		
421.70	0.13	1188.50	-0.00	3349.65	-0.24	9440.61	1.23		
446.68	0.16	1258.92	-0.00	3548.13	-0.24	10000.00	1.39		
473.15	0.12	1333.52	0.01	3758.37	-0.25	10592.54	1.23		
501.19	0.11	1412.54	-0.01	3981.07	-0.25	11220.18	0.59		
530.88	0.11	1496.24	-0.00	4216.97	-0.27	11885.02	0.21		

Technician: Leonard Lukasik Date: 03/02/2021

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~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150265

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
Bruel & Kjaer	4189	2470615	CA-1730	12/05/2019	03/04/2021
PCB	377B02	165403	CA-2455	06/05/2020	06/04/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 03/02/2021

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CAL106-3697533737.553+0

~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150265

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

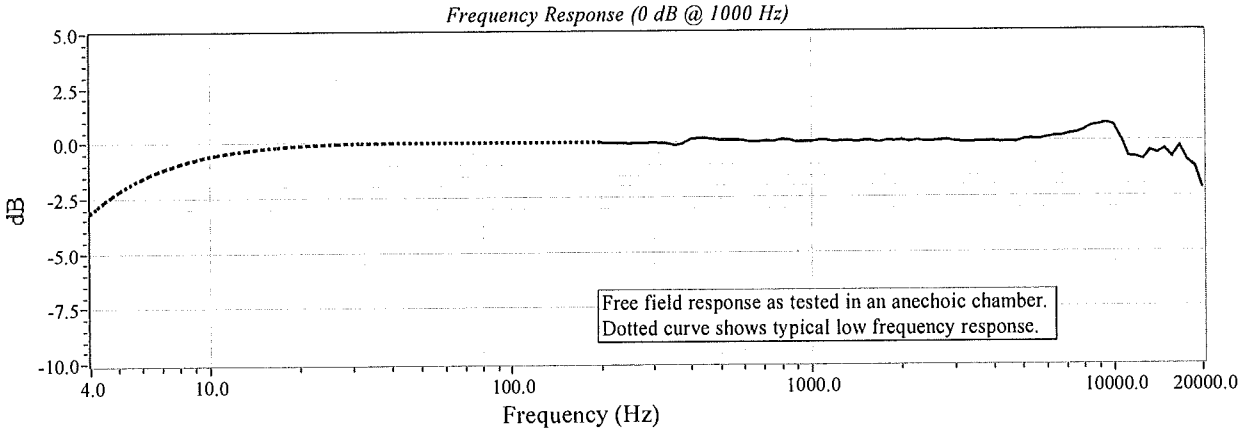
Calibration Data

System Sensitivity @ 1000 Hz: 439.77 mV/Pa
-7.14 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 5.38 dB(A) re 20 µPA

Temperature: 80 °F (27 °C) Ambient Pressure: 1000 mbar Relative Humidity: 29.5 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	-0.04	562.34	0.08	1584.89	0.03	4466.84	-0.03	12589.25	-0.86
211.35	-0.04	595.66	0.06	1678.80	-0.04	4731.51	-0.04	13335.21	-0.47
223.87	-0.05	630.96	0.00	1778.28	0.04	5011.87	0.05	14125.37	-0.59
237.14	-0.06	668.34	-0.00	1883.65	0.01	5308.84	0.10	14962.36	-0.39
251.19	-0.07	707.95	0.03	1995.26	0.05	5623.41	0.07	15848.93	-0.75
266.07	-0.05	749.89	0.02	2113.49	-0.01	5956.62	0.14	16788.04	-0.26
281.84	-0.04	794.33	0.10	2238.72	0.05	6309.57	0.20	17782.79	-0.91
298.54	-0.03	841.39	0.09	2371.37	-0.01	6683.44	0.22	18836.49	-1.20
316.23	-0.05	891.25	-0.01	2511.89	0.01	7079.46	0.31	19952.62	-2.18
334.96	-0.08	944.06	-0.00	2660.72	0.03	7498.94	0.35		
354.81	-0.15	1000.00	0.00	2818.38	0.06	7943.28	0.47		
375.84	-0.07	1059.25	0.05	2985.38	-0.01	8413.95	0.66		
398.11	0.11	1122.02	0.05	3162.28	-0.05	8912.51	0.71		
421.70	0.15	1188.50	-0.00	3349.65	-0.05	9440.61	0.81		
446.68	0.17	1258.92	0.02	3548.13	-0.03	10000.00	0.70		
473.15	0.12	1333.52	0.02	3758.37	-0.03	10592.54	0.09		
501.19	0.09	1412.54	-0.02	3981.07	-0.02	11220.18	-0.73		
530.88	0.08	1496.24	0.04	4216.97	-0.04	11885.02	-0.75		

Technician: Leonard Lukasik Date: 03/02/2021

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CAL106-3697533737.553+0

~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150266

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
Bruel & Kjaer	4189	2470615	CA-1730	12/05/2019	03/04/2021
PCB	377B02	165403	CA-2455	06/05/2020	06/04/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 03/02/2021

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CAL106-3697533589.968+0

~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150266

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

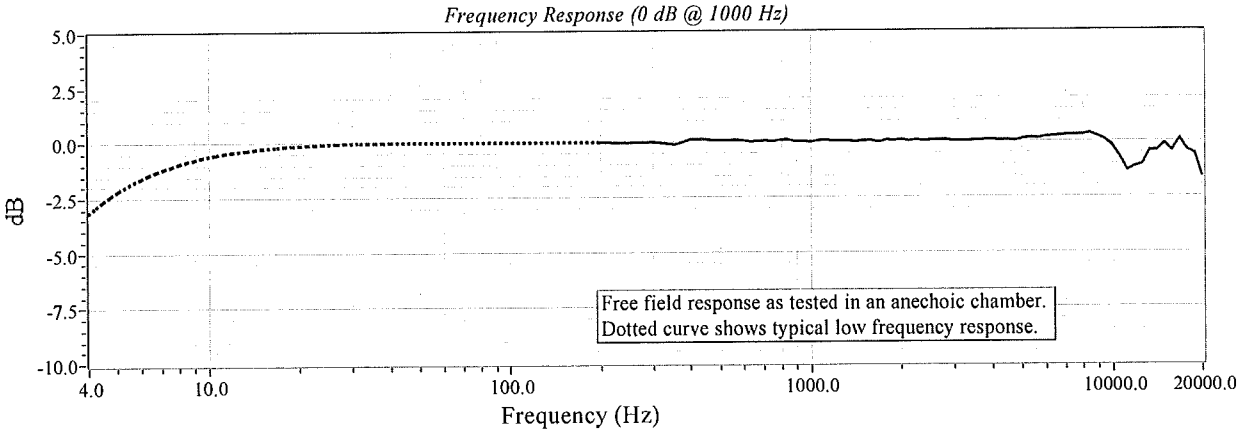
Calibration Data

System Sensitivity @ 1000 Hz: 439.99 mV/Pa
-7.13 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 5.41 dB(A) re 20 µPA

Temperature: 80 °F (27 °C) Ambient Pressure: 1000 mbar Relative Humidity: 29.5 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	-0.01	562.34	0.09	1584.89	0.05	4466.84	0.05	12589.25	-1.04
211.35	-0.02	595.66	0.06	1678.80	-0.02	4731.51	0.04	13335.21	-0.44
223.87	-0.03	630.96	0.01	1778.28	0.07	5011.87	0.12	14125.37	-0.42
237.14	-0.03	668.34	0.02	1883.65	0.04	5308.84	0.16	14962.36	-0.12
251.19	-0.03	707.95	0.05	1995.26	0.10	5623.41	0.14	15848.93	-0.44
266.07	-0.02	749.89	0.03	2113.49	0.02	5956.62	0.19	16788.04	0.10
281.84	-0.02	794.33	0.09	2238.72	0.08	6309.57	0.24	17782.79	-0.40
298.54	-0.01	841.39	0.10	2371.37	0.04	6683.44	0.25	18836.49	-0.58
316.23	-0.03	891.25	0.01	2511.89	0.06	7079.46	0.29	19952.62	-1.63
334.96	-0.07	944.06	0.02	2660.72	0.07	7498.94	0.28		
354.81	-0.12	1000.00	0.00	2818.38	0.07	7943.28	0.31		
375.84	-0.02	1059.25	0.05	2985.38	0.04	8413.95	0.37		
398.11	0.12	1122.02	0.06	3162.28	0.03	8912.51	0.23		
421.70	0.12	1188.50	0.02	3349.65	0.03	9440.61	0.07		
446.68	0.12	1258.92	0.03	3548.13	0.06	10000.00	-0.22		
473.15	0.08	1333.52	0.03	3758.37	0.06	10592.54	-0.74		
501.19	0.07	1412.54	0.01	3981.07	0.08	11220.18	-1.33		
530.88	0.07	1496.24	0.04	4216.97	0.05	11885.02	-1.16		

Technician: Leonard Lukasik Date: 03/02/2021

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~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150268

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
Bruel & Kjaer	4189	2470615	CA-1730	12/05/2019	03/04/2021
PCB	377B02	165403	CA-2455	06/05/2020	06/04/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 03/02/2021

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CAL106-3697533190.547+0

~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150268

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

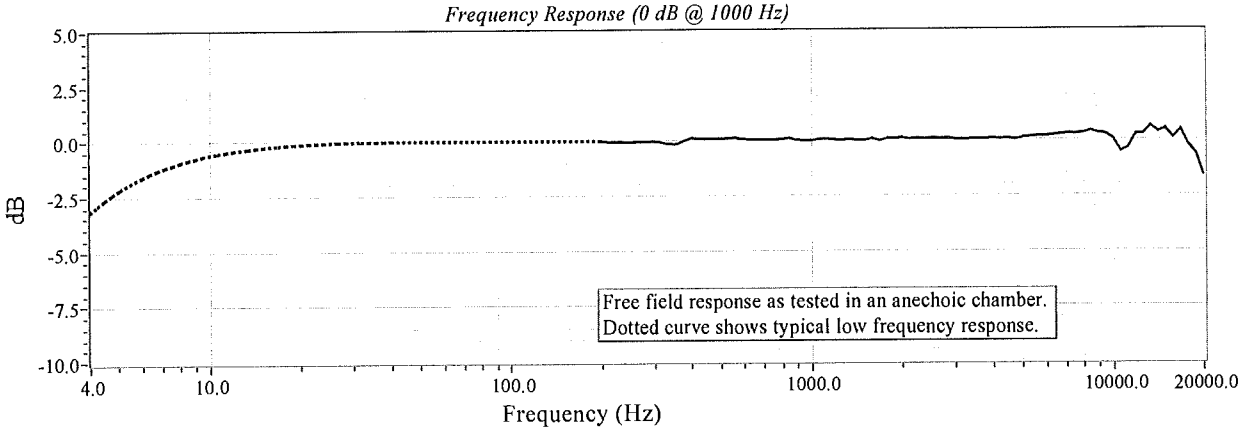
Calibration Data

System Sensitivity @ 1000 Hz: 422.16 mV/Pa
-7.49 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 4.45 dB(A) re 20 µPA

Temperature: 80 °F (27 °C) Ambient Pressure: 1000 mbar Relative Humidity: 29.5 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	-0.02	562.34	0.11	1584.89	0.08	4466.84	0.07	12589.25	0.26
211.35	-0.04	595.66	0.07	1678.80	-0.02	4731.51	0.03	13335.21	0.64
223.87	-0.06	630.96	0.02	1778.28	0.08	5011.87	0.11	14125.37	0.36
237.14	-0.07	668.34	0.04	1883.65	0.07	5308.84	0.15	14962.36	0.50
251.19	-0.07	707.95	0.04	1995.26	0.12	5623.41	0.16	15848.93	0.10
266.07	-0.05	749.89	0.03	2113.49	0.05	5956.62	0.18	16788.04	0.48
281.84	-0.05	794.33	0.06	2238.72	0.09	6309.57	0.22	17782.79	-0.22
298.54	-0.03	841.39	0.12	2371.37	0.05	6683.44	0.25	18836.49	-0.62
316.23	-0.07	891.25	0.02	2511.89	0.08	7079.46	0.28	19952.62	-1.64
334.96	-0.14	944.06	-0.00	2660.72	0.06	7498.94	0.27		
354.81	-0.16	1000.00	0.00	2818.38	0.08	7943.28	0.32		
375.84	-0.02	1059.25	0.05	2985.38	0.04	8413.95	0.41		
398.11	0.11	1122.02	0.05	3162.28	0.04	8912.51	0.32		
421.70	0.08	1188.50	0.03	3349.65	0.05	9440.61	0.27		
446.68	0.09	1258.92	0.00	3548.13	0.06	10000.00	0.05		
473.15	0.07	1333.52	0.04	3758.37	0.06	10592.54	-0.52		
501.19	0.08	1412.54	0.00	3981.07	0.06	11220.18	-0.36		
530.88	0.10	1496.24	0.00	4216.97	0.05	11885.02	0.25		

Technician: Leonard Lukasik Date: 03/02/2021

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~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150757

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
PCB	377B02	LW133492	CA-1773	10/19/2020	10/19/2021
PCB	377B02	165383	CA-2454	11/18/2020	11/18/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 04/23/2021

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CAL106-3702035724.844+0

~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150757

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

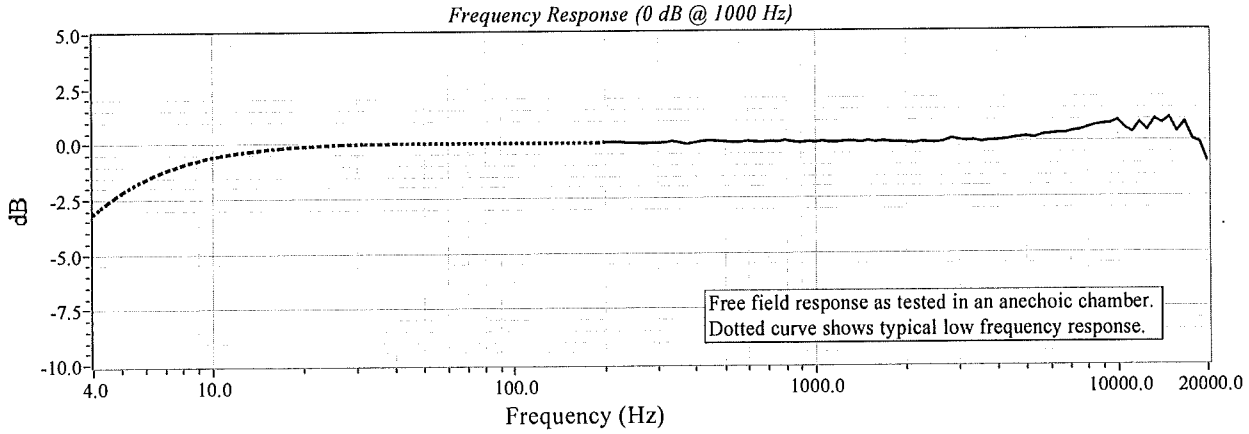
Calibration Data

System Sensitivity @ 1000 Hz: 473.77 mV/Pa
-6.49 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 4.52 dB(A) re 20 µPA

Temperature: 75 °F (24 °C) Ambient Pressure: 989.9 mbar Relative Humidity: 36.2 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	0.02	562.34	-0.01	1584.89	-0.00	4466.84	0.13	12589.25	0.48
211.35	0.03	595.66	0.06	1678.80	0.03	4731.51	0.17	13335.21	0.95
223.87	0.03	630.96	0.01	1778.28	-0.01	5011.87	0.20	14125.37	0.78
237.14	-0.00	668.34	-0.01	1883.65	-0.02	5308.84	0.15	14962.36	1.02
251.19	-0.02	707.95	0.02	1995.26	-0.04	5623.41	0.27	15848.93	0.41
266.07	-0.04	749.89	0.01	2113.49	-0.07	5956.62	0.31	16788.04	0.82
281.84	-0.03	794.33	0.09	2238.72	0.00	6309.57	0.35	17782.79	0.07
298.54	-0.02	841.39	0.01	2371.37	-0.03	6683.44	0.35	18836.49	-0.08
316.23	0.01	891.25	-0.03	2511.89	-0.05	7079.46	0.43	19952.62	-0.96
334.96	0.07	944.06	0.01	2660.72	0.01	7498.94	0.48		
354.81	0.00	1000.00	0.00	2818.38	0.14	7943.28	0.58		
375.84	-0.07	1059.25	0.04	2985.38	0.08	8413.95	0.68		
398.11	0.00	1122.02	-0.02	3162.28	0.03	8912.51	0.75		
421.70	0.06	1188.50	-0.01	3349.65	0.05	9440.61	0.77		
446.68	0.07	1258.92	0.03	3548.13	-0.01	10000.00	0.91		
473.15	0.06	1333.52	0.02	3758.37	0.03	10592.54	0.56		
501.19	0.04	1412.54	-0.01	3981.07	0.04	11220.18	0.38		
530.88	0.00	1496.24	0.05	4216.97	0.07	11885.02	0.80		

Technician: Leonard Lukasik Date: 04/23/2021

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CAL106-3702035724.844+0

~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150762

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
PCB	377B02	LW133492	CA-1773	10/19/2020	10/19/2021
PCB	377B02	165383	CA-2454	11/18/2020	11/18/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 05/04/2021

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~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150762

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

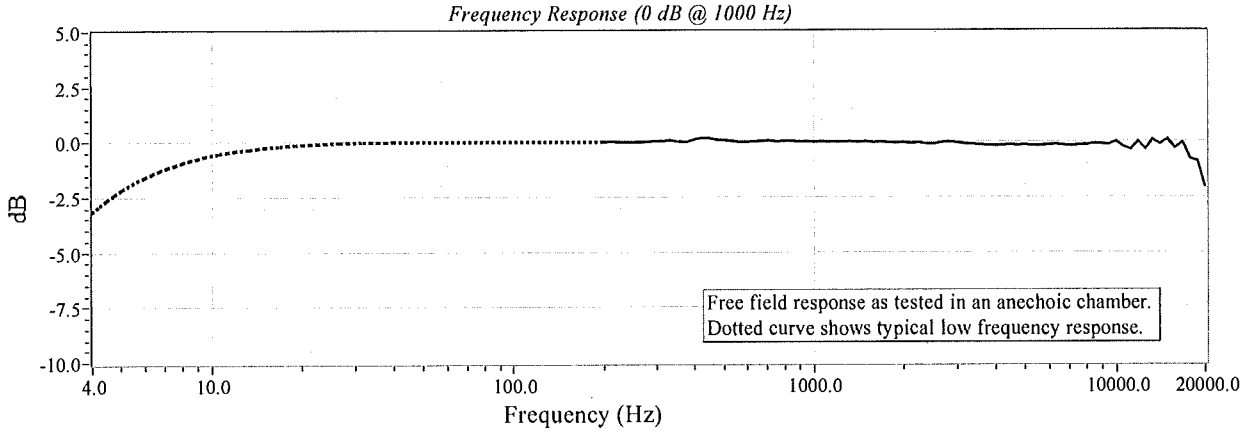
Calibration Data

System Sensitivity @ 1000 Hz: 436.08 mV/Pa
-7.21 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 5.84 dB(A) re 20 µPA

Temperature: 75 °F (24 °C) Ambient Pressure: 979.1 mbar Relative Humidity: 46.7 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	0.01	562.34	0.00	1584.89	-0.03	4466.84	-0.14	12589.25	-0.33
211.35	0.01	595.66	-0.01	1678.80	0.00	4731.51	-0.17	13335.21	0.06
223.87	0.01	630.96	0.01	1778.28	-0.04	5011.87	-0.14	14125.37	-0.11
237.14	-0.01	668.34	0.03	1883.65	-0.05	5308.84	-0.17	14962.36	0.10
251.19	-0.02	707.95	0.05	1995.26	-0.04	5623.41	-0.18	15848.93	-0.29
266.07	-0.01	749.89	0.02	2113.49	-0.07	5956.62	-0.14	16788.04	-0.05
281.84	0.01	794.33	0.04	2238.72	-0.04	6309.57	-0.12	17782.79	-0.77
298.54	0.03	841.39	0.03	2371.37	-0.08	6683.44	-0.16	18836.49	-0.88
316.23	0.04	891.25	0.01	2511.89	-0.08	7079.46	-0.19	19952.62	-2.07
334.96	0.07	944.06	0.01	2660.72	-0.04	7498.94	-0.16		
354.81	0.01	1000.00	0.00	2818.38	-0.01	7943.28	-0.14		
375.84	0.00	1059.25	0.01	2985.38	-0.05	8413.95	-0.08		
398.11	0.11	1122.02	-0.01	3162.28	-0.09	8912.51	-0.10		
421.70	0.17	1188.50	-0.01	3349.65	-0.10	9440.61	-0.14		
446.68	0.17	1258.92	0.00	3548.13	-0.15	10000.00	-0.01		
473.15	0.10	1333.52	0.01	3758.37	-0.16	10592.54	-0.23		
501.19	0.07	1412.54	-0.02	3981.07	-0.17	11220.18	-0.35		
530.88	0.04	1496.24	0.01	4216.97	-0.17	11885.02	0.00		

Technician: Leonard Lukasik Date: 05/04/2021

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CAL106-3702985076.522+0

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Microphone Model: 378A04 **Serial Number:** 150764

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
PCB	377B02	LW133492	CA-1773	10/19/2020	10/19/2021
PCB	377B02	165383	CA-2454	11/18/2020	11/18/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 05/04/2021

ilac-MRA A2LA ACCREDITED
CALIBRATION CERT #1862.01

PCB PIEZOTRONICS INC.
3425 Walden Avenue Depew, NY 14043
TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

~ *Calibration Report* ~

Mierophone Model: 378A04 **Serial Number:** 150764

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

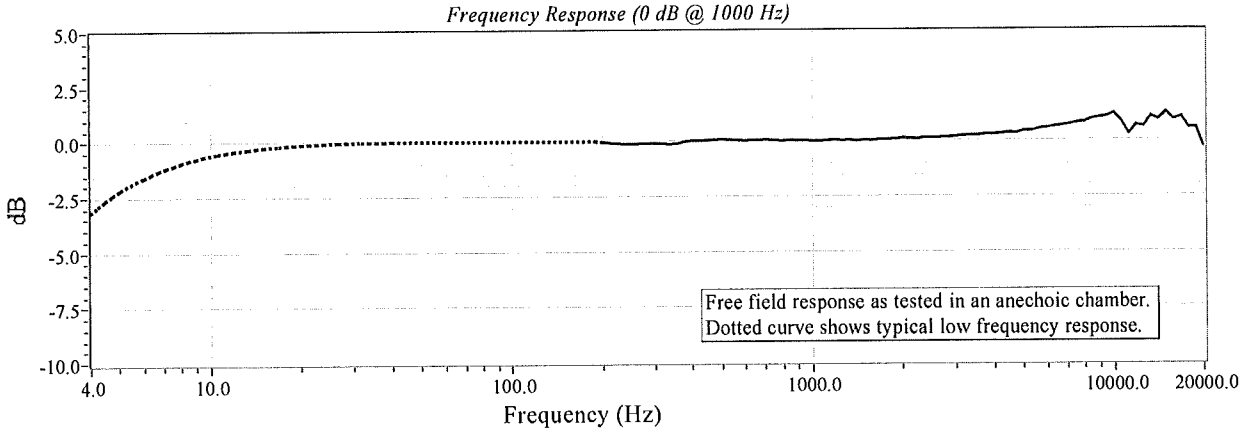
Calibration Data

System Sensitivity @ 1000 Hz: 429.62 mV/Pa
-7.34 dB re I V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 4.57 dB(A) re 20 µPA

Temperature: 75 °F (24 °C) Ambient Pressure: 979.1 mbar Relative Humidity: 46.7 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	-0.04	562.34	0.04	1584.89	0.02	4466.84	0.35	12589.25	0.61
211.35	-0.07	595.66	0.02	1678.80	0.06	4731.51	0.34	13335.21	1.08
223.87	-0.10	630.96	0.03	1778.28	0.06	5011.87	0.44	14125.37	0.94
237.14	-0.11	668.34	0.04	1883.65	0.07	5308.84	0.43	14962.36	1.25
251.19	-0.12	707.95	0.05	1995.26	0.12	5623.41	0.51	15848.93	0.93
266.07	-0.10	749.89	0.03	2113.49	0.11	5956.62	0.57	16788.04	1.06
281.84	-0.10	794.33	0.00	2238.72	0.09	6309.57	0.62	17782.79	0.56
298.54	-0.09	841.39	0.04	2371.37	0.12	6683.44	0.67	18836.49	0.56
316.23	-0.10	891.25	0.02	2511.89	0.13	7079.46	0.72	19952.62	-0.31
334.96	-0.14	944.06	0.02	2660.72	0.14	7498.94	0.79		
354.81	-0.12	1000.00	0.00	2818.38	0.14	7943.28	0.83		
375.84	-0.03	1059.25	0.01	2985.38	0.17	8413.95	0.96		
398.11	0.02	1122.02	0.02	3162.28	0.21	8912.51	1.03		
421.70	0.01	1188.50	0.04	3349.65	0.23	9440.61	1.07		
446.68	0.02	1258.92	0.02	3548.13	0.23	10000.00	1.21		
473.15	0.05	1333.52	0.03	3758.37	0.27	10592.54	0.83		
501.19	0.07	1412.54	-0.01	3981.07	0.27	11220.18	0.29		
530.88	0.05	1496.24	0.04	4216.97	0.31	11885.02	0.68		

Technician: Leonard Lukasik Date: 05/04/2021

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3425 Walden Avenue Depew, NY 14043
TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

CAL106-3702984789.202+0

~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150765

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
PCB	377B02	LW133492	CA-1773	10/19/2020	10/19/2021
PCB	377B02	165383	CA-2454	11/18/2020	11/18/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 05/04/2021

ilac-MRA A2LA ACCREDITED
CALIBRATION CERT #1862.01

PCB PIEZOTRONICS INC
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TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150765

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

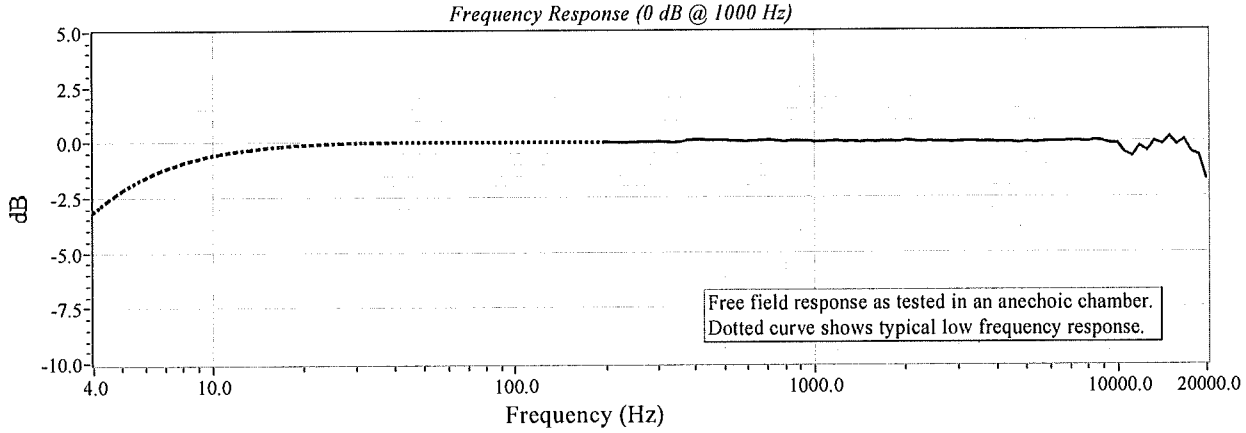
Calibration Data

System Sensitivity @ 1000 Hz: 438.41 mV/Pa
-7.16 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 6.13 dB(A) re 20 µPA

Temperature: 75 °F (24 °C) Ambient Pressure: 979.1 mbar Relative Humidity: 46.7 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	0.01	562.34	0.03	1584.89	-0.02	4466.84	-0.04	12589.25	-0.44
211.35	-0.02	595.66	0.01	1678.80	0.01	4731.51	-0.08	13335.21	-0.01
223.87	-0.03	630.96	0.04	1778.28	0.01	5011.87	-0.02	14125.37	-0.13
237.14	-0.02	668.34	0.05	1883.65	0.00	5308.84	-0.05	14962.36	0.20
251.19	-0.01	707.95	0.07	1995.26	0.05	5623.41	-0.03	15848.93	-0.16
266.07	0.00	749.89	0.04	2113.49	0.02	5956.62	0.00	16788.04	0.05
281.84	0.01	794.33	0.01	2238.72	-0.01	6309.57	-0.00	17782.79	-0.49
298.54	0.02	841.39	0.04	2371.37	0.01	6683.44	0.00	18836.49	-0.65
316.23	0.00	891.25	0.04	2511.89	0.01	7079.46	0.01	19952.62	-1.74
334.96	-0.03	944.06	0.03	2660.72	0.00	7498.94	0.02		
354.81	-0.02	1000.00	0.00	2818.38	-0.03	7943.28	-0.02		
375.84	0.07	1059.25	0.00	2985.38	-0.02	8413.95	0.05		
398.11	0.11	1122.02	0.02	3162.28	0.01	8912.51	0.02		
421.70	0.09	1188.50	0.03	3349.65	0.01	9440.61	-0.09		
446.68	0.07	1258.92	0.01	3548.13	-0.02	10000.00	-0.10		
473.15	0.07	1333.52	0.01	3758.37	-0.01	10592.54	-0.52		
501.19	0.07	1412.54	-0.03	3981.07	-0.04	11220.18	-0.69		
530.88	0.04	1496.24	0.01	4216.97	-0.03	11885.02	-0.23		

Technician: Leonard Lukasik Date: 05/04/2021

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TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

CAL106-3702984649.522+0

~ *Certificate of Calibration and Compliance* ~

Microphone Model: 378A04 **Serial Number:** 150766

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Reference Equipment

Manufacturer	Model #	Serial #	PCB Control #	Cal Date	Due Date
National Instruments	PCI-4461	198E6B6	CA-2121	09/21/2020	09/21/2021
PCB	377B02	LW133492	CA-1773	10/19/2020	10/19/2021
PCB	377B02	165383	CA-2454	11/18/2020	11/18/2021
PCB	HT426E01	034253	CA-2276	09/23/2020	09/23/2021

Condition of Unit

As Found : n/a

As Left : New Unit, In Tolerance

Notes

1. Calibration of reference equipment is traceable to one or more of the following National Labs; NIST, PTB or DFM.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 10012-1, ANSI/NCSL Z540.3 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. System Sensitivity is measured following procedure AT603-13.
6. Measurement uncertainty (95% confidence level with coverage factor of 2) for sensitivity is +/- 0.5 dB.
7. Unit calibrated per ACS-156.

Technician: Leonard Lukasik Date: 05/04/2021

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3425 Walden Avenue Depew, NY 14043
TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

~ *Calibration Report* ~

Microphone Model: 378A04 **Serial Number:** 150766

Manufacturer: PCB Description: 1/2" Free-Field Microphone System

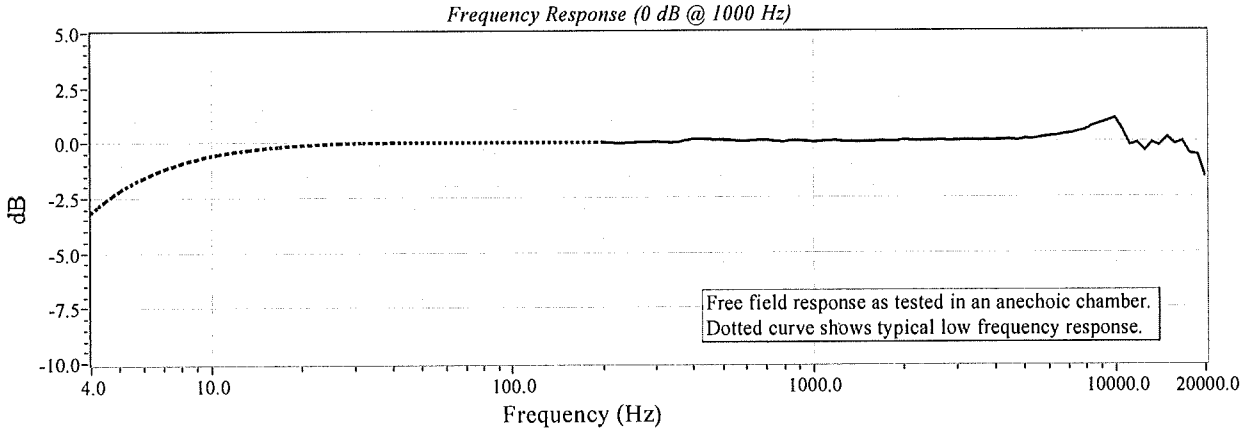
Calibration Data

System Sensitivity @ 1000 Hz: 430.40 mV/Pa
-7.32 dB re 1 V/Pa

Polarization Voltage: 0 V (External)
Inherent Noise: 5.51 dB(A) re 20 µPA

Temperature: 75 °F (24 °C) Ambient Pressure: 979.1 mbar Relative Humidity: 46.7 %

Frequency Response (0 dB @ 1000 Hz)



Data Points

Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude	Frequency	Magnitude
199.53	-0.01	562.34	0.04	1584.89	0.01	4466.84	0.10	12589.25	-0.42
211.35	-0.03	595.66	0.02	1678.80	0.04	4731.51	0.06	13335.21	-0.06
223.87	-0.04	630.96	0.05	1778.28	0.04	5011.87	0.13	14125.37	-0.18
237.14	-0.04	668.34	0.07	1883.65	0.04	5308.84	0.12	14962.36	0.17
251.19	-0.03	707.95	0.07	1995.26	0.09	5623.41	0.17	15848.93	-0.12
266.07	-0.01	749.89	0.04	2113.49	0.05	5956.62	0.22	16788.04	0.00
281.84	0.00	794.33	0.00	2238.72	0.04	6309.57	0.26	17782.79	-0.55
298.54	0.02	841.39	0.05	2371.37	0.05	6683.44	0.31	18836.49	-0.60
316.23	0.00	891.25	0.05	2511.89	0.05	7079.46	0.36	19952.62	-1.60
334.96	-0.03	944.06	0.04	2660.72	0.06	7498.94	0.45		
354.81	-0.02	1000.00	0.00	2818.38	0.04	7943.28	0.52		
375.84	0.07	1059.25	0.01	2985.38	0.05	8413.95	0.70		
398.11	0.13	1122.02	0.04	3162.28	0.08	8912.51	0.82		
421.70	0.13	1188.50	0.05	3349.65	0.07	9440.61	0.92		
446.68	0.11	1258.92	0.02	3548.13	0.06	10000.00	1.05		
473.15	0.10	1333.52	0.02	3758.37	0.07	10592.54	0.49		
501.19	0.09	1412.54	0.00	3981.07	0.06	11220.18	-0.16		
530.88	0.06	1496.24	0.02	4216.97	0.08	11885.02	-0.07		

Technician: Leonard Lukasik Date: 05/04/2021

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CALIBRATION CERT #1862.01

PCB PIEZOTRONICS Inc.
3425 Walden Avenue Depew, NY 14043
TEL: 888-684-0013 FAX: 716-685-3886 www.pcb.com

CAL106-3702984515.080+0

Calibrator

Calibration Certificate

Certificate Number 2021007071

Customer:
The Modal Shop
10310 AeroHub Boulevard
Cincinnati,OH 45215,United States

Model Number	CAL200	***Procedure Number***	D0001.8386		
Serial Number	18981	***Technician***	Scott Montgomery		
Test Results	**Pass**	***Calibration Date***	15 Jun 2021		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	25	°C	± 0.3 °C
Description	Larson Davis CAL200 Acoustic Calibrator	***Humidity***	26	%RH	± 3 %RH
		Static Pressure	101.3	kPa	± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	08/04/2020	08/04/2021	001021
Larson Davis Model 2900 Real Time Analyzer	04/01/2021	04/01/2022	001051
Microphone Calibration System	02/24/2021	02/24/2022	005446
1/2" Preamplifier	08/27/2020	08/27/2021	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/06/2020	08/06/2021	006507
1/2 inch Microphone - RI - 200V	09/24/2020	09/24/2021	006511
Pressure Transducer	07/17/2020	07/17/2021	007368

Output Level

Nominal Level [dB]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
114	101.4	114.00	113.80	114.20	0.14	Pass
94	101.3	93.98	93.80	94.20	0.15	Pass

-- End of measurement results--

Frequency

Nominal Level [dB]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
114	101.4	999.96	990.00	1,010.00	0.20	Pass
94	101.3	999.98	990.00	1,010.00	0.20	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N)

Nominal Level [dB]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
114	101.4	0.39	0.00	2.00	0.25 ‡	Pass
94	101.3	0.45	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Level Change Over Pressure

Tested at: 114 dB, 25 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
108.0	108.1	-0.03	-0.30	0.30	0.04 ‡	Pass
101.3	101.4	0.00	-0.30	0.30	0.04 ‡	Pass
92.0	92.1	0.03	-0.30	0.30	0.04 ‡	Pass
83.0	83.1	0.05	-0.30	0.30	0.04 ‡	Pass
74.0	74.2	0.05	-0.30	0.30	0.04 ‡	Pass
65.0	64.8	0.04	-0.30	0.30	0.04 ‡	Pass

-- End of measurement results--

Frequency Change Over Pressure

Tested at: 114 dB, 25 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
108.0	108.1	0.00	-10.00	10.00	0.20 ‡	Pass
101.3	101.4	0.00	-10.00	10.00	0.20 ‡	Pass
92.0	92.1	0.00	-10.00	10.00	0.20 ‡	Pass
83.0	83.1	-0.01	-10.00	10.00	0.20 ‡	Pass
74.0	74.2	-0.01	-10.00	10.00	0.20 ‡	Pass
65.0	64.8	-0.01	-10.00	10.00	0.20 ‡	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N) Over Pressure

Tested at: 114 dB, 25 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
108.0	108.1	0.40	0.00	2.00	0.25 ‡	Pass
101.3	101.4	0.39	0.00	2.00	0.25 ‡	Pass
92.0	92.1	0.39	0.00	2.00	0.25 ‡	Pass
83.0	83.1	0.38	0.00	2.00	0.25 ‡	Pass
74.0	74.2	0.40	0.00	2.00	0.25 ‡	Pass
65.0	64.8	0.43	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Signatory: *Scott Montgomery*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo,UT 84601,United States
716-684-0001

ACCREDITED Cert. #3622.01

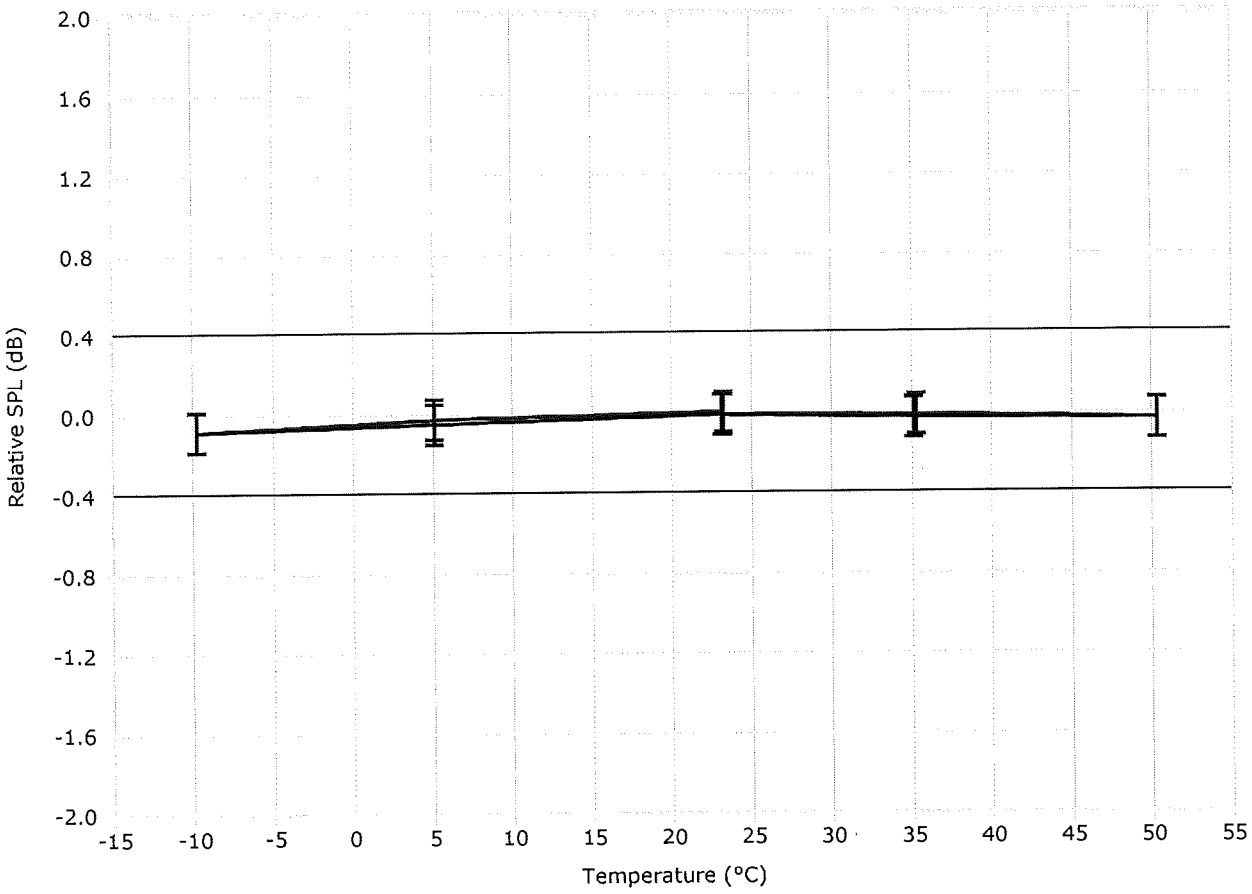
LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Model CAL200 Relative SPL vs. Temperature

Larson Davis Model CAL200 Serial Number: 18981

Model CAL200 Relative SPL vs. Temperature at 50% RH.
A 2559 Mic (SN: 2957) with a PRM901 Preamp (SN: 0193), station 11 was used to check the levels.

Test Date: 19 May 2021 2:55:34 PM



0.1dB expanded uncertainty at ~95% confidence level (k=2)

Sequence File: CAL200.SEQ

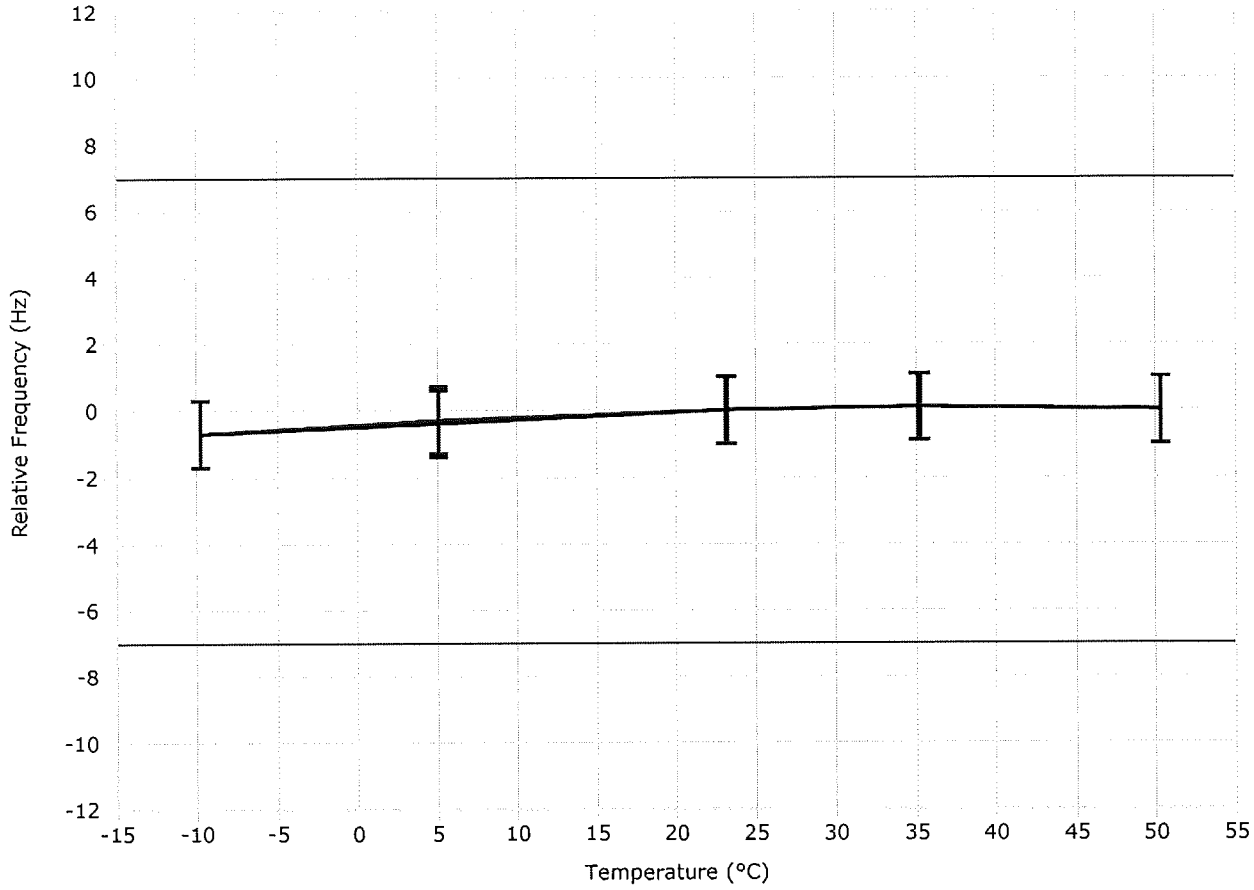
Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

Model CAL200 Relative Frequency vs. Temperature

Larson Davis Model CAL200 Serial Number: 18981

Model CAL200 Relative Frequency vs. Temperature at 50% RH.
A 2559 Mic (SN: 2957) with a PRM901 Preamp (SN: 0193), station 11 was used to check the levels.

Test Date: 19 May 2021 2:55:34 PM



1.0 Hz expanded uncertainty at ~95% confidence level (k=2)

Sequence File: CAL200.SEQ

Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

Calibration Certificate

Certificate Number 2022000747

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati,OH 45215,United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11736	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	20 Jan 2022		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.31	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.5R0	***Humidity***	51.6	%RH	± 2.0 %RH
		Static Pressure	87.4	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 076995 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

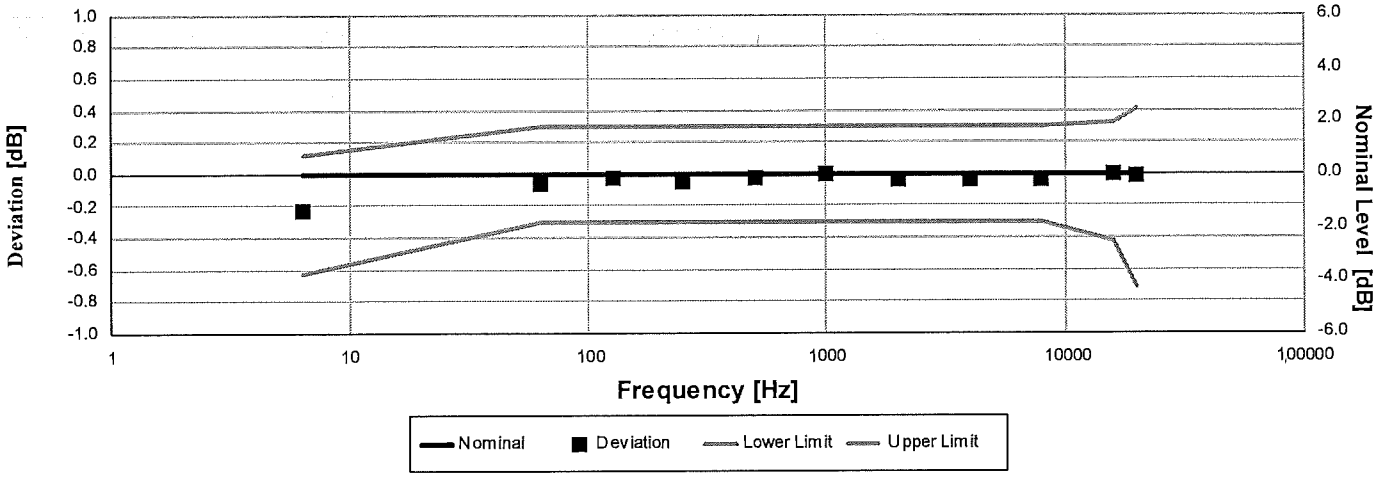
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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-H Temperature Probe	2021-02-04	2022-08-04	006767
SRS DS360 Ultra Low Distortion Generator	2022-01-03	2023-01-03	007118

Z-weight Filter Response

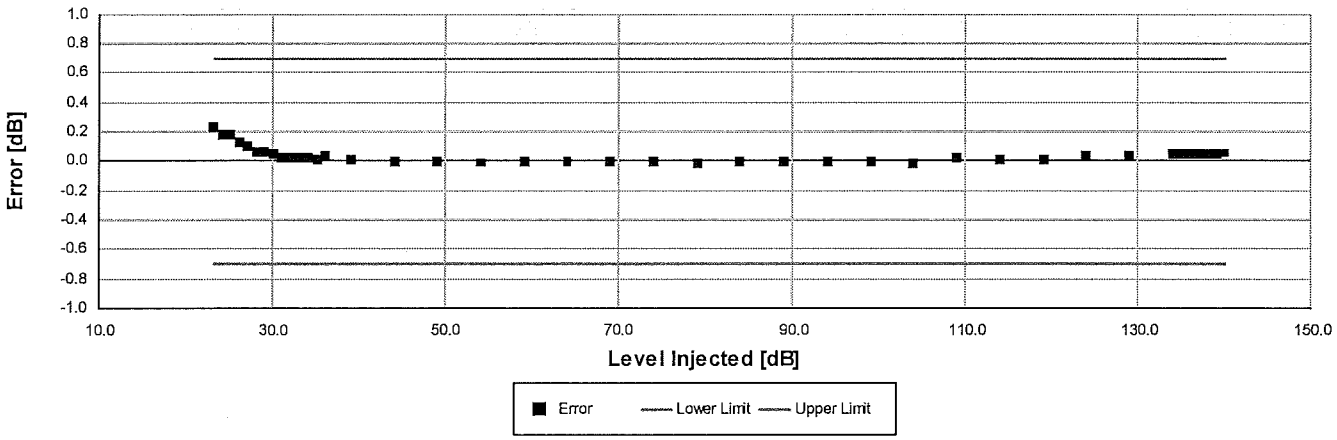


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.23	-0.23	-0.63	0.12	0.15	Pass
63.10	-0.06	-0.06	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.05	-0.04	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.04	-0.04	-0.30	0.30	0.15	Pass
15,848.93	0.00	0.00	-0.42	0.32	0.15	Pass
19,952.62	-0.01	-0.01	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



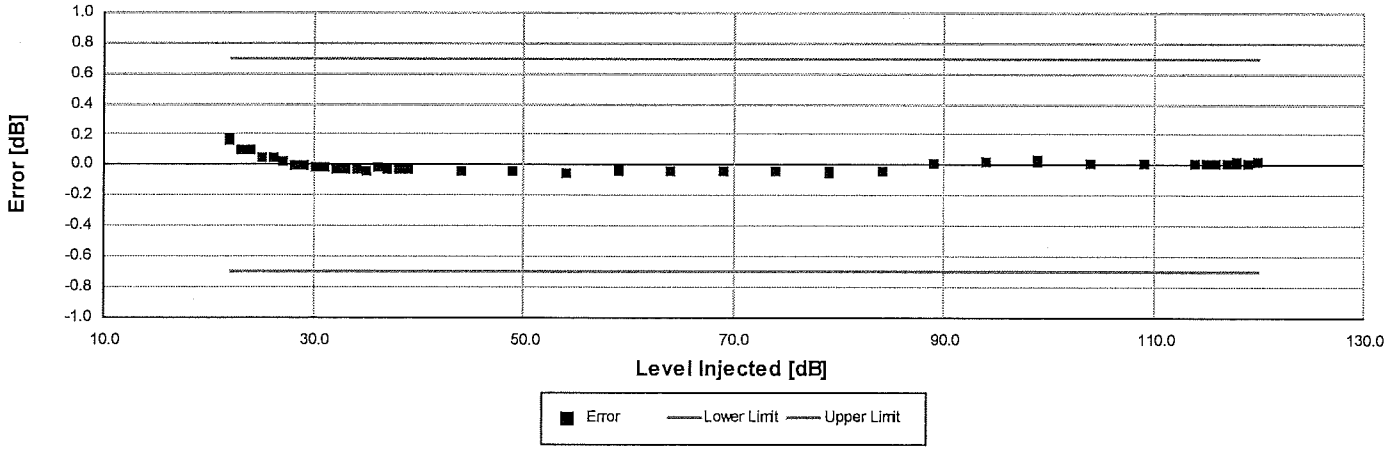
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
23.00	0.23	-0.70	0.70	0.16	Pass
24.00	0.18	-0.70	0.70	0.16	Pass
25.00	0.18	-0.70	0.70	0.16	Pass
26.00	0.13	-0.70	0.70	0.16	Pass
27.00	0.11	-0.70	0.70	0.16	Pass
28.00	0.06	-0.70	0.70	0.16	Pass
29.00	0.06	-0.70	0.70	0.18	Pass
30.00	0.05	-0.70	0.70	0.17	Pass
31.00	0.03	-0.70	0.70	0.17	Pass
32.00	0.03	-0.70	0.70	0.17	Pass
33.00	0.02	-0.70	0.70	0.16	Pass
34.00	0.02	-0.70	0.70	0.16	Pass
35.00	0.01	-0.70	0.70	0.16	Pass
36.00	0.03	-0.70	0.70	0.16	Pass
39.00	0.02	-0.70	0.70	0.16	Pass
44.00	0.00	-0.70	0.70	0.16	Pass
49.00	0.00	-0.70	0.70	0.16	Pass
54.00	-0.01	-0.70	0.70	0.16	Pass
59.00	0.00	-0.70	0.70	0.16	Pass
64.00	0.00	-0.70	0.70	0.16	Pass
69.00	0.00	-0.70	0.70	0.16	Pass
74.00	0.00	-0.70	0.70	0.16	Pass
79.00	-0.01	-0.70	0.70	0.16	Pass
84.00	0.00	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.00	-0.70	0.70	0.16	Pass
99.00	0.00	-0.70	0.70	0.16	Pass
104.00	-0.02	-0.70	0.70	0.15	Pass
109.00	0.03	-0.70	0.70	0.15	Pass
114.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.02	-0.70	0.70	0.15	Pass
124.00	0.03	-0.70	0.70	0.15	Pass
129.00	0.04	-0.70	0.70	0.15	Pass
134.00	0.05	-0.70	0.70	0.15	Pass
135.00	0.05	-0.70	0.70	0.15	Pass
136.00	0.05	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	0.05	-0.70	0.70	0.15	Pass
138.00	0.06	-0.70	0.70	0.15	Pass
139.00	0.05	-0.70	0.70	0.15	Pass
140.00	0.06	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
22.00	0.17	-0.70	0.70	0.16	Pass
23.00	0.10	-0.70	0.70	0.16	Pass
24.00	0.10	-0.70	0.70	0.16	Pass
25.00	0.04	-0.70	0.70	0.16	Pass
26.00	0.04	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	0.00	-0.70	0.70	0.19	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	-0.01	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.02	-0.70	0.70	0.17	Pass
33.00	-0.02	-0.70	0.70	0.16	Pass
34.00	-0.02	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
37.00	-0.02	-0.70	0.70	0.16	Pass
38.00	-0.03	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.05	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.05	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	0.01	-0.70	0.70	0.16	Pass
94.00	0.03	-0.70	0.70	0.16	Pass
99.00	0.03	-0.70	0.70	0.16	Pass
104.00	0.01	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.01	-0.70	0.70	0.15	Pass
115.00	0.01	-0.70	0.70	0.15	Pass
116.00	0.01	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.01	-0.70	0.70	0.15	Pass
120.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.89	134.58	136.58	0.15	Pass
		Positive Pulse	135.93	134.58	136.58	0.15	Pass
	30	Negative Pulse	135.09	134.58	136.58	0.15	Pass
		Positive Pulse	135.09	134.58	136.58	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.23	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.16	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.10	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	-0.08	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.00	93.92	94.12	0.15	Pass
0 dB Gain, Linearity	28.08	27.32	28.72	0.16	Pass
20 dB Gain	94.03	93.92	94.12	0.15	Pass
20 dB Gain, Linearity	23.12	22.32	23.72	0.16	Pass
OBA High Range	94.02	93.20	94.80	0.15	Pass
OBA Normal Range	94.02	93.92	94.12	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.88	9.00	Pass
C-weight Noise Floor	12.19	15.00	Pass
Z-weight Noise Floor	21.82	25.00	Pass

-- End of measurement results--

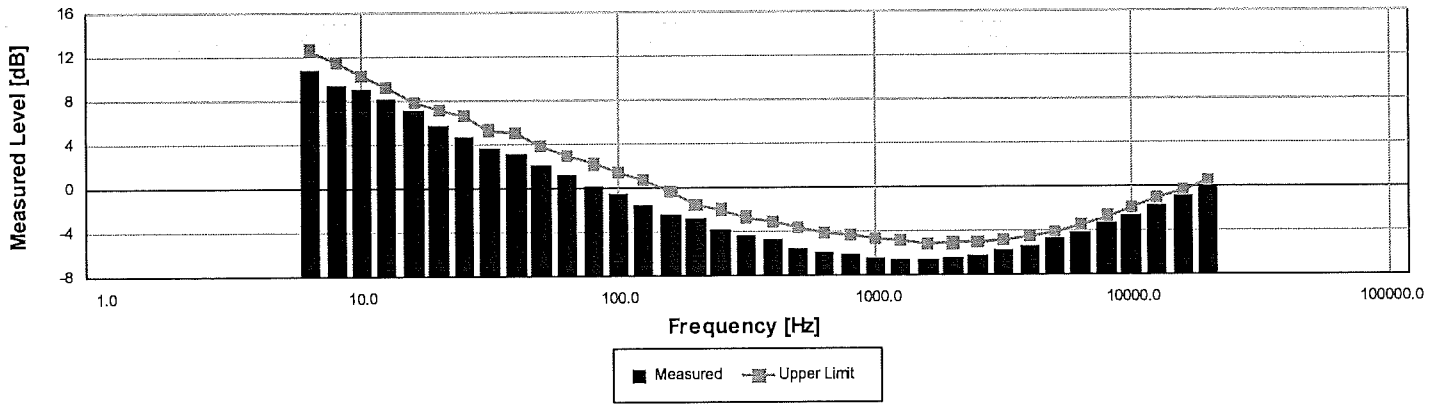
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.48	137.20	138.80	0.15	Pass
THD	-73.46		-60.00	1.30 ‡	Pass
THD+N	-72.76		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.85	12.60	Pass
8.00	9.47	11.50	Pass
10.00	9.13	10.20	Pass
12.50	8.11	9.20	Pass
16.00	7.08	7.90	Pass
20.00	5.71	7.20	Pass
25.00	4.62	6.60	Pass
31.50	3.75	5.30	Pass
40.00	3.18	5.00	Pass
50.00	2.10	3.80	Pass
63.00	1.23	3.00	Pass
80.00	0.16	2.20	Pass
100.00	-0.55	1.40	Pass
125.00	-1.53	0.70	Pass
160.00	-2.36	-0.40	Pass
200.00	-2.77	-1.50	Pass
250.00	-3.79	-2.00	Pass
315.00	-4.28	-2.70	Pass
400.00	-4.72	-3.10	Pass
500.00	-5.49	-3.70	Pass
630.00	-5.97	-4.10	Pass
800.00	-6.09	-4.30	Pass
1,000.00	-6.49	-4.70	Pass
1,250.00	-6.61	-4.80	Pass
1,600.00	-6.60	-5.20	Pass
2,000.00	-6.47	-5.10	Pass
2,500.00	-6.27	-5.00	Pass
3,150.00	-5.80	-4.80	Pass
4,000.00	-5.33	-4.50	Pass
5,000.00	-4.76	-4.10	Pass
6,300.00	-4.11	-3.40	Pass
8,000.00	-3.33	-2.70	Pass
10,000.00	-2.58	-1.90	Pass
12,500.00	-1.76	-1.10	Pass
16,000.00	-0.92	-0.30	Pass
20,000.00	-0.01	0.60	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo,UT 84601,United States
716-684-0001

ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB DIVISION

Calibration Certificate

Certificate Number 2022000768
Customer:
The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8384		
Serial Number	11736	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	20 Jan 2022		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.88	°C	± 0.25 °C
Description	Larson Davis Model 831C	***Humidity***	50.7	%RH	± 2.0 %RH
	Class 1 Sound Level Meter	***Static Pressure***	87.17	kPa	± 0.13 kPa
	Firmware Revision: 04.6.5R0				

Evaluation Method ***Tested with:*** ***Data reported in dB re 20 µPa.***

PCB 377B02. S/N 335801
Larson Davis CAL291. S/N 0108
Larson Davis CAL200. S/N 9079
Larson Davis PRM831. S/N 076995

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev B, 2017-03-31

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

1/2" adaptor is used with the preamplifier.

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with precedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

No Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 available.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3 cover only a limited subset of the specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis CAL291 Residual Intensity Calibrator	2021-09-10	2022-09-10	001250
Hart Scientific 2626-H Temperature Probe	2021-02-04	2022-08-04	006767
Larson Davis CAL200 Acoustic Calibrator	2021-07-21	2022-07-21	007027
Larson Davis Model 831	2021-03-02	2022-03-02	007182
PCB 377A13 1/2 inch Prepolarized Pressure Microphone	2021-03-03	2022-03-03	007185
SRS DS360 Ultra Low Distortion Generator	2021-04-13	2022-04-13	007635
Larson Davis 1/2" Preamplifier for Model 831 Type 1	2021-09-28	2022-09-28	PCB0004783

Acoustic Calibration

Measured according to IEC 61672-3:2013 10 and ANSI S1.4-2014 Part 3: 10

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz	114.01	113.80	114.20	0.14	Pass

Loaded Circuit Sensitivity

Measurement	Test Result [dB re 1 V / Pa]	Lower Limit [dB re 1 V / Pa]	Upper Limit [dB re 1 V / Pa]	Expanded Uncertainty [dB]	Result
1000 Hz	-26.13	-27.84	-24.74	0.14	Pass

-- End of measurement results--

Acoustic Signal Tests, C-weighting

Measured according to IEC 61672-3:2013 12 and ANSI S1.4-2014 Part 3: 12 using a comparison coupler with Unit Under Test (UUT) and reference SLM using slow time-weighted sound level for compliance to IEC 61672-1:2013 5.5; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Expected [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
125	-0.05	-0.20	-1.20	0.80	0.23	Pass
1000	0.12	0.00	-0.70	0.70	0.23	Pass
8000	-2.84	-3.00	-5.50	-1.50	0.32	Pass

-- End of measurement results--

Self-generated Noise

Measured according to IEC 61672-3:2013 11.1 and ANSI S1.4-2014 Part 3: 11.1

Measurement	Test Result [dB]
A-weighted, 20 dB gain	40.32

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

Calibration Certificate

Certificate Number 2022000757

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11737	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	20 Jan 2022		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.7	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.5R0	***Humidity***	52.5	%RH	± 2.0 %RH
		Static Pressure	87.32	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 076996 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

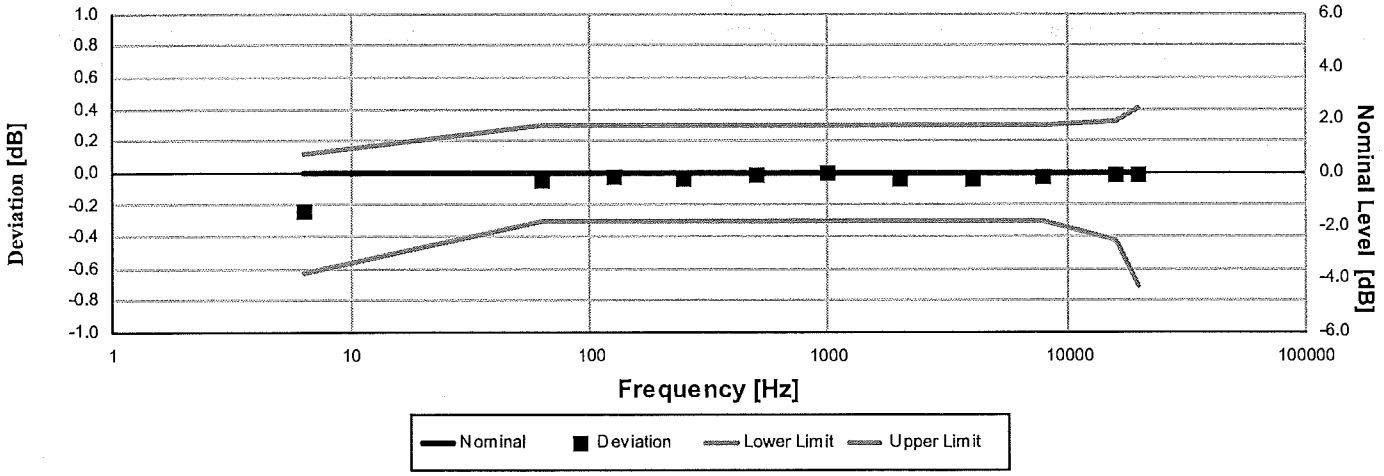
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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-H Temperature Probe	2021-02-04	2022-08-04	006767
SRS DS360 Ultra Low Distortion Generator	2021-09-02	2022-09-02	007167

Z-weight Filter Response

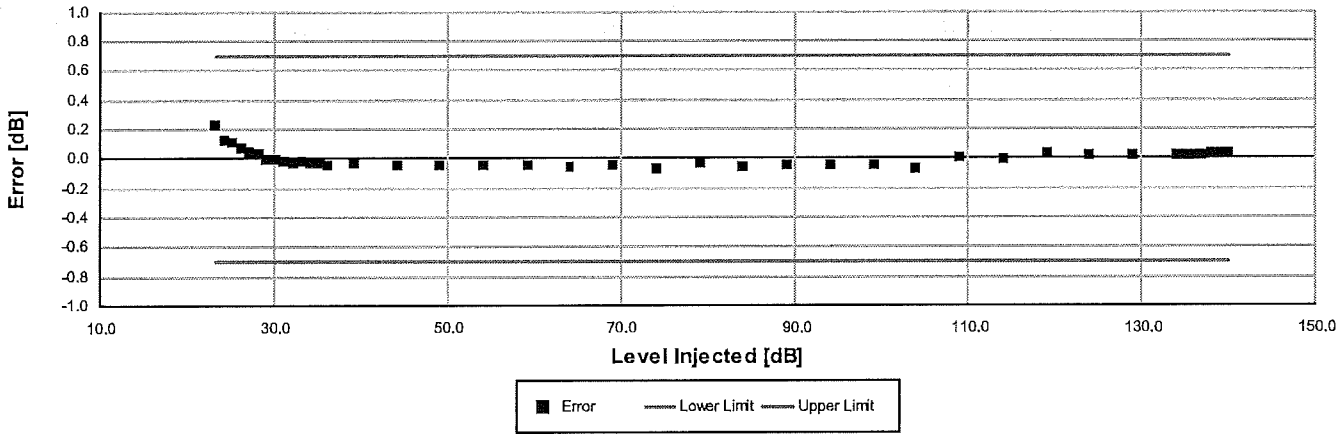


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.24	-0.24	-0.63	0.12	0.15	Pass
63.10	-0.05	-0.05	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.04	-0.04	-0.30	0.30	0.15	Pass
501.19	-0.01	-0.01	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.03	-0.03	-0.30	0.30	0.15	Pass
15,848.93	-0.01	-0.01	-0.42	0.32	0.15	Pass
19,952.62	-0.01	-0.01	-0.71	0.41	0.15	Pass

– End of measurement results–

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



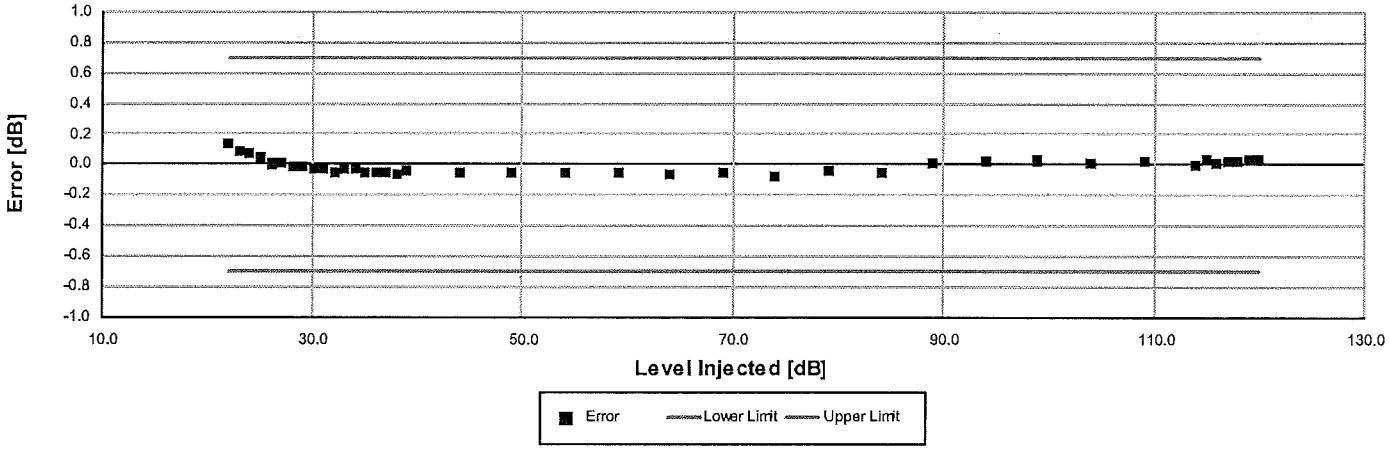
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
23.00	0.23	-0.70	0.70	0.16	Pass
24.00	0.13	-0.70	0.70	0.16	Pass
25.00	0.11	-0.70	0.70	0.16	Pass
26.00	0.08	-0.70	0.70	0.16	Pass
27.00	0.05	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	0.00	-0.70	0.70	0.17	Pass
31.00	-0.01	-0.70	0.70	0.17	Pass
32.00	-0.02	-0.70	0.70	0.17	Pass
33.00	-0.02	-0.70	0.70	0.16	Pass
34.00	-0.03	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.04	-0.70	0.70	0.16	Pass
39.00	-0.03	-0.70	0.70	0.16	Pass
44.00	-0.05	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.04	-0.70	0.70	0.16	Pass
64.00	-0.05	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.07	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.05	-0.70	0.70	0.16	Pass
89.00	-0.04	-0.70	0.70	0.16	Pass
94.00	-0.04	-0.70	0.70	0.16	Pass
99.00	-0.04	-0.70	0.70	0.16	Pass
104.00	-0.06	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
124.00	0.02	-0.70	0.70	0.15	Pass
129.00	0.03	-0.70	0.70	0.15	Pass
134.00	0.03	-0.70	0.70	0.15	Pass
135.00	0.03	-0.70	0.70	0.15	Pass
136.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	0.03	-0.70	0.70	0.15	Pass
138.00	0.03	-0.70	0.70	0.15	Pass
139.00	0.04	-0.70	0.70	0.15	Pass
140.00	0.04	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
22.00	0.13	-0.70	0.70	0.16	Pass
23.00	0.08	-0.70	0.70	0.16	Pass
24.00	0.07	-0.70	0.70	0.16	Pass
25.00	0.04	-0.70	0.70	0.16	Pass
26.00	0.01	-0.70	0.70	0.19	Pass
27.00	0.01	-0.70	0.70	0.18	Pass
28.00	-0.01	-0.70	0.70	0.19	Pass
29.00	-0.02	-0.70	0.70	0.18	Pass
30.00	-0.03	-0.70	0.70	0.17	Pass
31.00	-0.03	-0.70	0.70	0.17	Pass
32.00	-0.05	-0.70	0.70	0.17	Pass
33.00	-0.03	-0.70	0.70	0.16	Pass
34.00	-0.03	-0.70	0.70	0.16	Pass
35.00	-0.05	-0.70	0.70	0.16	Pass
36.00	-0.05	-0.70	0.70	0.16	Pass
37.00	-0.06	-0.70	0.70	0.16	Pass
38.00	-0.06	-0.70	0.70	0.16	Pass
39.00	-0.04	-0.70	0.70	0.16	Pass
44.00	-0.05	-0.70	0.70	0.16	Pass
49.00	-0.05	-0.70	0.70	0.16	Pass
54.00	-0.05	-0.70	0.70	0.16	Pass
59.00	-0.05	-0.70	0.70	0.16	Pass
64.00	-0.06	-0.70	0.70	0.16	Pass
69.00	-0.05	-0.70	0.70	0.16	Pass
74.00	-0.07	-0.70	0.70	0.16	Pass
79.00	-0.04	-0.70	0.70	0.16	Pass
84.00	-0.05	-0.70	0.70	0.16	Pass
89.00	0.01	-0.70	0.70	0.16	Pass
94.00	0.03	-0.70	0.70	0.16	Pass
99.00	0.03	-0.70	0.70	0.16	Pass
104.00	0.01	-0.70	0.70	0.15	Pass
109.00	0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.03	-0.70	0.70	0.15	Pass
116.00	0.01	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
120.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.99	134.66	136.66	0.15	Pass
		Positive Pulse	136.01	134.67	136.67	0.15	Pass
	30	Negative Pulse	135.16	134.66	136.66	0.15	Pass
		Positive Pulse	135.16	134.67	136.67	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.09	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.22	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.13	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.24	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	0.00	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.95	93.89	94.09	0.15	Pass
0 dB Gain, Linearity	28.02	27.29	28.69	0.16	Pass
20 dB Gain	94.00	93.89	94.09	0.15	Pass
20 dB Gain, Linearity	23.08	22.29	23.69	0.16	Pass
OBA High Range	93.99	93.20	94.80	0.15	Pass
OBA Normal Range	93.99	93.89	94.09	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	7.12	9.00	Pass
C-weight Noise Floor	12.55	15.00	Pass
Z-weight Noise Floor	21.60	25.00	Pass

-- End of measurement results--

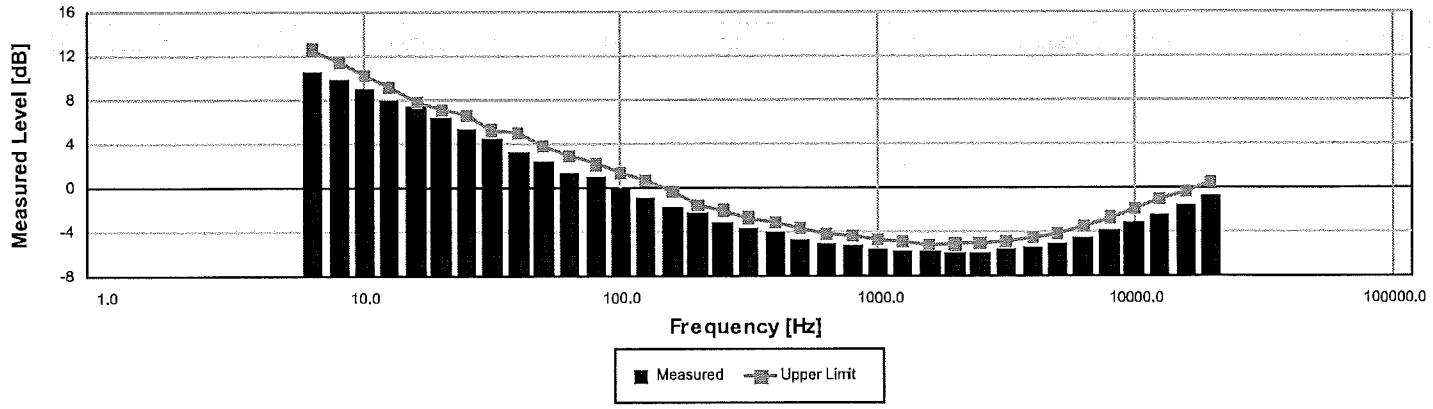
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.54	137.20	138.80	0.15	Pass
THD	-76.77		-60.00	1.30 ‡	Pass
THD+N	-75.76		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.66	12.60	Pass
8.00	9.92	11.50	Pass
10.00	8.99	10.20	Pass
12.50	7.94	9.20	Pass
16.00	7.45	7.90	Pass
20.00	6.52	7.20	Pass
25.00	5.44	6.60	Pass
31.50	4.53	5.30	Pass
40.00	3.37	5.00	Pass
50.00	2.42	3.80	Pass
63.00	1.32	3.00	Pass
80.00	1.04	2.20	Pass
100.00	0.03	1.40	Pass
125.00	-0.84	0.70	Pass
160.00	-1.79	-0.40	Pass
200.00	-2.33	-1.50	Pass
250.00	-3.09	-2.00	Pass
315.00	-3.65	-2.70	Pass
400.00	-4.07	-3.10	Pass
500.00	-4.65	-3.70	Pass
630.00	-5.04	-4.10	Pass
800.00	-5.20	-4.30	Pass
1,000.00	-5.62	-4.70	Pass
1,250.00	-5.68	-4.80	Pass
1,600.00	-5.80	-5.20	Pass
2,000.00	-5.87	-5.10	Pass
2,500.00	-5.83	-5.00	Pass
3,150.00	-5.62	-4.80	Pass
4,000.00	-5.31	-4.50	Pass
5,000.00	-4.94	-4.10	Pass
6,300.00	-4.44	-3.40	Pass
8,000.00	-3.83	-2.70	Pass
10,000.00	-3.13	-1.90	Pass
12,500.00	-2.38	-1.10	Pass
16,000.00	-1.53	-0.30	Pass
20,000.00	-0.62	0.60	Pass

-- End of measurement results--

– End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ilac-MRA A2LA ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB DIVISION

Calibration Certificate

Certificate Number 2022000770
Customer:
The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8384		
Serial Number	11737	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	20 Jan 2022		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	24.24	°C	± 0.25 °C
Description	Larson Davis Model 831C	***Humidity***	49.2	%RH	± 2.0 %RH
	Class 1 Sound Level Meter	***Static Pressure***	87.15	kPa	± 0.13 kPa
	Firmware Revision: 04.6.5R0				

Evaluation Method ***Tested with:*** ***Data reported in dB re 20 µPa.***

Larson Davis CAL291. S/N 0108
Larson Davis PRM831. S/N 076996
Larson Davis CAL200. S/N 9079
PCB 377B02. S/N 336515

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev B, 2017-03-31

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

1/2" adaptor is used with the preamplifier.

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with precedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

No Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 available.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3 cover only a limited subset of the specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis CAL291 Residual Intensity Calibrator	2021-09-10	2022-09-10	001250
Hart Scientific 2626-H Temperature Probe	2021-02-04	2022-08-04	006767
Larson Davis CAL200 Acoustic Calibrator	2021-07-21	2022-07-21	007027
Larson Davis Model 831	2021-03-02	2022-03-02	007182
PCB 377A13 1/2 inch Prepolarized Pressure Microphone	2021-03-03	2022-03-03	007185
SRS DS360 Ultra Low Distortion Generator	2021-04-13	2022-04-13	007635
Larson Davis 1/2" Preamplifier for Model 831 Type 1	2021-09-28	2022-09-28	PCB0004783

Acoustic Calibration

Measured according to IEC 61672-3:2013 10 and ANSI S1.4-2014 Part 3: 10

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz	114.01	113.80	114.20	0.14	Pass

Loaded Circuit Sensitivity

Measurement	Test Result [dB re 1 V / Pa]	Lower Limit [dB re 1 V / Pa]	Upper Limit [dB re 1 V / Pa]	Expanded Uncertainty [dB]	Result
1000 Hz	-26.55	-27.84	-24.74	0.14	Pass

-- End of measurement results--

Acoustic Signal Tests, C-weighting

Measured according to IEC 61672-3:2013 12 and ANSI S1.4-2014 Part 3: 12 using a comparison coupler with Unit Under Test (UUT) and reference SLM using slow time-weighted sound level for compliance to IEC 61672-1:2013 5.5; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Expected [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
125	-0.03	-0.20	-1.20	0.80	0.23	Pass
1000	0.12	0.00	-0.70	0.70	0.23	Pass
8000	-3.10	-3.00	-5.50	-1.50	0.32	Pass

-- End of measurement results--

Self-generated Noise

Measured according to IEC 61672-3:2013 11.1 and ANSI S1.4-2014 Part 3: 11.1

Measurement	Test Result [dB]
A-weighted, 20 dB gain	40.28

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
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ilac-MRA A2LA ACCREDITED Cert. #3622.01

LARSON DAVIS A PCB DIVISION

Calibration Certificate

Certificate Number 2022000766

Customer:

The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8384		
Serial Number	11735	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	20 Jan 2022		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.65	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.5R0	***Humidity***	50.2	%RH	± 2.0 %RH
		Static Pressure	87.19	kPa	± 0.13 kPa

Evaluation Method ***Tested with:*** ***Data reported in dB re 20 µPa.***

Larson Davis CAL200. S/N 9079
PCB 377B02. S/N 334653
Larson Davis CAL291. S/N 0108
Larson Davis PRM831. S/N 076994

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev B, 2017-03-31

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

1/2" adaptor is used with the preamplifier.

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with precedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

No Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 available.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3 cover only a limited subset of the specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis CAL291 Residual Intensity Calibrator	2021-09-10	2022-09-10	001250
Hart Scientific 2626-H Temperature Probe	2021-02-04	2022-08-04	006767
Larson Davis CAL200 Acoustic Calibrator	2021-07-21	2022-07-21	007027
Larson Davis Model 831	2021-03-02	2022-03-02	007182
PCB 377A13 1/2 inch Prepolarized Pressure Microphone	2021-03-03	2022-03-03	007185
SRS DS360 Ultra Low Distortion Generator	2021-04-13	2022-04-13	007635
Larson Davis 1/2" Preamplifier for Model 831 Type 1	2021-09-28	2022-09-28	PCB0004783

Acoustic Calibration

Measured according to IEC 61672-3:2013 10 and ANSI S1.4-2014 Part 3: 10

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz	114.01	113.80	114.20	0.14	Pass

Loaded Circuit Sensitivity

Measurement	Test Result [dB re 1 V / Pa]	Lower Limit [dB re 1 V / Pa]	Upper Limit [dB re 1 V / Pa]	Expanded Uncertainty [dB]	Result
1000 Hz	-26.25	-27.84	-24.74	0.14	Pass

-- End of measurement results--

Acoustic Signal Tests, C-weighting

Measured according to IEC 61672-3:2013 12 and ANSI S1.4-2014 Part 3: 12 using a comparison coupler with Unit Under Test (UUT) and reference SLM using slow time-weighted sound level for compliance to IEC 61672-1:2013 5.5; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Expected [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
125	-0.04	-0.20	-1.20	0.80	0.23	Pass
1000	0.14	0.00	-0.70	0.70	0.23	Pass
8000	-3.00	-3.00	-5.50	-1.50	0.32	Pass

-- End of measurement results--

Self-generated Noise

Measured according to IEC 61672-3:2013 11.1 and ANSI S1.4-2014 Part 3: 11.1

Measurement	Test Result [dB]
A-weighted, 20 dB gain	40.30

-- End of measurement results--

-- End of Report--

Signatory: *Ron Harris*

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1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ilac-MRA ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB DIVISION

Calibration Certificate

Certificate Number 2022000733
Customer:
The Modal Shop
10310 AeroHub Boulevard
Cincinnati, OH 45215, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	11735	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	20 Jan 2022		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.31	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.6.5R0	***Humidity***	51.7	%RH	± 2.0 %RH
		Static Pressure	87.39	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 076994 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

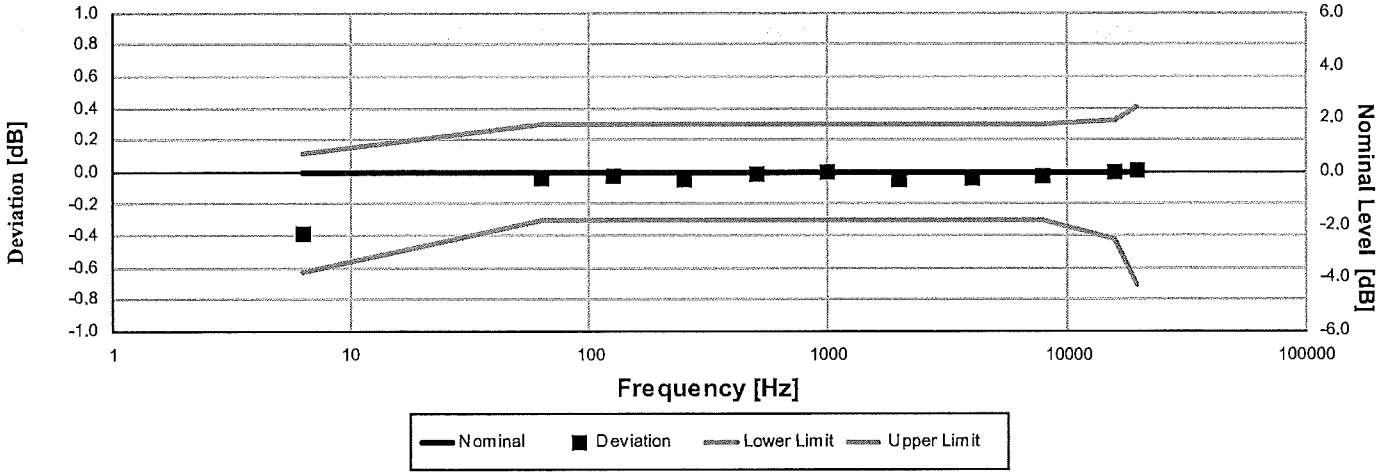
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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used			
Description	**Cal Date**	**Cal Due**	**Cal Standard**
Hart Scientific 2626-H Temperature Probe	2021-02-04	2022-08-04	006767
SRS DS360 Ultra Low Distortion Generator	2021-04-13	2022-04-13	007635

Z-weight Filter Response

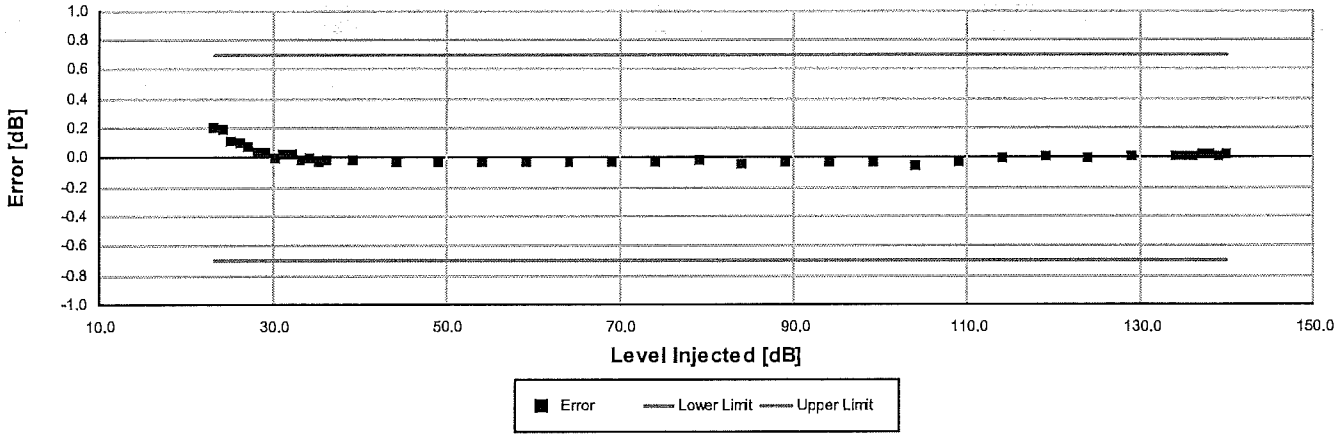


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.39	-0.39	-0.63	0.12	0.15	Pass
63.10	-0.04	-0.04	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.04	-0.04	-0.30	0.30	0.15	Pass
501.19	-0.02	-0.02	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.04	-0.04	-0.30	0.30	0.15	Pass
3,981.07	-0.04	-0.04	-0.30	0.30	0.15	Pass
7,943.28	-0.03	-0.03	-0.30	0.30	0.15	Pass
15,848.93	0.00	0.00	-0.42	0.32	0.15	Pass
19,952.62	0.01	0.01	-0.71	0.41	0.15	Pass

– End of measurement results–

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



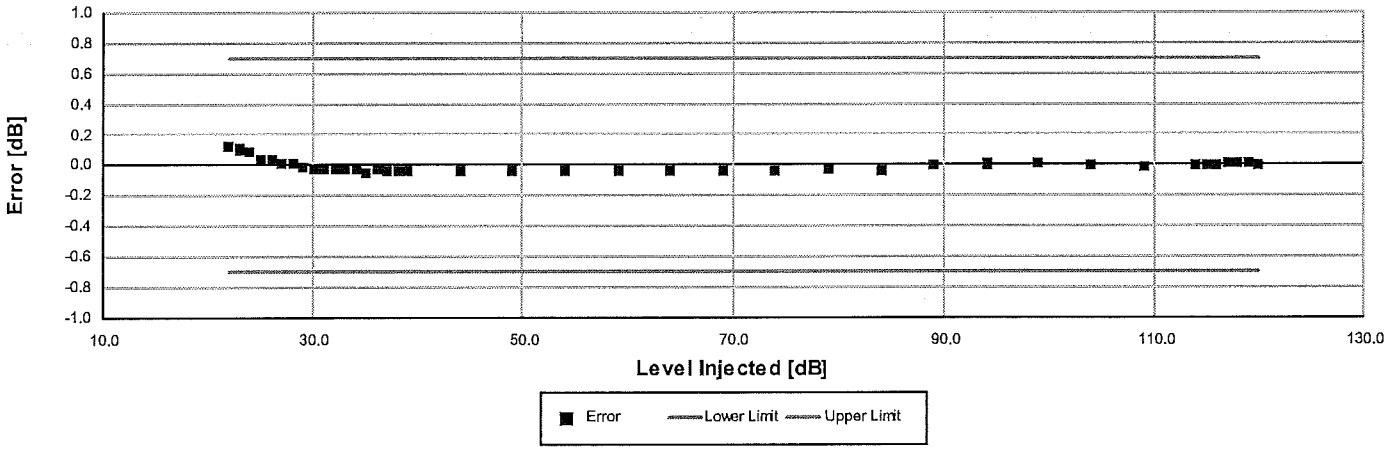
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
23.00	0.21	-0.70	0.70	0.16	Pass
24.00	0.20	-0.70	0.70	0.16	Pass
25.00	0.12	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.07	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.18	Pass
30.00	0.00	-0.70	0.70	0.17	Pass
31.00	0.02	-0.70	0.70	0.17	Pass
32.00	0.02	-0.70	0.70	0.17	Pass
33.00	-0.01	-0.70	0.70	0.16	Pass
34.00	0.00	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.01	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.03	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.03	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.03	-0.70	0.70	0.16	Pass
69.00	-0.03	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.02	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.03	-0.70	0.70	0.16	Pass
99.00	-0.03	-0.70	0.70	0.16	Pass
104.00	-0.05	-0.70	0.70	0.15	Pass
109.00	-0.02	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.02	-0.70	0.70	0.15	Pass
124.00	0.00	-0.70	0.70	0.15	Pass
129.00	0.02	-0.70	0.70	0.15	Pass
134.00	0.01	-0.70	0.70	0.15	Pass
135.00	0.01	-0.70	0.70	0.15	Pass
136.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	0.02	-0.70	0.70	0.15	Pass
138.00	0.02	-0.70	0.70	0.15	Pass
139.00	0.01	-0.70	0.70	0.15	Pass
140.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
22.00	0.13	-0.70	0.70	0.16	Pass
23.00	0.11	-0.70	0.70	0.16	Pass
24.00	0.09	-0.70	0.70	0.16	Pass
25.00	0.04	-0.70	0.70	0.16	Pass
26.00	0.04	-0.70	0.70	0.19	Pass
27.00	0.01	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	-0.02	-0.70	0.70	0.18	Pass
30.00	-0.03	-0.70	0.70	0.17	Pass
31.00	-0.02	-0.70	0.70	0.17	Pass
32.00	-0.03	-0.70	0.70	0.17	Pass
33.00	-0.02	-0.70	0.70	0.16	Pass
34.00	-0.03	-0.70	0.70	0.16	Pass
35.00	-0.05	-0.70	0.70	0.16	Pass
36.00	-0.03	-0.70	0.70	0.16	Pass
37.00	-0.04	-0.70	0.70	0.16	Pass
38.00	-0.04	-0.70	0.70	0.16	Pass
39.00	-0.03	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.04	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.01	-0.70	0.70	0.16	Pass
99.00	0.01	-0.70	0.70	0.16	Pass
104.00	-0.01	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.00	-0.70	0.70	0.15	Pass
116.00	0.00	-0.70	0.70	0.15	Pass
117.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
118.00	0.01	-0.70	0.70	0.15	Pass
119.00	0.01	-0.70	0.70	0.15	Pass
120.00	0.00	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.92	134.62	136.62	0.15	Pass
		Positive Pulse	135.94	134.62	136.62	0.15	Pass
	30	Negative Pulse	135.01	134.62	136.62	0.15	Pass
		Positive Pulse	135.08	134.62	136.62	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.10	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	-0.25	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	-0.22	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.10	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	0.01	± 1.50	0.15 ‡	Pass
108.00	3	-0.11	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	0.03	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.00	93.91	94.11	0.15	Pass
0 dB Gain, Linearity	28.06	27.31	28.71	0.16	Pass
20 dB Gain	94.02	93.91	94.11	0.15	Pass
20 dB Gain, Linearity	23.07	22.31	23.71	0.16	Pass
OBA High Range	94.01	93.20	94.80	0.15	Pass
OBA Normal Range	94.01	93.91	94.11	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.60	9.00	Pass
C-weight Noise Floor	12.39	15.00	Pass
Z-weight Noise Floor	22.48	25.00	Pass

-- End of measurement results--

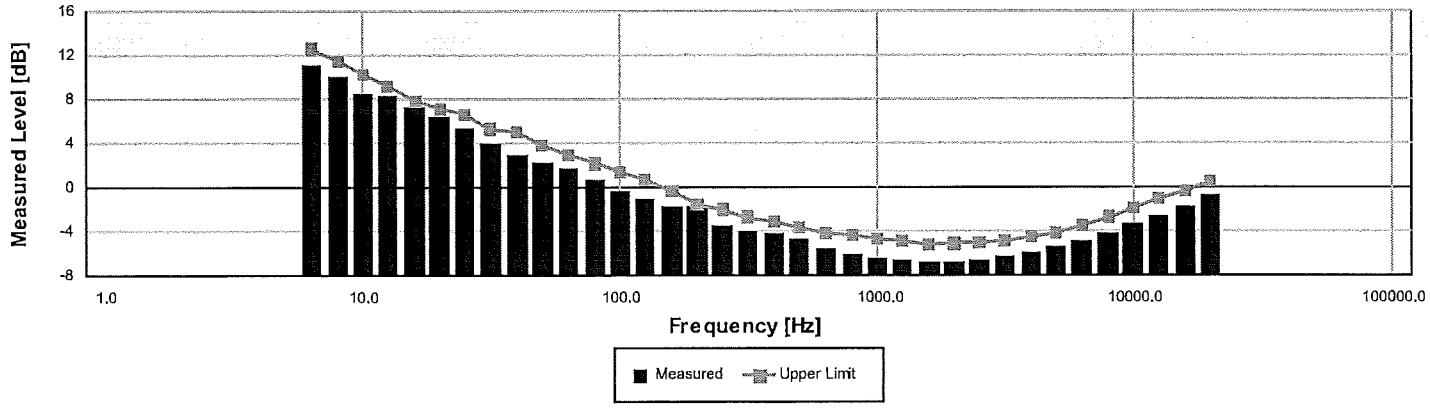
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.50	137.20	138.80	0.15	Pass
THD	-76.23		-60.00	1.30 ‡	Pass
THD+N	-75.27		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to normal range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.17	12.60	Pass
8.00	10.13	11.50	Pass
10.00	8.48	10.20	Pass
12.50	8.40	9.20	Pass
16.00	7.37	7.90	Pass
20.00	6.37	7.20	Pass
25.00	5.33	6.60	Pass
31.50	4.03	5.30	Pass
40.00	2.90	5.00	Pass
50.00	2.29	3.80	Pass
63.00	1.67	3.00	Pass
80.00	0.73	2.20	Pass
100.00	-0.31	1.40	Pass
125.00	-1.08	0.70	Pass
160.00	-1.65	-0.40	Pass
200.00	-1.77	-1.50	Pass
250.00	-3.55	-2.00	Pass
315.00	-3.93	-2.70	Pass
400.00	-4.14	-3.10	Pass
500.00	-4.71	-3.70	Pass
630.00	-5.60	-4.10	Pass
800.00	-6.08	-4.30	Pass
1,000.00	-6.41	-4.70	Pass
1,250.00	-6.56	-4.80	Pass
1,600.00	-6.77	-5.20	Pass
2,000.00	-6.74	-5.10	Pass
2,500.00	-6.62	-5.00	Pass
3,150.00	-6.28	-4.80	Pass
4,000.00	-5.83	-4.50	Pass
5,000.00	-5.35	-4.10	Pass
6,300.00	-4.79	-3.40	Pass
8,000.00	-4.09	-2.70	Pass
10,000.00	-3.33	-1.90	Pass
12,500.00	-2.52	-1.10	Pass
16,000.00	-1.64	-0.30	Pass
20,000.00	-0.73	0.60	Pass

-- End of measurement results--

– End of Report--

Signatory: *Ron Harris*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ilac-MRA

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APPENDIX C DEVIATIONS FROM PROCEDURES

Table 1. Calibration and Noise Floor Corrections

Monitoring ID	Calibration Corrections	Noise Floor Corrections
WM1	Calibration value used in measurement: -17.94 dB Previous accurate calibration value: -8.00 dB Correction made: -9.94 dB	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4 dBA
WM2	Calibration value used in measurement: -17.92 dB re. 1V/Pa Previous accurate calibration value: -7.98 dB re. 1V/Pa Correction made: -9.94 dB	Noise Floor: 6.5 dBA (Lowest Lmin value for two consecutive hours) Noise Floor Correction: 6.4 dBA
WM3	Calibration value used in measurement: -17.95 dB re. 1V/Pa Previous accurate calibration value: -7.98 dB re. 1V/Pa Correction made: -9.97 dB	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4 dBA
WM4	Calibration value used in measurement: -7.92dB re. 1V/Pa No calibration correction was needed.	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4 dBA
WM5	Calibration value used in measurement: 2.12 dB re. 1V/Pa Previous accurate calibration value: -7.73 dB re. 1V/Pa Correction made: +9.95 dB	Noise Floor: 4.1 dBA (Lowest Lmin value for two consecutive hours) Noise Floor Correction: 4.0 dBA
WM6	The meter only had PRM831 data logged. Calibration data from meters WM1, WM2, and WM3 (had similar PRM831 values) were used to recalibrate data for WM6. Correction made: -9.95 dB	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4dBA
WM8	Calibration value used in measurement: -18.27 dB re. 1V/Pa Previous accurate calibration value: -7.73 dB re. 1V/Pa Correction made: -10.54 dB	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4dBA
WM10	Calibration value used in measurement: 2.19 dB re. 1V/Pa Previous accurate calibration value: -7.64 dB re. 1V/Pa Correction made: +9.28 dB	Noise Floor: 6.1 dBA (Lowest Lmin value for two consecutive hours)) Noise Floor Correction: 6.0 dBA
WM11	Calibration value used in measurement: 2.08 dB re. 1V/Pa Previous accurate calibration value: -7.57 dB re. 1V/Pa Correction made: +9.65 dB	Noise Floor: 5.65 dBA (Lowest Lmin value for two consecutive hours) Noise Floor Correction: 5.55 dBA
WM12	Calibration value used in measurement: 2.22 dB re. 1V/Pa Previous accurate calibration value: -8.07 dB re. 1V/Pa Correction made: +10.29 dB	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4 dBA
WM13	Calibration value used in measurement: -17.42 dB re. 1V/Pa Previous accurate calibration value: -7.69 dB re. 1V/Pa	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4dBA

	Correction made: -9.73 dB	
WM15	Calibration value used in measurement: -18.09 dB re. 1V/Pa Previous accurate calibration value: -7.17 dB re. 1V/Pa Correction made: -10.92 dB	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4dBA
WM16	Calibration value used in measurement: -17.98 dB re. 1V/Pa Previous accurate calibration value: -7.17 dB re. 1V/Pa Correction made: -10.81 dB	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4dBA
WM18	Calibration value used in measurement: -17.92 Previous accurate calibration value: -7.63 Correction made: -10.29	Noise Floor: 6.5 dBA (manufacturer specification) Noise Floor Correction: 6.4dBA

APPENDIX D HOURLY DATA FOR WILDLIFE NOISE MONITORING LOCATIONS

WM1: Overall Hourly Intervals – A-weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/7/2022	10:42:26 AM	44.63366	28.79842	71.86591	41.57867	35.69952	32.10013
2/7/2022	11:00:00 AM	31.47706	18.78986	49.89872	34.77679	27.14068	21.84738
2/7/2022	12:00:00 PM	24.62593	18.71165	47.46384	26.13371	23.10269	21.33601
2/7/2022	1:00:00 PM	24.58928	19.39468	40.16278	26.34003	23.60608	21.79609
2/7/2022	2:00:00 PM	25.68118	19.8652	48.0472	26.95467	23.79948	22.03252
2/7/2022	3:00:00 PM	24.99612	18.97672	42.99905	25.64853	22.88933	21.38422
2/7/2022	4:00:00 PM	24.59369	19.86196	45.75593	25.29267	23.36403	22.09833
2/7/2022	5:00:00 PM	25.4294	20.53254	40.37177	27.29729	24.45203	22.85969
2/7/2022	6:00:00 PM	25.81842	20.66684	40.33428	27.66208	24.92013	23.06376
2/7/2022	7:00:00 PM	28.40961	20.20872	43.67584	30.93524	27.34392	23.68858
2/7/2022	8:00:00 PM	27.36538	20.23645	50.0233	27.51491	24.48703	22.84021
2/7/2022	9:00:00 PM	32.27378	21.63799	45.37563	35.09229	30.63529	26.06707
2/7/2022	10:00:00 PM	35.59953	21.02965	66.78234	35.75411	30.62503	24.88032
2/7/2022	11:00:00 PM	31.4122	21.47538	48.29107	34.42466	28.36726	24.61965
2/8/2022	12:00:00 AM	28.74129	21.62721	43.2494	31.25184	27.01657	24.53432
2/8/2022	1:00:00 AM	30.19024	21.66221	46.74622	32.60044	28.14701	24.84841
2/8/2022	2:00:00 AM	30.75048	21.24499	46.4959	33.37418	28.55801	24.83396
2/8/2022	3:00:00 AM	31.21638	21.9604	45.77369	34.23924	29.21023	25.21829
2/8/2022	4:00:00 AM	30.89356	22.59818	44.29717	33.67984	28.99549	25.78158
2/8/2022	5:00:00 AM	34.95776	24.60344	48.75186	37.85086	33.23073	28.98981
2/8/2022	6:00:00 AM	34.79591	22.44609	47.77779	38.1859	32.72026	26.04708
2/8/2022	7:00:00 AM	33.81376	23.45681	55.26339	35.42373	31.21832	27.34786
2/8/2022	8:00:00 AM	32.18854	24.69424	46.29629	34.76897	30.44966	27.74113
2/8/2022	9:00:00 AM	35.70423	26.25551	49.46884	38.41953	34.05103	30.63813
2/8/2022	10:00:00 AM	32.06767	20.17465	49.31548	34.35061	28.59664	24.72471
2/8/2022	11:00:00 AM	27.01966	16.91098	47.49769	28.78042	23.98991	21.20373
2/8/2022	12:00:00 PM	41.34246	17.83597	67.52525	34.94547	25.54494	22.26945
2/8/2022	1:00:00 PM	29.7473	21.02104	52.56957	32.96232	26.6277	23.90541
2/8/2022	2:00:00 PM	24.62262	18.83595	38.76381	26.70416	23.63083	21.73624
2/8/2022	3:00:00 PM	23.52478	19.02199	36.42512	25.17588	23.0174	21.33437
2/8/2022	4:00:00 PM	54.49349	9.845656	80.80005	37.18808	22.42662	15.26837
2/8/2022	5:00:00 PM	42.54115	19.86855	62.08058	45.14383	28.88158	22.02252
2/8/2022	6:00:00 PM	46.03216	21.09043	66.57024	49.71294	34.2144	24.36675

2/8/2022	7:00:00 PM	39.38157	19.81198	63.04739	38.79289	25.23811	22.00149
2/8/2022	8:00:00 PM	37.99141	19.586	60.49665	39.81526	25.57773	22.00547
2/8/2022	9:00:00 PM	27.27776	19.2762	44.46359	30.19424	24.4303	21.91623
2/8/2022	10:00:00 PM	28.01372	19.39664	51.60987	29.47019	24.79944	22.11227
2/8/2022	11:00:00 PM	32.78218	22.81299	50.65456	35.79808	30.44999	26.96541
2/9/2022	12:00:00 AM	31.52456	20.58012	49.3699	34.07141	26.79827	23.60704
2/9/2022	1:00:00 AM	31.60993	22.28994	47.15324	34.42195	29.34438	25.72749
2/9/2022	2:00:00 AM	29.75335	22.05707	46.94985	32.37711	27.65003	24.70848
2/9/2022	3:00:00 AM	34.90613	22.93775	53.4319	37.74883	30.74566	26.87044
2/9/2022	4:00:00 AM	27.66026	21.1789	45.49341	29.43076	26.09784	23.91138
2/9/2022	5:00:00 AM	31.72961	22.78751	50.46768	33.83108	29.07607	25.94433
2/9/2022	6:00:00 AM	35.18568	22.12807	55.32246	38.09155	32.52695	26.77034
2/9/2022	7:00:00 AM	34.91577	24.05097	51.72899	37.99418	32.78505	28.44481
2/9/2022	8:00:00 AM	34.5049	24.14342	55.60146	36.30019	31.31945	28.12987
2/9/2022	9:00:00 AM	30.20394	20.79564	53.59148	31.74665	26.38646	23.67221
2/9/2022	10:00:00 AM	28.34729	19.4495	46.52673	30.26964	26.66707	23.94874
2/9/2022	11:00:00 AM	44.41049	22.49814	64.46933	44.23781	30.0177	26.42868
2/9/2022	12:00:00 PM	45.28534	21.9895	66.81116	45.89431	28.51405	25.15893
2/9/2022	1:00:00 PM	45.30995	22.38844	68.46264	44.5598	28.33594	25.40005
2/9/2022	2:00:00 PM	46.18977	21.72463	67.11559	48.7566	30.76369	24.92605
2/9/2022	3:00:00 PM	51.15254	21.00803	71.68773	54.2115	34.12151	24.2725
2/9/2022	4:00:00 PM	52.54789	23.60015	71.95125	56.36562	39.29777	30.14335
2/9/2022	5:00:00 PM	48.15327	18.78652	68.56528	49.6993	30.13064	23.89567
2/9/2022	6:00:00 PM	30.53855	18.42861	50.99833	32.2819	22.68495	20.91389
2/9/2022	7:00:00 PM	39.71568	19.29751	58.86794	42.63909	28.67953	22.19435
2/9/2022	8:00:00 PM	35.52578	19.74142	54.0699	39.16375	28.19117	22.52799
2/9/2022	9:00:00 PM	38.15742	19.31835	58.95821	40.27403	24.09507	21.51323
2/9/2022	10:00:00 PM	34.43521	19.79571	57.91179	34.36015	24.14424	22.0321
2/9/2022	11:00:00 PM	36.40412	19.28089	58.45621	36.86201	24.61368	22.12704
2/10/2022	12:00:00 AM	32.39684	20.24258	52.73024	34.38667	27.90361	23.42751
2/10/2022	1:00:00 AM	34.33602	20.56307	50.18196	38.19372	30.46238	25.0904
2/10/2022	2:00:00 AM	32.32719	19.24703	54.81574	34.24964	26.9837	22.78686
2/10/2022	3:00:00 AM	27.23319	20.91325	40.44231	29.70273	25.81815	23.48258
2/10/2022	4:00:00 AM	31.54295	22.01217	50.05848	33.43686	28.57328	25.37057
2/10/2022	5:00:00 AM	35.18143	20.0904	54.34234	37.8809	29.83932	24.05655
2/10/2022	6:00:00 AM	34.06185	22.06505	53.01228	36.58439	30.2242	25.66808
2/10/2022	7:00:00 AM	35.54323	21.35673	54.55975	38.50495	32.02567	25.36256
2/10/2022	8:00:00 AM	36.44858	24.42238	53.38213	39.39649	32.6037	27.8384
2/10/2022	9:00:00 AM	34.58933	23.07304	52.07666	37.30511	30.3775	26.68927

2/10/2022	10:00:00 AM	29.75977	21.62351	45.70593	32.43186	27.66398	24.56685
2/10/2022	11:00:00 AM	32.35427	18.85783	55.88919	29.95328	24.18564	22.03286
2/10/2022	12:00:00 PM	41.48087	18.54887	65.08189	43.23637	24.8343	21.19277
2/10/2022	1:00:00 PM	41.75972	18.60635	61.39958	44.4257	26.03441	21.10254
2/10/2022	2:00:00 PM	43.99191	19.41817	70.60496	46.50752	30.06065	22.79795
2/10/2022	3:00:00 PM	43.43363	18.05929	64.70939	46.39338	28.49532	21.53102
2/10/2022	4:00:00 PM	29.22521	18.40432	49.58368	31.51931	25.02719	22.08055
2/10/2022	5:00:00 PM	39.70355	20.4528	71.5515	36.9473	29.18552	25.30517
2/10/2022	6:00:00 PM	36.44379	19.46041	60.52493	37.05089	27.03428	23.08421
2/10/2022	7:00:00 PM	36.33258	19.54564	59.1731	36.65993	24.16571	21.78602
2/10/2022	8:00:00 PM	28.26094	20.11348	49.19534	29.12858	25.01798	22.79417
2/10/2022	9:00:00 PM	34.6847	21.33206	52.46339	38.08684	29.32726	24.7857
2/10/2022	10:00:00 PM	32.6681	21.88756	50.52863	35.49872	29.32175	25.24375
2/10/2022	11:00:00 PM	32.49032	22.40313	53.27668	35.12796	29.73543	26.38527
2/11/2022	12:00:00 AM	30.27727	22.13203	46.657	32.84559	28.54067	25.29084
2/11/2022	1:00:00 AM	32.02927	21.97186	50.08707	34.37591	29.08634	25.44768
2/11/2022	2:00:00 AM	35.06501	23.90091	54.58312	38.02447	32.295	27.82869
2/11/2022	3:00:00 AM	37.28171	25.99029	58.30739	39.4529	34.07771	30.16561
2/11/2022	4:00:00 AM	39.4369	28.93331	54.19647	42.28669	37.6366	34.10126
2/11/2022	5:00:00 AM	36.85569	26.28006	52.07757	39.75553	34.51878	30.78116
2/11/2022	6:00:00 AM	39.52604	23.35846	56.45802	42.75661	36.85767	29.04441
2/11/2022	7:00:00 AM	37.35209	24.75333	55.99039	39.84454	34.37136	29.33039
2/11/2022	8:00:00 AM	42.41235	27.91931	70.18999	41.11558	36.06425	32.66245
2/11/2022	9:00:00 AM	34.32349	25.61511	47.51473	37.12542	32.57909	29.1891
2/11/2022	10:00:00 AM	36.36872	24.97238	57.16069	39.00336	33.61826	29.50383
2/11/2022	11:00:00 AM	31.61799	15.75312	51.33135	31.99326	24.9072	21.1405
2/11/2022	12:00:00 PM	36.51301	16.5536	57.83936	35.79096	23.04722	20.51969
2/11/2022	1:00:00 PM	47.67911	17.56418	67.80536	50.20284	29.54565	21.85175
2/11/2022	2:00:00 PM	47.29025	19.25203	66.64123	50.08408	30.24076	22.56254
2/11/2022	3:00:00 PM	47.86419	17.56801	70.2656	49.64391	30.74464	22.31086
2/11/2022	4:00:00 PM	39.30445	17.25309	63.13076	39.03237	25.31249	21.2977
2/11/2022	5:00:00 PM	38.79788	18.24084	59.97859	40.74132	25.69424	21.46592
2/11/2022	6:00:00 PM	41.85512	19.07165	60.55163	45.22083	31.13181	22.44053
2/11/2022	7:00:00 PM	37.01025	19.27896	59.09517	38.37709	24.92645	22.03077
2/11/2022	8:00:00 PM	36.3158	18.90385	54.96108	39.3905	29.45841	23.22167
2/11/2022	9:00:00 PM	36.14934	18.27865	57.61516	38.68196	28.72431	23.01234
2/11/2022	10:00:00 PM	33.56035	18.27402	53.11465	36.1761	26.6942	21.66736
2/11/2022	11:00:00 PM	33.98891	17.78634	57.86644	35.54663	25.67177	21.40964

2/12/2022	12:00:00 AM	30.43136	15.74178	55.70356	30.51044	22.59786	19.16622
2/12/2022	1:00:00 AM	32.96654	19.20611	56.74378	34.74389	28.91502	23.55891
2/12/2022	2:00:00 AM	32.83261	21.24998	47.26257	36.01159	30.70255	26.64115
2/12/2022	3:00:00 AM	33.82778	23.84357	51.18321	36.43412	31.73544	28.36743
2/12/2022	4:00:00 AM	32.05166	18.41335	50.80036	35.31441	28.60097	23.02147
2/12/2022	5:00:00 AM	33.36293	21.45064	53.77443	35.54422	29.8251	25.94964
2/12/2022	6:00:00 AM	32.93006	18.45936	52.22093	35.48272	29.43588	22.71662
2/12/2022	7:00:00 AM	33.51874	19.54741	49.0511	36.70342	31.40139	25.22811
2/12/2022	8:00:00 AM	33.28046	22.64711	47.5657	36.58468	31.02962	26.73757
2/12/2022	9:00:00 AM	36.96616	26.44436	51.07828	40.03808	34.97572	31.23804
2/12/2022	10:00:00 AM	37.06381	24.18035	54.34905	39.72617	33.13008	28.90531
2/12/2022	11:00:00 AM	43.23378	25.65765	71.35952	37.5132	32.41531	29.25272
2/12/2022	12:00:00 PM	38.09417	23.9217	60.50982	39.97727	32.41621	28.78722
2/12/2022	1:00:00 PM	36.56749	22.09941	57.69972	38.30302	30.77227	26.8312
2/12/2022	2:00:00 PM	35.41688	19.02345	61.47418	36.11428	27.89335	23.88588
2/12/2022	3:00:00 PM	32.34313	17.09236	54.57012	34.26265	24.81945	20.90557
2/12/2022	4:00:00 PM	33.91462	15.83404	55.13747	36.05187	24.51964	20.20989
2/12/2022	5:00:00 PM	38.53344	17.26021	61.75797	40.19253	27.74546	22.12124
2/12/2022	6:00:00 PM	36.06054	15.94087	56.8931	38.23861	25.7807	19.24436
2/12/2022	7:00:00 PM	36.0235	15.1443	62.80477	36.47321	23.19385	18.3607
2/12/2022	8:00:00 PM	33.13429	15.64556	53.51999	35.26722	23.23082	19.21839
2/12/2022	9:00:00 PM	31.36798	17.98882	50.69772	34.15058	26.30639	21.38142
2/12/2022	10:00:00 PM	37.64435	19.96532	58.10577	40.30434	32.31561	25.76645
2/12/2022	11:00:00 PM	34.92377	19.26402	53.37391	37.75994	28.84903	24.11412
2/13/2022	12:00:00 AM	37.17614	20.58423	53.83315	40.66781	31.74159	26.00151
2/13/2022	1:00:00 AM	35.3483	22.10928	52.49401	38.73037	31.30797	26.94417
2/13/2022	2:00:00 AM	36.29462	21.6572	52.80936	39.30364	32.9269	28.01291
2/13/2022	3:00:00 AM	34.03641	22.19065	51.71055	36.90406	29.71641	26.22454
2/13/2022	4:00:00 AM	37.09946	22.62587	52.7068	40.23295	33.95453	28.77957
2/13/2022	5:00:00 AM	39.40008	27.47384	53.93718	42.53139	37.10653	32.79196
2/13/2022	6:00:00 AM	37.6661	19.55182	56.75584	40.84695	34.24111	24.95975
2/13/2022	7:00:00 AM	36.15882	21.37378	56.06822	38.92178	33.07145	26.87818
2/13/2022	8:00:00 AM	36.59844	25.86667	52.57525	38.84287	33.55005	30.06372
2/13/2022	9:00:00 AM	36.4612	25.55715	51.64015	39.12686	33.56522	29.95691
2/13/2022	10:00:00 AM	36.08277	24.26515	51.01298	39.40286	33.18025	28.96841
2/13/2022	11:00:00 AM	34.93213	21.72468	61.26762	36.32827	30.09968	26.10771
2/13/2022	12:00:00 PM	32.68348	22.7726	56.15798	34.2407	29.87492	26.78285
2/13/2022	1:00:00 PM	46.16369	19.68426	64.5296	49.28339	32.71585	24.22267
2/13/2022	2:00:00 PM	49.88644	19.86448	70.75639	53.10645	37.25572	24.77232

2/13/2022	3:00:00 PM	44.32354	18.11631	65.99795	46.46442	29.35	21.09058
2/13/2022	4:00:00 PM	42.80566	15.11298	70.75049	41.33066	27.0566	20.65508
2/13/2022	5:00:00 PM	40.89683	19.92458	64.20017	41.3515	28.7258	24.75453
2/13/2022	6:00:00 PM	41.51108	19.87979	62.97246	42.3276	30.70525	24.35496
2/13/2022	7:00:00 PM	39.77254	19.54989	64.10954	38.8746	26.04985	22.55122
2/13/2022	8:00:00 PM	39.69269	19.74794	60.79622	39.07749	27.49255	23.53674
2/13/2022	9:00:00 PM	35.95871	19.61159	59.34867	33.38266	25.63264	22.57696
2/13/2022	10:00:00 PM	34.69996	18.20523	58.07805	30.67119	24.12833	21.10638
2/13/2022	11:00:00 PM	29.68116	19.24172	47.30456	32.67336	26.43097	22.93725
2/14/2022	12:00:00 AM	31.60059	21.58465	50.49205	33.63552	28.89982	25.53745
2/14/2022	1:00:00 AM	34.09625	24.34811	49.02898	37.20005	31.49992	27.78372
2/14/2022	2:00:00 AM	32.52996	21.1124	47.39015	35.32853	30.08799	25.72345
2/14/2022	3:00:00 AM	32.08825	22.58155	47.77132	34.79836	30.06162	26.32392
2/14/2022	4:00:00 AM	35.26405	21.9608	58.01566	37.7567	31.28475	26.95165
2/14/2022	5:00:00 AM	31.0359	21.04624	49.99387	33.11621	28.23227	25.04696
2/14/2022	6:00:00 AM	33.65606	20.61719	53.56931	36.3954	30.76214	24.96355
2/14/2022	7:00:00 AM	35.32522	20.82831	55.52581	37.12723	30.12354	25.52987
2/14/2022	8:00:00 AM	42.22489	22.53356	73.40406	33.80431	29.16169	26.11943
2/14/2022	9:00:00 AM	29.61537	22.2329	43.23764	32.03416	28.29407	25.65226
2/14/2022	10:00:00 AM	29.10332	21.84316	45.16525	31.32342	27.62949	24.99151
2/14/2022	11:00:00 AM	33.97892	20.25471	59.63238	34.59979	29.01065	23.75525
2/14/2022	12:00:00 PM	32.50382	21.58253	51.55451	35.16216	29.85734	26.35987
2/14/2022	1:00:00 PM	33.77799	22.89051	52.3031	36.59634	30.88621	26.71762
2/14/2022	2:00:00 PM	35.47931	21.98483	53.46153	38.72704	32.38402	26.64936
2/14/2022	3:00:00 PM	31.57102	22.10145	46.52948	34.46066	29.82037	26.09036
2/14/2022	4:00:00 PM	30.02232	21.26298	45.48169	32.82284	27.79783	24.67063
2/14/2022	5:00:00 PM	32.58135	21.54273	45.46763	35.97964	30.04065	25.54269
2/14/2022	6:00:00 PM	34.76785	23.53906	48.04254	37.92045	32.82264	27.58401
2/14/2022	7:00:00 PM	34.81857	23.67278	49.46881	38.02215	32.69693	27.7772
2/14/2022	8:00:00 PM	35.34994	23.73999	49.21555	38.7309	32.81639	28.07679
2/14/2022	9:00:00 PM	32.54841	22.63063	45.52757	35.54981	30.72736	27.00309
2/14/2022	10:00:00 PM	33.03315	23.82977	47.80498	35.88169	30.99128	27.65364
2/14/2022	11:00:00 PM	34.00651	21.37943	48.04411	38.04882	30.10229	25.57327
2/15/2022	12:00:00 AM	33.60654	19.48857	48.84784	37.62882	27.42159	22.10644
2/15/2022	1:00:00 AM	28.66305	18.12746	41.43419	32.39883	23.3534	20.36587
2/15/2022	2:00:00 AM	31.83683	21.49444	48.12545	34.63943	30.15519	26.05453
2/15/2022	3:00:00 AM	33.3283	21.72848	51.13931	36.70586	30.65425	25.57838
2/15/2022	4:00:00 AM	33.70825	22.23438	49.60626	37.04372	30.6682	25.54069
2/15/2022	5:00:00 AM	35.15368	20.01664	51.39654	38.9576	30.60573	25.24615

2/15/2022	6:00:00 AM	24.53273	11.78262	44.43636	27.09648	20.90023	16.92005
2/15/2022	7:00:00 AM	28.77399	11.11466	43.66395	33.04613	23.83859	15.77442
2/15/2022	8:00:00 AM	31.60066	22.0154	45.67064	34.4743	30.41417	26.30116
2/15/2022	9:00:00 AM	33.77858	23.26139	46.49549	36.46334	32.62282	29.0373
2/15/2022	10:00:00 AM	31.94632	19.88191	50.14376	34.92982	29.45943	24.92587
2/15/2022	11:00:00 AM	31.56765	19.76862	46.45034	34.72949	28.87822	24.67359
2/15/2022	12:00:00 PM	31.29052	19.48875	46.97321	34.59243	28.11025	24.0768
2/15/2022	1:00:00 PM	41.67437	20.0853	67.51117	45.03128	28.40921	24.21846
2/15/2022	2:00:00 PM	28.98403	18.29387	49.77572	31.35659	25.51946	22.05305
2/15/2022	3:00:00 PM	29.29006	18.24937	47.53305	32.53583	25.98244	21.88714
2/15/2022	4:00:00 PM	32.8765	24.20945	50.81672	35.09305	31.20238	28.02689
2/15/2022	5:00:00 PM	34.73512	23.81488	48.65892	37.88546	32.53017	28.12492
2/15/2022	6:00:00 PM	35.33567	24.57162	48.20051	38.43454	33.55123	29.26327
2/15/2022	7:00:00 PM	32.96238	22.56797	51.72641	35.78761	31.0049	26.68169
2/15/2022	8:00:00 PM	36.26519	23.89255	55.20884	39.37137	33.71761	28.93101
2/15/2022	9:00:00 PM	32.39125	22.48723	46.63321	35.38319	30.05313	26.83059
2/15/2022	10:00:00 PM	32.45236	22.45476	47.82484	35.55449	30.38114	26.47955
2/15/2022	11:00:00 PM	35.25553	22.98886	52.35788	38.45405	32.43215	27.52523
2/16/2022	12:00:00 AM	24.93827	15.23915	39.42032	28.61807	21.70903	18.0127
2/16/2022	1:00:00 AM	24.91741	15.70618	38.56373	27.90015	22.5929	19.2008
2/16/2022	2:00:00 AM	26.38779	17.49594	41.04849	29.40169	24.02674	20.59008
2/16/2022	3:00:00 AM	31.79449	17.85722	48.42019	35.31149	27.97687	22.26121
2/16/2022	4:00:00 AM	34.60938	22.15064	50.6361	37.82555	31.87922	26.41437
2/16/2022	5:00:00 AM	38.10184	23.10327	51.63359	41.4286	35.97025	28.79252
2/16/2022	6:00:00 AM	36.33252	22.28852	54.55648	39.10706	34.06603	28.84602
2/16/2022	7:00:00 AM	37.34269	23.13051	60.01977	40.10328	33.59506	28.75317
2/16/2022	8:00:00 AM	39.65013	27.1986	53.48808	42.64186	37.69299	32.94348
2/16/2022	9:00:00 AM	37.7234	25.94585	65.41819	38.92226	34.04826	30.67597
2/16/2022	10:00:00 AM	29.20674	19.16102	46.39507	32.40386	26.03652	22.33837
2/16/2022	11:00:00 AM	30.88181	21.72577	49.07306	32.37384	27.77495	25.01976
2/16/2022	12:00:00 PM	33.96333	22.45479	55.53145	36.18261	31.45505	27.84798
2/16/2022	1:00:00 PM	31.68272	20.33006	47.16097	35.11502	29.22433	24.8223
2/16/2022	2:00:00 PM	29.30862	18.74607	44.60087	33.1281	25.76202	22.11502
2/16/2022	3:00:00 PM	35.36022	24.13224	52.38414	38.35255	33.04114	28.20019
2/16/2022	4:00:00 PM	36.0641	23.12303	60.11525	37.40956	33.58314	27.10683
2/16/2022	5:00:00 PM	31.02871	23.01368	42.5291	33.39534	30.30874	26.40798
2/16/2022	6:00:00 PM	32.99747	24.92592	46.28441	35.65377	31.5324	28.35519
2/16/2022	7:00:00 PM	30.41039	21.24494	47.42825	33.03972	28.21091	24.74258
2/16/2022	8:00:00 PM	25.99931	19.8936	42.98978	27.44836	24.25224	22.08129

2/16/2022	9:00:00 PM	26.45746	18.92317	42.89262	28.63637	24.24532	21.64331
2/16/2022	10:00:00 PM	28.69504	19.123	42.77693	31.9111	26.27746	22.62686
2/16/2022	11:00:00 PM	29.90699	18.84596	46.15518	33.19823	26.69921	22.42191
2/17/2022	12:00:00 AM	30.81383	21.06735	46.36128	33.51396	28.36016	24.90966
2/17/2022	1:00:00 AM	37.03629	25.00025	52.6828	39.97472	34.6209	30.41988
2/17/2022	2:00:00 AM	36.12106	23.63095	52.05917	39.39424	33.81399	28.44272
2/17/2022	3:00:00 AM	31.7611	20.52483	49.48526	34.34342	28.99692	24.71521
2/17/2022	4:00:00 AM	29.4836	18.56279	45.52724	32.34292	25.63865	21.88923
2/17/2022	5:00:00 AM	26.2165	17.27749	45.54166	27.26562	21.82096	19.52281
2/17/2022	6:00:00 AM	29.91646	18.8279	48.12173	33.38006	25.71093	22.00499
2/17/2022	7:00:00 AM	40.02559	18.6709	71.8755	30.55009	25.14817	21.69975
2/17/2022	8:00:00 AM	32.02456	21.34273	45.32376	35.02953	30.54035	25.8007
2/17/2022	9:00:00 AM	30.73562	17.2528	63.8827	28.47063	23.77353	19.84099
2/17/2022	10:00:00 AM	26.87056	16.97519	49.79243	24.96121	21.26782	19.37669
2/17/2022	11:00:00 AM	25.38215	15.18595	45.36593	27.1286	22.7927	19.70208
2/17/2022	12:00:00 PM	24.63604	18.28954	43.48879	26.28127	23.03014	20.96764
2/17/2022	1:00:00 PM	26.83587	18.50728	55.67966	27.62927	23.91353	21.54727
2/17/2022	2:00:00 PM	27.22983	18.80965	51.84314	27.39823	23.35294	21.32033
2/17/2022	3:00:00 PM	23.62638	18.0471	44.29053	24.71655	22.21157	20.47574
2/17/2022	4:00:00 PM	26.00628	18.27257	48.00668	28.32912	24.20358	21.40482
2/17/2022	5:00:00 PM	29.42533	19.94392	46.25469	32.36647	26.99021	23.14462
2/17/2022	6:00:00 PM	27.61665	18.18981	43.23143	30.61973	25.07813	21.17263
2/17/2022	7:00:00 PM	24.14906	17.72909	42.42428	26.46363	22.48645	20.07346
2/17/2022	8:00:00 PM	28.74627	18.7927	52.86981	27.74006	23.49665	21.26583
2/17/2022	9:00:00 PM	27.07474	18.76727	42.48917	29.94026	25.02295	21.61864
2/17/2022	10:00:00 PM	29.71472	18.56091	44.92055	33.07435	26.67127	21.6248
2/17/2022	11:00:00 PM	33.44575	22.1902	49.35337	36.37748	31.22848	26.91043
2/18/2022	12:00:00 AM	29.9029	18.01864	46.82136	33.51782	24.1575	20.93292
2/18/2022	1:00:00 AM	39.88948	26.93305	54.06164	43.04884	37.4049	32.71354
2/18/2022	2:00:00 AM	35.97026	25.07784	48.78962	38.8054	34.39068	30.52775
2/18/2022	3:00:00 AM	32.91657	21.6307	47.15276	35.92852	30.76457	26.63808
2/18/2022	4:00:00 AM	29.24476	20.44945	45.34117	31.82924	27.38434	24.29107
2/18/2022	5:00:00 AM	31.30077	20.1001	45.70679	34.23501	29.51754	25.06416
2/18/2022	6:00:00 AM	32.69108	19.92098	47.83642	35.29141	30.66881	25.59195
2/18/2022	7:00:00 AM	35.58171	22.20082	50.27171	38.53997	33.61648	29.54901
2/18/2022	8:00:00 AM	35.0789	23.32201	48.72438	38.18809	33.1832	28.22862
2/18/2022	9:00:00 AM	35.68831	26.63413	48.19824	38.80474	33.61081	30.48443
2/18/2022	10:00:00 AM	34.22535	23.15238	50.99265	37.20098	30.87511	27.48067

2/18/2022	11:00:00 AM	26.78234	17.73251	49.73453	27.85896	22.629	20.50686
2/18/2022	12:00:00 PM	28.68945	17.44656	50.97499	25.69653	21.75708	19.94257
2/18/2022	1:00:00 PM	22.96232	17.25256	48.32475	24.29143	21.21333	19.50923
2/18/2022	2:00:00 PM	24.09371	17.17561	45.11315	25.86807	22.09601	19.49421
2/18/2022	3:00:00 PM	26.64063	18.95098	42.02725	29.13008	25.08055	22.22094
2/18/2022	4:00:00 PM	22.05258	15.41852	38.22119	24.77892	20.13744	17.79642
2/18/2022	5:00:00 PM	24.81379	17.76165	41.0658	27.05118	23.45362	20.78811
2/18/2022	6:00:00 PM	24.53331	18.44085	39.08007	26.86006	23.17655	20.91702
2/18/2022	7:00:00 PM	27.5231	18.61982	46.53892	29.44005	24.75591	21.67557
2/18/2022	8:00:00 PM	27.63435	18.60935	48.05202	28.88595	24.25937	21.49957
2/18/2022	9:00:00 PM	29.26512	20.05954	45.77433	32.20845	27.19763	23.64497
2/18/2022	10:00:00 PM	31.18367	20.79345	48.20207	33.94452	28.80895	24.96679
2/18/2022	11:00:00 PM	32.15834	18.71319	48.44858	35.51375	27.85046	22.59949
2/19/2022	12:00:00 AM	30.14421	20.19187	46.03744	32.97838	27.94984	24.22655
2/19/2022	1:00:00 AM	27.62027	19.8518	43.1485	29.92501	25.81676	23.18867
2/19/2022	2:00:00 AM	27.66317	19.26223	44.85135	30.37699	26.10683	22.67944
2/19/2022	3:00:00 AM	30.30354	21.07678	46.70862	32.93783	28.64016	25.17117
2/19/2022	4:00:00 AM	31.58087	19.7908	48.87113	33.95564	28.72095	23.83707
2/19/2022	5:00:00 AM	31.74728	20.54757	52.0759	34.11071	29.1707	25.09194
2/19/2022	6:00:00 AM	32.68202	20.065	47.30529	35.92591	30.6691	23.67326
2/19/2022	7:00:00 AM	32.89955	19.84967	50.99488	35.57388	29.58216	23.10196
2/19/2022	8:00:00 AM	36.41538	26.35539	52.61685	39.02215	33.9045	30.61026
2/19/2022	9:00:00 AM	32.00129	24.62059	45.09829	34.68942	30.62638	27.81051
2/19/2022	10:00:00 AM	32.71583	23.86657	51.35988	34.88843	30.16998	27.19036
2/19/2022	11:00:00 AM	30.02473	21.5114	45.78314	32.74862	27.84847	24.79505
2/19/2022	12:00:00 PM	49.31881	20.1076	75.67665	44.21841	27.70351	23.54296
2/19/2022	1:00:00 PM	45.18535	20.70753	64.92574	46.15425	30.13194	23.9935
2/19/2022	2:00:00 PM	50.75458	21.15179	66.98138	54.87058	39.83866	26.6873
2/19/2022	3:00:00 PM	47.48752	21.13784	65.99067	51.12767	35.39668	24.91632
2/19/2022	4:00:00 PM	39.75114	20.80651	60.67352	41.0939	28.4697	23.97205
2/19/2022	5:00:00 PM	40.11826	22.54454	62.0613	40.96703	30.64814	26.52907
2/19/2022	6:00:00 PM	37.9892	19.34188	61.22099	38.3975	28.81626	22.91703
2/19/2022	7:00:00 PM	41.32633	20.80424	61.40576	43.40683	28.78036	24.30772
2/19/2022	8:00:00 PM	45.56738	24.405	67.1107	46.728	34.31198	28.76475
2/19/2022	9:00:00 PM	47.31017	22.40094	69.1995	48.16547	35.18361	27.32419
2/19/2022	10:00:00 PM	48.60757	25.84136	68.80227	51.20601	37.82889	30.80782
2/19/2022	11:00:00 PM	37.94756	20.63524	61.56707	37.80658	32.05597	25.63457
2/20/2022	12:00:00 AM	44.74345	21.489	67.57358	39.70135	32.08069	26.83164

2/20/2022	1:00:00 AM	50.879	28.14616	68.62789	54.38477	40.41097	33.49159
2/20/2022	2:00:00 AM	45.10676	22.46796	68.59389	43.67188	31.66363	27.15434
2/20/2022	3:00:00 AM	37.32192	22.85268	61.99834	37.03328	30.91711	27.13678
2/20/2022	4:00:00 AM	32.18436	20.01812	52.71048	34.87846	28.95628	24.4015
2/20/2022	5:00:00 AM	37.41861	25.07919	53.02481	40.61297	35.10884	30.3249
2/20/2022	6:00:00 AM	44.4897	21.89874	67.14574	44.10326	33.14075	26.51814
2/20/2022	7:00:00 AM	53.65366	24.92047	74.37232	56.99188	41.64992	31.36211
2/20/2022	8:00:00 AM	53.90282	25.15765	72.31114	57.43251	38.14754	30.18939
2/20/2022	9:00:00 AM	52.35057	25.75286	72.31877	55.82197	39.20712	30.71537
2/20/2022	10:00:00 AM	50.2668	24.70084	70.28639	53.30379	37.54739	29.19719
2/20/2022	11:00:00 AM	55.44661	26.27731	72.32806	59.3711	44.52579	31.92719
2/20/2022	12:00:00 PM	58.31519	29.23493	73.94166	62.48187	51.39072	36.68765
2/20/2022	1:00:00 PM	58.26023	29.32244	73.21387	62.48855	51.50591	37.53399

WM1: Overall Hourly Intervals – C-weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/7/2022	10:42:26 AM	55.19592	43.79951	77.24702	57.47945	51.98559	48.10884
2/7/2022	11:00:00 AM	48.59991	34.32967	63.95036	51.90791	45.78482	40.0828
2/7/2022	12:00:00 PM	45.13293	31.21299	67.45995	47.64198	39.5088	36.01356
2/7/2022	1:00:00 PM	45.8284	31.15115	68.84475	48.12531	40.5469	36.55228
2/7/2022	2:00:00 PM	46.55647	31.95159	71.83095	48.79796	42.82329	38.1496
2/7/2022	3:00:00 PM	46.42844	30.58608	65.79074	48.04803	42.13685	36.99276
2/7/2022	4:00:00 PM	43.11316	29.36537	67.54987	46.87378	37.35313	33.70842
2/7/2022	5:00:00 PM	44.82447	29.68692	69.30311	46.07339	38.73104	34.50125
2/7/2022	6:00:00 PM	43.80962	29.80408	65.08276	46.03483	38.45444	34.22374
2/7/2022	7:00:00 PM	51.85376	30.49053	72.98859	54.27965	41.75103	35.95463
2/7/2022	8:00:00 PM	42.54349	29.48269	65.47132	43.3229	37.75931	34.11426
2/7/2022	9:00:00 PM	47.32369	33.11857	61.87177	50.32893	45.4668	39.77023
2/7/2022	10:00:00 PM	48.52374	33.08497	68.81001	51.34693	45.67397	39.06257
2/7/2022	11:00:00 PM	46.56129	33.18196	62.73764	49.92	43.38894	38.41494
2/8/2022	12:00:00 AM	44.37074	33.23127	60.18218	47.24519	42.07362	38.31171
2/8/2022	1:00:00 AM	45.09518	33.82252	61.24942	47.89258	42.93089	38.72911
2/8/2022	2:00:00 AM	46.02677	32.74561	61.50554	49.03498	43.74688	38.73203
2/8/2022	3:00:00 AM	46.52109	34.32879	60.91431	49.77268	44.27848	39.39856
2/8/2022	4:00:00 AM	46.5598	35.73696	58.83876	49.65361	44.73486	40.76505
2/8/2022	5:00:00 AM	50.51313	38.90814	63.68798	53.54239	48.84414	44.37942
2/8/2022	6:00:00 AM	50.21911	36.26675	62.54915	53.6709	48.33343	42.18808
2/8/2022	7:00:00 AM	51.04417	38.79501	72.62379	53.0289	48.34653	44.15093
2/8/2022	8:00:00 AM	48.6301	39.07361	61.99123	51.43223	46.97442	43.59641
2/8/2022	9:00:00 AM	51.82049	40.81538	68.68863	54.53457	49.94066	46.23078
2/8/2022	10:00:00 AM	48.12233	36.34102	65.55727	50.78793	45.81007	41.87052
2/8/2022	11:00:00 AM	43.84698	31.29402	59.84136	47.03261	41.1103	36.82809
2/8/2022	12:00:00 PM	54.57857	32.09703	79.26745	52.10393	42.29615	37.78344
2/8/2022	1:00:00 PM	49.20448	33.73894	69.27454	51.44641	42.65315	38.61019
2/8/2022	2:00:00 PM	44.66389	30.63678	65.96138	46.84096	39.19224	35.20754
2/8/2022	3:00:00 PM	44.94254	29.32944	65.61336	47.4768	37.97149	33.90027
2/8/2022	4:00:00 PM	63.48739	25.73151	88.61581	57.11544	37.24741	31.81116
2/8/2022	5:00:00 PM	68.50047	29.64309	84.76872	72.78563	58.66648	39.84417
2/8/2022	6:00:00 PM	71.13971	31.8018	85.61311	75.86038	63.95911	45.95651
2/8/2022	7:00:00 PM	65.09504	29.53536	84.27489	68.23648	48.5281	34.99832
2/8/2022	8:00:00 PM	64.79923	29.02049	82.64502	68.80435	52.66892	35.28358
2/8/2022	9:00:00 PM	49.80586	29.35963	71.31111	51.28454	41.00409	34.6837
2/8/2022	10:00:00 PM	53.72086	29.74599	77.70349	55.43848	43.34211	35.56495
2/8/2022	11:00:00 PM	56.32792	35.84139	75.96274	60.06915	50.24292	42.74755
2/9/2022	12:00:00 AM	57.36619	31.74972	76.29784	60.5401	45.92258	37.04058
2/9/2022	1:00:00 AM	56.36485	34.57684	73.61942	59.95747	49.83586	41.63379

2/9/2022	2:00:00 AM	52.61602	34.18664	73.11883	54.75726	44.88175	39.99578
2/9/2022	3:00:00 AM	51.30824	36.36112	71.65274	54.19436	46.71743	42.01839
2/9/2022	4:00:00 AM	50.27589	33.585	72.4709	52.36091	43.54342	38.61454
2/9/2022	5:00:00 AM	55.62803	36.49964	76.28488	57.53929	46.35757	41.39
2/9/2022	6:00:00 AM	52.93782	36.70394	71.60646	56.00184	48.83395	43.17632
2/9/2022	7:00:00 AM	55.55686	39.2859	73.22682	59.00915	50.41629	45.17512
2/9/2022	8:00:00 AM	55.73806	37.60152	76.04979	58.12989	48.70431	43.89796
2/9/2022	9:00:00 AM	55.92668	34.62777	77.96029	57.34681	45.79071	40.59512
2/9/2022	10:00:00 AM	50.20683	36.58407	70.36724	52.46679	46.33918	41.91955
2/9/2022	11:00:00 AM	68.33397	38.13867	85.32833	71.83528	52.55943	44.27328
2/9/2022	12:00:00 PM	68.98312	37.58875	86.14281	72.84411	54.14499	43.32472
2/9/2022	1:00:00 PM	67.80286	37.50587	85.69274	71.32795	54.14521	43.58437
2/9/2022	2:00:00 PM	69.86919	36.53044	86.12545	74.26975	59.35416	44.30782
2/9/2022	3:00:00 PM	73.16755	35.08632	87.75705	77.961	63.11351	43.34036
2/9/2022	4:00:00 PM	74.47784	36.24832	87.82362	79.30627	67.43343	50.11028
2/9/2022	5:00:00 PM	70.65323	31.79279	86.45558	75.10131	56.02034	40.8113
2/9/2022	6:00:00 PM	59.93496	30.69769	78.50343	63.66961	49.04029	37.41783
2/9/2022	7:00:00 PM	66.77122	32.11928	82.85053	71.09758	57.48406	41.80971
2/9/2022	8:00:00 PM	64.31709	32.6483	80.65442	68.62265	58.44666	44.92668
2/9/2022	9:00:00 PM	65.5747	31.55415	82.61505	69.60624	53.64983	38.42713
2/9/2022	10:00:00 PM	62.02425	32.32168	81.2156	65.17153	49.5214	38.63276
2/9/2022	11:00:00 PM	63.6561	31.81754	82.44261	66.93141	50.38223	37.63152
2/10/2022	12:00:00 AM	58.51494	33.50741	78.62945	60.78738	45.70359	39.21476
2/10/2022	1:00:00 AM	58.83597	33.97023	75.87784	62.51535	52.42519	42.08162
2/10/2022	2:00:00 AM	56.74503	33.6266	79.29538	57.26314	43.99549	38.89763
2/10/2022	3:00:00 AM	44.78399	34.32629	65.73406	47.3326	42.47361	39.05621
2/10/2022	4:00:00 AM	56.08246	34.76762	76.76154	56.68645	44.62467	40.09318
2/10/2022	5:00:00 AM	61.52311	34.06573	79.16881	65.45414	47.44402	40.12109
2/10/2022	6:00:00 AM	57.47648	36.90505	75.63558	61.20888	48.93692	42.50104
2/10/2022	7:00:00 AM	57.42334	36.72474	77.1424	59.33114	48.97036	42.87138
2/10/2022	8:00:00 AM	55.7049	37.87083	74.84774	57.85	47.91349	42.87045
2/10/2022	9:00:00 AM	54.18896	37.37139	75.28603	55.98259	47.59914	43.13536
2/10/2022	10:00:00 AM	50.92168	36.91476	70.65809	53.4308	46.42804	42.25411
2/10/2022	11:00:00 AM	58.71953	33.29612	79.95026	59.73565	45.0529	39.8107
2/10/2022	12:00:00 PM	65.73543	31.18915	82.5744	70.05601	51.56017	37.30137
2/10/2022	1:00:00 PM	67.22484	32.45727	83.62998	71.56575	56.80545	40.50693
2/10/2022	2:00:00 PM	68.99625	34.33034	85.80234	73.37931	60.75405	44.05322
2/10/2022	3:00:00 PM	68.89854	32.72854	84.56229	73.39374	59.77419	42.089
2/10/2022	4:00:00 PM	56.52668	33.92669	75.5473	59.895	47.20428	39.75085
2/10/2022	5:00:00 PM	60.55095	36.04994	83.04791	63.96043	51.77251	42.72668
2/10/2022	6:00:00 PM	63.19936	32.34388	82.96612	66.18388	53.27196	40.48099
2/10/2022	7:00:00 PM	63.47106	30.8079	82.55351	66.60728	50.67609	37.19586
2/10/2022	8:00:00 PM	53.74603	33.39364	72.15837	57.20244	47.417	40.14416

2/10/2022	9:00:00 PM	63.13888	35.38299	78.59207	67.2619	57.78904	46.83033
2/10/2022	10:00:00 PM	57.11381	34.03221	76.42527	60.68707	48.39905	39.92999
2/10/2022	11:00:00 PM	53.58261	35.27665	78.04738	54.70024	45.63996	40.82707
2/11/2022	12:00:00 AM	51.59537	35.01189	72.35803	53.62471	45.13659	40.41354
2/11/2022	1:00:00 AM	57.99643	34.7456	77.67267	61.28811	48.55668	41.14797
2/11/2022	2:00:00 AM	58.66563	37.68582	79.10596	62.057	49.41127	43.3774
2/11/2022	3:00:00 AM	57.3488	40.15336	78.72135	59.0517	50.38743	45.37365
2/11/2022	4:00:00 AM	59.82409	44.04247	78.07117	62.49048	54.59812	49.90786
2/11/2022	5:00:00 AM	61.05652	41.08983	78.65261	64.59317	55.42552	48.04846
2/11/2022	6:00:00 AM	63.48617	39.6381	79.2799	67.53692	58.12925	47.36111
2/11/2022	7:00:00 AM	56.6365	40.17462	74.78461	59.52609	51.30074	46.14164
2/11/2022	8:00:00 AM	55.19421	42.28486	78.62651	56.83715	51.61555	47.85582
2/11/2022	9:00:00 AM	51.50675	39.91574	71.57493	53.98549	48.89551	45.0817
2/11/2022	10:00:00 AM	52.14294	39.88539	67.90731	55.15854	49.85736	45.48365
2/11/2022	11:00:00 AM	51.43096	32.32081	71.9541	54.46574	44.52989	38.39952
2/11/2022	12:00:00 PM	62.73406	30.06551	81.02241	65.44658	45.00787	35.87722
2/11/2022	1:00:00 PM	71.0366	30.1803	87.12233	75.56018	59.86566	39.31613
2/11/2022	2:00:00 PM	71.02594	30.63689	86.72971	75.49286	60.24255	39.28025
2/11/2022	3:00:00 PM	70.75782	29.85795	86.88155	75.25384	60.37108	39.58395
2/11/2022	4:00:00 PM	64.54512	26.33472	83.76587	67.35175	47.49523	32.79263
2/11/2022	5:00:00 PM	65.91116	27.3975	83.00738	69.89579	55.9143	36.02956
2/11/2022	6:00:00 PM	68.66737	28.12762	83.73073	72.93887	62.51022	46.53289
2/11/2022	7:00:00 PM	64.29751	27.80154	82.53797	68.00409	52.46965	36.46728
2/11/2022	8:00:00 PM	61.20938	30.05257	78.57591	65.17829	52.14596	39.28326
2/11/2022	9:00:00 PM	62.55953	30.33271	81.53094	66.23723	53.38053	39.05346
2/11/2022	10:00:00 PM	60.41868	30.79786	78.79021	63.76675	51.49078	38.9912
2/11/2022	11:00:00 PM	62.1464	31.73639	81.00789	65.6898	53.88245	40.05117
2/12/2022	12:00:00 AM	58.97267	28.18807	80.3843	61.75516	50.01584	36.73945
2/12/2022	1:00:00 AM	56.92027	33.25111	80.38737	58.53052	46.25001	39.8096
2/12/2022	2:00:00 AM	54.62952	36.26041	73.27223	57.8841	49.46276	43.49769
2/12/2022	3:00:00 AM	57.33984	38.42404	76.10609	60.63554	51.77892	45.21046
2/12/2022	4:00:00 AM	57.08358	32.35932	77.12406	60.66336	47.66053	39.7044
2/12/2022	5:00:00 AM	58.41042	35.58581	79.71571	61.18075	48.6672	41.93429
2/12/2022	6:00:00 AM	58.47732	32.92269	77.32783	61.36105	50.23676	41.0581
2/12/2022	7:00:00 AM	54.73217	34.5114	72.67432	58.3135	48.15496	41.29011
2/12/2022	8:00:00 AM	49.88464	37.16471	65.54715	53.21711	47.26541	42.43397
2/12/2022	9:00:00 AM	52.50431	40.13038	66.37553	55.79731	50.4936	45.97469
2/12/2022	10:00:00 AM	52.83772	38.50332	72.40223	55.56544	49.03631	44.39909
2/12/2022	11:00:00 AM	61.12659	40.82411	83.87419	61.84358	50.45579	45.85191
2/12/2022	12:00:00 PM	63.90898	39.76208	81.94958	67.6915	53.76106	46.29571
2/12/2022	1:00:00 PM	62.7052	35.33471	80.58065	66.46095	49.77086	42.31235
2/12/2022	2:00:00 PM	61.76012	33.13824	82.18858	65.30865	50.35205	40.14063
2/12/2022	3:00:00 PM	60.43868	30.95263	79.20419	64.37947	48.19657	37.32947

2/12/2022	4:00:00 PM	62.08459	30.45971	80.15716	66.09503	49.99034	37.24138
2/12/2022	5:00:00 PM	65.46383	31.58099	84.47174	69.15656	57.63876	43.99784
2/12/2022	6:00:00 PM	64.30794	26.37484	80.99592	68.24213	57.18615	42.6521
2/12/2022	7:00:00 PM	63.44882	26.99926	84.05122	66.71092	54.63775	40.72329
2/12/2022	8:00:00 PM	62.09936	28.9075	79.67296	65.8824	53.29531	40.14028
2/12/2022	9:00:00 PM	60.10697	31.57578	76.79691	64.10561	53.25959	40.93087
2/12/2022	10:00:00 PM	63.94491	35.33956	81.39065	67.6538	58.23497	47.40608
2/12/2022	11:00:00 PM	58.73324	32.70449	78.48215	60.82525	48.1843	40.32361
2/13/2022	12:00:00 AM	58.226	33.66637	77.19215	61.63955	46.51354	39.97054
2/13/2022	1:00:00 AM	55.78288	37.2683	74.32853	58.71578	48.82316	43.57642
2/13/2022	2:00:00 AM	62.25886	38.11331	78.59168	66.2563	56.60039	46.42021
2/13/2022	3:00:00 AM	60.69508	37.81673	77.65363	64.86605	51.67048	44.37973
2/13/2022	4:00:00 AM	61.75212	38.50392	77.36331	65.84318	55.43327	46.59197
2/13/2022	5:00:00 AM	63.61931	41.78426	78.9458	67.9451	56.83165	48.72394
2/13/2022	6:00:00 AM	63.36234	35.87177	80.81198	67.55611	55.21209	43.47993
2/13/2022	7:00:00 AM	52.24318	38.01925	71.31791	54.79328	49.09859	44.34324
2/13/2022	8:00:00 AM	52.28473	40.56514	70.79391	54.13891	49.26864	45.71817
2/13/2022	9:00:00 AM	51.65768	41.01937	66.16399	54.35294	49.79046	46.29358
2/13/2022	10:00:00 AM	52.60675	39.34157	68.62981	55.85599	49.88651	45.47245
2/13/2022	11:00:00 AM	53.58859	36.6931	74.82017	55.18793	47.18104	42.6449
2/13/2022	12:00:00 PM	56.28833	36.74326	80.14232	57.80233	47.08915	42.49573
2/13/2022	1:00:00 PM	70.75791	33.81206	85.64524	75.3257	62.07778	45.56754
2/13/2022	2:00:00 PM	73.24066	33.60209	87.60801	77.87452	66.67399	50.83083
2/13/2022	3:00:00 PM	69.43827	29.11282	85.3854	73.67604	60.86657	41.85937
2/13/2022	4:00:00 PM	66.27874	27.85803	84.55482	69.65631	55.64781	40.11876
2/13/2022	5:00:00 PM	66.42847	33.20734	84.28114	69.76323	54.84985	41.81054
2/13/2022	6:00:00 PM	66.86209	33.12617	84.69239	70.3423	55.23923	42.36218
2/13/2022	7:00:00 PM	65.35665	31.30875	84.4905	68.40068	52.91754	39.2156
2/13/2022	8:00:00 PM	65.33689	32.60976	83.57026	68.26835	51.6643	40.0663
2/13/2022	9:00:00 PM	61.42874	32.51691	81.9649	61.11161	45.58499	38.48878
2/13/2022	10:00:00 PM	60.61664	29.26191	82.39437	59.97649	45.55797	35.95293
2/13/2022	11:00:00 PM	52.03624	32.03386	72.42546	54.77304	44.40919	38.42637
2/14/2022	12:00:00 AM	55.76096	35.33769	77.24344	55.37691	46.2574	41.24154
2/14/2022	1:00:00 AM	53.22904	38.55036	72.86532	55.47936	48.52112	43.73831
2/14/2022	2:00:00 AM	52.81846	35.91534	70.99715	55.73437	47.51865	42.2018
2/14/2022	3:00:00 AM	54.85122	37.25278	75.60514	56.64773	47.8838	42.83239
2/14/2022	4:00:00 AM	59.75203	36.03914	79.66645	62.88469	50.91166	43.08952
2/14/2022	5:00:00 AM	54.91899	35.04175	74.42762	56.73939	45.64954	40.69829
2/14/2022	6:00:00 AM	53.90499	34.79036	73.98844	56.55442	47.92559	41.52209
2/14/2022	7:00:00 AM	54.29353	35.21971	77.64608	55.71823	47.5761	42.09368
2/14/2022	8:00:00 AM	52.02569	35.28562	78.33081	49.90577	44.32338	40.57923
2/14/2022	9:00:00 AM	44.80682	35.31245	59.90424	47.44499	43.11775	39.71256
2/14/2022	10:00:00 AM	43.73847	33.87794	60.08502	46.42022	42.03758	38.56511

2/14/2022	11:00:00 AM	51.7266	32.38226	78.20158	51.48546	43.99592	37.72535
2/14/2022	12:00:00 PM	55.53475	33.81463	79.35109	54.99988	44.64614	39.8997
2/14/2022	1:00:00 PM	57.08631	35.66131	78.83426	59.03856	46.33714	40.67051
2/14/2022	2:00:00 PM	61.19235	35.04156	79.38139	64.558	50.79703	41.68681
2/14/2022	3:00:00 PM	56.07449	34.2201	76.27335	58.75598	46.34921	39.81969
2/14/2022	4:00:00 PM	52.2852	34.65409	74.64618	52.52801	43.83131	39.61182
2/14/2022	5:00:00 PM	50.86279	35.58357	74.41356	53.27186	46.64504	41.25254
2/14/2022	6:00:00 PM	57.14149	37.49876	76.80708	59.48714	49.46975	43.74935
2/14/2022	7:00:00 PM	56.31115	36.99254	78.06391	58.35747	49.37337	43.49273
2/14/2022	8:00:00 PM	57.23047	37.53955	76.97074	59.6972	48.95636	43.34231
2/14/2022	9:00:00 PM	53.03717	35.69956	73.38218	55.00453	46.89935	42.24994
2/14/2022	10:00:00 PM	53.50404	36.94065	74.19727	55.39341	47.0358	42.53224
2/14/2022	11:00:00 PM	53.52669	34.44249	75.51427	55.49077	46.12377	40.54202
2/15/2022	12:00:00 AM	50.08056	30.98742	68.53374	53.84281	44.1205	35.87708
2/15/2022	1:00:00 AM	43.76605	29.27751	58.91799	47.4679	38.9959	34.00888
2/15/2022	2:00:00 AM	48.45479	35.41113	66.61722	51.22228	45.93203	41.37079
2/15/2022	3:00:00 AM	51.74274	35.55057	71.73134	54.04682	46.69443	41.52031
2/15/2022	4:00:00 AM	54.08946	32.62892	74.12008	56.94032	45.82023	38.22189
2/15/2022	5:00:00 AM	55.84064	35.94573	77.48095	57.26208	46.76089	41.774
2/15/2022	6:00:00 AM	45.12745	29.35138	69.80477	46.93548	39.99497	35.49
2/15/2022	7:00:00 AM	49.01544	29.11687	70.94313	50.26072	41.70242	36.17335
2/15/2022	8:00:00 AM	52.92629	33.81844	73.78546	55.02841	44.61471	39.43421
2/15/2022	9:00:00 AM	55.32189	36.79995	77.6306	56.83356	47.88665	42.83752
2/15/2022	10:00:00 AM	50.16728	33.90526	71.25968	52.4244	45.02446	39.93399
2/15/2022	11:00:00 AM	50.16145	33.56906	71.09544	52.42377	44.69495	39.71779
2/15/2022	12:00:00 PM	48.26972	33.55818	68.09352	50.81924	43.88477	39.38588
2/15/2022	1:00:00 PM	52.759	34.01392	78.44585	54.33751	44.43907	39.45833
2/15/2022	2:00:00 PM	45.3698	30.92345	64.76588	48.10273	40.75556	36.41198
2/15/2022	3:00:00 PM	46.64549	30.63785	69.92493	48.23964	40.71593	35.84651
2/15/2022	4:00:00 PM	55.38373	33.17539	75.582	58.79132	45.89766	38.67146
2/15/2022	5:00:00 PM	53.59522	34.74497	75.56091	55.24449	44.69074	39.87619
2/15/2022	6:00:00 PM	52.56985	37.18547	71.49984	55.05235	48.41206	43.55218
2/15/2022	7:00:00 PM	51.04876	35.8353	71.54784	53.16115	46.3559	41.29695
2/15/2022	8:00:00 PM	52.2296	37.94787	70.75726	55.27472	49.47983	44.587
2/15/2022	9:00:00 PM	48.6687	36.2901	67.19157	51.63055	45.76859	41.70688
2/15/2022	10:00:00 PM	48.2525	36.80438	65.29297	51.15699	45.98555	41.98716
2/15/2022	11:00:00 PM	50.86775	36.83442	67.82012	54.13384	47.71631	42.54902
2/16/2022	12:00:00 AM	44.7506	30.34993	66.25649	47.90298	40.19012	35.8632
2/16/2022	1:00:00 AM	40.84302	29.82864	57.7296	43.30613	39.13821	35.45504
2/16/2022	2:00:00 AM	43.25537	31.75273	63.19193	44.81784	40.06233	36.68916
2/16/2022	3:00:00 AM	46.24439	33.46311	61.53203	49.54333	43.94546	38.82919
2/16/2022	4:00:00 AM	49.42613	37.1931	65.07148	52.4936	46.97488	42.29828
2/16/2022	5:00:00 AM	52.76978	37.82609	66.6937	56.07547	50.68662	43.98212

2/16/2022	6:00:00 AM	51.89067	38.23294	70.28324	54.57168	49.69644	44.84066
2/16/2022	7:00:00 AM	52.10009	39.01072	66.98545	55.30293	49.40015	44.99762
2/16/2022	8:00:00 AM	54.08461	41.7637	67.17472	57.13232	52.37142	47.84389
2/16/2022	9:00:00 AM	50.98645	40.40919	70.29392	53.54968	48.97821	45.48417
2/16/2022	10:00:00 AM	46.98437	35.22498	65.20556	49.82034	44.45708	40.53343
2/16/2022	11:00:00 AM	46.22538	35.42349	60.66176	49.18443	44.06843	40.29874
2/16/2022	12:00:00 PM	50.87965	35.53992	70.78188	53.73875	46.53121	42.19076
2/16/2022	1:00:00 PM	53.23907	33.25942	72.34707	56.15528	44.46466	39.20273
2/16/2022	2:00:00 PM	51.33202	32.76118	71.73816	53.43095	42.89089	38.55233
2/16/2022	3:00:00 PM	51.41693	37.71928	68.31901	54.67931	48.44955	43.20585
2/16/2022	4:00:00 PM	57.72612	35.32657	80.10142	60.47116	47.44196	40.86943
2/16/2022	5:00:00 PM	49.8255	34.96512	69.79963	52.69026	43.48412	39.53418
2/16/2022	6:00:00 PM	52.08223	35.44589	72.93068	54.38125	45.03054	40.43355
2/16/2022	7:00:00 PM	48.85887	32.81704	72.01015	50.45113	41.92898	37.70518
2/16/2022	8:00:00 PM	44.75296	32.32868	69.17641	46.29426	39.9487	36.67709
2/16/2022	9:00:00 PM	42.71621	31.97576	60.82491	45.21718	39.99938	36.5998
2/16/2022	10:00:00 PM	44.42408	32.37665	60.6377	47.71031	42.02964	37.73117
2/16/2022	11:00:00 PM	45.83413	31.82816	63.16021	49.21797	42.26295	37.37908
2/17/2022	12:00:00 AM	47.03387	34.16008	66.9174	49.39961	43.62403	39.6066
2/17/2022	1:00:00 AM	52.55977	38.52305	72.39715	55.19908	49.31723	44.78009
2/17/2022	2:00:00 AM	51.49681	37.56307	66.89752	54.79754	49.15901	44.02018
2/17/2022	3:00:00 AM	47.35688	34.37929	64.49765	50.21725	44.83043	40.24427
2/17/2022	4:00:00 AM	48.21317	33.36263	63.99078	51.78109	44.20595	38.99537
2/17/2022	5:00:00 AM	43.44165	31.0339	61.69195	45.73682	39.90375	36.38327
2/17/2022	6:00:00 AM	47.26264	33.95104	64.44001	50.78259	43.59791	39.07293
2/17/2022	7:00:00 AM	46.22964	33.85136	73.15022	47.66375	42.7885	38.95092
2/17/2022	8:00:00 AM	47.8754	36.69125	59.66804	50.96879	46.48104	41.90047
2/17/2022	9:00:00 AM	43.86617	33.32226	69.44353	45.79927	41.96015	38.38336
2/17/2022	10:00:00 AM	46.03071	32.62872	67.34459	44.66181	40.12355	37.06037
2/17/2022	11:00:00 AM	43.44915	32.46826	57.29562	46.06294	41.60542	38.08403
2/17/2022	12:00:00 PM	45.70985	32.77638	65.04331	48.11927	41.59787	38.07184
2/17/2022	1:00:00 PM	46.96069	32.29472	69.16356	49.66658	42.16902	37.94827
2/17/2022	2:00:00 PM	45.3204	32.61638	66.84618	47.3012	41.047	37.64985
2/17/2022	3:00:00 PM	42.94226	32.06806	60.64245	45.41492	40.58714	37.25389
2/17/2022	4:00:00 PM	43.13992	32.76846	57.22262	45.99556	41.30829	37.79061
2/17/2022	5:00:00 PM	48.37942	33.27203	68.07077	51.02151	43.69441	38.8519
2/17/2022	6:00:00 PM	47.26267	31.7594	69.02266	49.737	41.8483	36.99511
2/17/2022	7:00:00 PM	43.82395	31.80494	64.32464	45.63284	40.27745	36.57467
2/17/2022	8:00:00 PM	45.71738	32.65903	68.3051	46.0818	40.85898	37.44587
2/17/2022	9:00:00 PM	44.9591	33.34484	62.46004	47.29453	42.44587	38.59227
2/17/2022	10:00:00 PM	46.22589	32.8386	64.0623	49.33491	43.33661	38.32442
2/17/2022	11:00:00 PM	49.8286	37.11785	68.26458	52.59904	47.2709	42.82927
2/18/2022	12:00:00 AM	45.87872	32.19844	63.09822	49.11759	41.92443	37.74548

2/18/2022	1:00:00 AM	54.87212	41.01241	68.93288	57.99028	52.63783	47.6285
2/18/2022	2:00:00 AM	51.5102	40.03115	63.82758	54.38855	50.0368	46.03477
2/18/2022	3:00:00 AM	48.35186	35.45151	62.0232	51.50039	46.35678	41.69296
2/18/2022	4:00:00 AM	44.6572	34.22156	59.13657	47.44062	43.05074	39.55866
2/18/2022	5:00:00 AM	46.79182	34.48039	59.62747	49.92649	45.11585	40.3811
2/18/2022	6:00:00 AM	48.02696	34.42966	61.91979	50.86097	46.18096	41.36192
2/18/2022	7:00:00 AM	50.73315	38.43081	63.04614	53.62794	49.21532	45.26999
2/18/2022	8:00:00 AM	50.52194	37.85463	62.42214	53.75893	48.75602	43.78887
2/18/2022	9:00:00 AM	52.27538	42.63951	63.57721	55.20717	50.70817	47.33836
2/18/2022	10:00:00 AM	49.7343	38.78881	69.82399	52.34479	47.84436	44.09537
2/18/2022	11:00:00 AM	44.48029	32.62577	62.51732	47.13862	41.86795	38.2108
2/18/2022	12:00:00 PM	44.36542	31.09788	63.97366	45.39256	39.97544	36.38022
2/18/2022	1:00:00 PM	47.6078	30.21534	75.46545	48.82337	39.35468	35.17293
2/18/2022	2:00:00 PM	49.16502	28.80133	67.64237	52.71371	41.43952	34.82318
2/18/2022	3:00:00 PM	53.10363	29.75153	73.54785	55.9313	43.33959	35.06795
2/18/2022	4:00:00 PM	47.26833	26.86115	69.70208	48.35159	36.97227	32.40229
2/18/2022	5:00:00 PM	46.51845	29.48541	66.05679	49.09422	40.31462	35.41499
2/18/2022	6:00:00 PM	47.20441	28.28257	69.22062	49.60937	38.97246	33.47698
2/18/2022	7:00:00 PM	48.68425	28.23586	73.01655	50.01704	39.41052	33.64779
2/18/2022	8:00:00 PM	45.19486	28.99383	70.93879	46.12714	39.41305	34.68903
2/18/2022	9:00:00 PM	46.17538	31.50519	65.00908	49.23245	42.18166	37.50012
2/18/2022	10:00:00 PM	49.1174	33.99454	68.36796	51.70345	44.94871	40.19338
2/18/2022	11:00:00 PM	48.60662	30.21024	65.60168	52.25332	43.57438	36.71499
2/19/2022	12:00:00 AM	46.22355	32.51199	62.90608	49.08044	43.42993	38.80417
2/19/2022	1:00:00 AM	42.28168	31.72505	57.35125	44.97883	40.17916	36.7317
2/19/2022	2:00:00 AM	43.72629	30.92976	59.57631	47.01536	41.49171	36.66859
2/19/2022	3:00:00 AM	45.41413	33.90784	60.57517	48.24862	43.73465	39.75222
2/19/2022	4:00:00 AM	45.98202	31.47709	60.97307	49.13546	43.46481	37.72686
2/19/2022	5:00:00 AM	46.97679	32.86671	63.95539	49.61086	44.42431	39.46878
2/19/2022	6:00:00 AM	47.67616	33.74138	61.31941	50.93966	45.84336	39.74237
2/19/2022	7:00:00 AM	48.13569	34.7226	61.73466	51.72142	45.9323	40.2976
2/19/2022	8:00:00 AM	50.80877	39.74007	65.9422	53.37929	48.59144	45.04539
2/19/2022	9:00:00 AM	47.31599	37.70225	59.26697	50.2503	45.82452	42.37209
2/19/2022	10:00:00 AM	48.0072	37.47274	64.8473	50.68095	45.6229	41.98223
2/19/2022	11:00:00 AM	45.2725	34.28352	59.55087	48.29483	43.17496	39.43974
2/19/2022	12:00:00 PM	68.2573	32.85399	86.65524	71.55318	54.05783	40.11595
2/19/2022	1:00:00 PM	69.51673	33.17972	85.79297	73.42452	59.10941	44.7948
2/19/2022	2:00:00 PM	74.11056	34.62478	86.48768	78.79619	68.43775	51.57831
2/19/2022	3:00:00 PM	72.0043	32.91509	86.3567	76.6579	65.48663	49.34241
2/19/2022	4:00:00 PM	66.05687	32.17863	83.46625	69.77867	55.46552	40.40552
2/19/2022	5:00:00 PM	65.77488	35.45428	83.8648	69.00511	53.44738	42.45298
2/19/2022	6:00:00 PM	63.76649	31.89462	83.53631	66.24068	51.34627	40.85736
2/19/2022	7:00:00 PM	67.3598	34.45203	84.17164	71.61254	56.21284	42.95214

2/19/2022	8:00:00 PM	69.59401	39.00941	86.43147	73.49284	59.57342	47.48824
2/19/2022	9:00:00 PM	70.48231	36.59316	86.90927	74.56693	59.97621	46.28232
2/19/2022	10:00:00 PM	72.1391	40.34405	87.14132	76.6599	64.21208	50.25972
2/19/2022	11:00:00 PM	61.95343	35.21278	83.85828	62.27131	49.08526	42.0828
2/20/2022	12:00:00 AM	66.78644	35.72969	86.27792	65.79759	48.82806	42.77978
2/20/2022	1:00:00 AM	73.87942	43.36888	86.89354	78.5837	67.72036	54.75309
2/20/2022	2:00:00 AM	68.2503	36.53529	86.94817	71.15092	51.11402	42.89681
2/20/2022	3:00:00 AM	60.72872	36.77482	83.87761	59.11026	48.29869	42.94831
2/20/2022	4:00:00 AM	54.33943	33.76566	77.1279	55.90383	46.4641	40.43156
2/20/2022	5:00:00 AM	56.09383	40.36355	75.38417	58.35044	51.45711	46.61649
2/20/2022	6:00:00 AM	67.96126	34.93709	85.72283	71.32026	54.46773	42.6593
2/20/2022	7:00:00 AM	75.26387	37.53058	88.47727	79.94235	69.21901	54.10123
2/20/2022	8:00:00 AM	75.07189	36.78347	88.54287	80.2519	65.26549	43.45486
2/20/2022	9:00:00 AM	74.38901	38.69206	88.46359	79.31223	66.76979	45.28657
2/20/2022	10:00:00 AM	73.32714	37.89183	87.53077	78.0252	66.50545	52.34867
2/20/2022	11:00:00 AM	76.55713	38.83996	88.78982	81.16715	71.96422	58.81243
2/20/2022	12:00:00 PM	78.65549	42.41634	89.37314	82.69018	76.22998	64.06314
2/20/2022	1:00:00 PM	78.64755	42.90535	88.71947	82.69682	76.3516	64.56908

WM1: Overall Hourly Intervals – Unweighted							
Date	Time	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
2/7/2022	10:42:26 AM	57.36381	45.49321	80.1212	59.44717	54.17745	50.24863
2/7/2022	11:00:00 AM	51.5742	37.69107	67.70982	54.62447	49.27149	44.29481
2/7/2022	12:00:00 PM	55.50335	34.72848	80.84356	53.9947	45.02635	40.93624
2/7/2022	1:00:00 PM	56.5101	34.54487	80.20881	57.45031	46.5763	41.53519
2/7/2022	2:00:00 PM	54.91841	34.99092	78.22026	57.57606	47.63114	42.35302
2/7/2022	3:00:00 PM	55.59626	33.64047	75.05732	58.05103	46.69069	41.19596
2/7/2022	4:00:00 PM	52.45263	32.90001	77.08805	55.31805	45.32693	39.64285
2/7/2022	5:00:00 PM	56.97418	32.91668	80.29844	58.23383	47.5513	40.83814
2/7/2022	6:00:00 PM	56.98205	32.99609	79.82429	59.16955	47.48934	40.34275
2/7/2022	7:00:00 PM	65.4191	33.17272	86.21964	68.46715	52.75747	40.97442
2/7/2022	8:00:00 PM	48.52309	31.98132	70.66485	49.7437	42.35239	38.0336
2/7/2022	9:00:00 PM	53.09091	35.31026	71.79322	56.33301	48.77539	42.70383
2/7/2022	10:00:00 PM	53.9931	35.82883	74.96426	56.66638	48.85268	42.73778
2/7/2022	11:00:00 PM	51.12044	35.25276	69.47214	54.59936	47.12694	41.93365
2/8/2022	12:00:00 AM	51.31237	35.54811	70.68428	53.83285	46.05076	41.73287
2/8/2022	1:00:00 AM	47.75417	35.65939	64.07217	50.46835	45.62149	41.47774
2/8/2022	2:00:00 AM	48.8237	35.02528	65.62351	51.57148	46.38584	41.81095
2/8/2022	3:00:00 AM	51.08281	36.46696	68.31902	54.2892	47.01754	42.35813
2/8/2022	4:00:00 AM	49.18855	37.77506	61.14446	52.21259	47.64242	43.63026
2/8/2022	5:00:00 AM	52.37447	40.51589	65.94887	55.38312	50.73897	46.40827
2/8/2022	6:00:00 AM	52.20043	38.66953	66.20146	55.41398	50.29891	44.97494
2/8/2022	7:00:00 AM	53.25644	40.81595	73.94026	55.47624	50.91815	46.7437
2/8/2022	8:00:00 AM	51.67426	41.15189	66.15549	54.46263	50.10659	46.47921
2/8/2022	9:00:00 AM	55.38331	42.48044	80.54194	56.85323	52.37125	48.58743
2/8/2022	10:00:00 AM	51.50073	39.10551	76.22212	53.75959	49.22864	45.30155
2/8/2022	11:00:00 AM	50.51831	35.01112	71.74472	52.6546	46.3785	41.93973
2/8/2022	12:00:00 PM	61.38127	35.33287	84.3312	62.05794	48.58943	42.41966
2/8/2022	1:00:00 PM	62.34167	35.69453	81.95167	64.99372	50.13272	42.54679
2/8/2022	2:00:00 PM	57.63726	33.55244	78.5371	59.50574	45.75328	39.9422
2/8/2022	3:00:00 PM	58.89607	32.27909	81.17557	61.82356	47.08079	39.55934
2/8/2022	4:00:00 PM	68.51662	30.20655	91.91739	66.17895	44.9554	38.22592
2/8/2022	5:00:00 PM	75.99048	34.54072	91.98248	80.32516	67.84274	50.38878
2/8/2022	6:00:00 PM	78.49503	37.4417	92.69145	83.19341	72.51888	57.14282
2/8/2022	7:00:00 PM	72.70694	33.2076	91.06846	76.25747	59.1944	41.98692
2/8/2022	8:00:00 PM	72.72253	32.77926	90.11927	76.7618	62.79505	43.75778
2/8/2022	9:00:00 PM	58.97111	32.8699	79.6295	61.41635	51.31318	41.61143
2/8/2022	10:00:00 PM	62.70539	33.37818	84.86032	65.34272	54.04605	43.20883
2/8/2022	11:00:00 PM	65.02046	38.14785	82.2016	69.01331	59.42321	48.812
2/9/2022	12:00:00 AM	66.0414	34.60176	84.3639	69.6228	56.21427	42.38981
2/9/2022	1:00:00 AM	65.25937	37.24349	82.2922	69.11643	59.51915	47.98752

2/9/2022	2:00:00 AM	61.37598	37.05067	81.2531	64.16535	52.39289	45.21974
2/9/2022	3:00:00 AM	56.86269	38.82468	78.10275	59.67951	51.09339	45.66211
2/9/2022	4:00:00 AM	59.60062	36.94315	80.72669	62.5688	53.35201	44.72658
2/9/2022	5:00:00 AM	63.99334	38.70168	83.64507	66.64702	53.98396	45.43954
2/9/2022	6:00:00 AM	60.20894	39.30557	79.96229	63.76019	53.46857	46.50462
2/9/2022	7:00:00 AM	63.47081	41.68541	81.49673	67.28026	56.21981	48.37631
2/9/2022	8:00:00 AM	63.76612	39.88721	83.62643	66.94354	54.31227	47.30025
2/9/2022	9:00:00 AM	64.51378	38.08733	86.00883	66.91684	53.25031	45.36933
2/9/2022	10:00:00 AM	57.24151	39.56094	77.86065	59.52848	50.9653	45.87725
2/9/2022	11:00:00 AM	74.88247	40.95935	91.39909	78.86087	61.62988	48.94298
2/9/2022	12:00:00 PM	75.64254	41.05844	92.20722	79.76966	63.89788	49.69056
2/9/2022	1:00:00 PM	74.51896	40.76781	91.20311	78.45438	63.85585	50.46146
2/9/2022	2:00:00 PM	76.92412	41.33574	92.56367	81.40936	68.65905	53.85804
2/9/2022	3:00:00 PM	79.67073	40.28392	93.97487	84.4962	72.02768	53.66604
2/9/2022	4:00:00 PM	80.96727	41.99343	93.29159	85.66925	75.58409	61.19066
2/9/2022	5:00:00 PM	77.46257	37.00342	92.7719	82.20253	66.16757	49.81532
2/9/2022	6:00:00 PM	68.38171	35.37276	86.26534	72.30315	59.88782	46.34325
2/9/2022	7:00:00 PM	74.5232	37.29142	90.22144	78.90035	66.73155	51.91734
2/9/2022	8:00:00 PM	72.46653	37.84508	88.0073	76.72159	67.64514	55.77793
2/9/2022	9:00:00 PM	73.45459	36.16732	90.15741	77.58726	63.6684	48.11391
2/9/2022	10:00:00 PM	70.20586	37.45532	89.07874	73.70943	60.19558	47.50151
2/9/2022	11:00:00 PM	71.63352	36.12434	90.54974	75.1517	60.95262	44.13733
2/10/2022	12:00:00 AM	66.91117	37.54542	86.84711	69.81947	55.20683	45.22332
2/10/2022	1:00:00 AM	67.58829	38.46794	84.67104	71.3212	62.38532	51.14147
2/10/2022	2:00:00 AM	64.97074	36.97811	88.11733	66.4369	51.3511	43.98864
2/10/2022	3:00:00 AM	53.30437	37.42306	74.09826	56.69201	49.26432	43.90061
2/10/2022	4:00:00 AM	64.39675	37.53028	83.95174	66.11439	53.08725	45.42153
2/10/2022	5:00:00 AM	69.76558	37.38391	88.24648	73.84131	55.60107	44.95369
2/10/2022	6:00:00 AM	65.89709	39.69897	83.60828	69.92078	57.09024	47.70777
2/10/2022	7:00:00 AM	65.19624	39.17991	84.60159	67.56286	53.65716	46.21942
2/10/2022	8:00:00 AM	63.37004	40.36263	82.62723	66.13622	51.9341	46.54729
2/10/2022	9:00:00 AM	59.72611	40.45543	84.80347	61.16101	53.06438	47.53933
2/10/2022	10:00:00 AM	58.97548	40.52343	78.18467	62.19738	52.38422	46.83866
2/10/2022	11:00:00 AM	65.97128	36.93042	86.01296	68.37252	52.70799	45.20043
2/10/2022	12:00:00 PM	72.664	35.17757	89.68368	77.00708	61.66134	45.11947
2/10/2022	1:00:00 PM	74.19862	37.27224	90.16742	78.54259	66.22972	50.50379
2/10/2022	2:00:00 PM	75.77176	38.22832	91.32925	80.14719	69.37278	53.61968
2/10/2022	3:00:00 PM	75.57916	36.96653	90.41356	80.01243	68.50344	51.70267
2/10/2022	4:00:00 PM	65.50811	37.07736	84.30697	69.30072	56.09887	44.63139
2/10/2022	5:00:00 PM	68.67757	38.9438	87.14547	72.5165	61.48797	49.91834
2/10/2022	6:00:00 PM	71.10025	37.05111	89.56639	74.49797	63.21557	49.59423
2/10/2022	7:00:00 PM	71.39056	34.69539	89.83919	75.02695	61.24694	44.33051
2/10/2022	8:00:00 PM	63.0808	38.33043	79.91672	66.89007	57.96723	48.87568

2/10/2022	9:00:00 PM	71.52681	40.5906	86.7827	75.52287	67.06361	57.15299
2/10/2022	10:00:00 PM	65.6715	36.75967	83.88849	69.55164	57.69039	45.06229
2/10/2022	11:00:00 PM	61.87698	37.75018	85.44414	63.93883	52.689	44.61522
2/11/2022	12:00:00 AM	60.26967	37.24577	81.42255	62.99371	52.45127	44.26063
2/11/2022	1:00:00 AM	66.57234	37.6243	85.95247	70.18959	57.90134	47.70256
2/11/2022	2:00:00 AM	66.7222	39.53572	86.4682	70.54624	56.34577	46.13167
2/11/2022	3:00:00 AM	64.77959	41.38055	85.52444	66.9465	55.23595	47.61428
2/11/2022	4:00:00 AM	67.40054	45.6057	86.46216	70.42636	60.69546	52.91795
2/11/2022	5:00:00 AM	69.32502	43.78007	86.32514	73.03869	64.21029	54.96393
2/11/2022	6:00:00 AM	71.53774	42.20796	87.17559	75.64274	66.54458	53.21849
2/11/2022	7:00:00 AM	64.09655	41.88923	83.25552	67.33584	55.92886	48.50457
2/11/2022	8:00:00 AM	59.82596	43.63877	81.32442	62.21007	55.14258	50.11078
2/11/2022	9:00:00 AM	57.41136	41.88003	78.25592	59.82572	53.41539	48.36858
2/11/2022	10:00:00 AM	56.25093	41.76552	73.34906	59.28048	52.4784	47.92766
2/11/2022	11:00:00 AM	60.10711	36.36751	79.33022	63.75146	52.71882	44.02342
2/11/2022	12:00:00 PM	69.90997	34.13385	88.44831	73.21699	56.07686	42.59208
2/11/2022	1:00:00 PM	77.5821	33.56206	93.13702	82.14207	68.86603	50.39794
2/11/2022	2:00:00 PM	77.6706	34.33282	92.60612	82.23079	69.35662	50.411
2/11/2022	3:00:00 PM	77.41738	33.08484	92.89153	81.94669	69.24968	50.10269
2/11/2022	4:00:00 PM	71.65729	29.50083	90.01569	75.08408	58.75581	41.15421
2/11/2022	5:00:00 PM	73.70135	31.69756	90.15933	77.77271	65.53158	47.31922
2/11/2022	6:00:00 PM	76.39602	33.41195	91.16404	80.64147	71.16006	57.81438
2/11/2022	7:00:00 PM	72.22553	32.80916	89.69021	76.16862	62.82697	47.58273
2/11/2022	8:00:00 PM	69.50344	34.29462	86.40451	73.56	62.28719	49.45629
2/11/2022	9:00:00 PM	70.76069	34.19139	88.37841	74.59081	63.34535	48.54638
2/11/2022	10:00:00 PM	68.79255	34.49776	86.67319	72.5041	61.6722	48.58243
2/11/2022	11:00:00 PM	70.41297	34.5601	87.69732	74.12291	63.74052	49.28205
2/12/2022	12:00:00 AM	67.45997	32.49288	87.04916	70.77155	60.55351	45.66326
2/12/2022	1:00:00 AM	64.99574	35.2924	87.89856	67.57217	52.31836	42.99389
2/12/2022	2:00:00 AM	63.14737	38.43848	81.4171	66.75873	57.37827	48.28234
2/12/2022	3:00:00 AM	65.88873	40.53338	83.28233	69.51133	60.78014	51.68145
2/12/2022	4:00:00 AM	65.69711	35.69331	85.45544	69.48608	57.00786	47.16159
2/12/2022	5:00:00 AM	66.75111	37.3852	87.69686	69.99288	57.66901	47.05319
2/12/2022	6:00:00 AM	66.9053	35.97638	85.75856	70.11869	59.48085	48.46166
2/12/2022	7:00:00 AM	63.0921	36.12803	81.08325	67.07889	54.85184	43.91759
2/12/2022	8:00:00 AM	55.33365	38.85409	71.59425	58.88694	51.4378	45.35804
2/12/2022	9:00:00 AM	56.69712	41.74468	72.13888	60.31773	53.69667	48.3852
2/12/2022	10:00:00 AM	58.78339	39.98773	80.25734	61.78648	51.85042	46.56677
2/12/2022	11:00:00 AM	67.63763	42.11591	88.34511	69.86735	55.70265	48.36696
2/12/2022	12:00:00 PM	70.94769	41.35746	87.829	75.07338	61.77209	49.81903
2/12/2022	1:00:00 PM	69.83869	36.53933	87.20878	73.8841	58.14554	45.60215
2/12/2022	2:00:00 PM	69.2346	35.20966	88.47999	73.05156	60.19929	44.95107
2/12/2022	3:00:00 PM	68.08959	33.1146	85.92692	72.36912	58.57743	41.98874

2/12/2022	4:00:00 PM	70.52055	33.11525	88.29251	74.72996	60.41554	41.76789
2/12/2022	5:00:00 PM	73.43276	36.14986	90.6558	77.21991	66.97393	54.70254
2/12/2022	6:00:00 PM	72.51351	30.93302	88.49228	76.3786	66.6284	54.22428
2/12/2022	7:00:00 PM	71.47139	32.09262	91.02588	74.98141	64.56634	52.62261
2/12/2022	8:00:00 PM	70.34354	33.02751	86.93798	74.18805	63.41414	50.90862
2/12/2022	9:00:00 PM	68.84356	35.08816	85.92408	72.87212	63.23914	51.22719
2/12/2022	10:00:00 PM	72.09279	39.11962	89.07129	75.8232	67.29383	56.85629
2/12/2022	11:00:00 PM	66.94077	34.72513	86.83904	69.49828	57.0949	44.41469
2/13/2022	12:00:00 AM	66.47515	35.78598	85.72334	70.31742	54.48804	43.65197
2/13/2022	1:00:00 AM	64.00863	38.81098	82.26117	67.43047	55.49544	46.26334
2/13/2022	2:00:00 AM	70.55803	40.06217	86.51467	74.55803	65.58146	51.9736
2/13/2022	3:00:00 AM	68.95218	39.7938	85.55933	73.26695	60.55162	48.91608
2/13/2022	4:00:00 AM	69.91094	40.87307	85.35185	74.03942	64.03616	51.11691
2/13/2022	5:00:00 AM	71.50792	42.85094	87.09667	75.93106	64.83292	51.16634
2/13/2022	6:00:00 AM	71.46336	37.67311	88.9724	75.7155	63.80875	47.25266
2/13/2022	7:00:00 AM	58.61944	39.85545	79.21686	61.16453	52.8866	46.94303
2/13/2022	8:00:00 AM	58.3659	42.25833	78.72517	59.91857	52.91905	48.38689
2/13/2022	9:00:00 AM	56.56392	42.59148	72.97448	59.90341	53.76154	48.73542
2/13/2022	10:00:00 AM	56.95808	40.89718	75.72979	60.23	52.35928	47.66185
2/13/2022	11:00:00 AM	60.43228	38.43525	80.75429	62.82978	51.30089	45.24005
2/13/2022	12:00:00 PM	63.78246	38.07409	86.50747	66.42565	53.27025	45.35988
2/13/2022	1:00:00 PM	77.76851	37.13574	91.92628	82.29738	70.5588	55.34109
2/13/2022	2:00:00 PM	79.97324	37.1514	93.55656	84.52639	74.56474	61.0924
2/13/2022	3:00:00 PM	76.57038	33.40895	91.55936	80.9153	69.64268	53.74901
2/13/2022	4:00:00 PM	73.84393	32.96546	90.78045	77.5817	65.33407	51.18019
2/13/2022	5:00:00 PM	73.93028	35.97673	91.24869	77.65405	64.61637	50.84072
2/13/2022	6:00:00 PM	74.32372	36.16316	91.37635	78.01146	64.71439	50.51904
2/13/2022	7:00:00 PM	72.95982	33.60884	91.67897	76.38506	63.01661	47.88929
2/13/2022	8:00:00 PM	72.90755	34.18361	90.47599	76.37341	61.72532	46.20635
2/13/2022	9:00:00 PM	69.16451	34.07789	89.77775	70.02365	54.70243	42.11361
2/13/2022	10:00:00 PM	68.40315	31.5871	89.90128	69.05324	55.4698	40.34691
2/13/2022	11:00:00 PM	60.82391	33.59616	80.22001	64.30899	52.13859	41.68372
2/14/2022	12:00:00 AM	63.65804	36.77885	85.20617	64.5554	53.88729	44.71377
2/14/2022	1:00:00 AM	60.42497	39.55883	80.55064	63.04468	52.80786	45.69451
2/14/2022	2:00:00 AM	60.48013	37.32652	78.50553	63.98665	51.75349	44.32113
2/14/2022	3:00:00 AM	63.08662	38.58704	83.58873	65.54942	54.75136	45.90606
2/14/2022	4:00:00 AM	67.9187	37.50899	86.7992	71.37968	59.44157	45.99369
2/14/2022	5:00:00 AM	63.35023	36.36816	82.86639	66.03913	52.74975	43.15811
2/14/2022	6:00:00 AM	61.76037	36.74428	82.3953	64.91121	52.55595	44.24152
2/14/2022	7:00:00 AM	61.70308	36.97748	82.84953	63.55457	51.62724	44.80515
2/14/2022	8:00:00 AM	56.51798	36.62688	83.82406	53.13592	46.61326	42.60965
2/14/2022	9:00:00 AM	48.9705	36.49282	67.32042	51.28619	45.45641	41.59374
2/14/2022	10:00:00 AM	49.44955	35.12794	72.28217	51.47755	44.81158	40.84408

2/14/2022	11:00:00 AM	62.98425	34.16487	88.37849	62.38814	48.3205	40.86569
2/14/2022	12:00:00 PM	67.77059	36.12962	90.59288	68.68565	54.18513	44.32327
2/14/2022	1:00:00 PM	69.8414	38.15915	89.26469	72.87887	58.46438	46.90397
2/14/2022	2:00:00 PM	73.58547	38.31242	90.82786	77.75395	64.66099	51.51606
2/14/2022	3:00:00 PM	69.06913	37.75194	87.60493	72.63858	59.14225	47.10727
2/14/2022	4:00:00 PM	64.63732	36.56452	86.29261	65.68106	51.31158	43.69942
2/14/2022	5:00:00 PM	60.83783	37.5021	84.96745	62.33899	50.30907	44.16441
2/14/2022	6:00:00 PM	69.46917	39.77181	87.95051	72.49092	57.22807	47.45428
2/14/2022	7:00:00 PM	68.41116	39.02927	88.5218	71.13182	57.92973	47.78102
2/14/2022	8:00:00 PM	69.44827	39.56925	88.2008	72.64113	57.04048	46.92498
2/14/2022	9:00:00 PM	65.22891	37.39732	86.29883	67.45377	53.32892	45.207
2/14/2022	10:00:00 PM	65.79652	38.48525	86.82182	68.10459	54.53888	45.58096
2/14/2022	11:00:00 PM	65.7228	36.19059	86.99311	67.58686	52.53948	43.35673
2/15/2022	12:00:00 AM	56.95333	32.50745	80.35003	58.81988	47.07212	38.77206
2/15/2022	1:00:00 AM	48.69674	30.99491	70.9089	50.9706	41.82447	36.66131
2/15/2022	2:00:00 AM	55.91978	36.63407	79.42173	55.79179	48.12286	43.20627
2/15/2022	3:00:00 AM	63.79931	37.26346	84.30179	66.25611	51.26071	44.38245
2/15/2022	4:00:00 AM	67.20201	34.72758	86.5168	70.55612	55.60754	43.03143
2/15/2022	5:00:00 AM	68.44059	38.0007	89.11859	70.74648	51.83144	44.61702
2/15/2022	6:00:00 AM	56.56617	32.42016	81.21017	56.91843	45.57233	39.79788
2/15/2022	7:00:00 AM	62.68105	32.6244	84.78067	63.97354	49.85229	41.07157
2/15/2022	8:00:00 AM	66.72548	37.2013	86.5563	69.79354	56.22178	46.56723
2/15/2022	9:00:00 AM	68.22447	39.76829	89.14972	70.74248	58.01231	48.61173
2/15/2022	10:00:00 AM	62.41525	36.46348	83.42546	64.944	52.50431	44.58965
2/15/2022	11:00:00 AM	62.19011	35.7585	83.59197	64.34701	51.45279	43.8405
2/15/2022	12:00:00 PM	58.7713	35.9881	82.49901	59.93792	48.48688	42.89472
2/15/2022	1:00:00 PM	57.90373	36.1753	83.93811	57.94256	47.85102	42.70517
2/15/2022	2:00:00 PM	55.72534	33.39218	75.72099	58.60724	45.98685	40.46341
2/15/2022	3:00:00 PM	58.69225	33.58684	82.62671	58.77398	45.11761	39.96288
2/15/2022	4:00:00 PM	69.0828	36.70059	86.50184	73.18894	60.1136	46.78108
2/15/2022	5:00:00 PM	67.36282	37.83814	87.25081	70.39191	55.25552	45.24167
2/15/2022	6:00:00 PM	63.91454	39.37302	84.65199	65.90975	53.41026	46.83736
2/15/2022	7:00:00 PM	63.06622	38.76458	84.08134	64.94455	52.30206	45.42148
2/15/2022	8:00:00 PM	57.59319	40.14504	82.12445	59.19548	52.02708	47.11618
2/15/2022	9:00:00 PM	55.64612	38.40735	79.26036	57.08267	49.20776	44.80913
2/15/2022	10:00:00 PM	54.76732	39.15635	75.94562	56.5618	49.43782	45.23232
2/15/2022	11:00:00 PM	56.49365	39.06028	76.67008	59.46618	51.00554	45.69892
2/16/2022	12:00:00 AM	56.93621	35.74137	78.2953	60.33396	48.8442	42.83265
2/16/2022	1:00:00 AM	49.56364	34.17959	70.95489	50.58866	45.04271	41.12261
2/16/2022	2:00:00 AM	54.08282	34.98645	77.39109	53.38815	45.16641	41.37864
2/16/2022	3:00:00 AM	49.44041	37.27872	63.74319	52.49114	47.82828	43.46386
2/16/2022	4:00:00 AM	52.43193	39.14439	72.79159	54.82179	49.57907	45.18929
2/16/2022	5:00:00 AM	54.21818	39.74235	68.65175	57.42863	52.24174	46.26643

2/16/2022	6:00:00 AM	54.32026	40.54337	73.39879	56.5948	51.79349	47.28222
2/16/2022	7:00:00 AM	53.93013	40.81333	68.64611	57.01436	51.49541	47.2584
2/16/2022	8:00:00 AM	55.8561	43.48599	69.05896	58.86171	54.16186	49.81365
2/16/2022	9:00:00 AM	53.30038	42.135	74.02789	55.66376	51.37819	47.88302
2/16/2022	10:00:00 AM	54.23879	38.49519	78.3101	56.16866	49.30771	45.09304
2/16/2022	11:00:00 AM	50.90339	37.62844	67.98044	53.73716	47.52027	43.36291
2/16/2022	12:00:00 PM	61.88178	37.30923	82.77776	65.26442	50.23701	44.71704
2/16/2022	1:00:00 PM	66.13853	35.43913	85.0258	69.63896	52.66263	43.26152
2/16/2022	2:00:00 PM	63.91416	36.17445	83.44671	66.87329	49.32141	43.01237
2/16/2022	3:00:00 PM	58.21734	39.5784	78.58704	60.93704	51.51519	46.03009
2/16/2022	4:00:00 PM	70.55213	38.73233	88.28047	74.56145	60.73588	46.97778
2/16/2022	5:00:00 PM	63.71261	38.19461	83.787	67.11112	53.71341	44.94379
2/16/2022	6:00:00 PM	65.50211	38.30577	84.83986	68.69494	54.27167	45.57151
2/16/2022	7:00:00 PM	61.89784	36.36982	82.37378	64.20124	49.92243	43.2512
2/16/2022	8:00:00 PM	57.29438	35.76673	83.10665	59.32318	47.40017	42.29205
2/16/2022	9:00:00 PM	51.33376	35.26151	73.359	53.04807	45.33687	41.34549
2/16/2022	10:00:00 PM	49.45484	35.62027	71.03838	51.64941	46.04055	41.83718
2/16/2022	11:00:00 PM	50.64168	35.0834	74.15035	52.83481	46.27595	41.63547
2/17/2022	12:00:00 AM	56.23058	36.94545	79.27503	56.29946	47.73696	43.37979
2/17/2022	1:00:00 AM	60.39735	40.33068	84.25951	60.84807	51.84078	47.00999
2/17/2022	2:00:00 AM	54.41734	39.40703	73.5288	57.27372	51.38354	46.42936
2/17/2022	3:00:00 AM	53.12948	36.84675	73.80766	55.73394	48.68728	43.84987
2/17/2022	4:00:00 AM	60.06827	37.20095	78.09159	63.96293	54.196	45.25966
2/17/2022	5:00:00 AM	51.51612	34.95118	72.58354	54.06535	46.02652	41.75786
2/17/2022	6:00:00 AM	54.85814	37.27925	74.356	57.7051	48.4355	43.59625
2/17/2022	7:00:00 AM	49.83411	36.98751	75.21266	51.56772	47.08364	43.23871
2/17/2022	8:00:00 AM	50.75681	39.30188	63.13424	53.78207	49.48353	45.24827
2/17/2022	9:00:00 AM	48.27121	37.23233	70.80437	50.52028	46.93918	43.39837
2/17/2022	10:00:00 AM	51.333	36.72561	70.85083	52.80354	46.32909	42.58127
2/17/2022	11:00:00 AM	49.29503	36.29567	65.68453	51.61103	46.89636	43.18608
2/17/2022	12:00:00 PM	58.16999	36.24828	79.17544	60.92828	48.79668	43.63961
2/17/2022	1:00:00 PM	59.90442	36.27548	80.75595	63.19804	51.64892	44.03111
2/17/2022	2:00:00 PM	57.15054	36.20331	78.75117	59.36582	48.55012	43.04747
2/17/2022	3:00:00 PM	53.78287	36.46526	74.17351	56.12362	47.33174	42.94302
2/17/2022	4:00:00 PM	49.40443	36.79055	66.78203	51.766	46.53684	42.78287
2/17/2022	5:00:00 PM	59.92584	36.5885	80.46747	62.44517	49.29506	43.59002
2/17/2022	6:00:00 PM	59.2142	35.35662	82.6408	61.01723	48.2123	42.27653
2/17/2022	7:00:00 PM	55.24078	36.34323	78.3222	55.63391	46.6319	42.32668
2/17/2022	8:00:00 PM	54.29024	36.36708	75.54145	55.85407	47.16409	42.80615
2/17/2022	9:00:00 PM	54.21034	36.70836	76.59523	53.76156	46.97355	42.98366
2/17/2022	10:00:00 PM	53.49175	36.63799	76.99915	54.55724	47.68096	43.14911
2/17/2022	11:00:00 PM	55.96006	39.08551	80.48537	56.37006	49.75953	45.37538
2/18/2022	12:00:00 AM	51.96842	35.59468	73.7213	53.22781	46.45626	42.22368

2/18/2022	1:00:00 AM	57.05772	42.27761	72.53766	60.1858	54.26423	49.27467
2/18/2022	2:00:00 AM	54.35174	41.64849	68.79503	57.41241	52.3221	48.06353
2/18/2022	3:00:00 AM	51.5602	37.67255	67.44064	54.55471	48.84173	44.26546
2/18/2022	4:00:00 AM	49.32769	36.8309	65.08435	52.32103	47.07844	43.14318
2/18/2022	5:00:00 AM	49.64595	36.99402	63.39896	52.78282	47.9574	43.51129
2/18/2022	6:00:00 AM	50.64293	37.32276	65.14742	53.44649	48.80606	44.38672
2/18/2022	7:00:00 AM	52.58467	40.30555	65.07045	55.45007	51.17465	47.293
2/18/2022	8:00:00 AM	52.81979	40.33053	64.07533	55.97646	51.27508	46.7442
2/18/2022	9:00:00 AM	54.74093	44.47809	65.35899	57.62435	53.39197	49.85442
2/18/2022	10:00:00 AM	54.23706	40.65453	84.0754	55.19449	50.73856	46.87219
2/18/2022	11:00:00 AM	52.8619	36.61295	74.08166	55.08013	47.70193	43.46484
2/18/2022	12:00:00 PM	54.0465	34.40865	75.30057	56.40399	45.74415	41.08403
2/18/2022	1:00:00 PM	59.76126	33.98537	83.51047	62.22647	47.84715	40.69805
2/18/2022	2:00:00 PM	63.12732	33.65623	81.36614	66.98034	54.11261	42.65146
2/18/2022	3:00:00 PM	66.61813	33.52571	84.77352	70.28866	57.74629	43.43923
2/18/2022	4:00:00 PM	60.71132	31.17036	81.5411	62.56635	45.69004	38.41483
2/18/2022	5:00:00 PM	60.08414	33.82716	80.06779	62.87112	50.06884	41.7489
2/18/2022	6:00:00 PM	61.02848	32.57059	81.50903	63.87357	50.40378	40.74397
2/18/2022	7:00:00 PM	62.05054	32.07451	84.67131	63.9008	50.44281	40.16983
2/18/2022	8:00:00 PM	55.6689	31.70274	82.03805	56.35498	45.58249	39.00467
2/18/2022	9:00:00 PM	56.77787	33.39469	76.20913	59.77243	47.45744	40.60681
2/18/2022	10:00:00 PM	59.74595	35.97194	80.96822	62.04234	49.74969	42.97824
2/18/2022	11:00:00 PM	55.40127	32.42468	75.84168	58.07868	46.56841	39.59262
2/19/2022	12:00:00 AM	53.29711	34.3245	74.49301	55.60167	46.52396	41.26369
2/19/2022	1:00:00 AM	45.69672	33.12449	64.49582	48.24505	42.7798	38.95065
2/19/2022	2:00:00 AM	46.31095	32.61841	66.20467	49.4002	43.873	39.13444
2/19/2022	3:00:00 AM	47.42077	35.42014	61.72982	50.29761	45.81034	41.75323
2/19/2022	4:00:00 AM	48.15598	33.72069	63.57224	51.23267	45.61708	40.31101
2/19/2022	5:00:00 AM	50.02883	34.65222	67.61327	52.74647	46.96322	42.02781
2/19/2022	6:00:00 AM	51.13839	35.93241	67.33647	54.35303	48.43623	42.83417
2/19/2022	7:00:00 AM	51.26022	37.58066	65.55141	54.74659	48.96078	43.797
2/19/2022	8:00:00 AM	52.50439	41.07522	66.69674	55.19131	50.61009	46.95783
2/19/2022	9:00:00 AM	50.01591	39.35417	61.16787	52.94858	48.73515	45.10592
2/19/2022	10:00:00 AM	50.32595	39.03983	66.04394	53.20007	48.26464	44.43614
2/19/2022	11:00:00 AM	50.47373	36.51001	69.22151	53.01419	46.39491	42.37777
2/19/2022	12:00:00 PM	75.33019	36.05784	92.9166	78.97372	63.5917	44.95207
2/19/2022	1:00:00 PM	76.51189	37.53582	92.57469	80.70258	68.10075	54.63814
2/19/2022	2:00:00 PM	80.90306	40.2289	93.57743	85.49773	76.08448	61.64377
2/19/2022	3:00:00 PM	78.95607	37.05875	92.73829	83.51716	73.54179	59.60371
2/19/2022	4:00:00 PM	73.64858	36.24447	90.69607	77.5127	65.28378	49.97607
2/19/2022	5:00:00 PM	73.39611	37.68578	91.31321	76.92654	63.19362	49.5411
2/19/2022	6:00:00 PM	71.64789	34.93613	90.42421	74.54903	60.78626	47.56604
2/19/2022	7:00:00 PM	74.98808	37.05677	91.64236	79.18178	65.65668	51.64553

2/19/2022	8:00:00 PM	76.79816	41.11852	92.97856	80.87227	68.37114	55.28206
2/19/2022	9:00:00 PM	77.51944	38.69025	93.09053	81.83852	68.6746	54.20564
2/19/2022	10:00:00 PM	79.1702	42.86688	93.2151	83.79128	72.53943	58.28084
2/19/2022	11:00:00 PM	69.37859	37.29569	90.29179	70.62718	55.02448	44.92219
2/20/2022	12:00:00 AM	73.61278	37.38154	92.86544	73.84212	54.32312	45.16482
2/20/2022	1:00:00 AM	80.79047	46.25213	93.36364	85.45308	75.56661	63.42169
2/20/2022	2:00:00 AM	75.28356	37.59386	92.83909	78.84295	59.49948	45.3464
2/20/2022	3:00:00 AM	67.98028	38.19743	91.17633	67.51073	53.47601	45.62703
2/20/2022	4:00:00 AM	62.1644	35.56368	83.71058	64.23953	50.97102	43.08266
2/20/2022	5:00:00 AM	62.59113	41.70193	82.58128	65.00641	54.34829	48.38561
2/20/2022	6:00:00 AM	75.05647	37.37643	91.95069	78.76169	63.52106	46.39071
2/20/2022	7:00:00 AM	82.01161	40.24628	94.92341	86.65992	76.98678	63.48196
2/20/2022	8:00:00 AM	81.55513	38.58023	94.4595	86.63358	73.41442	47.6898
2/20/2022	9:00:00 AM	81.13541	40.13475	94.60268	85.98317	74.67883	48.90836
2/20/2022	10:00:00 AM	80.3067	42.19854	94.34046	84.9985	74.57024	62.20884
2/20/2022	11:00:00 AM	83.14434	43.22699	94.54836	87.6239	79.36947	67.77878
2/20/2022	12:00:00 PM	85.07757	48.3798	95.47972	88.97654	83.04881	72.41079
2/20/2022	1:00:00 PM	85.12559	50.34033	95.20893	89.02462	83.15325	72.88408

WM1: Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25k Hz	1.6k Hz	2k Hz	2.5k Hz	3.15k Hz	4k Hz	5k Hz	6.3k Hz	8k Hz	10k Hz	12.5k Hz	16k Hz	20k Hz
2/7/2022	10:42:26 AM	40.5	39.1	40.4	41.8	47	47.8	45	46.8	45.4	45	45.4	46.5	44.9	46.6	45.3	40	40.2	36.7	38	34.4	37.8	34.1	30.6	28.8	26	34.7	31.5	31.4	30.1	28.3	26.2	24.6	19.6	20.4	17.1	13.5
2/7/2022	11:00:00 AM	37.6	36.4	38.1	39.1	42	39.4	38.9	44.5	40.3	37.9	37.5	38.9	36.6	39.8	40.2	32.3	30	27.4	24.2	17	11.8	8.3	5.8	4.2	4.7	5.3	6	6.4	6	5	4.3	2.3	-0.5	0.1	-0.7	0.5
2/7/2022	12:00:00 PM	50.1	49.2	48.3	45.2	43.7	40.3	37.4	42.1	38.6	31.9	30.9	27	25.4	26.7	27.9	24.7	24.5	23.3	21.6	15.2	11.6	6.7	3	2.4	3.1	4.4	5.3	5.7	6.6	8.7	10.7	5.2	-2.8	-1.9	-1.5	0.3
2/7/2022	1:00:00 PM	51.2	50.8	48.1	46.4	45.1	42.8	40.5	40.2	37.6	35.2	31.4	29.5	27.8	28.3	28.8	24.4	23.3	24.1	21.8	15.2	11.7	7.1	3.6	2.3	2.6	3.2	4.4	4.4	3.9	2.7	2.1	0.9	-1.8	-1.1	-1.1	0.4
2/7/2022	2:00:00 PM	50.1	47.7	45.2	44.2	42.7	41.7	40.8	42.2	40.3	36.8	36.6	31.9	32.4	33.6	29.2	26	25.1	24.2	21.9	14.9	10.2	5.5	1.7	0.7	-0.1	1.3	2.8	2.9	2.5	0.8	-0.1	-1.4	-3.8	-2.4	-1.8	0.3
2/7/2022	3:00:00 PM	51.1	48.8	46.3	45.4	42.5	39.4	39.8	42.1	41.2	37.4	35.2	34.5	30.7	29.5	27.2	25.4	23.9	24.3	22.1	15.6	10.8	5.8	1.3	-0.3	-0.5	1.3	2.9	3.2	2.8	0.8	-0.1	-1.3	-3.7	-2.4	-1.8	0.2
2/7/2022	4:00:00 PM	47.4	46.4	43.8	41.4	40.7	37.3	35.4	35.2	38.8	36.8	26.7	26.2	25.5	26.5	26.1	25.2	24.2	24.6	22.5	14.8	10.9	6.1	3.8	3.4	3.4	5.2	6.4	6.7	5.2	3.1	2	0.6	-2.2	-1.4	-1.3	0.4
2/7/2022	5:00:00 PM	52.8	51.2	48.3	46.5	44.2	41.4	39.2	36.9	34.6	33.1	30.9	29.5	27.7	28.6	28.1	24.8	24.9	25.3	22.8	15.8	11.3	7.1	5.4	5.7	6.2	7.1	7.7	8.1	6.2	4.2	3.3	1.9	-2	-1.8	-1.9	0.2
2/7/2022	6:00:00 PM	53.2	51.1	48.8	46	43.3	39.9	36.8	34.4	31.8	29.2	28.7	27.5	26.1	29.5	28.4	25.2	25.3	25.5	23.5	16.8	12.3	7.7	6.4	7	6.8	7.4	7.7	8.3	6.3	4.5	3.2	1.5	-1.5	-1.4	-1.8	0.2
2/7/2022	7:00:00 PM	61.1	60	57.5	54.8	52.5	49	45.2	42.5	39.1	35.9	34.2	32.7	30.6	30.7	29.2	27.6	27.1	26.9	25.5	20.8	17	13.9	13.6	14	12.6	10.7	9.4	9.4	7.4	6	4.9	3.3	0.4	0.4	-0.6	0.7
2/7/2022	8:00:00 PM	43.3	40.8	38.9	37	36.1	32	30.7	34.1	29.3	29.6	30	30.7	35.9	36.1	33.6	26.6	25.6	24.6	23.1	15.7	10.8	5	1.4	2	3.9	6.1	7	7.7	5.8	4.2	3.1	1.1	-2	-1.8	-2.1	0.2
2/7/2022	9:00:00 PM	47.9	45.2	42.7	40.8	42.5	35.5	34.3	37.1	35.9	35.4	36	37.8	37.2	40.3	40.2	33.7	32	29.6	26	19.2	13.2	6.4	3.1	2.9	4.2	5.9	6.7	7.3	5.6	4	2.8	1	-2.1	-1.9	-2.1	0.2
2/7/2022	10:00:00 PM	48.4	46.3	43.7	41.7	42.5	37.6	36.8	38.5	37.2	37.6	38.4	38.7	38.5	41.6	40.2	34.5	32.4	30.4	27.2	25.4	22.4	17.3	24.8	16.4	28	15.9	12.3	16.6	13.2	14.8	19.4	3.3	-0.1	-1.1	-1.6	0.2
2/7/2022	11:00:00 PM	44.2	42.1	40	39.3	41.6	35.4	35.6	37.5	36.1	35.8	36	37.1	35.9	38.7	39.3	32.7	30.5	29.8	25.4	19.4	11.8	5.6	2	2.5	4.2	5.8	6.7	7.4	5.7	4.2	3.1	1.1	-2	-1.9	-2.1	0.2
2/8/2022	12:00:00 AM	46.1	44	42.2	40.5	38.6	36.2	34.3	37.8	33.7	32.3	33	34.3	33.7	35.7	36.4	29.7	28.1	26.2	23.8	16	11.4	5.4	2.1	2.6	4.1	5.6	6.5	7	5.4	3.9	2.8	0.8	-2.2	-2	-2.2	0.2
2/8/2022	1:00:00 AM	36.4	34.8	35.3	35.6	38.2	32.2	31.8	35	36.8	34.4	33.2	35.4	34.1	38.5	38	31.5	29	28.5	23.3	15.9	11	10.6	4.6	1.2	2.8	4.7	5.8	6.4	5	3.6	2.6	0.6	-2.3	-2.1	-2.2	0.1
2/8/2022	2:00:00 AM	38	36.3	36.1	37.4	39.1	34.2	33.4	36.5	35.9	34.8	35.5	37.1	36.3	38.8	39	31.6	29.3	28.3	24	16.8	11.5	11.4	6.3	2.2	3.7	5.4	6.3	7.1	5.6	4.1	3	0.9	-2	-2	-2.2	0.2
2/8/2022	3:00:00 AM	44.8	42.5	40.7	39	38.5	35.1	34.3	37.1	36.3	34.9	36.2	36.5	36.3	39.6	39.7	32.6	30	27.9	24.1	17.7	10.7	4.4	1.4	1.9	3.4	5.2	6	6.7	5.4	3.9	2.8	0.9	-2.1	-2	-2.2	0.2
2/8/2022	4:00:00 AM	35	34.8	35.6	38.5	39.5	35.4	35	39.2	37.8	35.6	36.2	36	36.4	39.2	39.2	32.1	29.2	27.2	24.7	18.9	11.8	5	1.6	1.4	2.9	5	6.2	6.8	5.5	4	2.9	1	-2	-1.9	-2.2	0.2
2/8/2022	5:00:00 AM	38.1	36.7	37.3	38.2	42.1	36.7	36.9	40.8	40	40.1	38.6	40.1	41.4	44.1	44.3	36.5	32.7	30	24.4	17.1	10.9	4.8	1.5	1.8	3.2	5.2	6.5	7	5.6	4	2.9	1.1	-1.9	-1.9	-2.2	0.2
2/8/2022	6:00:00 AM	38.7	37.3	37.7	39.4	41	36.6	36.6	41.5	39.4	38.6	40.1	39.8	40.7	43.8	43.7	36	33.4	30.8	25	17.3	11.2	5	1.9	4.9	9.2	9.4	9.7	9.8	9.5	5.9	6.5	4.1	-1.8	-1.8	-2.2	0.2
2/8/2022	7:00:00 AM	34.3	34.7	37.1	39.9	42	40.7	41.1	43.7	44.4	44	42.8	38.6	40.3	43.1	40.2	34.7	32.3	30.3	26.5	23.4	20.4	15.7	12.5	10.6	10.3	10.7	10.8	11.4	9.3	6.6	5.3	2.8	-0.9	-1.6	-2.1	0.2
2/8/2022	8:00:00 AM	37.3	36.6	38.3	39.4	41.3	41.4	39.6	44.5	39.7	38	37.8	37.8	37.7	39.3	39.9	33.2	31.4	29.9	26.9	22.1	14.5	7.1	2.2	2.2	3.4	5.3	6.5	6.9	5.4	3.7	2.6	0.9	-2.1	-2.1	-2.3	0.2
2/8/2022	9:00:00 AM	46.5	44.8	43.6	42.6	44.1	42.1	40.9	46.5	41.9	40.6	42.2	42.5	41.3	43.7	43.1	36.8	35.3	34.1	29	23.7	15.5	7	2.2	1.6	2.9	5	6.3	6.6	5.1	3.4	2.3	0.6	-2.3	-2.2	-2.2	0.2
2/8/2022	10:00:00 AM	39.6	40.3	39.7	39.2	40.2	40.4	37.6	44.3	37.3	36.7	37.8	38.5	36.2	38.5	40.2	32.1	31.2	31.5	24.8	19.1	13.3	8.4	5.2	5	5.8	6.5	7.5	8	7.2	5.9	8.5	4.2	0.4	0.6	-0.4	0.5
2/8/2022	11:00:00 AM	43.9	42.3	41.3	40.1	39.8	39	37.9	39	36	33.9	32.6	33.3	30.5	30.9	31.5	27.7	25.8	24.8	22.8	19.5	16.3	11.2	9.6	9.1	7	6.1	6.8	7.5	7	6.1	5.4	4.1	1.1	1.1	-0.2	0.6
2/8/2022	12:00:00 PM	56.4	54.4	52.6	49.4	48	45.3	42.7	43	41.3	43	45.1	46.9	47.3	44.4	43.6	40.8	38.5	37.8	37.5	35.2	33.6	29.8	26.2	25.1	24.1	23.5	21.9	20.3	18.4	16.2	13.9	11.2	7.1	5.5	2.3	1.4
2/8/2022	1:00:00 PM	58.4	56.8	54.1	51.2	48.5	45	42.1	40.7	37.3	35.5	35	34.9	32.5	34	34.3	29.5	27.6	27.2	25	22.2	20.4	17.5	14.7	14.5	12.6	10.4	8.7	8	6.9	4.6	2.1	0.3	-1.9	-1.3	-1.2	0.4
2/8/2022	2:00:00 PM	54.1	51.6	49	46.3	43.4	41.3	38.5	37.8	33.6	30.7	28.3	30	26.4	28.4	30.2	24.5	23.3	23	21.6	16.4	13	9.3	5.7	3.8	2.7	3	3.6	3.7	3.2	1.5	0.6	0.8	-2.9	-2	-1.5	0.3

2/8/2022	3:00:00 PM	55.4	53	50.4	47.8	44.5	41.5	38.3	37.1	32	29.1	26.8	27.1	24.5	25.6	25.7	22.6	22	22.3	22.4	16.6	12.5	8.1	4.1	3.1	1.7	1.8	3	3.4	2.8	0.9	0.1	-1.2	-3.5	-2.4	-1.7	0.2
2/8/2022	4:00:00 PM	60.9	60	59.2	58	57	55.8	55.2	54.1	53.6	52.9	52.8	52.3	52.1	52.5	51.8	51.9	50.7	49.9	48.1	47.3	45.6	44.4	43.1	42.1	41.4	40.1	39.4	38.8	38.5	38.6	37.8	36.5	35.6	35.7	36.5	33.9
2/8/2022	5:00:00 PM	68.5	67.9	67.6	66.6	66.1	65.3	64.2	63	61.8	60.2	58.3	56.2	53.5	50.2	46.8	42.9	39.7	36.1	31.5	25.9	21.1	16.9	13.6	11.3	9.5	8.6	7.6	7.8	7	5.1	5.8	3.9	0.4	-0.7	-0.8	1.6
2/8/2022	6:00:00 PM	70.9	70.6	69.8	69.3	68.5	67.6	66.8	65.5	64.3	62.9	61.3	59.2	56.6	53.5	50.2	47	43.8	40.3	36.4	32.2	28.1	24	21	18.2	15.2	12.3	10.4	9.6	8.3	6.6	5.2	3.4	1.8	0.8	0.7	2.9
2/8/2022	7:00:00 PM	64.9	65	64.4	63.6	62.8	61.9	60.7	59.7	58.4	56.6	54.6	52.4	49.5	46.8	43.4	40.4	37.4	33.9	30.1	25.9	21	16.3	13.3	11	9.1	7.7	7.3	7.8	7	5.6	4.3	2.5	0.8	-0.5	-0.9	1.1
2/8/2022	8:00:00 PM	65.4	65.1	64.3	63.7	62.8	61.7	60.5	59.4	58.1	56.3	53.9	51.6	48.7	45.5	42.6	37.9	34.6	30.8	27.5	21.2	16.2	11.7	9.1	7.5	6	5.8	6.1	7.2	6.5	4.9	3.7	1.9	0.1	-1.1	-1.5	0.4
2/8/2022	9:00:00 PM	52.2	51.7	51.2	50.3	49.1	47.6	45.8	43.8	41.4	38.5	35.8	33.5	31.9	33.5	35.1	27.6	25.5	24	22	15.9	11.2	7	3.5	2.5	3.9	5.5	5.9	7.4	6.7	5.1	4	2.1	0.4	-1.1	-1.7	0.2
2/8/2022	10:00:00 PM	55.8	55.4	54.7	54.1	52.7	51.6	49.9	47.9	46.4	43.8	40.4	38	34.8	34.4	34.9	27	25.9	23.9	22.4	15.6	10.2	5.7	2.9	3.6	4.9	6	6.1	7.6	6.9	5.5	4.1	2.3	0.6	-1.1	-1.7	0.2
2/8/2022	11:00:00 PM	58	57.6	57	56.2	55.3	53.9	52.4	50.7	48.5	45.9	42.4	40.8	38.5	40.7	41.8	32.7	30.6	28.4	24.8	17.3	10.7	4.9	2.2	2.9	3.6	4.8	5.3	6.9	6.3	5	3.6	1.9	0.1	-1.3	-1.8	0.2
2/9/2022	12:00:00 AM	58.8	58.8	58	57.2	56.3	54.8	53.6	52	50.1	47.8	44.8	41.5	37.7	37.7	39.3	30.9	29.1	26.6	24.1	16.9	13.4	18.2	11.4	2.3	3.1	4.4	4.9	6.4	6	4.6	3.4	1.8	0	-1.4	-1.9	0.2
2/9/2022	1:00:00 AM	58.4	57.9	57.3	56.4	55.3	54.2	52.6	51	48.5	46	42.7	40.1	37.2	38.9	39.5	32.1	30.7	27.9	24.6	16.9	10.7	6.9	3.2	2.6	3.3	4.7	5.5	7	6.4	5	3.8	2	0.2	-1.3	-1.8	0.2
2/9/2022	2:00:00 AM	54.4	54	53.4	52.4	51.7	50.4	48.4	47.3	44.3	41.9	39	37.2	34.8	37.8	37.9	30.4	27.4	25.9	23.6	16.2	10.3	5.3	2.4	2.9	3.6	4.9	5.5	7	6.5	5.2	4	2.3	0.6	-1.2	-1.8	0.2
2/9/2022	3:00:00 AM	49.3	48.5	47.8	46.9	46.4	44.6	42.3	43.6	40.1	38.8	40.1	42.4	39.9	42.2	44.6	35.1	33.7	31.1	26.4	18.7	11.1	5.1	1.3	1.8	2.4	4.4	5.1	6.7	6.3	4.9	3.8	2.2	0.5	-1.3	-1.8	0.2
2/9/2022	4:00:00 AM	53.1	52.5	51.7	50.8	49.4	48.2	46.2	44.3	41.9	38.7	36.7	35.3	33.1	34.2	34.8	27.6	26.1	24.5	23.3	17	10	5	2	2.8	3.5	4.9	5.5	7.1	6.6	5.2	4.1	2.5	0.8	-1.1	-1.7	0.2
2/9/2022	5:00:00 AM	56.7	56.7	55.7	55	54.2	53.1	51.6	50.4	48.3	45.7	42.9	40.1	37.9	39.5	40.1	32.7	29.5	27	24.1	17.3	10.8	5	1.3	2.1	2.3	3.9	4.6	6.4	6	4.6	3.6	2.1	0.3	-1.4	-1.8	0.2
2/9/2022	6:00:00 AM	53	52.6	51.7	50.9	50.4	48.6	46.9	46.2	43.7	41.6	41.8	40	39.9	42.9	43.6	36.5	33.7	30.8	26.3	19.2	13.4	7.2	2.6	5.3	10	12.7	14.1	16.6	17.2	16.4	19.2	16.3	3.5	2.2	1	0.5
2/9/2022	7:00:00 AM	56.3	55.8	55.4	54.4	53.6	52.2	50.6	49.7	47.1	45.1	44.5	41.7	41.5	43.6	42.8	36.5	33.9	31.1	27	19.6	13.4	6.6	1.9	2.7	4.3	6.1	5.6	7.3	6.3	6.8	15.9	4.8	0.4	-1	-1.7	0.2
2/9/2022	8:00:00 AM	56.5	56.4	55.5	54.6	53.7	52.8	51.4	50	47.8	46.8	42.7	40.5	41.8	41.9	41.4	35.2	33	32.7	29.6	23.2	17.1	10.4	4.9	3.7	3	3.7	4.3	6.3	5.8	4.7	3.6	2	0.3	-1.4	-1.8	0.2
2/9/2022	9:00:00 AM	57.8	57.3	56.2	55.3	54.3	53.2	51.9	50.8	48.8	47.1	43.9	40.7	37.6	36.1	34.5	30	28.9	26.3	25.7	19.5	14	8.3	4	3.4	2.7	3.5	4.5	6.1	5.6	4.5	14.5	8.2	0.1	-1.4	-1.8	0.2
2/9/2022	10:00:00 AM	49.6	49.1	48.3	47.5	46.7	47	43.8	48.5	41.5	38.9	37.4	36	34.5	34.9	34.3	29	26.3	24.6	23	17.1	13.4	10	6.9	5.6	6	6.8	7.5	7.9	7.9	7.7	15.2	9.9	2.6	1.5	0	0.5
2/9/2022	11:00:00 AM	66.8	66.5	65.9	65.6	64.5	64.1	63.3	62.6	61.8	60.6	59.1	57.4	55	52.3	49.2	45.3	42.6	39.1	34.4	29.2	24.3	20.5	17.2	14.1	11.5	9.6	8.3	8.4	8.7	8.9	8.8	8	5.6	4.5	2.3	2
2/9/2022	12:00:00 PM	67.8	67.4	66.8	65.9	65.4	64.6	63.9	63.5	62.5	61.2	59.7	58	55.7	53.2	49.9	46.5	43.4	40.3	36.3	31.4	26.4	22.3	18.6	15.8	12.9	10.2	8.4	7.2	5.9	4.8	3.6	2	0.2	-0.2	0	2
2/9/2022	1:00:00 PM	66.8	66.4	65.7	64.9	64.1	63.5	62.8	61.8	60.9	60.1	58.4	56.8	55.4	52.9	48.5	45.6	44	39.5	37.5	37.8	33.5	25.8	21.8	21.2	20	20.4	19.7	17.7	15.2	12.9	10.4	8	4.3	2.1	0.7	1.6
2/9/2022	2:00:00 PM	69.6	69	68.1	67.3	66.5	65.8	65	64.1	63.1	61.9	60.5	58.8	56.4	53.5	50.7	47.6	44.5	41.7	38	33	28.2	24.2	20.5	17.8	15.2	12	9.2	7.4	6.1	4.9	3.9	2.5	0.8	0.5	0.6	2.4
2/9/2022	3:00:00 PM	71.9	71.3	70.8	70	69.3	68.7	67.9	67.1	66.1	65.4	64	62.6	60.7	58.3	55.6	52.9	50	47.3	44	40.2	36.5	32.6	29.2	26.4	23.5	20.2	17.1	14.5	12.5	10.9	9.4	7.7	5.7	4.8	4.2	6.2
2/9/2022	4:00:00 PM	73.1	72.6	72	71.4	70.7	70.1	69.2	68.4	67.5	66.5	65.3	63.9	61.9	59.7	57	54.3	51.4	48.7	45.7	41.8	37.9	34.7	31.6	28.8	25.9	22.7	19.6	17	14.8	12.8	11.3	9.4	7.5	6.5	5.8	7
2/9/2022	5:00:00 PM	69.9	69.3	68.5	68	67.3	66.4	65.6	64.6	63.7	62.7	61.5	59.7	57.6	55.2	52.6	49.6	46.9	44.1	40.9	37	33.2	29.7	27.1	25.3	23.1	20.6	19.3	18.3	17.8	17.6	17.9	16.8	16.3	15.7	13.5	9.9
2/9/2022	6:00:00 PM	61.3	60.8	60	59.6	58.5	57.6	56.2	54.8	52.9	50.7	48	44.6	40.5	36.7	33.1	28.7	24.1	22.5	21.4	15.5	11	5.8	2.1	2.2	2.2	3.4	5.5	5.6	5.4	4.1	3.2	1.3	-0.5	-2.2	-2.2	0.1
2/9/2022	7:00:00 PM	67.2	66.6	66.2	65.4	64.5	63.7	62.6	61.3	59.9	58.4	56.3	53.9	50.7	47.2	43.3	39.8	36.2	31.9	27.3	21.4	16.7	12.5	8.9	7.2	5.5	5.3	5.9	6.1	5.9	4.5	3.6	1.7	-0.1	-1.8	-1.8	0.8
2/9/2022	8:00:00 PM	65.1	64.7	64.2	63.4	62.8	61.7	60.6	59.2	57.6	55.4	52.9	49.7	45.6	41.9	39.9	34.4	29.9	26.3	24.2	18.3	12.9	7.8	3.3	3.6	3.1	4.2	5.5	6.1	6.1	4.8	3.9	1.8	0.1	-1.9	-2.1	0.1
2/9/2022	9:00:00 PM	66	65.8	65.2	64.3	63.5	62.6	61.4	60.2	58.8	57	55	52.3	48.9	45.3	41.4	38.3	34.6	30.6	26.7	20.5	15.9	11.5	8.5	6.6	5.3	5.4	6.1	6.5	6.3	5.2	4.1	1.8	0.1	-1.8	-1.9	0.4

2/9/2022	10:00:00 PM	63	62.8	61.8	61.1	60.3	59.1	58.1	56.7	55.1	53.2	51.1	48.3	45.2	41.1	37.3	34.1	30.7	27.6	25.2	20.1	14.5	9.5	5.1	4.6	3.8	4.7	5.8	6.4	6.4	5.2	4.2	1.9	0.2	-1.8	-2.1	0.2
2/9/2022	11:00:00 PM	64.2	63.9	63.4	62.6	61.9	60.7	59.5	58.3	56.9	54.9	52.8	50.3	46.7	43.3	40	36.7	32.8	29.6	26.9	21.3	16.6	12.5	8.9	7.8	6.2	5.8	6.5	7	6.9	5.8	4.7	2.4	0.6	-1.4	-1.8	0.4
2/10/2022	12:00:00 AM	59.9	59.3	58.8	57.7	57.1	55.9	54.6	53.4	51.4	49.5	46.8	44.1	40.6	37.4	35.5	32.1	29.2	29	27.7	24.7	18.7	13.3	5.7	8.4	4.8	4.5	5.9	6.4	6.3	5.3	4.3	1.9	0.2	-1.7	-2.1	0.1
2/10/2022	1:00:00 AM	60.4	60.5	59.4	58.7	57.8	56.6	55	53.5	51.5	49	45.9	42.4	40.5	37.2	36.2	37.5	31.6	31.8	31.6	27	22.5	13.9	6.6	10.3	5.5	5.1	6.6	7	6.6	5.6	4.4	2.1	0.4	-1.6	-2.1	0.1
2/10/2022	2:00:00 AM	57.7	57.9	56.7	55.6	54.8	53.9	52.7	51.3	49.6	47.9	45.5	43.2	40.6	38.3	36.2	32.3	30.2	28.6	28.8	23.6	17.8	11.4	5.3	9	3.8	4.5	6.2	6.6	6.2	5.1	4	1.7	0.1	-1.7	-2.1	0.1
2/10/2022	3:00:00 AM	47	46.4	45	44.2	42.7	40.9	38.8	38.9	34.9	33.7	32.1	33.5	32.3	32.3	32.2	27	26.1	25.6	24.1	19.8	14.2	7.1	3.8	6.5	3.8	4.8	6.4	7.1	6.5	5.4	4.2	1.7	0.1	-1.4	-2.2	0.1
2/10/2022	4:00:00 AM	57.1	56.9	56.1	55.6	54.5	53.6	52.2	50.7	49	46.8	44.1	41.2	38.1	36.1	35.5	32.3	29.5	29.7	27.8	23.1	16.9	8.7	8.3	11	5.8	5	6.2	6.7	6.4	5.2	4.3	1.8	0.2	-1.5	-2.2	0.2
2/10/2022	5:00:00 AM	62.5	62.1	61.6	60.9	59.8	59	57.5	56.2	54.5	52.4	50.1	47.3	44.1	41.3	41.1	34.4	31.4	30.8	28.3	24.6	20.7	11.8	7.2	7.7	4.4	4.7	5.9	6.4	6.3	5.2	4.3	1.9	0.3	-1.5	-2.3	0.2
2/10/2022	6:00:00 AM	58.9	58.3	57.7	56.9	56.1	55	53.6	51.9	49.9	47.6	45.6	41.9	40.7	40.8	41.2	33.6	30.6	28.8	27.4	22.4	16.6	8.8	6.3	7.5	9.9	12.7	14.6	18.6	20.6	13.1	14.6	12.5	2	0.1	-1.4	0.3
2/10/2022	7:00:00 AM	57.7	57.6	56.9	56.2	55.1	54.3	53.1	51.5	50.1	48.1	46	43.8	42.2	43.6	42.7	37.3	34.1	31.9	28.4	21.6	15.9	8.9	5.4	5.4	5.5	5.4	7.5	9.7	9	7.2	19.3	11.6	0.3	-1.6	-2.3	0.2
2/10/2022	8:00:00 AM	56.2	55.1	55.2	54.4	53.7	52.2	51.1	49.6	47.9	45.4	43.6	42.4	40.8	42.2	44.3	38.4	33.6	32.3	31.2	24.8	20.8	12.1	6.7	6.4	4.9	4.3	6	6.6	6.7	8.9	24.8	21.3	0.6	-1.2	-2	0.2
2/10/2022	9:00:00 AM	51.7	52.5	49.8	48.6	47.9	47.3	46.3	47.7	47.3	47	46.4	44.8	43.3	40.4	40.1	35.9	30.5	30.1	31.5	25.6	22.1	11.9	5.7	6.7	5.1	5.2	8.1	8.1	6.4	5.6	11.1	6.2	0.1	-1.4	-2	0.1
2/10/2022	10:00:00 AM	51.7	51.4	50.6	50	49.2	48.3	46.2	46.2	42.1	39.6	38.3	39.3	36.6	35.2	35.5	31	27	26.8	26.3	20.8	18.1	11.8	4.7	2.7	1.2	3	5.9	5.8	5	4	2.8	0.7	-1.1	-1.2	-1.7	0.1
2/10/2022	11:00:00 AM	58.4	57.8	57	56.5	56.1	55.6	54.5	53.8	52.2	50.8	48.3	45.6	42.3	38.4	35.3	32.1	28	23.9	22.6	16.9	13.1	7.2	9	9.5	6.5	2.6	3.5	4.4	4.4	5	22.4	14.8	-0.9	-0.4	-1.3	0.2
2/10/2022	12:00:00 PM	64.8	64.6	63.8	63.1	62.6	61.9	61.2	60.2	59.4	58	56.3	53.8	50.8	47	43.4	40.7	38.4	34.8	32.6	32	29.3	26.6	23.9	22.8	24.2	25.1	24.6	21.1	20	20	14.9	12.2	8.5	7.9	4.6	2.2
2/10/2022	1:00:00 PM	66.6	66	65.4	64.6	64	63.5	62.6	61.7	60.7	59.3	57.7	55.7	52.8	49.8	46	42.5	39	33.9	28.3	24.2	18.5	14.8	12.5	9.8	6.5	4.7	4.3	4.4	3.8	3.4	2.5	0.9	-0.9	0.2	-0.2	0.9
2/10/2022	2:00:00 PM	67.9	67.4	66.8	66.3	65.8	65	64.4	63.6	62.5	61.2	59.5	57.3	54.4	51.1	47.3	46.6	40.6	36.2	36.3	26.2	25.5	24.2	23.6	16.6	13.9	12.5	10.4	10.4	7.8	5.9	4.7	4.4	4.3	4.5	4.1	3.2
2/10/2022	3:00:00 PM	67.5	67.1	66.7	66	65.6	65.1	64.3	63.4	62.4	61.1	59.5	57.4	54.5	51.2	47.3	44	40.8	36.3	31.2	25.7	21	16.8	13.7	10.7	8.4	6.7	6.3	6.6	6.2	5.9	4.9	3.1	0.9	0.5	-0.7	0.8
2/10/2022	4:00:00 PM	58.9	58.3	57.5	56.5	55.1	54.1	52.7	52	48.9	46.5	43.4	40.2	37.2	36.2	33.8	28.4	25.6	23.7	22.2	17.5	14	10.2	7.1	6.2	7.8	8.7	9.6	10	9.6	9	8.7	6.8	4.5	3.3	0.9	0.8
2/10/2022	5:00:00 PM	61.5	61.1	60.4	59.7	58.8	57.6	56.4	55	53.1	51.3	48.5	46.4	43.9	42.8	44.2	41.2	40.1	37.8	32.6	29.5	26.8	24.6	20.6	19.7	20	20	19.9	20.2	20.7	21.2	20.3	19.9	19	18.5	17.4	12.9
2/10/2022	6:00:00 PM	63.9	63.1	62.7	62.1	61.2	60.4	59.2	57.8	56.1	54.5	52.5	50	46.4	43.4	41	36.6	33.6	30.3	26.8	21.5	16.7	12.2	9.3	7.8	6.3	6.1	6.8	7.8	6.6	5.6	4.4	2.1	0.3	-1	-1.6	0.4
2/10/2022	7:00:00 PM	63.9	63.7	63.1	62.4	61.5	60.6	59.3	58.1	56.7	54.8	52.6	50	46.7	43.3	39.9	36.6	33.3	29.6	25.6	22.1	18.9	13.3	8.2	7	5.3	5.3	6.4	7.7	6.4	5.1	4.1	1.8	0.1	-1.2	-1.8	0.3
2/10/2022	8:00:00 PM	56.3	56	55.2	54.4	53	51.9	50.1	48.1	45.8	42.4	38.8	36.6	35.6	37.3	33.4	26.6	25.6	24.8	23	18.2	12.8	6.1	3.2	4.1	3.8	5.1	6.5	8.1	6.8	5.3	4.3	1.9	0.1	-1.3	-1.9	0.1
2/10/2022	9:00:00 PM	64.4	63.8	63.4	62.5	61.8	60.7	59.4	57.9	56.2	54	51.4	47.8	44	41	39.5	33.7	30.7	28.3	25.4	21.3	15.1	8.7	5.4	6.3	4.3	5	6	7.6	6.5	4.9	3.9	1.6	-0.1	-1.3	-1.9	0.2
2/10/2022	10:00:00 PM	58.6	58.1	57.6	56.9	55.9	54.6	53.1	51.6	49.9	47.4	44.3	42.1	39.4	40.9	39	33.2	30.9	29	26.7	21.8	15.7	8.1	4.9	5.6	3.6	4.5	5.9	7.3	6.1	4.5	3.8	1.3	-0.3	-1.3	-1.9	0.2
2/10/2022	11:00:00 PM	54.7	54.5	53.9	52.9	51.9	50.7	49	47.8	45.6	43.8	41.2	39.4	38.1	38.9	40	32.4	30.8	29.4	27.6	23.6	17.8	11	8.9	8.8	7.7	7.6	8	8.4	6.9	5.4	4.7	2	0.2	-0.8	-1.7	0.2
2/11/2022	12:00:00 AM	53.4	53	52.4	51.3	50.2	48.7	47.4	46	43.3	40.7	37.8	38	36.1	37.6	36.9	31.7	28.7	27.6	24.8	20.5	14.8	8.1	6	7.5	4.6	4.8	6	7.4	6.1	4.7	4	1.4	-0.2	-1.2	-2	0.2
2/11/2022	1:00:00 AM	59.4	59.2	58.6	57.6	56.8	55.4	54.1	52.7	50.6	48.5	45.6	42.8	39.3	39.3	39.8	31.7	28.6	27.2	23.7	19.1	13.5	7.1	4.3	5.3	3.5	4.1	5.3	6.8	5.8	4.1	3.5	1.2	-0.4	-1.4	-2.1	0.2
2/11/2022	2:00:00 AM	59.4	59	58.4	57.8	57	55.9	54.6	53.1	51.3	49.1	46.6	45.1	42	43.1	43.2	35.8	32.6	30.3	27.3	20.9	14.2	8	5.9	5.6	4	4.5	6	7.2	6.1	4.7	4.1	1.6	0	-1.1	-2	0.2
2/11/2022	3:00:00 AM	57.7	56.8	56.3	55.7	54.8	53.3	52.3	51	49.6	47.4	45.3	44.9	43.2	45.9	46.7	37.6	34.5	32.1	28.4	22.8	17.5	10.3	6.2	6.7	3.4	3.7	5.4	6.7	5.8	4.4	4	1.7	0	-1.2	-2	0.2
2/11/2022	4:00:00 AM	60.2	59.9	58.7	58.2	57.4	56.2	54.8	53.9	52	50	47.9	46.5	45.2	47.8	48.8	40.9	37.7	33.9	29.4	22.9	16.9	9.7	4.5	5.9	4.1	4.4	6	7.2	6.4	5	4.6	2.3	0.6	-0.9	-1.9	0.2

2/11/2022	5:00:00 AM	62.2	61.7	61.1	60.3	59.6	58.4	57	55.6	53.8	51.4	48.7	46.5	44.1	44.7	44.9	37.3	34.8	32	29.2	23.8	16.8	9.6	5.4	9.4	5.3	4.7	6.2	7.5	6.6	5.1	4.6	2.4	0.7	-1	-1.9	0.2
2/11/2022	6:00:00 AM	64.1	63.9	63.4	62.5	61.6	60.8	59.4	58.1	56.3	54.2	51.8	49.2	46.4	46.7	47.6	40	37.6	35	31.7	25.5	18.4	11.4	8.1	13.7	9.9	11.5	14.4	15.1	14.3	12.4	17.2	14.4	2.1	0.7	-0.6	0.3
2/11/2022	7:00:00 AM	56.8	56.3	55.9	55	54	52.7	51.4	50.2	48.2	46.3	46.3	44.1	44.1	45.1	44.4	38.1	36	33.9	30.3	26.5	24	21	18.9	14.7	11.5	10.3	14.9	14.4	13.5	10.4	9.2	4.1	1.1	-1.2	-2	0.2
2/11/2022	8:00:00 AM	51.4	50.7	49.9	49.8	49.4	47.3	45.9	46.8	45.2	43.6	44.6	44.4	44.5	46.1	47.5	41	39.9	39	38	36.7	34.2	30.3	27.9	25.8	24.5	23.1	20.9	19.3	17.8	15.5	14.3	11.7	9.7	6.9	4.1	1.9
2/11/2022	9:00:00 AM	49.6	49	48.7	47.7	47.1	45.4	43.1	45.4	42.2	40	41.1	41.5	40.8	42	42.4	34.9	33.1	31.3	28	23	17.6	11	6	5	4.3	6	7.6	8.1	6.6	5.8	6.1	3.7	1.2	-0.7	-1.7	0.2
2/11/2022	10:00:00 AM	47.9	46.5	45.4	44.8	45.3	43.8	40.3	46.6	41.3	40.2	41	42.3	43	43.4	44.8	36.2	34.9	33.1	29.2	23.1	17	9.6	6.1	8.9	11.6	14.1	19.8	19.1	11.5	13.8	16.6	11.5	0.9	0	-1.3	0.1
2/11/2022	11:00:00 AM	53.1	52.7	52	51.1	50.5	49.2	47.4	46.6	42.5	39.8	37.3	36	37.9	34.7	32.7	30.6	29.2	26.4	24.7	19.8	15.9	11.4	6	5.5	5.9	6.4	8	8.9	8.8	13.2	27.2	20.8	2.2	2.6	0.4	0.8
2/11/2022	12:00:00 PM	62.2	61.7	61.2	60.7	59.8	59.2	58.5	57.4	56.2	54.7	52.9	50.3	48.1	43.6	39.6	36.8	33	28.4	24.5	18.1	13.9	9.5	6.5	5.5	5.5	5.3	8.5	8.4	6.4	8.8	19.1	16.1	-0.7	-0.3	-1.1	0.6
2/11/2022	1:00:00 PM	69.7	69.3	68.7	67.9	67.2	66.7	65.8	65.2	64.4	63.3	62	60.2	58.2	55.4	52.1	49.1	46	42.7	38.9	34.2	29.6	25.8	22.2	19.2	16.6	13.9	12	11.4	11.1	11.7	16.3	14.2	12.3	13.9	12.9	9.4
2/11/2022	2:00:00 PM	70	69.3	68.6	68.1	67.3	66.9	66.1	65.2	64.3	63.3	61.9	60.1	57.9	55	51.8	48.7	45.5	42.2	37.9	33.2	28.5	24.6	21.4	18.3	15.4	12.4	10.2	8	6.3	5.1	3.7	1.9	0.2	0.7	0.9	2.6
2/11/2022	3:00:00 PM	69.4	69.2	68.6	68	67.1	66.5	65.8	65	64.1	63	61.5	59.5	57.3	54.6	51.3	49.7	48.5	43.7	39.6	35.9	33.1	27.8	24.9	20.2	17.7	15.4	12.5	10.7	9.3	7.8	6.2	3.9	1.8	1.6	0.8	2.1
2/11/2022	4:00:00 PM	63.7	63.4	63.3	62.3	61.7	61	60	59	58	56.6	54.8	52.7	49.7	46.1	42.8	39.3	36.2	32.7	28.3	23.9	21.6	19.8	18.4	16.7	17.3	18	18.3	18.5	19	18.6	18.1	16.3	15.2	14.8	12.3	8.5
2/11/2022	5:00:00 PM	66.3	66	65.3	64.5	63.7	62.8	61.9	60.5	59	57.5	55.6	52.8	49.8	46	42.2	38.8	35.3	31.4	27.4	21.2	16.3	12.3	9	7.2	5.6	5	5.6	6.3	5.7	3.9	3.2	1.2	-1.1	-1.4	-1.5	0.9
2/11/2022	6:00:00 PM	69	68.5	68	67.3	66.4	65.6	64.5	63.2	61.8	60.4	58.3	55.8	52.8	49.3	45.5	42.1	38.7	34.4	30.2	24.2	19.5	15.4	12.3	9.9	7.7	6.6	6.9	7.2	6.1	4.4	3.2	1	-0.5	-1	-1.1	1.5
2/11/2022	7:00:00 PM	64.9	64.3	64.1	63.1	62.3	61.4	60.2	58.9	57.6	55.7	53.5	50.9	47.7	43.8	40.5	37.7	33.7	29.3	26.9	19.9	15.9	11.3	8.4	7.3	5.7	5.6	6.4	7.1	6.1	4.8	3.4	1.2	-0.3	-0.8	-1.5	0.5
2/11/2022	8:00:00 PM	62.3	62	61.1	60.6	59.7	58.6	57.3	55.9	54.3	52.1	49.3	46.1	44.6	40.6	37.2	38.1	31.1	31.5	35.6	26.6	23.3	14	5.7	5.3	3.8	4	5.4	6.3	5.7	4.3	3	0.9	-0.5	-1.1	-1.8	0.2
2/11/2022	9:00:00 PM	63.6	63	62.6	61.7	60.9	59.9	58.7	57.2	55.6	53.7	51	48.3	45.5	41.3	37.6	36.8	31.3	29.7	33.5	26	23.8	17.5	7.2	5.8	4.1	3.6	3.8	4.8	4.8	3.3	2.1	0.2	-1.1	-1.6	-1.9	0.2
2/11/2022	10:00:00 PM	61.7	61.2	60.4	59.8	59	58	56.8	55.2	53.4	51.1	48.5	45.4	41.7	39.1	38.6	34.8	30	27.4	29.2	21.6	18.6	11.3	3.7	3.3	2.7	3.6	3.9	5.1	5	3.6	2.3	0.3	-1	-1.6	-2	0.2
2/11/2022	11:00:00 PM	63.4	62.9	62	61.2	60.5	59.5	58.3	57	55.3	53.1	50.6	47.7	44.1	40.8	39	33.6	29.8	25.9	21.8	17.5	12.4	7.5	4.2	3.7	2.9	3.7	3.9	5.1	5.1	3.6	2.3	0.3	-0.9	-1.5	-1.9	0.3
2/12/2022	12:00:00 AM	60.3	59.8	59.4	58.7	57.6	56.5	55.2	53.7	51.9	49.8	47.1	43.7	40.3	37.1	34.3	29.1	26.3	24	21.4	15.9	11.1	5.9	1.6	2.1	2	3.4	4.2	5.4	5.3	3.8	2.5	0.5	-0.8	-1.5	-1.9	0.2
2/12/2022	1:00:00 AM	58	57.3	56.8	55.9	54.7	54	52.7	51.5	49.6	48	45.3	43.1	40.5	40.5	41.6	33.6	30.6	27.2	23	17	10.9	5.1	1.1	1.5	1.4	2.8	3.5	4.6	4.6	3.3	2	0.2	-1	-1.6	-2	0.2
2/12/2022	2:00:00 AM	56.4	55.6	55	54.2	53.5	51.7	50.2	48.8	46.4	43.4	42.5	39.7	38.2	40.9	42.2	34.2	31.3	27.6	21.8	15.5	9.5	3.9	0.3	1.5	2	3.3	3.8	4.9	4.9	3.6	2.3	0.3	-0.8	-1.6	-2	0.2
2/12/2022	3:00:00 AM	58.9	58.4	57.8	57	56.1	54.9	53.1	51.8	49.6	47	44.4	42.2	40.3	42.3	42.4	35	32.7	28.9	22.7	16.4	10.1	4.2	1	2	2.1	3.4	3.7	4.9	4.9	3.5	2.3	0.3	-0.7	-1.6	-2	0.2
2/12/2022	4:00:00 AM	58.6	58.3	57.7	56.8	55.9	54.5	53.1	51.7	49.7	47.3	44.5	41.8	38.6	39.6	40.7	32.5	29.9	26.9	21.5	15.1	9.9	4.5	1.1	2.1	2.2	4	4.3	5.4	5.3	4	2.6	0.7	-0.5	-1.5	-2	0.2
2/12/2022	5:00:00 AM	59.4	59.3	58.7	57.8	56.9	55.9	54.4	53	50.8	48.9	46.6	43.8	41.1	41.3	41.6	34.1	30.9	27	23	17.3	11.7	5.2	1.3	2.1	3.4	4	3.8	5	5.2	3.7	2.5	0.5	-0.6	-1.6	-2	0.2
2/12/2022	6:00:00 AM	59.8	59.5	58.6	57.9	57.1	56	54.5	53.2	51.2	48.9	46.2	43.7	41	41.3	39.9	34.1	30.4	25.8	20.8	15.5	11.4	6	2.8	7.5	9.5	11.1	12.5	12.5	12.2	7.2	9.7	7.7	0.4	-0.4	-0.2	0.5
2/12/2022	7:00:00 AM	56	55.8	54.8	54.4	53.3	51.7	50.1	48.8	46.2	43.4	41.8	39.7	42.9	40.9	42.3	34.7	31.6	29.1	24.5	18.5	11.4	4.2	0.8	1.8	1.3	3.1	5	4.9	4.6	3.5	2.3	0.3	-0.8	-1.7	-2.1	0.2
2/12/2022	8:00:00 AM	47.9	47.1	46.2	45.2	45.4	41.7	39.4	41.5	37.8	37.1	40.4	37.8	42.9	41.1	41.8	34.8	31.7	29.4	24.5	18.9	12.5	5	1.5	1.9	1.1	2.8	3.5	5	4.8	3.6	2.5	0.4	-0.7	-1.8	-2.1	0.2
2/12/2022	9:00:00 AM	47.7	47	46.5	45.5	47.5	43.2	41.5	44.9	41.2	39.7	44.3	41.4	43.8	43.6	44.6	38.8	36.8	34.6	31.7	24.7	18.9	9.7	2.8	2.1	1.3	3.1	3.6	4.9	4.8	3.5	7.1	3.3	-1.1	-1.8	-2	0.2
2/12/2022	10:00:00 AM	50.9	50.6	50.2	48.9	48.7	46.9	44.9	45.5	42.3	40.4	41.4	41	46.1	42	43.3	38.1	33.6	32.3	32.2	24.9	20.7	11.1	3.7	2.5	1.4	0.4	1.4	3.2	5	11	29.8	22.4	-0.9	-0.7	-1.5	0.7
2/12/2022	11:00:00 AM	59.2	59.5	58.8	58.1	57.8	57	55.7	55.5	53.5	51.9	51.6	50.2	50.1	46.4	44.3	41.1	38.5	36.6	37.3	38.2	36.4	33.7	29.3	27.9	27.1	25.5	23.3	21.1	19.4	17.4	20.3	17.8	9.8	8.9	5.6	2.6

2/12/2022	12:00:00 PM	62.8	62.7	62.4	61.5	61.1	60.4	59.6	59	57.3	55.8	53.7	51.2	48.5	45.5	44.5	38.6	34.5	30.3	25.1	19.6	14.7	8.4	4.6	4.4	6.2	6.9	11.3	11.4	8.9	7.7	3.9	0.2	-2.3	-1.9	-1.7	0.2
2/12/2022	1:00:00 PM	62	61.6	61.2	60.5	59.8	59.2	58.6	57.6	56.2	54.6	52.5	49.7	47.1	43.8	42.6	37	33.1	29	24.3	18.2	13.7	7.7	3.8	5	10.3	3.2	0.9	2	1.8	1.2	0	-1.4	-2.9	-2.1	-1.8	0.2
2/12/2022	2:00:00 PM	61.5	61.3	60.6	59.9	59.5	58.6	57.8	56.6	55.3	53.4	51	48.3	45.5	42.1	40.6	36.3	33.1	29.1	25.1	20.5	15.5	10.9	6.9	5.6	7.5	2.8	3.1	3	2.3	1.7	0.4	-1	-2.5	-1.7	-1.5	0.3
2/12/2022	3:00:00 PM	60.1	59.9	59.7	59.2	58.6	57.8	56.6	55.4	53.9	51.8	48.9	45.8	41.9	38.9	38.1	31.9	27.9	23.4	19.3	14.6	10.7	5.7	2.9	3.5	1.9	1.2	1.3	2.6	2.4	1.9	9.1	0.5	-2.6	-1.8	-1.7	0.2
2/12/2022	4:00:00 PM	63.5	63.2	62.4	61.5	60.3	59.2	58	56.8	55.2	53.3	50.9	48.1	44.2	40.8	39	33.2	29.4	24.2	19.9	14.3	10.7	6	1.9	2.2	0.6	1.8	2.9	3.8	3.6	2.2	0.8	-0.9	-2.3	-2.2	-1.9	0.2
2/12/2022	5:00:00 PM	66.2	65.7	65.1	64.3	63.4	62.7	61.3	60.1	58.5	56.9	54.6	52.3	49.3	45.7	42.7	38.7	35.1	31.2	26.5	22	18	15	12.7	11.1	11.3	11	10.9	11.8	11.7	11.9	11.5	10.1	9	8.7	6.4	4.1
2/12/2022	6:00:00 PM	65.4	64.8	64.2	63.5	62.7	61.6	60.3	59	57.4	55.6	53.2	50.2	46.7	43.1	39.4	36	31.9	27.1	22.7	17	12.6	9.6	6.1	5.5	3.9	4.5	4.8	6	5.4	4.3	2.5	0.5	-1.1	-1.5	-1.6	0.6
2/12/2022	7:00:00 PM	64.2	63.7	63.1	62.5	61.6	60.7	59.4	58.2	56.6	54.6	52.4	49.4	46.3	42.9	40	36.1	33.3	28.8	25.9	21.2	17.7	12.5	9.5	7.5	5.2	5	4.8	5.7	5.2	4	2.2	0.2	-1.2	-1.8	-2	0.3
2/12/2022	8:00:00 PM	63.1	62.7	62.1	61.3	60.5	59.6	58.4	56.8	55.1	53.2	50.7	47.5	43.4	39.5	36.2	32.6	27.9	22.8	21.8	15	12.9	6.9	2.3	3	2	3.4	3.8	5.1	4.9	3.7	1.7	-0.2	-1.5	-2.1	-2.2	0.2
2/12/2022	9:00:00 PM	62	61.4	60.7	59.7	59	57.9	56.5	54.9	53.1	50.6	47.6	43.9	40.2	36.9	34.8	31.7	26.5	24.4	25.4	19.1	17.2	10.1	3.1	3.4	2.6	3.7	4.3	5.5	5.1	3.9	1.9	-0.1	-1.5	-2.1	-2.2	0.1
2/12/2022	10:00:00 PM	64.8	64.5	63.8	63.1	62.2	61.1	60	58.8	57	55.1	52.7	49.6	46.4	44.2	43.1	38.6	33.8	31.2	32.5	25.2	22.5	14.6	8	6.5	5.2	4.5	4.5	5.4	5.2	3.9	2.1	0.1	-1.3	-1.9	-2.1	0.2
2/12/2022	11:00:00 PM	59.7	59.4	58.9	57.7	57.2	56	54.5	53.1	51.6	49.6	47.6	44.7	42.2	39.7	38.8	35.2	33.8	31.5	32.1	26.7	21.9	16.3	5.4	4.9	3	2.5	3.6	4.6	4.5	3.2	1.6	-0.3	-1.5	-2.2	-2.2	0.1
2/13/2022	12:00:00 AM	59.2	59.1	58.1	57.5	56.7	55.5	54.3	52.7	51	48.7	45.9	43.1	41.6	38.7	39.9	38.9	34.1	35.4	36.6	30.2	25.2	19	9.6	7.8	5.8	2.7	3.3	4.5	4.5	3.4	1.7	-0.2	-1.4	-2.2	-2.3	0.1
2/13/2022	1:00:00 AM	56.8	56.3	56	55.1	54.4	52.8	51.4	50.3	48	45.2	42.7	41	39.9	41.7	42.3	35.9	32.3	31.8	32.8	27.8	22.4	15.9	5.9	5.1	3.5	3.3	3.5	4.8	4.6	3.5	1.7	-0.3	-1.5	-2.2	-2.3	0.1
2/13/2022	2:00:00 AM	63.4	63	62.3	61.6	60.6	59.6	58.4	57.2	55.2	52.9	50.2	47.1	44.6	43.8	43.7	37.2	33.1	29.8	28.4	22.9	17.4	10.3	6.4	5.1	3.4	3.4	3.4	4.8	4.7	3.3	1.7	-0.3	-1.5	-2.2	-2.3	0.1
2/13/2022	3:00:00 AM	61.6	61.4	60.8	60	59.1	58	56.9	55.6	53.7	51.4	48.8	45.6	42.5	41.6	39.8	33.9	29.7	29.7	27.7	22.1	16	10.3	3.8	3.7	2.6	2.8	3.2	4.5	4.7	3.3	1.7	-0.2	-1.4	-2.3	-2.3	0.1
2/13/2022	4:00:00 AM	62.6	62.3	61.5	60.9	60.3	59.1	57.8	56.5	54.6	52.4	49.7	46.9	44.4	44.7	44.6	38.1	34.1	31.6	31.6	23.9	20	11.3	5.1	4.6	3	2.7	3.2	4.4	4.5	3.1	1.7	-0.3	-1.5	-2.3	-2.3	0.1
2/13/2022	5:00:00 AM	64.2	63.6	63.2	62.6	61.5	60.7	59.5	58.4	56.4	54.5	52.1	49.3	46.8	47.3	48	40.6	37.5	33.7	27.7	20.1	12.9	6.4	2.5	2.9	1.8	3.1	3.6	4.7	4.7	3.3	1.8	-0.2	-1.5	-2.2	-2.3	0.2
2/13/2022	6:00:00 AM	64.3	63.6	63.2	62.5	61.7	60.6	59.2	58.1	56.3	54.3	51.9	49	45.8	45.4	45.9	38	34.2	30	24.2	17.4	11.8	6.7	7.6	14.6	12.3	10	10.8	12	13.4	7.7	10.2	1.2	-1.4	-2	-2.1	0.2
2/13/2022	7:00:00 AM	51	50.2	49.6	49.9	48.6	46.2	45.7	45.6	43.2	41.8	41.5	41.7	41.6	41.8	41.4	37.6	33	31.7	31.5	26	22.8	15.2	6.3	4.9	4.6	9.7	9.2	15.5	14.4	12.9	28.2	22.7	1.1	-0.7	-2	0.4
2/13/2022	8:00:00 AM	50.6	50	49.5	48.9	48.3	46.2	45	46.3	43	41.4	41.1	40	40.4	41.7	43.9	38.7	33.3	32	32.6	26.7	24.7	15.2	7.6	9.6	4.5	3.3	3.8	4.9	5.1	7.6	26.1	21.5	-0.8	-1.6	-2.1	0.3
2/13/2022	9:00:00 AM	48.5	47.8	46.9	46.3	46	43.4	41.4	44.8	42.6	42	40.3	41.1	40.4	41.9	44	38.9	34.8	33.7	32.3	26.9	25.2	15.4	7.6	8.2	3.5	3.3	3.8	4.9	4.5	3.3	1.6	-0.4	-1.7	-2.1	-2.2	0.1
2/13/2022	10:00:00 AM	48	47.6	46.7	45.9	46.3	44.2	41.8	48.1	41.8	41.6	41.3	41	39.6	42.4	47.2	35.5	32.4	30.2	24.2	18.5	13.7	8.4	7.2	8	7.3	1.2	2.1	2.8	2.7	3.5	12	6.2	-2.5	-1.9	-1.8	0.1
2/13/2022	11:00:00 AM	53.1	52.4	51.9	50.8	50.2	48.9	47.6	48.2	45.2	43.2	42	39.1	40.9	44.3	43.5	33.7	33	27	29.4	18.5	19	18.4	14.3	12.1	8.4	7.8	9.2	12.3	11.7	6.9	11.6	6.8	1.4	2.4	1.1	1.2
2/13/2022	12:00:00 PM	56.5	55.8	55.1	54.4	54.1	52.8	51.8	50.9	49.7	47.4	45.1	43.8	40.7	40.6	39.2	34.6	30.9	27.5	24.6	19.4	15.6	9.3	8.9	8.3	8.8	1.9	1.8	2.5	2.1	1.3	0	-1.4	-2.9	-1.9	-1.7	0.2
2/13/2022	1:00:00 PM	69.9	69.6	69.1	68.4	67.7	67	66.2	65.2	64.1	62.8	61.2	59.1	56.5	53.7	50.5	47.5	44.2	40.5	36.5	31.7	27.8	23.9	21	18.3	16	13.2	11.5	10	8.9	8.1	20.7	11.1	3.6	3.6	2.5	3.2
2/13/2022	2:00:00 PM	72	71.8	71.2	70.5	69.8	69.1	68.4	67.5	66.4	65.3	63.8	62	59.9	57.2	54.3	51.5	48.4	45.3	41.6	38.1	34.1	29.9	27	24.1	21.3	18.8	16.9	15.4	14.5	13.9	13.2	12.1	11	11.5	9.1	6.9
2/13/2022	3:00:00 PM	68.8	68.4	67.8	67.3	66.8	65.9	64.8	64	62.7	61.3	59.6	57.5	55	51.9	48.5	45.4	42.2	38.4	34	29.4	25.4	21.7	18.4	15.3	12.4	9.2	7	5.3	4.1	3	2.2	0.4	-1	-0.4	-0.2	1.5
2/13/2022	4:00:00 PM	66.4	66.1	65.3	64.5	63.8	63	62	60.8	59.4	58	56	53.8	50.6	47.3	44.4	42.6	45.7	37.7	35.3	35.2	28.9	20.6	16.8	16.3	17.9	18.3	16.2	14.1	13	12.8	11.8	10.9	9.5	9.2	6.4	3.7
2/13/2022	5:00:00 PM	66.4	65.8	65.4	65	64	63.2	61.9	61.1	59.8	58	56.1	53.7	51.3	48.1	45	41.3	37.9	34.5	30.1	25.9	22.6	20.5	18.1	18.1	18.6	17.9	17.9	17.9	18.1	20.6	19	18.4	17.2	17.5	16.2	12.5
2/13/2022	6:00:00 PM	66.9	66.3	65.8	65	64.3	63.5	62.7	61.2	60.1	58.6	56.9	54.4	51.8	49.1	46.8	42.4	39.1	35.5	30.9	25.8	21.7	17.5	14.8	12.5	10.4	8.4	6.6	6	4.9	4	2.8	1.1	-0.1	-0.4	-0.6	1

2/13/2022	7:00:00 PM	65.5	65.3	64.3	63.6	63.2	62.2	60.9	59.8	58.4	57.1	55.1	52.8	49.8	47.3	43.9	41.2	37.7	33.6	30.7	25.7	21	16.8	13.9	11.1	9	7.4	5.9	5.6	4.5	3.6	2.4	0.7	-0.5	-0.8	-1.1	1.5
2/13/2022	8:00:00 PM	65.4	64.9	64.6	63.6	63.1	62.1	60.9	59.9	58.5	57	55.1	52.8	50.1	47.5	44.2	40.7	37.2	33.5	29.6	24.2	19.9	15.8	12.9	10.6	8.4	6.9	5.4	5.3	4.2	3.3	2.2	0.6	-0.6	-1	-0.8	1.1
2/13/2022	9:00:00 PM	61.9	61.2	61	59.9	59	58.5	56.9	56	54.2	52.9	51.2	49.1	46.2	43.5	40.8	37.4	33.6	29.9	25.8	20.5	14.3	10.3	7.8	6.1	5.1	5.3	4.2	4.7	3.8	3.1	2	0.3	-0.8	-1.4	-1.6	0.4
2/13/2022	10:00:00 PM	60.6	61	60	59.4	58.7	57.3	56.2	55.1	53.7	52	50.4	47.7	45.2	42.3	39.4	35.3	32	29.2	24.6	18.8	13.5	9.6	7.3	6.3	4.6	3.8	3.3	3.8	3.1	2.4	1.6	-0.2	-1.3	-1.7	-1.9	0.3
2/13/2022	11:00:00 PM	53.9	53.5	52.9	51.9	50.9	49.8	47.8	46.6	44.2	41.4	38	35.9	35.8	36.5	35.3	32.2	27.7	26.1	26	20.6	16	8.8	2.7	2	3.5	4.1	3.5	4.5	3.5	2.7	1.7	-0.2	-1.3	-1.9	-2.1	0.2
2/14/2022	12:00:00 AM	56.2	55.9	55.2	54.6	54.1	52.9	51.7	50.6	48.4	46.3	43.9	41.4	38.7	40.3	40.1	32.3	28.5	25.3	21.3	14.2	8.5	3.4	1.3	1.2	2.9	4.4	4	5	4	3.1	2	0.1	-1	-1.7	-2	0.2
2/14/2022	1:00:00 AM	52.9	52.6	52.1	51.1	50.7	48.9	47.5	47.6	44.7	42.3	41.2	39.7	40.1	43.3	42.8	35.1	31.7	29.6	27	19.9	11.7	6.6	5.4	2.2	2.7	3.4	3.6	4.6	3.9	3	2.1	0.1	-1	-1.8	-2.1	0.2
2/14/2022	2:00:00 AM	53.3	52.9	52.1	51.3	50.4	49.2	47.5	47.9	44	41.3	40.7	39.2	37.9	41.2	42.8	33.2	28.7	24.1	20	14.2	7.6	4.6	2.9	1.5	1.9	2.7	2.9	3.8	3.2	2.3	1.6	-0.3	-1.4	-2.1	-2.2	0.2
2/14/2022	3:00:00 AM	56	55.4	54.9	54.3	53.3	51.9	50.5	49.4	47.1	44.5	42.3	40.2	38.5	41.2	41.5	33.1	28.4	23.9	20.3	14.4	7.7	3.2	1.2	0.8	2.1	3.8	4	4.8	3.9	3.2	2.2	0.2	-0.9	-1.8	-2.1	0.2
2/14/2022	4:00:00 AM	60.8	60.4	59.7	58.7	58.1	56.9	55.4	54.3	52.5	50.5	48.2	45.5	43	43.5	44.6	35.1	30.6	26.9	22.9	18	10.5	5.7	2.9	1.8	1.7	3.2	3.7	4.2	3.4	2.5	1.8	0.1	-1.2	-1.9	-2.1	0.2
2/14/2022	5:00:00 AM	56.3	55.9	55.5	54.1	53.4	52.2	50.7	49.7	47.2	44.9	42.3	39.9	37.9	40.8	39.6	31.6	27	23.7	20.5	14.9	9.5	5.2	3	2.2	1.7	3.4	3.8	4.2	3.4	2.7	1.9	0	-1.1	-1.9	-2.1	0.2
2/14/2022	6:00:00 AM	54.5	54.2	53.8	52.6	51.9	50.3	48.6	48.1	45.6	43.2	41.2	40.3	39.5	42.7	43.2	34.4	30.2	26.1	22	16.7	10.9	8.2	6.5	4.9	6.5	10.5	11.3	11.6	10.3	9.7	10.3	8.9	-0.2	-1.1	-1.5	0.3
2/14/2022	7:00:00 AM	54.5	53.9	53	52.5	51.6	50.5	49.2	49.1	46.7	44.5	42.6	40.6	42	41	40.5	35	33	33.8	31.9	25.9	17.9	12.1	8.7	4.9	0.9	2.4	2.9	3.6	5	10.1	25.2	17.5	-0.5	-1	-1.7	0.4
2/14/2022	8:00:00 AM	48.5	46.4	45.7	45.2	45.5	45.2	44.1	45.5	43.5	41.5	43.8	39.8	41.3	40.7	39.3	37.4	36.1	34.1	35	35.1	34.1	30.9	29.1	28.9	29.4	32.3	29.5	27.2	27.2	25.1	25.5	25.3	24.2	19.7	23.9	22.7
2/14/2022	9:00:00 AM	42	39.9	37.9	36.2	38.4	32	31.5	36.7	34.8	34.3	34	34.2	34.5	37.6	37.8	31.5	29	26.4	22	16.7	10.5	9	8.3	5.5	1.5	1.9	2.8	3.2	2.8	1.9	1.3	-0.1	-2.1	-2.4	-0.4	0.6
2/14/2022	10:00:00 AM	44.2	41.3	39.7	37.9	36.9	32.9	31.1	35.3	32.9	32.2	32.6	33.1	34.5	36.1	36.4	30.4	28.4	26.1	23	18.2	11.5	9.9	9.6	8	6.8	5.7	3.2	3.2	2.7	2.5	11.7	12.5	-2.1	-2.6	-1.8	0.3
2/14/2022	11:00:00 AM	58.4	56.8	55	53.4	49.9	47.2	46.5	43.8	42.2	39.8	38.1	37.2	36.7	37.8	39.4	33	31.3	29.6	29.1	27.3	24.9	22.2	19.6	18	17.1	15.6	14.1	11.8	9.6	9.4	17.3	9.1	2	1.9	1.8	1.4
2/14/2022	12:00:00 PM	63.1	61.8	59.7	58.3	55.5	53.5	50.3	47.7	44.7	42.2	38.7	37.1	37	34.4	35.2	33.7	30.9	29.1	28.3	23.9	20.4	19.4	19.3	18.5	17.1	15.8	14.7	13.1	10.7	9.5	10.9	7.9	5.3	4.5	3	2.3
2/14/2022	1:00:00 PM	65.3	63.9	62.3	59.8	57.4	54.3	52	48.8	45.8	42.7	40.5	37.8	36.1	35.8	35.9	32.9	30.9	30.3	28.3	25.5	23.3	23.2	23	22.3	20.5	17.3	13.9	11.3	9	7.8	7.2	6.3	4.6	4.2	3.9	3.3
2/14/2022	2:00:00 PM	68.8	67.6	65.9	63.9	61.6	59.1	56.6	53.2	50.4	47.1	44	41	38.3	37	36.1	33.1	32	30.9	29.8	27.6	25.2	24.5	24.8	24.3	22.8	20	16.6	13.8	11.6	10.7	17	14.7	7.5	7.4	6.5	6.3
2/14/2022	3:00:00 PM	64.5	63.3	61.5	58.9	56.7	53.6	50.6	47.4	43.9	40.5	38	36.2	34.2	34.6	35.6	30.2	28.8	27.7	26.5	23.7	21.1	20.6	20.2	19	16.7	13.7	10.7	8.9	7.2	6.6	8.2	5.6	3.6	3.2	2.3	2
2/14/2022	4:00:00 PM	60.3	58.5	56.7	54.6	52.2	49.5	47	44.2	41.3	37.6	36.7	34.3	35	36	37.1	31.1	28.1	26.5	24.4	20	16.5	15.1	13.8	12.9	11.4	9.2	7.4	6.8	5.5	4.9	4.8	3.5	1.5	0.9	0.4	1.4
2/14/2022	5:00:00 PM	56.5	54.5	52.1	50.2	48.2	45.5	42.9	43.8	40.3	38.7	39.2	38.4	37.6	40.8	42.4	33.4	29.6	25.7	22.4	17.7	14.3	13.4	11.9	10.4	8.3	6.7	5.6	5.5	4.2	3.3	2.7	1.1	-0.8	-1.4	-1.3	0.4
2/14/2022	6:00:00 PM	65	63.6	61.5	59.4	56.8	54.3	51.6	49.4	45.5	43.1	42.1	40.4	39.4	42.2	42.7	34.7	31.2	28.8	26.8	23.9	21.6	21.2	20.6	19.9	18.3	15.3	11.8	9.4	7.2	5.9	5.3	4.2	2.5	2	1.3	2.4
2/14/2022	7:00:00 PM	63.9	62.4	60.5	58.5	55.8	53.6	50.2	49	44.6	42.7	42.6	39.5	39.5	42.2	41.2	34.6	31.7	29.5	27.6	24.6	22.3	22.2	22.1	21.6	19.7	16.6	13.2	10.2	7.6	6.2	5.5	4.3	2.5	1.8	1.2	2.2
2/14/2022	8:00:00 PM	64.9	63.4	61.8	59.3	57.3	54.3	51.4	48.9	45.8	43.3	41	41.1	39.4	42.4	43.8	35.4	32.1	29.6	27.3	24.1	21.8	21.1	20.4	19.7	18.3	15.4	11.9	9.3	7	5.7	5	3.8	1.8	1.1	0.8	1.8
2/14/2022	9:00:00 PM	60.9	59.3	57.4	54.7	52.7	49.3	46	44	41.3	39.5	38	38.8	38.3	41	40.4	33.4	30.2	27.9	24.7	20.6	17.6	16.9	16.1	14.9	12.8	10	7.6	6.5	4.8	3.7	2.9	1.3	-0.7	-1.4	-1.1	0.6
2/14/2022	10:00:00 PM	61.4	59.9	58.1	55.6	52.8	49.6	46.6	44.2	41.7	40.1	39.1	39	38.3	41.3	40.9	33.9	30.9	28.4	25	20.8	18.2	17.8	17.1	16.1	13.9	10.5	7.8	6.6	4.8	3.6	2.8	1.2	-0.7	-1.4	-1.1	0.9
2/14/2022	11:00:00 PM	61.4	59.9	57.8	55.5	52.5	49	46.5	45.2	42.2	39.8	39.3	39.8	38.8	41.3	41.2	34.5	31.7	29.8	26.5	22.7	20.8	19.8	19.2	19.4	18.3	15.4	11.6	8.7	6	4.2	3.6	2.3	0.5	-0.4	-0.4	1
2/15/2022	12:00:00 AM	52	49.9	47.6	45.1	44.2	40.4	37.7	43.1	39.6	39.7	39.8	39.3	40	42.9	41.2	35.4	32.5	30.7	25.7	19.2	14.2	10.5	8.2	7.9	6.4	4.5	3.2	3.3	3	1.7	1.7	0.1	-2.1	-3	-2.1	0.2
2/15/2022	1:00:00 AM	43.5	40.3	38.1	36	35.2	30.9	30.4	33.5	31.4	31.4	34	32.5	34.5	37.5	37.1	30.2	26.9	24.8	21.3	15.1	9.4	4.7	2	1.5	0.8	2.9	2.9	3.5	3.4	2.1	2	0.1	-2	-3.1	-2.3	0.2

2/15/2022	2:00:00 AM	50.9	49.4	46.6	44.2	43.9	38.9	37.6	41.6	38.1	37.5	37.9	38.1	38.3	40.4	39.7	32.9	30.6	29.5	24.6	19	13.2	7.6	5.2	4.9	3.6	3.2	2.8	3.3	3.1	2.1	2	0.2	-1.9	-3.1	-2.2	0.2
2/15/2022	3:00:00 AM	59.8	58.1	55.4	52.9	50	46.3	43.3	43.4	40.7	39.2	38.7	39.4	38.2	40.1	40.5	33.6	31.8	30.2	27.1	22.8	20.1	18.4	17.6	17.4	16	12.7	8.7	6.1	4.1	2.7	2.4	0.9	-1.1	-2.3	-1.2	0.6
2/15/2022	4:00:00 AM	63.4	61.4	58.9	56.2	53.6	50	47.2	44.5	42.1	40.8	38.7	39.3	40.1	40.8	38.4	33.2	31.2	31.2	27.1	23.8	21.4	19.9	19.2	19.2	18.1	15.5	12.3	11.2	11	10.9	12.4	13.7	11.5	10.8	11.2	15.9
2/15/2022	5:00:00 AM	64.5	62.3	60.4	57.8	55	52.6	50	47.5	44.4	41.4	40.7	39.9	40.3	42.2	42.1	34.7	31.6	29	25.4	22.9	22.2	22.4	23	23.1	21.5	18.3	14.7	11.3	8.8	7.8	7.8	8.1	6.7	6.3	7.2	12.1
2/15/2022	6:00:00 AM	52.4	50.7	48.7	44.9	42.9	40.4	36.4	35.9	34.7	34.4	38.4	30.8	32	32.1	29.5	24.7	20.4	16.1	13.8	13.8	12.3	11.5	10.9	9.7	11	5.6	2.7	2	3	4.5	8.2	6.2	3.9	4.2	4.7	7
2/15/2022	7:00:00 AM	59.3	56.7	54	51.6	47.7	45	42.3	39.7	38.8	35.1	36.1	31.6	35.8	30	26.5	22.5	18.6	17.2	15.9	16.4	18.5	21	22.1	20.5	17.3	13.6	9.6	5.9	3.5	1.3	6.7	3.6	-0.5	-2	-1.3	2.1
2/15/2022	8:00:00 AM	63.1	60.9	58.4	55.6	52.5	49.5	46.7	44	41.7	38	38.8	33.2	35	33.4	30	25.9	22.4	20.9	19.5	19.7	21.6	23.9	24.8	23.4	20.5	16.7	12.5	8.4	5.1	3.2	8.2	6.2	2	-1.4	-0.7	2.8
2/15/2022	9:00:00 AM	64.5	62.1	59.8	57.4	54.9	52.2	49	46.4	44.7	41.8	44.8	37.3	38.8	39	33.7	30	25.2	22.8	21.4	21.2	22.8	25.2	26.4	25.2	22.3	18.7	14.5	9.9	6.4	3.5	2.9	1	-0.8	-0.6	1	5
2/15/2022	10:00:00 AM	58.8	56.3	54	51	48.6	44.9	42.6	40.3	39.1	36.4	38.8	36.5	37.8	40.1	37.8	30.9	25.9	22.2	18.7	18.3	19.5	21.2	21.9	20.5	18.9	18	11.7	7.1	4.1	1.2	1.7	-0.3	-3	-2.8	-1.7	0.9
2/15/2022	11:00:00 AM	58.5	55.9	54	51.1	48.7	44.4	41.9	39.9	38.7	37.7	36.2	36.7	37.3	40.8	39.5	32.9	28.7	25.3	19.5	17.6	17.4	17.3	17	15.6	12.6	9	5.8	2.3	1.2	4.3	7.7	3.4	-1.8	-2.1	-1.6	0.7
2/15/2022	12:00:00 PM	55.3	52.4	49.3	46.6	45.4	41.5	38.7	39.9	38.1	34.6	34.7	36.4	35.3	38.6	41.4	32.3	28.7	25.7	21.4	15.7	13	10.9	10.1	9	6.8	4.3	2.8	1.2	0.5	0.9	2.2	0.8	-2.5	-2	-0.8	0.7
2/15/2022	1:00:00 PM	51.3	49.9	47.3	46.8	46	44.2	42.4	45.9	42.6	40.9	41.5	44.2	42.4	42.2	40.8	38.6	39	40.8	38.5	35.9	33.8	29	26.3	25.7	25.9	25.2	24.8	22.3	20	17.3	17.9	13.7	9.3	6.1	4	1.4
2/15/2022	2:00:00 PM	51.6	49.5	47.2	44.8	42.6	39.3	36.4	36.8	34.1	32.6	33.8	33.5	33	35.7	36.3	30.3	28.2	26.2	22.9	17.4	12.8	7.9	6.7	8.2	8.9	9.7	9.5	8.7	6.2	5.8	10	7.6	-0.2	-0.7	-0.5	0.5
2/15/2022	3:00:00 PM	55.1	52.3	50.3	47.8	44.7	41.3	39.3	37.5	35.4	33.5	34	33.2	31.4	35.1	37	28.7	26.8	26.5	22.4	17.8	15.4	14.2	13.3	12.9	13.4	11.7	7.9	9.5	6.7	4.4	13.2	7.6	-2.3	-2.5	-1.7	0.3
2/15/2022	4:00:00 PM	65.1	63.3	61.1	58.4	55.9	52.6	49.3	46.1	42.8	39.9	36.7	34.9	32.9	32.2	31.6	28.8	27.5	26.6	25.2	24.4	24.2	24.1	23.3	22.9	21.1	17.7	14.7	15.5	16.4	12.2	15.7	12.7	1.8	0.3	0.2	1.6
2/15/2022	5:00:00 PM	63.8	61.6	58.8	56.2	52.9	49.9	47.5	45	41.3	38.9	37.3	36.4	34.9	35.5	36.8	31.4	29.9	29	27.4	25.8	25.2	24.9	25.5	25.5	23.8	20.5	16.6	12.7	9	6	4.9	3.4	1.5	0.9	1	2.9
2/15/2022	6:00:00 PM	60.4	57.6	55.3	52	50	46	43	43.4	42.7	40.3	43	39.7	39.8	42	43	35.1	33	30.9	27.7	24	22.4	21.5	21.8	21.6	19.6	15.8	11.6	8.2	5.3	2.9	2.3	0.8	-1	-1.4	-0.7	1.7
2/15/2022	7:00:00 PM	59.3	57.5	54.3	51.4	48.5	45.1	42.4	41.4	41.3	39.1	41.3	38.6	37.8	39.5	39.6	32.1	30.2	28.6	25.7	22.7	21.2	20.2	20.3	19.9	17.6	13.8	9.9	7	4.7	2.8	2.3	0.9	-0.9	-1.5	-1	0.5
2/15/2022	8:00:00 PM	52.3	50	46.4	44	45.8	40.1	39.5	43.4	42.7	41.7	42.6	42.2	41.9	44.7	45.2	36.5	35	33	28.6	21.7	15.4	10.4	10	9.5	7.4	5.3	3.9	4.2	3.2	1.5	1.2	-0.3	-2.1	-2.7	-2	0.3
2/15/2022	9:00:00 PM	50.7	48.5	46.2	44	43.4	39.9	37.9	40.8	38.3	38.5	38.9	38.3	37	40.6	40.9	33.1	31.3	30.2	24.8	18.6	12.5	7.7	7.4	6.8	5.1	4.2	3.7	4.3	3.3	1.5	1.2	-0.4	-2.2	-2.9	-2.1	0.2
2/15/2022	10:00:00 PM	49.7	47.5	44.4	42.9	42.8	39.3	38.6	41.4	37.7	36.2	38.2	37.7	37.3	39.7	40.9	32.8	31.8	30	25.4	19.5	14.5	12.7	12.8	11.6	8.4	5.4	3.8	4.1	2.9	1.3	1.1	-0.5	-2.3	-3	-2.1	0.2
2/15/2022	11:00:00 PM	51.2	48.7	46.4	44.2	43.9	40.3	38.5	42.6	40.3	39	38.9	40.9	40.6	43.5	44.6	35.7	33.5	31.8	27	20.2	13.9	9.6	9.9	9	6.9	5.4	4.6	4.9	3.6	2	1.7	0.2	-1.7	-2.6	-2	0.2
2/16/2022	12:00:00 AM	53.2	50.8	48.3	45.7	43.9	40.9	38.3	37.4	33.7	31.4	29.7	30.3	30.5	32	31.5	25.9	24.2	23.6	18.8	12.8	6.7	1.3	1.6	2.6	3.8	4.8	5	5.5	3.8	2.2	1.9	0.2	-1.7	-2.7	-2.1	0.2
2/16/2022	1:00:00 AM	44.5	42.4	41	39.5	38.5	35.9	33.9	34.2	30.2	29.5	29.1	28.3	29.6	29.8	30.5	24.3	23.5	22.1	21	18	13.8	9.3	3	4.1	5.6	5	5.5	6.2	4.1	2.8	2.3	0.4	-1.5	-2.7	-2.1	0.2
2/16/2022	2:00:00 AM	50	47.8	45.4	43.3	41.3	38.4	36.5	36.2	32.4	30.4	29.9	29.5	30.7	32.1	32.6	26.4	25.5	24.2	22	18.8	14.4	9.9	3.7	3.4	5.4	4.6	4.7	5.4	3.5	2.3	1.9	0.2	-1.7	-2.7	-2.1	0.2
2/16/2022	3:00:00 AM	34.2	35.2	39	39.3	40.2	38.2	36.8	38.2	36.4	35	34.6	35.2	35.6	38.7	38.7	32.8	30.6	29.5	27.3	24	18.4	12.7	6.3	7.8	10.5	4.4	4.5	5.5	4.2	3.9	3.5	1.1	-1.2	-2.7	-2.1	0.2
2/16/2022	4:00:00 AM	42	40.7	40.3	40.3	41.6	38.8	37	43.5	38.6	37.1	37.9	38.4	39	42.1	42.2	36.9	34.8	31.7	28	23.6	18.2	12.2	7.4	7.6	9.4	5	5.6	6	4	2.9	2.3	0.6	-1.4	-2.6	-2.1	0.2
2/16/2022	5:00:00 AM	37.3	36.7	38.2	39.6	42.9	38.5	38.1	42.9	40.2	39.3	40.5	41.4	42.1	46.7	47.9	39.9	36.6	33.4	27.2	18.4	10.9	3.9	1.5	2.1	3.3	4.6	5.3	5.7	3.8	2.7	2.1	0.5	-1.4	-2.7	-2.2	0.2
2/16/2022	6:00:00 AM	43.7	41.7	41.6	41.2	41.9	40.3	39.3	44.3	39.2	38.2	40.4	40.2	42.7	46.1	45.7	37.7	34.2	30.5	24.5	17.1	11.5	6.6	3.8	3.9	4.4	4.8	5.4	5.6	4.1	4.4	12.2	5.1	-1.3	-2.6	-2.2	0.2
2/16/2022	7:00:00 AM	38.2	37.3	38.7	39.7	42.1	39.6	37.9	45.2	41	42	42.6	39.7	42.5	44.7	45.3	39.4	35.7	34.2	29.6	22.9	17.4	11.8	6.8	8.3	11	14.8	16.7	21.8	21	15.6	14.4	10.5	5.9	1.3	-1	0.3
2/16/2022	8:00:00 AM	40.5	39.2	40.3	40.7	44.5	41.8	40.9	47.1	41.6	41.9	41.3	42.3	44.4	47.4	48.2	41.3	38	36.1	33.2	29	24.4	19.9	14.1	13.3	14.4	3.8	3.7	4.4	3.3	3.2	11.2	9.1	3.2	-1.7	-1.9	0.3

2/16/2022	9:00:00 AM	41.3	39.5	39.6	39.9	42	39.7	39.5	43.6	39.1	39.3	40.1	40.7	39.9	43	45.2	37	34.9	33.8	30.5	30.9	22.5	16.9	13.6	20.4	25.8	17.9	22.7	19.5	12.2	14.7	18.1	11.3	0.8	-0.9	-1.2	0.4
2/16/2022	10:00:00 AM	48.3	47.3	45.1	43.1	42.2	40.9	39.5	43.6	37.6	37.1	36.2	35.4	33.7	35.4	35.3	30.6	28.5	27.9	23.2	18.8	15	10.9	6.7	5.9	7.3	7.9	8.4	8.4	7.3	6.7	7.1	6.6	1.9	0.1	-0.6	0.4
2/16/2022	11:00:00 AM	44	41.6	40.1	38.4	38.8	39.2	34.3	41.6	34.4	33.8	38.7	33.8	35.5	37.9	37.2	31.7	29.6	26.9	21.9	16.3	12	5.4	4.9	4.4	5.1	4.1	5.1	5.4	6.5	10.2	24	15.5	2.1	-1.2	-1.7	0.3
2/16/2022	12:00:00 PM	57.9	55.6	53.5	51	48.9	45.3	42.1	42.2	39.4	38.2	37.8	38.1	38.2	41	41.4	34.9	32.6	32.3	29	22.3	18.4	15.5	14.4	14.2	12.6	9	5.6	4.4	3.1	1.9	1.9	0	-2.1	-2.6	-1.8	0.3
2/16/2022	1:00:00 PM	61.6	60.4	58.5	56.1	53.5	50.4	47	44.1	41.3	38.1	36.5	35	34.7	37	36.4	30.7	28.8	27.8	25.1	22.5	21.2	20.3	19.2	19.2	17.7	14.1	9.8	7.1	4.7	5	16.5	12.5	-0.2	-1.1	-0.5	1.3
2/16/2022	2:00:00 PM	59.5	57.8	56.2	54.3	51.2	48.1	45.4	42.2	39.6	38.8	38.8	33.9	33.4	33.5	32.8	28.3	26.5	25.5	23.3	21.1	18.9	16.8	16.6	16.5	14.9	12.4	9.5	8.8	8.5	8.1	11	9.4	6.3	5.4	5.1	6.3
2/16/2022	3:00:00 PM	53.3	51.1	48.7	46.1	46.2	41	41.4	41.7	41.6	41.7	40	42.4	41.4	43.9	42.7	36.5	33.4	31.9	27.8	23.1	19.4	15.7	12.8	12.2	16.9	18.7	12.6	11.2	10.1	8.4	11	9.6	5.6	4.8	4.7	8.1
2/16/2022	4:00:00 PM	66.3	64.6	62.6	60.5	57.8	54.7	52	48.8	45.4	42.1	39.4	40	45.1	39.7	40.5	36.8	31.2	29.4	27.5	25.7	25.1	25.4	25.3	25.1	23.1	19.2	15	11.4	7.5	5	4.6	3.3	1.5	0.9	1.1	2.2
2/16/2022	5:00:00 PM	60.3	57.7	55.4	52.4	49.1	45.7	42.3	40.4	37.3	35.1	34.1	34	33.3	34.6	33.6	28.7	27.1	26.2	24.3	22.3	21.1	21.5	21.9	21.1	18.3	13.7	9.4	6.6	4.4	2.6	2.5	1.5	-0.6	-1.4	-0.9	0.6
2/16/2022	6:00:00 PM	61.9	59.5	57.2	54.4	51.6	48.4	45	43.8	39.2	36.7	36.2	36.3	35.2	37.4	37.3	31.5	29.8	28.5	26	23.8	22.8	22.5	22.8	22.3	20	16	11.5	8	5.2	3.3	3	2	0.4	-0.3	0	1
2/16/2022	7:00:00 PM	58.2	56	53.4	51.1	47.9	44.9	41.9	39.5	36.7	35	33.3	33.9	33.8	35.1	35.9	29.5	27.9	26.3	23.9	21.5	19.9	19.1	19.1	18.4	16	11.9	7.8	5.6	3.7	2.2	1.9	0.7	-1	-1.6	-1.1	0.5
2/16/2022	8:00:00 PM	53.2	51.9	48.8	46.1	43.6	40.7	37.9	36.3	32.6	30	30.4	30	30.3	34.1	31.1	24.7	24.4	22.3	19.8	17	14.2	13.9	13.2	11.8	8.1	4.4	2.7	3.3	2.5	1.2	0.8	-0.5	-2.3	-2.8	-1.8	0.4
2/16/2022	9:00:00 PM	47	44.7	42.1	39.4	38.6	36.1	34.1	36.7	32.1	31.4	30.6	32.1	31.3	33.7	32.8	27.9	25.6	24.3	20.5	15.8	11.2	9.6	9.3	7.9	4.7	3.1	2.9	4	2.9	1.4	1.1	-0.5	-2.5	-3.1	-2.2	0.2
2/16/2022	10:00:00 PM	42.8	41.1	39	37.8	39.1	34.7	34.3	35.6	34.2	34.3	34	34.9	34.3	36.9	36.1	30.1	28	26	22.3	16.6	10.8	6.9	5.8	4.1	2.3	2.9	3.2	4.3	3.2	1.7	1.3	-0.3	-2.3	-3.2	-2.2	0.2
2/16/2022	11:00:00 PM	43.6	42.2	40	39.1	41.1	34.5	34.4	37.2	35	34.8	35.7	37	35.6	38	38.6	30.5	28	26.7	22.5	17	10.8	7.8	7.4	5.9	3	2.7	2.8	3.9	2.9	1.4	1	-0.6	-2.5	-3.2	-2.2	0.2
2/17/2022	12:00:00 AM	52.2	49.6	47.2	45	43.3	38.5	36.9	39	37.1	34.6	35.3	36.2	36.4	37.2	39.5	31.3	29	27.3	24.4	19.2	15	14.4	12.9	11.5	8.7	5.5	3.7	3.9	2.8	1.4	0.9	-0.5	-2.3	-2.9	-2	0.3
2/17/2022	1:00:00 AM	55.9	53.8	50.9	48.9	48.3	43.1	41.3	42.3	39.9	38.8	40.8	42.4	42.4	44.9	46	37.4	35.7	33.6	29.6	23.3	18.6	16.2	16.7	16.1	13.8	10.1	6.6	5.1	3.4	1.9	1.5	0.3	-1.5	-2.2	-1.5	0.4
2/17/2022	2:00:00 AM	45.4	43.4	41.5	40.7	44.1	38.3	38.5	43.2	40	39.9	41	41.4	42.6	44	45.1	37.7	35	32.9	28.2	20.7	12.7	4.7	3.7	3.1	1.9	2.9	3.1	3.9	2.9	1.4	1.2	-0.2	-2.2	-3	-2.1	0.2
2/17/2022	3:00:00 AM	47.3	45.4	43.2	41.4	41.3	38.5	36.1	41.3	37.1	35.2	36.5	34.8	35.1	38.1	41.7	32.7	30.4	28.5	23.2	16.3	8.6	1.8	1.4	1.8	2.1	3.7	4	4.6	3.4	1.8	1.6	0.2	-1.9	-2.9	-2.1	0.2
2/17/2022	4:00:00 AM	56.2	54.1	51.4	49	46.7	43.5	40.6	42.3	36.4	34.8	35.3	34.1	34	35.8	35.5	31.8	30.3	28.9	22.3	16.9	13	7.7	4	3.8	4	5.2	5.3	5.6	4.3	2.7	2.2	0.7	-1.3	-2.5	-1.9	0.3
2/17/2022	5:00:00 AM	46.5	44.4	42.6	40.9	39.2	37.5	35.1	39.1	33	31.4	34	30.7	30.4	34.3	31.5	27.7	26.3	25.1	19.9	14.3	10.1	4.6	0.7	1.9	2.7	4.5	4.7	5.4	3.8	2.5	2	0.5	-1.4	-2.6	-2	0.3
2/17/2022	6:00:00 AM	49.5	48.2	46	43.6	42.1	40.1	37.1	43.3	36	35.2	37	36.4	35.7	37.8	37.8	31.4	28.6	25.8	21.6	15.3	9.8	4.5	2.7	5.1	9.5	10.5	12.4	12	9	5	7	4.6	-0.9	-2.2	-1.9	0.3
2/17/2022	7:00:00 AM	38.1	37.7	38.9	39.4	39.2	38.5	37.5	40.4	34.8	34.6	36.6	34.7	35.5	35.6	33.5	31.4	29.4	29.1	27.8	27.5	28.9	25.5	24.2	24.8	27.5	28.7	29.3	28.3	29.7	28.9	30.3	27.9	22.5	22.5	18.6	13.9
2/17/2022	8:00:00 AM	35.2	36.2	38.7	38.9	40.8	39.1	40.5	41	37.8	37.2	37.8	38	37.6	39.3	39.5	34.4	31.3	30.2	25.3	19.4	13.3	6.6	1.1	1.5	2.2	4.5	5.1	5.5	3.7	2.9	9.3	1.8	-1.1	-2.6	-2.1	0.3
2/17/2022	9:00:00 AM	36.5	36.3	38.7	38.3	39.4	37.7	37.3	37.8	34.7	33.5	31.7	32.7	32.4	32.2	33.7	27.9	28.2	32.4	27.5	22.8	19.1	11.1	9.6	10	11.7	12.2	9.1	9.7	14.2	8.7	10.8	7.5	4.1	2.1	0.9	1.3
2/17/2022	10:00:00 AM	44.6	43	42.4	40.3	39.6	37.2	36.2	36	33.5	31.8	33	44	32	28	33.8	24.7	26.5	22.5	18.5	12.5	7	1.1	2.1	2.5	4.2	3.4	3.3	3.9	2.6	2.4	6.9	1.6	-2.1	-1.9	-1.9	0.2
2/17/2022	11:00:00 AM	41.5	40	39.7	38.9	39.4	38	38.6	37.9	35.7	34.3	33.1	32	32.3	31.3	31.1	25.9	24	22.9	18.2	13.8	8.6	3.4	5.4	7.1	5.5	5.3	5.5	6.6	6.4	6.4	13.2	6.5	1.9	1.6	-0.1	0.6
2/17/2022	12:00:00 PM	54.1	52.4	49.9	47.3	44.8	41.7	39.9	38.3	35.4	33.6	31.4	31.1	30	30.2	30.2	24.8	23	22.4	19.5	14.3	9.3	4.3	3.4	2.7	1.9	3.5	2.9	3.5	3.1	2.9	13.9	7.4	-2.1	-1.8	-1.8	0.2
2/17/2022	1:00:00 PM	56	54	51.7	49.1	46.6	43.1	40.6	39	36.5	34	32	30.9	29.6	30.5	30.6	25.6	24.2	23.6	21.3	17.1	14.3	10.9	9.3	9.5	10.6	10	15.4	14.8	7.9	9.9	8.1	6	1.1	0.3	-0.8	0.4
2/17/2022	2:00:00 PM	53.4	50.8	48.2	46.6	44.5	40.8	38.5	38.3	35.2	32.8	33.4	30.9	31.6	31.2	30.8	26.4	24.8	24.1	22	19	16.1	12.5	10	7.8	6.4	6.1	5.2	4.9	4	4.1	19.3	13.1	-1.6	-1.8	-1.8	0.3
2/17/2022	3:00:00 PM	49.6	47.2	44.7	42.7	43.1	40	36.8	35.8	33.1	31.9	29.9	29.7	28.5	28.2	27.7	23	21.7	21.6	18.8	14.2	9.6	4.3	1.4	1	0.3	2.8	2.7	3	2.7	2.5	15.6	3.1	-2.1	-2.2	-2	0.2

2/17/2022	4:00:00 PM	42.1	40.1	38.9	38.6	42.2	37.5	36.6	36.9	34.7	33.5	32.6	32.1	32.3	31.6	30.5	25.4	23.7	23.9	22.4	18.3	13.6	8.7	3	4.2	5.7	6.2	5.5	8.5	9.3	4.2	7.1	1.4	-1.1	-2.1	-2	0.2
2/17/2022	5:00:00 PM	55.8	53.9	51.7	49.2	46.9	43.2	40.6	41	37.2	36.6	35.7	36.7	34.9	35.9	36.6	30.4	27.7	26.8	24.2	20.6	15	9.1	6.4	6.2	5.7	6	5.4	5.6	4.8	3.5	3.2	1.6	-0.7	-2.1	-2	0.3
2/17/2022	6:00:00 PM	55.5	52.9	50.9	48.5	45.1	42	39.9	38.6	35.9	34.2	37.3	35.2	32.8	35.7	35.2	28.2	25.8	24.1	20.7	16.1	11.2	6.4	6.1	6.4	5.8	6.2	5.5	5.7	4.8	3.6	3.2	1.8	-0.6	-2.1	-2.1	0.3
2/17/2022	7:00:00 PM	51.4	48.8	46.5	44.7	42.2	39.5	37.3	36.4	33.1	31.1	31.5	32.8	31	31.3	29.7	24.6	22.5	21.8	18.2	13.7	8.7	3.4	3	3.7	4.1	5.5	5.1	5.4	4.6	3.4	3	1.4	-0.8	-2.3	-2.1	0.3
2/17/2022	8:00:00 PM	50	47.5	45.5	43.1	40.9	38.8	36.7	35.7	32.2	30.8	33.3	35.3	38.8	37.8	36.7	27.5	26.5	23.7	20.2	17.8	12.6	5.2	2.5	3.3	4	5.6	5.1	5.4	4.6	3.4	3.1	1.5	-0.8	-2.4	-2.3	0.2
2/17/2022	9:00:00 PM	49.7	47.8	45.5	43.4	41.5	38.5	36.8	36.3	35.5	34.1	36.6	35.3	33.4	34.1	33	28.2	25.8	25.4	21.4	17.4	11.3	4.9	2.7	3.2	3.6	5.3	4.8	5.4	4.7	3.5	3.2	1.6	-0.8	-2.4	-2.3	0.2
2/17/2022	10:00:00 PM	48.4	46.1	44.8	42.7	40.6	38.8	36.7	39.1	35.1	34.5	36.9	36.2	36.3	37.9	36	31.5	30.1	27.7	22.6	16.7	11.6	5	1.9	3	3.8	5.4	5.1	5.6	4.7	3.5	3.1	1.5	-0.9	-2.4	-2.3	0.2
2/17/2022	11:00:00 PM	50.8	48.4	46.3	44	42.8	40.8	38	42.4	38.1	38.8	39.1	38.5	40.5	43.1	41.9	35.5	32	28.5	22.9	17.5	11.5	4.9	2.8	3.4	3.5	4.9	4.5	4.9	4.2	2.9	2.7	1.2	-1.1	-2.5	-2.3	0.2
2/18/2022	12:00:00 AM	46	44.2	42.4	40.7	40.2	38.4	37.4	40.2	34.5	32.9	32.7	33.3	34.8	37.6	39.3	31.4	28.7	25.7	21.2	15.1	9.4	1.8	-0.4	0.8	2.1	4.1	4.1	4.8	4.3	2.8	2.7	1.1	-1.1	-2.7	-2.4	0.2
2/18/2022	1:00:00 AM	47.1	44.7	43.3	41.9	45.2	39.3	40.5	45.7	43.2	42.9	42.9	43.3	44.6	48.1	50	42	38.1	34.1	27.6	18.2	10.1	0.8	0.2	1.7	2.9	4.5	4.4	4.9	4.5	2.9	2.8	1.3	-0.9	-2.5	-2.3	0.2
2/18/2022	2:00:00 AM	44.9	42.9	41.4	40.4	43.4	38.9	37.7	44.8	41.5	40.3	40.5	41	41.3	44.6	44.5	38	35.3	33	27.1	18.6	10.9	2.1	0.9	2.4	3.1	4.6	4.5	5.1	4.5	3	2.9	1.4	-0.9	-2.5	-2.4	0.2
2/18/2022	3:00:00 AM	43.1	41	39.8	38.8	39.5	37	35.7	40.7	37.4	36.8	37.3	37.9	38.2	41.7	41.7	34.7	31.9	29.4	23.9	15.8	8.7	1.1	0.3	1.9	2.6	4.3	4.3	5.1	4.3	3	2.8	1.4	-0.9	-2.5	-2.4	0.2
2/18/2022	4:00:00 AM	42.3	40.1	39.2	38.4	38.1	36.2	34.3	36.6	33.7	32.8	32.6	34.2	34.6	37.5	37.2	32	28.5	25.9	20.8	14.1	9.4	3.3	1	2.5	3.3	4.9	4.5	5.1	4.4	3.2	2.9	1.4	-0.9	-2.5	-2.4	0.2
2/18/2022	5:00:00 AM	36.9	37.2	37.6	37.8	40.5	36.4	35.6	38.8	35.8	34.9	35.5	36	37.1	40	39.8	34.1	30.3	27	21.4	14.7	8.5	1.1	0.2	1.9	2.9	4.5	4.4	5.1	4.4	3.2	2.8	1.3	-1	-2.5	-2.4	0.2
2/18/2022	6:00:00 AM	38.2	37.5	38.3	38.4	40.8	37.4	36.1	39.7	36.7	36.4	38	36.8	37.8	41.1	41.7	34.7	31.3	28.2	22.8	17.5	12.9	6.7	1.7	3.8	7.2	7.5	8.9	6.8	5	3.5	11.8	2.5	-0.7	-2.4	-2.4	0.2
2/18/2022	7:00:00 AM	35.1	36.1	38.4	39.3	40.6	38.8	38.4	42.4	40.7	39.6	40.9	40.2	41.3	44.5	42.6	37.8	34.4	32	28.8	25.6	19.9	13.3	5.2	5.8	6.5	5.6	5.8	7.4	7.7	5.5	17.9	9.2	-1	-2.2	-2.4	0.2
2/18/2022	8:00:00 AM	34.5	36.2	39	40.1	43.2	40.8	40.5	42.7	40.1	39.1	39.5	40.9	40.9	43.3	43.1	36.9	33.9	31.5	28.2	24.4	18.4	11.2	5	6.3	6.8	5.2	6.1	7.5	4.5	3.8	3	1.2	-1.2	-2.4	-2.4	0.2
2/18/2022	9:00:00 AM	35.6	37.6	40.9	42.4	45.4	43.5	40.9	45.6	42.4	42	42.6	42.9	42.7	44.5	44	37.3	34.4	31.7	27.1	21.8	14.6	7.6	2.1	3.6	5.4	4	3.8	4.5	3.7	2.6	7.6	1.9	-1.6	-2.4	-2.1	0.2
2/18/2022	10:00:00 AM	48	42.8	42.7	42.2	42	41.5	39.7	45.1	40	39.1	39.2	40	38.7	40.6	41.7	34.2	31.7	29.1	24.6	18.3	12.1	5.2	1.9	5.8	6.8	1.9	1.7	2.4	3.1	7.1	27.7	23.1	-2	-2	-1.6	0.4
2/18/2022	11:00:00 AM	47.4	45.5	44.4	42.8	41.2	40.4	38.3	39.6	36.5	34.9	32.4	31.9	31.4	32.3	30.9	25.4	23.4	22.1	19.2	14.4	10.4	4.7	7.4	10	9.6	4.5	4	2.6	2.1	0.7	19.6	19.4	-2.7	-2.5	-1.7	0.2
2/18/2022	12:00:00 PM	49.6	48	45.4	42.8	40.6	38.4	35.3	38	33.7	36.1	31.1	30.9	33.5	34.3	32.7	29.6	26.6	23.2	20	15	11.5	6.8	6.7	5.2	3.2	4.7	5.4	6.6	7.9	11.7	23.5	16.3	-0.8	-1.1	-1.1	0.5
2/18/2022	1:00:00 PM	55.2	53.9	52.1	49.3	46.9	44.8	41.9	39.5	38.7	37.7	33.6	30.4	28.8	27.8	26.7	21.6	20.5	20.5	18.8	14.8	11.3	6.7	3.8	2.5	1.1	1.3	0.9	1.4	1.4	0.9	9.5	5.1	-2.9	-2.8	-1.8	0.2
2/18/2022	2:00:00 PM	59.1	57.6	55.1	52.4	49.5	46.3	42.7	39.5	36.3	33.3	30.1	27.6	25.1	24.7	25.5	21.5	21.3	21.5	20.3	17.2	14.1	10.9	8.7	7.8	5.4	2.8	1.2	1.5	1.5	1	15	10.5	-2.4	-2.4	-1.4	0.5
2/18/2022	3:00:00 PM	62.3	60.9	58.8	56.4	54.1	50.6	47.1	43.5	40	36.8	33.4	30.7	28.1	26.6	25.9	23.9	23.7	23.7	22.9	20.7	18.7	16.5	14.1	13.2	11.5	8	4.2	3	2.3	1.3	1.3	0.2	-1.5	-1.8	-1.2	0.4
2/18/2022	4:00:00 PM	56.5	54.7	53.3	50.5	47.2	44.8	41.1	38.2	35.5	33.3	29.7	26.2	23.2	21.6	21.4	19.4	19.6	20.3	19.2	15.9	13.2	10.2	7.3	6.4	4.8	3.2	1.9	2.3	2.1	0.9	1	-0.5	-2.5	-2.8	-1.9	0.2
2/18/2022	5:00:00 PM	56.4	54.2	51.9	48.9	46.2	43	39.8	37.7	34.8	33.2	30.3	29.7	29.9	27.7	29.5	23.6	23	22.7	20.7	17.3	14.1	8.7	7.6	8.6	7.9	6.6	5.8	5.9	5.3	3.8	3.3	2.7	-0.9	-2.1	-1.6	0.4
2/18/2022	6:00:00 PM	57.3	55	53.1	50.2	47.2	44.2	40.7	37.9	34.9	31.8	28.8	28.1	28.2	25.9	26.5	23.3	22.7	22.9	20.9	17.4	13.5	9.6	10	10.2	8.5	7.1	6.2	6.2	5.2	4.1	3.6	2.1	-0.1	-1.6	-1.6	0.4
2/18/2022	7:00:00 PM	57.9	56.5	53.9	51.5	48.9	45.6	42.3	39.1	36	33.9	31.9	30.4	29.7	29.1	32.3	27.1	26.9	26	24.1	19.7	15.4	11.7	11.7	11.8	10	8.2	7.3	7	5.7	4.7	4.2	2.8	0.5	-1.1	-1.3	0.4
2/18/2022	8:00:00 PM	51.4	49.2	47.7	44.9	43.8	38.4	35.4	35.5	32.5	31.5	32.7	32.8	35.2	37.1	35.2	26.4	25.9	23.3	20.7	16	11.6	6.3	5.5	6	5.5	5.8	5.8	6	4.8	3.7	3.2	1.7	-0.5	-2	-1.8	0.3
2/18/2022	9:00:00 PM	52.9	50.6	48.3	45.3	42.5	39.6	37	36.7	37.9	35.3	34.7	33.9	33.1	35.8	36.8	30.6	28.4	27	23.7	18.7	13.6	8.3	7.4	8	6.9	6.5	6.2	6.5	5.1	4.1	3.6	2.2	0.1	-1.6	-1.6	0.3
2/18/2022	10:00:00 PM	55.7	53.7	51.3	48.5	45.9	42.3	39.8	41.1	40.7	37.3	38.9	36.5	36.1	38.5	39.4	32.7	30.3	28.2	24.3	18.3	13.1	7.9	7.8	8.4	7	6.4	6	6.1	4.9	3.9	3.5	2	-0.1	-1.6	-1.6	0.5

2/18/2022	11:00:00 PM	50.7	48.3	46	43.4	41.1	38	36.3	39.7	39.9	39.6	39.5	39.4	36.8	38.9	41.4	33	30.9	28.8	24.9	17	11.5	5.7	5.8	6.5	5.3	5.3	5.2	5.5	4.4	3.4	3	1.5	-0.6	-2.2	-1.9	0.3
2/19/2022	12:00:00 AM	48.7	46.3	43.7	41.6	39.5	36.5	34.1	38.7	34.8	35.3	36.2	37.2	35.6	37.3	39	31.3	28.8	26.5	22.7	16.9	11.2	4.8	4.3	5.2	4.4	5.1	5.2	5.8	4.3	3.4	2.9	1.5	-0.6	-2.1	-1.9	0.3
2/19/2022	1:00:00 AM	35.8	34	35.2	36.4	34.8	30.6	29.1	34.4	30.4	30.3	31.3	31.5	31.9	35.6	35.6	28.1	26.7	25.4	20.8	16.1	10.7	3.3	0.6	1.3	2.3	4.6	5	5.7	4.3	3.4	2.8	1.3	-0.9	-2.5	-2	0.3
2/19/2022	2:00:00 AM	33.9	33.3	32.1	34.2	35.4	31	28.9	36.5	38.4	33.4	32	32.9	33	35.7	36	29	26	23.9	20.1	15.8	10.3	3.2	1	1.6	3.3	5.2	5.5	6	4.9	4	3.2	1.7	-0.5	-2.4	-2.1	0.3
2/19/2022	3:00:00 AM	33.4	32.4	32.9	35.1	37.4	31.3	31.1	35.8	34.5	34.1	34.6	33.9	35.7	39.3	39.2	32	28.6	25.8	21.1	16	10.5	3.2	1.1	1.6	3.3	5.3	5.5	5.9	5	4	3.3	1.9	-0.3	-2.3	-2	0.3
2/19/2022	4:00:00 AM	36.3	34.5	34	35	38	32.4	31.6	36.4	35	34.1	34.3	34.5	36.1	40.3	39.2	32.9	30.6	28.9	26.1	20	14.3	5	2	2.2	2.8	4.8	4.6	5.2	4.4	3.4	3	1.4	-0.6	-2.5	-2.1	0.3
2/19/2022	5:00:00 AM	41	38.8	37.4	37.5	39.3	33.9	32	38.9	39.4	37	34.6	35.6	36.8	39.5	40.1	33.2	32.7	27.4	24.1	19.4	12.1	5.2	2.1	2.4	3	4.9	4.7	5.2	4.3	3.4	3	1.5	-0.6	-2.4	-2.1	0.3
2/19/2022	6:00:00 AM	43.6	41	39.5	38.7	39.4	35.3	34.5	38.7	36.7	36.4	37.5	36.1	37.5	40.5	41.9	33.4	31.2	28.7	25	19.8	14.1	7.2	3.2	6.8	11	6.4	6.4	7.4	6.8	3.8	9	3.4	-0.7	-2.4	-2.1	0.3
2/19/2022	7:00:00 AM	40.4	38.8	38.8	39.3	40.6	39.1	36	41.9	40.4	37.5	39.3	35.7	39	40.1	38.8	33.7	30.7	29	26.1	21.4	16.2	9.9	5.3	5.6	5.6	6.3	6.4	7.6	8.2	10.2	25.3	18.3	1	-1.7	-1.8	0.4
2/19/2022	8:00:00 AM	34.3	34.6	37.7	39	40.6	38.8	38	41.3	40	39.6	41.5	42.5	42.2	42.6	42.1	39.5	35.3	34.9	32.1	26.6	19.5	13.2	12.3	10.9	12.1	10.7	10.4	9.8	9.3	8.9	9.2	7.8	4.4	1.2	-0.2	0.6
2/19/2022	9:00:00 AM	34.9	34.9	37.4	38.2	39	39.3	35.6	41.7	38.1	36.8	37.9	36	37	39.3	38.3	33.6	31.2	30.1	28.1	22.7	15.5	8.3	3.7	2.8	3.2	5.1	5.1	5.4	4.3	3.1	2.7	1	-1.1	-2.3	-1.9	0.2
2/19/2022	10:00:00 AM	34.7	34.1	35.2	36.9	40.4	38.3	34.5	42.7	37.4	36.6	36.4	37.8	38.5	40.7	40	34	31.5	29.6	26.5	21.8	16.7	12.2	9.9	10.9	10.8	10.7	10.9	10.8	9.3	9.7	9.5	8.1	5.7	6	4.1	1.9
2/19/2022	11:00:00 AM	44.2	41.9	39.9	39.2	39.6	37.1	34.2	36.7	36.5	34.6	34.5	35.4	34.8	36.3	37.8	31.4	28.7	27.6	24.3	19.5	14.3	9.2	8.9	9.4	7.6	6.5	6.4	6.2	5.5	4.4	4.2	2.6	-0.7	-1.1	-1	0.4
2/19/2022	12:00:00 PM	67.8	67.3	66.5	66	65.1	64.4	63.6	62.6	61.3	59.9	58.4	56.8	54.5	52	49.1	46.8	44.3	42.1	39.8	38.7	38.1	36.4	36.9	39.8	37.5	35.2	34.5	33.2	32.8	33.2	32.2	31	29.5	30.2	31.3	28.2
2/19/2022	1:00:00 PM	68.9	68.4	67.8	67	66.3	65.6	64.9	63.8	62.8	61.6	59.9	58	55.7	52.7	49.4	46.5	43.4	40.1	35.9	31.6	26.8	22.9	19.4	16.3	13.5	10.7	8	6.5	5.4	3.9	3.3	1.4	-0.2	-0.1	0.1	2
2/19/2022	2:00:00 PM	73.2	72.6	72.1	71.4	70.8	70	69.1	68.3	67.3	66.2	64.7	63	61	58.4	55.2	52.3	49.3	46	42.3	38.1	33.6	29.8	26.6	23.7	20.8	17.6	14.9	12.7	11.2	10.1	8.9	7.6	5.8	5.4	4.7	5.8
2/19/2022	3:00:00 PM	71.2	70.7	70.3	69.6	68.9	68.1	67.3	66.2	65.2	64.1	62.5	60.7	58.2	55.2	51.8	48.6	45.3	41.8	37.6	32.9	28.2	24.5	21.3	18.6	15.7	12.7	10.7	9.8	9.1	8.4	7.7	6.1	4.5	3.9	2.6	3.1
2/19/2022	4:00:00 PM	66.2	66	65.1	64.3	63.6	62.7	61.7	60.6	59.5	57.8	55.9	53.5	50.5	46.9	43.5	40.2	36.7	33.2	29.2	25.4	20.9	15.1	11.9	10.6	7	5.4	4.8	5.2	5	3.9	3	1.1	-0.9	-1.3	-1.5	0.5
2/19/2022	5:00:00 PM	66	65.4	65	64.2	63.5	62.5	61.4	60.5	58.9	57.4	55.5	53.1	50.3	47.6	43.9	40.8	38	35.1	31.1	26.9	22.2	16.8	13.6	11.7	9	7.5	6.6	6.5	6	5	4.2	2.2	0	-0.8	-1.3	0.7
2/19/2022	6:00:00 PM	64.5	63.9	63.3	62.4	61.8	60.4	59.5	58.4	56.9	55.1	53.2	50.7	48.1	45.3	43.1	38.9	35.3	32.2	29	24.4	19.2	14.1	11.9	10.4	7.7	6.6	6.2	6.2	5.7	4.8	3.8	2.2	0.1	-0.9	-1.6	0.4
2/19/2022	7:00:00 PM	67.4	67.1	66.7	65.8	65.1	64.2	62.9	61.9	60.6	59	57.2	54.7	52.1	49	45.6	42	38.6	34.7	30.3	24.9	20.4	16.3	13.8	11.6	9.3	7.8	6.9	6.5	5.9	4.8	3.7	2.3	0.3	-0.6	-1.1	0.8
2/19/2022	8:00:00 PM	69.1	68.7	68.5	67.5	66.6	65.8	65	63.9	62.8	61.4	59.8	57.7	55.6	53.1	50.9	46.7	43.6	40.4	36.7	33	28.8	24.8	21.8	18.6	15.5	12.6	10.6	9.1	7.2	5.7	4.4	3	1.3	0.6	0.1	1.8
2/19/2022	9:00:00 PM	69.9	69.3	68.9	68.2	67.2	66.7	65.9	64.8	63.5	62.2	60.8	59	57	54.6	52.2	48.7	45.7	42.9	39.6	35.9	32.2	28.7	25.8	23	19.8	16.3	13.7	10.9	9.2	7.5	5.9	4.4	2.7	2.2	1.6	3.5
2/19/2022	10:00:00 PM	71.5	71	70.4	69.8	69.1	68.4	67.4	66.6	65.2	64	62.4	60.7	58.5	56.1	53.4	50	47.2	43.9	40.3	36.4	32.3	29	26	23.4	20	16.7	13.9	11.4	9.3	7.5	5.9	4.5	2.9	2.2	1.7	3.6
2/19/2022	11:00:00 PM	62.3	61.3	60.4	60.2	59.4	58.6	57.1	56.4	55.1	53.6	51.7	49.4	47.5	46.3	44.9	39	35.5	31.6	27	21.7	17	15.6	14.6	11.4	7.1	5.3	4.8	4.7	4.6	3.4	2.7	1.4	-0.3	-1	-1.2	0.6
2/20/2022	12:00:00 AM	65.8	65.6	64.8	64	63.6	62.7	61.9	60.8	59.7	58.4	57.3	55.7	53.8	51.8	49.7	46.4	43.6	40.9	37.7	34	30.6	27.1	24.3	20.8	17.5	14.2	11.6	9.7	7.7	6	4.7	3.2	1.5	0.6	0.1	2
2/20/2022	1:00:00 AM	72.9	72.7	72.2	71.3	70.7	69.9	69.1	68	67	65.8	64.3	62.6	60.5	58.1	55.5	52.5	49.6	46.6	43.2	39.4	35.4	32	29.7	27	23.8	20.2	17.1	14.1	11.7	9.8	8	6.5	4.9	4.3	4.1	5.8
2/20/2022	2:00:00 AM	67.6	67.1	66.6	65.9	65.2	64.6	63.5	62.6	61.3	59.9	58.5	56.7	54.6	52.5	50	46.6	43.6	40.8	37.1	33.9	30.2	26.5	23.6	20.6	16.8	13.9	11.3	9.5	8.9	6.9	5.9	5	4.7	4	5.6	3.9
2/20/2022	3:00:00 AM	60.3	60	59.4	58.6	57.9	57.5	56.1	55.3	53.8	51.9	50.5	48.1	46	45	45.3	38.3	34.9	31.1	27.7	22.8	17.1	14.2	12.5	9.7	6.5	5.6	5.5	5.5	5.2	4	3.1	1.8	-0.2	-1.1	-1.6	0.6
2/20/2022	4:00:00 AM	54.9	54.8	53.8	53	51.6	51.1	49.8	49.1	46.7	44.9	43.6	39.6	39.5	41.1	39.9	33.2	30.1	28.8	23.1	17.1	11.6	8.5	7.9	5.4	2.2	3.2	4.1	4.7	4.7	3.6	2.8	1.5	-0.3	-1.3	-1.8	0.2
2/20/2022	5:00:00 AM	55	54.6	53.7	53.2	52.2	51.1	49.9	49.8	47.2	46.2	45.9	42.1	42.8	46.2	47.8	37.9	33.8	28.9	22.9	16.5	12.5	14.8	15.3	12.8	8.7	4.8	4.6	4.9	5.1	3.8	2.9	1.5	-0.3	-1.3	-1.9	0.2

2/20/2022	6:00:00 AM	67.2	67	66.5	65.7	65	64.2	63.4	62.4	61.1	59.8	58.3	56.2	53.8	51.3	49.5	45.8	43	39.8	36.7	33	29.6	26.7	25.1	22.3	17.9	14.9	14	14.3	18.3	11.7	11.6	8.4	1.6	0.6	0.1	1.8
2/20/2022	7:00:00 AM	74.3	73.8	73.2	72.5	71.8	71.1	70.2	69.2	68.2	67.2	65.8	64.3	62.5	60.3	57.9	55.2	52.6	49.9	47	44.1	41.1	37.8	35.3	32.6	29.3	25.9	23.2	19.7	16.9	14.2	11.9	9.7	7.8	6.7	6.1	7.5
2/20/2022	8:00:00 AM	73.6	73.2	72.7	71.9	71.3	70.6	69.9	69	68	67	65.9	64.4	62.7	60.7	58.3	55.6	53	50.5	47.6	44.2	40.9	37.3	34.2	31.4	27.9	24.7	21.7	18.6	15.4	13	10.9	8.9	7.1	6.3	5.9	7.7
2/20/2022	9:00:00 AM	73.4	72.9	72.4	71.6	70.9	70.1	69.3	68.5	67.4	66.4	65.1	63.4	61.6	59.2	56.7	53.9	51.3	48.4	45.3	42.2	38.8	35.6	33.1	30.6	27.2	23.7	20.5	17.3	14.5	11.8	10	8	6.1	5.5	5.1	7.2
2/20/2022	10:00:00 AM	72.6	72.4	71.5	70.9	70.2	69.2	68.5	67.5	66.4	65.2	63.8	62.1	59.9	57.4	54.7	51.8	49	46	42.6	39.1	35.2	31.6	28.5	25.7	23	20.1	18.7	17.6	17.7	17.9	17.1	15.2	14.2	13.8	11	8.9
2/20/2022	11:00:00 AM	75.4	74.8	74.3	73.7	72.8	72.1	71.3	70.4	69.5	68.5	67.3	65.8	64.1	61.9	59.5	57.2	54.6	52.1	49.2	46.2	42.9	39.4	36	32.6	29.6	26.3	23.2	20.2	17.7	15.6	20.5	17	9.2	8.5	8.3	10.1
2/20/2022	12:00:00 PM	77.2	76.8	76.2	75.4	74.7	74	73.2	72.5	71.5	70.6	69.4	68	66.5	64.6	62.3	60	57.5	55.1	52.5	49.6	46.5	43.2	40	36.9	33.8	30.5	27.2	24.1	21.3	18.7	17	14.5	12.3	11.5	11	12.8
2/20/2022	1:00:00 PM	77.2	76.8	76.2	75.6	74.9	74.1	73.3	72.5	71.5	70.5	69.4	68	66.4	64.5	62.2	59.8	57.5	55.1	52.4	49.6	46.5	43.1	39.9	36.8	33.8	30.7	27.4	24.3	21.5	19	17.3	15	13.1	12.4	11.7	12.8

WM2: Overall Hourly Intervals – A-weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/1/2022	10:21:11 AM	43.66737	12.09239	72.74196	32.0193	19.35896	15.85153
4/1/2022	11:00:00 AM	21.12875	13.45101	46.52683	22.89799	19.78863	17.33828
4/1/2022	12:00:00 PM	30.37677	13.78196	54.54305	24.48281	20.52232	17.9593
4/1/2022	1:00:00 PM	21.285	13.57107	46.18652	23.07446	19.74035	17.43116
4/1/2022	2:00:00 PM	20.97274	13.64042	37.1257	23.02984	19.79138	17.48944
4/1/2022	3:00:00 PM	21.05928	13.20236	40.11931	23.18069	19.61734	17.04028
4/1/2022	4:00:00 PM	21.9456	13.04679	43.99027	23.61806	19.81009	17.2669
4/1/2022	5:00:00 PM	20.20987	8.197198	40.27212	21.20613	17.44817	13.64492
4/1/2022	6:00:00 PM	17.50134	0	39.02477	19.23747	12.06275	4.645723
4/1/2022	7:00:00 PM	26.00778	0	52.43543	21.91564	11.83668	5.162077
4/1/2022	8:00:00 PM	15.01934	0	38.16425	18.42487	11.27059	5.793133
4/1/2022	9:00:00 PM	25.11118	7.178307	44.08501	27.82417	21.48292	15.941
4/1/2022	10:00:00 PM	24.72833	4.578953	41.90564	28.4001	20.32876	12.4215
4/1/2022	11:00:00 PM	28.39246	8.507482	45.02961	31.41985	25.72078	16.53496
4/2/2022	12:00:00 AM	28.2664	9.942758	45.52253	31.6673	23.74928	16.72005
4/2/2022	1:00:00 AM	26.9939	10.60429	44.96709	29.78912	23.02587	17.58033
4/2/2022	2:00:00 AM	27.40048	11.95084	41.04152	30.98445	24.82725	17.59876
4/2/2022	3:00:00 AM	31.43872	19.00133	45.46294	34.83	29.11646	23.60242
4/2/2022	4:00:00 AM	32.08594	20.38512	52.60062	33.93539	29.04572	25.35692
4/2/2022	5:00:00 AM	28.90788	15.71968	51.08417	31.30353	26.04108	22.16601
4/2/2022	6:00:00 AM	32.56219	13.96775	52.2806	36.17581	26.04653	19.66789
4/2/2022	7:00:00 AM	36.39362	17.68411	58.25464	35.32957	26.77529	21.98098
4/2/2022	8:00:00 AM	35.42454	21.7155	57.23919	36.8055	31.1473	26.44324
4/2/2022	9:00:00 AM	29.36455	16.57645	43.09166	33.15655	26.62901	21.603
4/2/2022	10:00:00 AM	32.099	19.85187	49.06726	35.00112	29.30981	24.80938
4/2/2022	11:00:00 AM	27.09336	18.33791	45.1651	29.58256	24.92445	22.05877
4/2/2022	12:00:00 PM	25.52346	17.99641	46.01781	27.3372	23.90473	21.44837
4/2/2022	1:00:00 PM	26.44676	17.3581	44.84017	28.49368	23.83816	21.08598
4/2/2022	2:00:00 PM	25.97033	16.93543	42.87567	28.6763	23.97648	20.68495
4/2/2022	3:00:00 PM	24.31859	15.22127	43.74953	26.06845	21.91885	19.2241
4/2/2022	4:00:00 PM	23.32276	14.51381	42.13584	24.62497	20.80767	18.33267
4/2/2022	5:00:00 PM	37.31393	13.47155	68.84883	28.59605	22.28523	18.03258
4/2/2022	6:00:00 PM	26.33834	6.295372	50.38435	26.17873	19.7698	14.99736
4/2/2022	7:00:00 PM	20.68994	3.094085	42.07873	23.11091	15.8402	10.30052
4/2/2022	8:00:00 PM	21.41856	6.673728	38.66293	24.47047	18.68403	13.38516
4/2/2022	9:00:00 PM	20.56589	7.905998	36.92405	23.68475	17.75045	13.08393
4/2/2022	10:00:00 PM	15.7215	3.956053	30.72707	18.76583	13.83365	9.958708
4/2/2022	11:00:00 PM	13.63901	0	29.35505	17.0548	11.16167	6.180414
4/3/2022	12:00:00 AM	17.33348	0	34.71702	20.08971	12.37202	7.179926
4/3/2022	1:00:00 AM	14.07486	#NUM!	32.93043	16.65167	8.367976	2.99305

4/3/2022	2:00:00 AM	22.92985	5.714394	39.08453	26.16928	18.67005	12.80115
4/3/2022	3:00:00 AM	24.65665	7.112618	44.99668	27.84579	20.88549	14.94599
4/3/2022	4:00:00 AM	18.41123	0.24435	37.95748	21.29689	14.06279	8.527011
4/3/2022	5:00:00 AM	21.3471	8.451323	50.01882	23.30533	17.68024	13.36858
4/3/2022	6:00:00 AM	27.90707	4.295722	50.06873	27.77594	17.47961	10.97833
4/3/2022	7:00:00 AM	33.80308	9.90167	62.4931	34.54693	27.23547	18.11639
4/3/2022	8:00:00 AM	31.93007	22.07361	47.06419	34.94296	29.68579	26.07641
4/3/2022	9:00:00 AM	31.02717	13.38706	56.191	27.88148	22.32835	18.75553
4/3/2022	10:00:00 AM	21.86463	12.1043	43.3792	22.69413	18.97748	15.75978
4/3/2022	11:00:00 AM	25.12822	12.30374	48.31873	25.40381	20.5686	16.97356
4/3/2022	12:00:00 PM	22.7897	13.94505	42.59417	24.8699	20.81972	17.99395
4/3/2022	1:00:00 PM	22.81574	12.93843	40.89952	24.9834	20.88493	17.9028
4/3/2022	2:00:00 PM	24.2777	15.25479	39.62197	26.7574	22.68941	19.84612
4/3/2022	3:00:00 PM	24.92965	14.22435	45.15844	27.59477	22.51696	19.36131
4/3/2022	4:00:00 PM	28.02945	14.36455	53.73544	29.05278	23.54116	19.68993
4/3/2022	5:00:00 PM	29.19981	13.88621	51.78579	28.84351	23.31533	19.18143
4/3/2022	6:00:00 PM	23.76723	11.4238	43.45242	25.39867	21.32551	17.76175
4/3/2022	7:00:00 PM	27.3173	11.8686	46.04729	29.75897	23.85943	17.91978
4/3/2022	8:00:00 PM	32.4022	21.15254	45.04617	35.59582	30.45283	26.13346
4/3/2022	9:00:00 PM	29.9475	15.93167	47.41199	33.06076	27.47923	21.72774
4/3/2022	10:00:00 PM	25.88545	11.28684	37.26271	29.03041	24.41048	19.86656
4/3/2022	11:00:00 PM	27.16606	11.38556	40.59361	30.71473	24.96933	18.83619
4/4/2022	12:00:00 AM	26.41997	13.66337	40.62901	29.62491	24.34949	19.22926
4/4/2022	1:00:00 AM	32.32297	20.54742	46.75707	35.57866	29.90475	25.71485
4/4/2022	2:00:00 AM	32.88834	20.5204	49.26712	35.63617	30.9231	26.9725
4/4/2022	3:00:00 AM	29.0661	17.0881	42.54926	31.96543	27.46752	23.30915
4/4/2022	4:00:00 AM	31.65456	20.27907	47.53261	34.26494	29.73878	25.49968
4/4/2022	5:00:00 AM	32.68498	21.92428	46.58772	35.53143	31.20917	26.96346
4/4/2022	6:00:00 AM	33.86145	21.55974	53.48481	36.10257	30.99909	27.03092
4/4/2022	7:00:00 AM	32.1542	21.09308	51.11048	35.0492	29.6352	25.90566
4/4/2022	8:00:00 AM	36.62161	23.77899	63.51375	36.01365	31.71785	28.36505
4/4/2022	9:00:00 AM	34.02722	22.32429	50.54573	37.03892	31.24115	27.09271
4/4/2022	10:00:00 AM	35.76602	22.33794	55.56759	38.68553	32.61814	27.80953
4/4/2022	11:00:00 AM	36.24194	24.04914	57.47598	38.26118	32.70753	28.74133
4/4/2022	12:00:00 PM	46.50119	24.55227	72.62452	41.05716	34.35752	29.34585
4/4/2022	1:00:00 PM	42.83913	27.87719	64.3785	44.84998	37.41344	32.63176
4/4/2022	2:00:00 PM	36.82271	23.39138	56.35609	39.50143	32.78302	28.06088
4/4/2022	3:00:00 PM	38.2442	25.56768	58.54299	40.97346	34.74911	30.46023
4/4/2022	4:00:00 PM	41.68654	26.98494	67.83044	42.87123	36.47696	31.91244
4/4/2022	5:00:00 PM	42.91641	28.4744	65.29252	44.60439	37.99956	33.39905
4/4/2022	6:00:00 PM	42.07518	25.49589	64.48244	44.76456	38.21137	32.94965
4/4/2022	7:00:00 PM	39.01386	24.84603	64.54764	41.14774	34.98147	30.28837
4/4/2022	8:00:00 PM	39.93398	27.21084	63.70934	42.03355	35.66334	31.71926

4/4/2022	9:00:00 PM	35.98493	26.57232	55.75853	38.52877	34.05329	30.85023
4/4/2022	10:00:00 PM	35.21922	25.72602	50.38584	37.92944	33.37464	30.0928
4/4/2022	11:00:00 PM	34.29252	25.36688	46.39019	36.96171	33.03976	30.02638
4/5/2022	12:00:00 AM	35.55252	23.67564	50.85302	38.43414	33.7821	29.66508
4/5/2022	1:00:00 AM	31.81985	21.98924	46.6524	34.42187	30.42296	27.03817
4/5/2022	2:00:00 AM	32.46043	22.08874	46.60157	35.30665	30.47331	27.04351
4/5/2022	3:00:00 AM	31.98485	21.77732	45.30176	34.91262	30.29793	26.55498
4/5/2022	4:00:00 AM	31.96905	22.83052	47.95334	34.67954	30.36704	27.00788
4/5/2022	5:00:00 AM	32.46637	22.97569	48.78048	35.12889	30.78491	27.43831
4/5/2022	6:00:00 AM	37.1224	23.63225	61.71718	36.68379	31.86269	28.10691
4/5/2022	7:00:00 AM	32.74852	21.68088	49.54482	35.42711	30.00948	26.0829
4/5/2022	8:00:00 AM	36.6014	23.39148	55.8834	39.26019	33.20254	28.74682
4/5/2022	9:00:00 AM	45.29695	23.71103	67.96089	46.16643	32.81128	27.92281
4/5/2022	10:00:00 AM	32.70183	22.85177	48.99576	35.4884	30.76942	27.13684
4/5/2022	11:00:00 AM	30.1841	21.64793	43.2255	32.96325	28.65877	25.55886
4/5/2022	12:00:00 PM	51.64379	18.05272	73.95695	43.3084	26.90505	22.03348
4/5/2022	1:00:00 PM	29.41152	17.42626	49.82223	32.08778	25.78269	22.29707
4/5/2022	2:00:00 PM	30.39999	15.21752	52.77513	31.16685	23.99899	19.71451
4/5/2022	3:00:00 PM	31.11783	15.79258	50.22506	33.18581	26.44712	21.5358
4/5/2022	4:00:00 PM	43.42065	19.03181	66.65681	41.81752	29.86447	24.61381
4/5/2022	5:00:00 PM	32.04701	17.1337	53.73358	33.31899	27.29969	22.59561
4/5/2022	6:00:00 PM	31.47985	10.60525	54.24281	30.61879	23.89315	17.98325
4/5/2022	7:00:00 PM	27.47869	10.80301	45.75452	30.50849	23.69932	17.14353
4/5/2022	8:00:00 PM	30.00449	17.02144	42.84769	33.2869	28.26323	22.44001
4/5/2022	9:00:00 PM	28.29268	13.30589	50.23417	30.64116	23.93577	18.30235
4/5/2022	10:00:00 PM	17.3939	6.98751	27.60698	20.03048	15.95459	12.17089
4/5/2022	11:00:00 PM	22.1223	6.773032	40.41685	25.05076	18.43292	13.43238
4/6/2022	12:00:00 AM	15.37778	1.728176	30.10703	18.99488	12.80518	8.096654
4/6/2022	1:00:00 AM	18.30693	4.593335	30.23021	21.35893	16.53924	11.68185
4/6/2022	2:00:00 AM	20.91673	5.339122	31.38196	24.26599	18.95889	13.48152
4/6/2022	3:00:00 AM	29.04561	13.86726	44.63472	33.10836	24.81303	18.98524
4/6/2022	4:00:00 AM	30.98259	14.2485	44.93385	34.4448	28.87302	20.6436
4/6/2022	5:00:00 AM	25.68229	14.11658	46.30994	27.76136	22.86611	19.07333
4/6/2022	6:00:00 AM	35.50798	16.99139	59.08034	32.26887	26.01192	22.17075
4/6/2022	7:00:00 AM	29.38541	16.72081	47.86399	29.99331	26.69254	21.6694
4/6/2022	8:00:00 AM	22.42357	8.837266	43.15097	24.52013	17.98718	13.65002
4/6/2022	9:00:00 AM	30.55066	8.085396	52.62375	23.65524	15.57902	12.22479
4/6/2022	10:00:00 AM	32.72539	8.84687	65.15652	21.1315	16.6994	12.9197
4/6/2022	11:00:00 AM	27.66601	11.11598	56.20117	24.27353	19.2224	15.53654
4/6/2022	12:00:00 PM	34.42995	10.69769	60.07537	27.7515	18.86237	15.12237
4/6/2022	1:00:00 PM	29.6746	9.852668	63.39927	22.4199	17.33569	14.00244
4/6/2022	2:00:00 PM	41.78687	8.063806	68.13365	24.3189	15.67577	12.32781
4/6/2022	3:00:00 PM	18.86881	8.278026	39.31336	21.0647	16.55481	12.56013

4/6/2022	4:00:00 PM	28.5523	9.020678	56.05832	21.87169	17.14915	13.65643
4/6/2022	5:00:00 PM	37.46055	5.095127	72.84142	18.23234	14.12609	10.57804
4/6/2022	6:00:00 PM	20.64574	0	43.50962	20.13535	10.5829	0
4/6/2022	7:00:00 PM	19.23347	0	41.92478	13.90085	3.297637	0
4/6/2022	8:00:00 PM	19.26959	0	36.73009	21.96587	9.929773	0.7481
4/6/2022	9:00:00 PM	24.88981	7.261845	44.83695	27.46678	20.38871	13.84263
4/6/2022	10:00:00 PM	24.95682	5.296066	39.49503	29.15744	20.18342	13.7452
4/6/2022	11:00:00 PM	21.38239	2.211823	35.4894	25.32335	17.59096	11.34542
4/7/2022	12:00:00 AM	21.16431	8.376205	35.63035	24.26039	18.22756	13.93743
4/7/2022	1:00:00 AM	24.93916	13.39996	40.76883	27.6202	22.97778	19.22227
4/7/2022	2:00:00 AM	31.82762	16.59279	43.73057	35.49381	29.62824	22.30931
4/7/2022	3:00:00 AM	32.68853	21.9172	45.19007	35.92178	30.75248	26.92248
4/7/2022	4:00:00 AM	29.5816	17.18296	44.86176	33.1243	26.87512	21.67259
4/7/2022	5:00:00 AM	29.885	14.93596	54.1072	32.93605	25.60128	21.27143
4/7/2022	6:00:00 AM	31.23994	15.03882	49.79456	34.29053	28.12213	20.53128
4/7/2022	7:00:00 AM	35.91095	14.75106	60.22915	30.84575	24.52017	20.15006
4/7/2022	8:00:00 AM	30.50006	15.96612	53.19899	30.17296	25.45866	21.52532
4/7/2022	9:00:00 AM	34.37922	13.22115	57.75014	26.03728	20.27221	17.62186
4/7/2022	10:00:00 AM	36.08831	14.15831	56.48177	38.21862	22.31717	18.83554
4/7/2022	11:00:00 AM	37.42802	13.28109	63.93844	25.49648	20.30716	17.56096
4/7/2022	12:00:00 PM	25.76408	13.79631	47.39997	26.33819	20.67091	17.77057
4/7/2022	1:00:00 PM	22.46869	13.20528	45.77979	23.66095	19.78958	17.27054
4/7/2022	2:00:00 PM	20.69082	10.04929	46.30063	21.92609	17.70061	14.19243
4/7/2022	3:00:00 PM	19.55092	10.25196	41.83014	20.79596	17.27154	14.02316
4/7/2022	4:00:00 PM	20.39398	9.823213	42.63643	22.04098	17.43293	13.94938
4/7/2022	5:00:00 PM	24.24162	7.870994	45.83624	24.27755	15.21731	11.76602
4/7/2022	6:00:00 PM	21.12723	0	44.18861	20.72727	7.062739	0
4/7/2022	7:00:00 PM	19.1728	0	41.11404	19.22306	3.614695	0
4/7/2022	8:00:00 PM	20.8273	0	39.69548	23.24803	13.2773	1.773105
4/7/2022	9:00:00 PM	26.39213	9.663471	47.48244	28.30688	20.95631	15.68123
4/7/2022	10:00:00 PM	25.53314	13.94203	40.34263	28.86558	22.69088	18.69991
4/7/2022	11:00:00 PM	22.08974	10.98726	37.54174	24.87246	19.96143	15.9266
4/8/2022	12:00:00 AM	23.24883	10.77759	39.36688	26.21701	20.09968	15.70096
4/8/2022	1:00:00 AM	24.15944	11.19371	42.70737	26.62303	20.13657	16.62498
4/8/2022	2:00:00 AM	24.1843	12.94676	39.50486	27.11363	21.91504	17.98369
4/8/2022	3:00:00 AM	31.34573	19.43942	43.24027	34.71085	29.22813	24.70338
4/8/2022	4:00:00 AM	32.338	19.06436	44.66433	35.43938	30.76265	25.44738
4/8/2022	5:00:00 AM	30.17615	20.34695	44.31799	32.89354	28.70176	25.29696
4/8/2022	6:00:00 AM	29.40561	16.56902	47.63925	31.79415	26.93645	21.90483
4/8/2022	7:00:00 AM	30.42375	14.88825	48.49051	33.82944	25.95888	20.26421
4/8/2022	8:00:00 AM	41.352	23.03502	72.0678	39.93835	34.34793	29.05985
4/8/2022	9:00:00 AM	33.22736	17.49352	49.6045	36.75057	30.45262	23.77425
4/8/2022	10:00:00 AM	28.81635	16.74203	52.51003	29.14215	23.88467	20.6448

4/8/2022	11:00:00 AM	26.86944	16.63562	43.02425	29.77252	24.69631	21.03787
4/8/2022	12:00:00 PM	32.72987	17.42612	51.34701	36.09793	28.70412	23.76724
4/8/2022	1:00:00 PM	36.87183	20.60819	62.79589	39.29177	31.63852	26.06296
4/8/2022	2:00:00 PM	37.13922	22.48095	60.44654	40.01074	33.00537	28.28415
4/8/2022	3:00:00 PM	39.90979	24.59326	61.03876	43.1434	35.96158	30.09319
4/8/2022	4:00:00 PM	35.71145	21.49406	60.20153	37.92974	31.08691	26.54452
4/8/2022	5:00:00 PM	34.88073	20.05633	57.94007	35.05734	29.26738	25.10157
4/8/2022	6:00:00 PM	30.38247	14.65147	49.33366	33.22376	27.59855	20.95821
4/8/2022	7:00:00 PM	31.81734	18.62213	47.96731	34.515	29.83431	25.30301
4/8/2022	8:00:00 PM	30.78387	20.8567	44.50758	33.46701	29.20424	25.79519
4/8/2022	9:00:00 PM	30.54744	21.89671	44.01443	33.23806	29.34135	25.91731
4/8/2022	10:00:00 PM	32.64206	23.2615	50.49487	35.25511	30.6391	27.32038
4/8/2022	11:00:00 PM	32.79743	17.99601	49.02885	35.92503	29.96781	24.06743
4/9/2022	12:00:00 AM	27.81704	12.39119	44.1736	31.63714	23.45276	17.84692
4/9/2022	1:00:00 AM	29.83029	18.65588	45.4842	32.86074	27.9887	23.69284
4/9/2022	2:00:00 AM	30.44086	21.00415	45.32477	33.25439	28.52328	25.07485
4/9/2022	3:00:00 AM	26.30605	17.37905	39.77803	29.20426	24.46335	21.38936
4/9/2022	4:00:00 AM	26.47324	17.14524	43.63001	29.10684	24.66894	21.20082
4/9/2022	5:00:00 AM	29.60421	15.31742	61.25869	28.15281	22.86118	19.51564
4/9/2022	6:00:00 AM	33.00776	16.70881	60.67096	31.34972	24.50003	20.56031
4/9/2022	7:00:00 AM	39.99245	18.16857	72.18587	35.32634	28.53289	23.29424
4/9/2022	8:00:00 AM	29.92382	19.09051	51.60551	31.26783	25.95444	22.58478
4/9/2022	9:00:00 AM	25.44391	16.60122	48.44196	26.45659	22.64533	19.92936
4/9/2022	10:00:00 AM	29.6773	16.64228	54.7053	27.46624	22.36675	19.85851
4/9/2022	11:00:00 AM	28.85475	15.86218	49.05654	29.91319	23.09285	20.01692
4/9/2022	12:00:00 PM	25.27148	17.51056	40.17346	27.72986	23.69502	20.92444
4/9/2022	1:00:00 PM	28.73562	18.21648	48.97789	30.01433	24.79491	21.85101
4/9/2022	2:00:00 PM	30.23124	17.12325	50.20903	32.50681	26.10334	21.67159
4/9/2022	3:00:00 PM	31.22591	19.43355	55.11439	33.45778	26.92116	23.31662
4/9/2022	4:00:00 PM	27.30583	15.25193	45.63045	30.02263	24.37366	20.3994
4/9/2022	5:00:00 PM	28.97974	14.39634	51.8659	31.1593	24.4876	19.84015
4/9/2022	6:00:00 PM	29.98593	12.67346	51.21384	32.29315	25.40171	20.14711
4/9/2022	7:00:00 PM	26.25979	10.53614	47.3037	28.38267	22.26771	17.30538
4/9/2022	8:00:00 PM	25.64993	13.63056	43.29427	28.74555	22.69813	18.60838
4/9/2022	9:00:00 PM	26.47262	14.02678	41.81619	29.51278	24.19919	19.58821
4/9/2022	10:00:00 PM	26.85439	8.758243	43.1128	30.03021	23.2964	16.60855
4/9/2022	11:00:00 PM	27.67811	14.95932	42.38459	30.76916	25.59834	21.23008
4/10/2022	12:00:00 AM	25.8312	11.17371	41.39336	29.13098	21.40554	17.16032
4/10/2022	1:00:00 AM	33.26671	17.49287	48.15974	36.44841	30.50459	24.5679
4/10/2022	2:00:00 AM	33.98375	21.24831	47.10134	37.18892	32.08515	27.63961
4/10/2022	3:00:00 AM	28.01821	15.55405	44.98712	32.05407	22.95411	19.6461
4/10/2022	4:00:00 AM	18.5646	6.037994	32.93498	21.59403	16.89729	11.67792
4/10/2022	5:00:00 AM	19.3496	2.177268	39.51081	21.93785	13.45421	8.738401

4/10/2022	6:00:00 AM	26.37102	5.271193	50.0045	25.87372	16.68921	11.62717
4/10/2022	7:00:00 AM	29.39655	5.435362	59.66254	26.02761	20.40501	13.01196
4/10/2022	8:00:00 AM	22.92248	11.75003	45.18578	24.58064	20.19779	16.93834
4/10/2022	9:00:00 AM	21.91383	12.16976	38.41182	24.47214	20.39122	17.15182
4/10/2022	10:00:00 AM	21.19589	12.0718	34.07167	23.93574	19.69618	16.02733
4/10/2022	11:00:00 AM	24.60095	13.12392	42.70411	27.21814	21.88019	18.27789
4/10/2022	12:00:00 PM	24.84261	14.52311	42.73205	26.73687	22.16181	19.13862
4/10/2022	1:00:00 PM	29.21501	15.03363	52.74212	28.91103	24.18957	20.61939
4/10/2022	2:00:00 PM	28.79446	16.91725	49.0935	30.67609	24.71772	21.21675
4/10/2022	3:00:00 PM	26.09307	14.94642	46.01603	28.34284	23.15928	19.63058
4/10/2022	4:00:00 PM	26.03059	15.228	46.57819	27.95828	23.08148	19.85035
4/10/2022	5:00:00 PM	32.22342	14.77594	57.09442	28.25732	23.42547	20.15618
4/10/2022	6:00:00 PM	33.5877	3.255718	61.8402	28.40435	21.24879	10.59979
4/10/2022	7:00:00 PM	29.96106	6.292675	52.13425	27.94115	22.02383	13.59034
4/10/2022	8:00:00 PM	25.35131	11.21711	40.00507	28.5784	22.74591	17.74741
4/10/2022	9:00:00 PM	23.9366	9.692362	39.63856	27.13585	21.03799	14.82212
4/10/2022	10:00:00 PM	26.36633	11.94905	44.39499	29.20649	22.58779	17.28982
4/10/2022	11:00:00 PM	31.07773	17.31918	48.89585	34.06484	26.64413	21.98687
4/11/2022	12:00:00 AM	31.21111	20.33707	43.98868	34.15876	29.39601	24.95044
4/11/2022	1:00:00 AM	34.72146	22.0843	50.37992	37.8037	32.44538	27.89608
4/11/2022	2:00:00 AM	35.01488	24.7236	49.68579	37.80538	32.95015	29.31473
4/11/2022	3:00:00 AM	35.99603	25.81284	52.08756	38.78435	34.00556	30.38915
4/11/2022	4:00:00 AM	31.46202	19.41879	51.50176	33.54117	27.98726	23.94173
4/11/2022	5:00:00 AM	35.31128	21.56199	51.78162	38.61705	32.14215	26.63923
4/11/2022	6:00:00 AM	35.43524	21.17334	53.81602	38.51105	31.96004	26.49081
4/11/2022	7:00:00 AM	39.63007	21.4048	58.2706	43.07622	35.40025	27.67076
4/11/2022	8:00:00 AM	42.62488	25.81915	61.80333	45.76848	38.61948	31.30632
4/11/2022	9:00:00 AM	35.06893	24.25221	53.21155	37.93776	32.1516	28.49474
4/11/2022	10:00:00 AM	41.59659	28.20569	60.43832	44.74773	38.61599	33.57397
4/11/2022	11:00:00 AM	41.34078	30.40432	61.55555	44.2455	38.61859	34.72235
4/11/2022	12:00:00 PM	46.33258	31.90238	65.58081	49.29332	42.53552	37.46929
4/11/2022	1:00:00 PM	49.56116	31.9586	67.7822	52.23973	44.13812	37.87501
4/11/2022	2:00:00 PM	45.51697	25.72689	66.75655	48.12491	39.30535	32.41452
4/11/2022	3:00:00 PM	34.22223	24.5255	51.37854	36.92974	32.09006	28.75186
4/11/2022	4:00:00 PM	32.0669	20.07829	52.82962	32.95523	27.71392	24.32665
4/11/2022	5:00:00 PM	32.25644	21.84368	49.138	34.75064	30.86953	26.91432
4/11/2022	6:00:00 PM	29.57874	18.27576	53.68431	30.50854	25.70541	22.20026
4/11/2022	7:00:00 PM	32.04223	15.30295	55.05124	26.99646	23.11666	19.93636
4/11/2022	8:00:00 PM	29.37075	19.75941	45.59439	32.19746	27.1318	23.63595
4/11/2022	9:00:00 PM	35.15431	20.50707	52.63363	38.85828	31.238	25.82302
4/11/2022	10:00:00 PM	38.89941	27.84295	52.63698	41.90078	37.10657	32.95071
4/11/2022	11:00:00 PM	33.00075	21.56538	46.72812	35.74246	31.49583	27.64391
4/12/2022	12:00:00 AM	33.81715	22.35268	48.57276	36.55404	31.73523	27.96817

4/12/2022	1:00:00 AM	32.57018	23.37061	46.35057	35.34581	31.15018	27.77437
4/12/2022	2:00:00 AM	30.78975	21.16081	46.34145	33.54485	28.73274	25.16966
4/12/2022	3:00:00 AM	32.46145	20.24317	47.59051	35.65376	29.78835	25.02354
4/12/2022	4:00:00 AM	32.14989	21.97969	48.22259	34.86816	30.14089	26.60432
4/12/2022	5:00:00 AM	32.12976	22.2627	45.78073	35.18886	30.13596	26.28016
4/12/2022	6:00:00 AM	31.55449	17.65087	50.78496	34.15612	28.52878	22.83697
4/12/2022	7:00:00 AM	29.8057	15.68494	48.66692	32.54579	25.70747	20.68734
4/12/2022	8:00:00 AM	32.87297	20.39985	55.23225	32.26698	27.68241	24.68532
4/12/2022	9:00:00 AM	44.27416	20.13377	68.71651	37.54087	28.21171	24.31339
4/12/2022	10:00:00 AM	43.83332	20.91161	63.53223	46.46252	31.25237	25.37963
4/12/2022	11:00:00 AM	37.19865	21.32397	59.69187	38.48331	30.97055	26.43115
4/12/2022	12:00:00 PM	36.32784	21.83559	59.61057	37.45038	30.90904	26.80018
4/12/2022	1:00:00 PM	34.44875	21.38631	53.43857	37.47011	31.05159	26.66169
4/12/2022	2:00:00 PM	33.21249	18.66059	50.54873	36.52751	29.1516	24.13024
4/12/2022	3:00:00 PM	41.46984	20.59321	62.41944	40.01117	29.74814	25.08019
4/12/2022	4:00:00 PM	44.24138	21.36905	66.49893	44.25948	31.7286	26.44327
4/12/2022	5:00:00 PM	36.89408	19.1525	60.00414	34.60295	27.75063	23.76824
4/12/2022	6:00:00 PM	43.25837	12.44094	68.71043	33.21269	23.87781	19.04081
4/12/2022	7:00:00 PM	25.62366	10.89458	42.11136	28.85729	22.854	16.88668
4/12/2022	8:00:00 PM	30.15878	17.53556	44.77645	33.43683	27.69898	23.36175
4/12/2022	9:00:00 PM	30.27235	14.00619	54.84391	31.63754	26.29962	20.60021
4/12/2022	10:00:00 PM	27.73617	14.80888	42.85863	30.69871	25.94705	20.65714
4/12/2022	11:00:00 PM	30.32615	18.39463	48.63746	33.13842	28.03039	23.67649
4/13/2022	12:00:00 AM	30.50638	20.39139	44.80882	33.34915	29.01924	25.34679
4/13/2022	1:00:00 AM	32.12986	21.26657	48.16307	34.88353	29.85296	25.84757
4/13/2022	2:00:00 AM	32.94988	22.28082	46.6089	35.89654	31.29758	27.31333
4/13/2022	3:00:00 AM	30.08844	18.40951	47.15527	32.60496	27.60826	23.32881
4/13/2022	4:00:00 AM	32.43695	20.0061	45.19492	35.25531	30.8314	26.96099
4/13/2022	5:00:00 AM	28.89169	16.85248	42.51451	32.31534	26.62652	21.93742
4/13/2022	6:00:00 AM	33.39956	16.98437	57.77992	33.85727	26.88407	22.2616
4/13/2022	7:00:00 AM	27.85224	17.90219	43.86913	30.61436	26.22128	22.43123
4/13/2022	8:00:00 AM	27.40839	17.87394	45.58634	29.79006	25.43309	22.13551
4/13/2022	9:00:00 AM	37.7863	18.65056	63.32707	32.55232	26.74652	23.25344
4/13/2022	10:00:00 AM	39.47489	22.51645	61.70295	39.10673	31.094	27.00836
4/13/2022	11:00:00 AM	39.92114	23.58514	62.66896	42.11419	33.19321	28.02737
4/13/2022	12:00:00 PM	35.64367	22.00162	54.47593	38.12756	31.19088	26.64815
4/13/2022	1:00:00 PM	34.39713	22.24978	52.43188	37.61251	31.2888	26.74894
4/13/2022	2:00:00 PM	34.15458	19.77685	52.04321	37.50411	29.39354	24.88196
4/13/2022	3:00:00 PM	39.09154	20.38189	61.06937	41.52188	31.89124	26.38255
4/13/2022	4:00:00 PM	37.71912	20.97452	58.20809	38.92425	30.17673	25.6172
4/13/2022	5:00:00 PM	39.37951	20.87903	63.06519	38.56883	30.82179	26.0008
4/13/2022	6:00:00 PM	39.35445	12.60044	63.85519	35.16595	26.93187	19.92831
4/13/2022	7:00:00 PM	28.88839	12.5853	44.76776	32.14094	26.0351	20.58588

4/13/2022	8:00:00 PM	29.42251	19.69449	42.39581	32.32597	27.76748	24.20275
4/13/2022	9:00:00 PM	29.5245	17.63136	50.69308	31.8554	26.97611	22.99651
4/13/2022	10:00:00 PM	32.94059	22.93967	47.25213	35.86055	30.98744	27.24143
4/13/2022	11:00:00 PM	31.24753	22.13158	46.032	33.9309	29.44809	26.29535
4/14/2022	12:00:00 AM	31.92548	21.98856	47.25122	34.77815	30.04111	26.5186
4/14/2022	1:00:00 AM	31.92474	23.03459	47.40119	34.41541	30.44427	27.21135
4/14/2022	2:00:00 AM	34.51315	24.29593	48.47226	37.33221	32.48256	28.79719
4/14/2022	3:00:00 AM	35.04762	26.08652	49.18996	37.57277	33.64037	30.5984
4/14/2022	4:00:00 AM	33.0924	23.18535	46.06017	35.72704	31.84516	28.42578
4/14/2022	5:00:00 AM	32.15289	22.11419	46.3154	35.01846	30.5328	26.99631
4/14/2022	6:00:00 AM	30.4168	19.81823	48.54113	33.00651	28.44186	24.59162
4/14/2022	7:00:00 AM	32.94188	18.37444	55.71931	30.79946	26.04828	22.65602
4/14/2022	8:00:00 AM	33.65641	21.29419	57.42965	32.62817	28.2488	24.9271
4/14/2022	9:00:00 AM	42.52714	22.13178	68.37409	37.85221	29.60441	25.94315
4/14/2022	10:00:00 AM	46.51451	23.85916	67.11088	48.97794	36.68087	29.41402
4/14/2022	11:00:00 AM	37.20864	23.59705	59.14006	40.4016	33.31574	28.01781
4/14/2022	12:00:00 PM	41.40197	23.83697	65.69883	43.59816	33.40112	28.5264
4/14/2022	1:00:00 PM	37.40411	22.68003	59.96907	40.27256	33.7906	28.54358
4/14/2022	2:00:00 PM	38.19986	23.12828	60.52092	40.84789	34.01489	28.54954
4/14/2022	3:00:00 PM	36.89811	23.17978	55.65429	40.30864	33.13727	28.08349
4/14/2022	4:00:00 PM	30.07713	20.0192	49.58177	32.7375	27.15238	23.69295
4/14/2022	5:00:00 PM	29.00998	18.60782	46.20094	31.80027	26.51379	23.1254
4/14/2022	6:00:00 PM	27.23586	15.19113	43.94044	29.7671	25.05508	21.08116
4/14/2022	7:00:00 PM	41.10943	14.69306	59.92661	45.20908	26.95456	20.29576
4/14/2022	8:00:00 PM	42.36324	19.90766	62.18733	46.19959	31.70378	25.49312
4/14/2022	9:00:00 PM	30.12377	17.40941	45.3316	33.9436	26.47099	22.18474
4/14/2022	10:00:00 PM	30.004	18.87603	46.45511	32.6777	26.48062	22.94538
4/14/2022	11:00:00 PM	29.33004	18.9478	44.09235	32.3015	27.60412	23.61008
4/15/2022	12:00:00 AM	31.71906	18.07486	53.80311	34.23558	28.16381	22.97467
4/15/2022	1:00:00 AM	26.83499	17.37429	40.53582	29.69297	25.18219	21.90698
4/15/2022	2:00:00 AM	26.22229	16.82767	43.00844	28.34743	24.30033	20.92758
4/15/2022	3:00:00 AM	31.35622	19.61725	47.10253	34.48268	28.5768	24.30772
4/15/2022	4:00:00 AM	31.86444	22.22774	44.07123	34.62841	30.53306	26.78227
4/15/2022	5:00:00 AM	36.05732	24.83386	52.39115	38.84654	33.71659	29.50402
4/15/2022	6:00:00 AM	34.6621	15.84955	52.41679	36.7914	31.50477	22.43888
4/15/2022	7:00:00 AM	31.50676	17.94218	53.62136	32.34047	28.08014	23.44499
4/15/2022	8:00:00 AM	34.7505	18.80124	58.94857	34.15243	27.84937	23.40921

WM2: Overall Hourly Intervals - C-weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/1/2022	10:21:11 AM	51.36587	28.61076	79.42975	48.3296	38.35401	34.2155
4/1/2022	11:00:00 AM	42.35	29.99332	61.61161	44.54889	38.64777	34.96398
4/1/2022	12:00:00 PM	46.92833	29.78932	70.90941	45.09693	38.35074	34.75726
4/1/2022	1:00:00 PM	43.62077	29.58078	65.75229	45.07563	37.92013	34.44613
4/1/2022	2:00:00 PM	43.21906	29.65439	63.53887	45.23462	38.19736	34.58149
4/1/2022	3:00:00 PM	45.01537	30.29036	71.39304	44.37883	38.40399	34.9782
4/1/2022	4:00:00 PM	41.55506	30.50256	62.153	43.69367	38.89396	35.57981
4/1/2022	5:00:00 PM	38.2534	27.37229	54.67908	40.79343	36.6847	33.10943
4/1/2022	6:00:00 PM	38.25299	22.0314	59.61772	41.04777	34.87287	29.4266
4/1/2022	7:00:00 PM	37.6073	21.45869	59.85686	40.80387	32.96194	27.83068
4/1/2022	8:00:00 PM	34.84846	22.00474	50.07469	37.90952	32.7387	28.15567
4/1/2022	9:00:00 PM	41.33278	27.01057	56.83056	44.57444	38.85043	34.02503
4/1/2022	10:00:00 PM	41.89276	26.21934	62.54921	45.03727	37.86239	32.29948
4/1/2022	11:00:00 PM	45.30073	28.23152	60.07534	48.65761	42.82472	34.97602
4/2/2022	12:00:00 AM	43.90798	27.74948	62.05907	47.3543	40.27173	34.31955
4/2/2022	1:00:00 AM	43.6566	29.80817	60.72712	46.50054	40.77626	36.31776
4/2/2022	2:00:00 AM	45.13808	30.7891	57.84484	48.62591	42.85569	36.85349
4/2/2022	3:00:00 AM	48.76541	35.45043	62.72579	51.96784	46.25065	40.8366
4/2/2022	4:00:00 AM	48.2764	36.81781	63.53623	50.81871	46.26515	42.58362
4/2/2022	5:00:00 AM	45.26001	33.74033	58.54405	48.3462	43.29271	39.42671
4/2/2022	6:00:00 AM	47.7794	32.97246	64.67707	51.11137	44.01066	38.86609
4/2/2022	7:00:00 AM	48.05952	35.6747	64.25035	51.10641	45.13882	40.99926
4/2/2022	8:00:00 AM	51.85583	38.88225	66.8571	55.03583	49.36054	44.61583
4/2/2022	9:00:00 AM	48.86543	33.90183	65.64395	52.26049	45.28787	40.29719
4/2/2022	10:00:00 AM	52.558	36.55978	72.53421	55.11129	47.37973	42.42368
4/2/2022	11:00:00 AM	52.60379	33.38685	71.5538	55.74009	44.27133	38.35767
4/2/2022	12:00:00 PM	49.10764	32.96872	70.73374	51.05941	41.62588	37.55481
4/2/2022	1:00:00 PM	51.63555	32.5541	71.85085	53.95067	41.58705	37.26934
4/2/2022	2:00:00 PM	53.19826	32.56951	74.1538	56.57367	44.65382	37.55532
4/2/2022	3:00:00 PM	49.58451	31.5059	69.82913	52.11816	40.89677	36.14257
4/2/2022	4:00:00 PM	46.62059	30.43382	69.49616	48.604	38.76498	34.85482
4/2/2022	5:00:00 PM	54.35327	29.79624	75.5108	57.08063	43.66935	35.52092
4/2/2022	6:00:00 PM	52.50164	26.49135	74.10302	54.79019	41.45089	34.10029
4/2/2022	7:00:00 PM	40.0518	25.44583	58.74798	42.96829	36.83731	31.90536
4/2/2022	8:00:00 PM	43.63196	26.31575	65.59086	45.09584	38.81383	33.80915
4/2/2022	9:00:00 PM	44.36068	29.1387	65.3877	46.29109	39.19035	34.73114
4/2/2022	10:00:00 PM	37.24207	24.77859	49.53742	40.37265	35.54921	31.11103
4/2/2022	11:00:00 PM	33.88663	22.27632	46.51677	36.86583	32.24955	28.14993
4/3/2022	12:00:00 AM	37.0463	23.43892	51.04251	40.51472	34.21037	29.13407
4/3/2022	1:00:00 AM	36.16027	20.9341	52.24574	39.9804	32.39604	27.27044

4/3/2022	2:00:00 AM	38.94298	24.26571	55.07141	41.82919	35.52357	30.83906
4/3/2022	3:00:00 AM	41.12134	26.23414	55.23621	44.69596	38.04026	33.03585
4/3/2022	4:00:00 AM	38.0902	24.93193	56.44458	41.04526	35.59348	31.23675
4/3/2022	5:00:00 AM	39.14104	27.33128	52.55837	42.00981	37.9664	33.49496
4/3/2022	6:00:00 AM	41.91407	26.5769	61.9189	43.19241	37.02646	32.71792
4/3/2022	7:00:00 AM	47.48488	29.31596	64.2895	50.89682	44.7761	36.65395
4/3/2022	8:00:00 AM	49.85904	38.9308	63.24712	53.0047	48.10831	44.26707
4/3/2022	9:00:00 AM	47.28522	31.03967	69.34937	47.87779	42.34673	37.56838
4/3/2022	10:00:00 AM	39.98021	28.76458	58.62287	42.21337	37.35394	33.79259
4/3/2022	11:00:00 AM	43.71266	29.27038	63.84799	45.90083	38.90292	34.65391
4/3/2022	12:00:00 PM	42.0294	29.46127	63.50228	44.02281	37.96166	34.38429
4/3/2022	1:00:00 PM	45.19142	30.07679	65.22396	47.09806	39.43601	35.53885
4/3/2022	2:00:00 PM	48.53856	31.82764	71.54307	50.00865	40.9348	37.00673
4/3/2022	3:00:00 PM	50.03924	31.83696	69.61915	52.14524	42.2307	37.71761
4/3/2022	4:00:00 PM	54.45083	31.75281	77.11804	57.17508	44.39476	37.79266
4/3/2022	5:00:00 PM	50.05437	30.81972	70.59055	51.80792	41.72755	36.77584
4/3/2022	6:00:00 PM	41.03166	28.78395	58.25988	43.46715	38.44036	34.44666
4/3/2022	7:00:00 PM	43.90507	29.38153	62.54889	46.33317	40.59685	35.00573
4/3/2022	8:00:00 PM	48.9076	36.66298	61.51048	52.14214	46.73381	42.31148
4/3/2022	9:00:00 PM	46.09433	31.94494	62.04469	49.35202	43.99581	38.06981
4/3/2022	10:00:00 PM	41.2912	27.46586	54.2683	44.49283	39.4711	35.03468
4/3/2022	11:00:00 PM	42.58828	28.02097	56.04511	45.94644	40.31427	34.76604
4/4/2022	12:00:00 AM	42.28428	30.66102	57.46841	45.25211	40.20827	35.84355
4/4/2022	1:00:00 AM	47.36445	35.98743	62.38657	50.27027	45.36248	41.33791
4/4/2022	2:00:00 AM	48.7366	36.94554	64.175	51.48024	46.85309	42.96422
4/4/2022	3:00:00 AM	44.83541	33.80466	58.5291	47.70041	43.41508	39.6311
4/4/2022	4:00:00 AM	47.93176	36.13471	64.52707	50.30575	45.6331	41.56569
4/4/2022	5:00:00 AM	48.94619	37.22215	63.84928	51.9963	46.94541	42.57463
4/4/2022	6:00:00 AM	50.50981	37.03271	69.14651	53.17961	47.19997	43.09294
4/4/2022	7:00:00 AM	49.62309	37.33207	66.93182	52.53925	46.71185	42.73147
4/4/2022	8:00:00 AM	51.22985	39.45868	70.67606	53.11719	48.13866	44.62391
4/4/2022	9:00:00 AM	61.90458	37.89119	78.04998	66.14413	53.58853	43.7104
4/4/2022	10:00:00 AM	63.65671	37.39976	78.5525	68.17705	56.78346	44.88175
4/4/2022	11:00:00 AM	62.7472	39.25079	78.72503	66.95929	55.49985	45.72209
4/4/2022	12:00:00 PM	65.32808	39.4099	80.63371	69.84315	58.41951	46.72954
4/4/2022	1:00:00 PM	68.28015	41.88931	82.3997	72.59969	63.39144	50.9017
4/4/2022	2:00:00 PM	64.16674	38.80142	79.64803	68.6844	56.81996	45.34851
4/4/2022	3:00:00 PM	65.38515	40.59529	80.35147	69.77425	59.25587	48.03054
4/4/2022	4:00:00 PM	66.7699	42.21861	87.61339	70.9258	60.91002	49.65287
4/4/2022	5:00:00 PM	68.12475	43.41286	81.75933	72.46275	63.41786	51.46666
4/4/2022	6:00:00 PM	68.17698	40.7354	81.72845	72.55567	63.47594	51.37627
4/4/2022	7:00:00 PM	65.17989	40.14313	79.72371	69.68683	59.02461	48.12498
4/4/2022	8:00:00 PM	65.32512	42.56557	80.8545	69.67295	57.7621	48.74516

4/4/2022	9:00:00 PM	60.2058	42.26901	77.80274	64.05618	53.14537	47.63441
4/4/2022	10:00:00 PM	59.93959	41.47117	77.84174	63.48204	52.34235	46.85045
4/4/2022	11:00:00 PM	55.36113	41.12812	74.49867	57.76869	50.25478	46.45241
4/5/2022	12:00:00 AM	55.21798	39.26565	75.99162	57.41718	50.67478	46.06418
4/5/2022	1:00:00 AM	54.27049	37.23131	74.77501	56.92242	47.59428	42.90943
4/5/2022	2:00:00 AM	59.40922	36.74257	77.29254	63.15582	50.86991	43.10903
4/5/2022	3:00:00 AM	56.53276	36.57425	75.68043	59.76097	48.23915	42.34964
4/5/2022	4:00:00 AM	57.74216	37.31443	76.2155	61.21351	49.28695	42.73876
4/5/2022	5:00:00 AM	51.85299	37.49163	73.23193	53.78601	47.13955	43.16765
4/5/2022	6:00:00 AM	57.44165	38.77735	77.17768	59.45385	49.50813	44.48071
4/5/2022	7:00:00 AM	56.70269	36.83261	77.38776	58.34062	46.90433	42.34721
4/5/2022	8:00:00 AM	59.88856	38.96175	78.34885	63.46099	53.05623	45.56412
4/5/2022	9:00:00 AM	64.75632	38.76915	87.57293	66.79945	53.56479	44.6464
4/5/2022	10:00:00 AM	59.01335	38.15664	78.10733	62.77953	50.50066	43.54052
4/5/2022	11:00:00 AM	56.23388	36.97151	74.04763	59.63249	47.95898	41.82851
4/5/2022	12:00:00 PM	67.48083	34.84224	89.58655	65.062	48.10105	40.46342
4/5/2022	1:00:00 PM	58.16166	34.03176	79.583	60.89479	46.21138	39.89759
4/5/2022	2:00:00 PM	56.16199	32.3333	76.7826	59.00727	45.59863	38.19624
4/5/2022	3:00:00 PM	59.45353	33.08911	76.68504	63.26117	49.92432	39.97155
4/5/2022	4:00:00 PM	65.04709	35.29134	86.88309	67.18523	54.91004	43.27967
4/5/2022	5:00:00 PM	60.04671	34.05941	77.75267	64.04733	52.00202	41.7726
4/5/2022	6:00:00 PM	56.42354	30.41298	74.52523	59.96325	47.3039	38.33949
4/5/2022	7:00:00 PM	48.15749	30.78705	69.36583	50.69695	43.50088	37.46108
4/5/2022	8:00:00 PM	51.32138	34.18573	72.36179	53.42424	46.53253	40.99944
4/5/2022	9:00:00 PM	45.83596	30.50997	66.09917	48.51562	41.85344	36.68341
4/5/2022	10:00:00 PM	38.63095	27.83004	49.28012	41.52298	37.36875	33.53938
4/5/2022	11:00:00 PM	40.88012	27.80531	61.5011	42.51915	37.41697	33.50931
4/6/2022	12:00:00 AM	34.52884	24.35208	48.99428	37.30463	33.28261	29.7387
4/6/2022	1:00:00 AM	36.18393	25.53436	48.60267	39.15115	34.53322	30.98638
4/6/2022	2:00:00 AM	37.3672	26.4332	47.39238	40.19749	36.15227	32.6153
4/6/2022	3:00:00 AM	45.17541	30.35055	60.44006	49.44426	40.95473	35.61882
4/6/2022	4:00:00 AM	47.56711	31.46762	60.74477	51.19366	45.33074	37.12459
4/6/2022	5:00:00 AM	41.51478	31.82203	53.26501	44.23598	40.00659	36.65487
4/6/2022	6:00:00 AM	44.17065	32.89077	59.66021	46.9033	42.36993	38.52868
4/6/2022	7:00:00 AM	44.42059	34.15349	54.24524	47.18164	43.50279	39.41734
4/6/2022	8:00:00 AM	45.71174	30.96221	68.00856	46.22081	40.77546	36.77963
4/6/2022	9:00:00 AM	53.87705	28.99356	74.13154	49.60689	38.76107	34.40068
4/6/2022	10:00:00 AM	52.02794	27.72689	82.56475	45.68706	37.25237	33.26169
4/6/2022	11:00:00 AM	49.25926	29.76617	69.45187	52.30352	40.03916	34.75024
4/6/2022	12:00:00 PM	57.93357	29.64164	82.10999	55.14223	41.09821	35.44076
4/6/2022	1:00:00 PM	48.92287	28.85601	76.8483	47.22302	37.57064	34.00685
4/6/2022	2:00:00 PM	56.24246	29.3925	81.97558	48.7627	38.63899	34.48404
4/6/2022	3:00:00 PM	44.72407	29.74877	68.47914	45.75344	38.42635	34.73218

4/6/2022	4:00:00 PM	47.41775	28.83803	73.79919	45.35587	38.17317	34.40136
4/6/2022	5:00:00 PM	40.36585	25.90325	71.13738	41.09547	35.28913	31.49194
4/6/2022	6:00:00 PM	40.88627	20.65341	63.04127	42.0277	32.93484	27.09665
4/6/2022	7:00:00 PM	34.73677	20.05199	49.32991	37.19077	31.61668	27.58524
4/6/2022	8:00:00 PM	37.85549	22.74615	54.1874	40.83431	33.375	28.93266
4/6/2022	9:00:00 PM	41.7061	27.45442	61.11009	44.35102	38.27956	33.62971
4/6/2022	10:00:00 PM	41.86175	26.43307	55.7932	45.58839	38.73221	33.37114
4/6/2022	11:00:00 PM	40.54848	26.44897	52.81756	44.11241	38.16217	33.20285
4/7/2022	12:00:00 AM	39.21892	27.3774	52.08616	42.3346	37.24866	33.49593
4/7/2022	1:00:00 AM	42.49508	30.35366	60.87917	45.04172	40.20089	36.4241
4/7/2022	2:00:00 AM	48.29025	33.50791	60.66866	51.9218	46.39011	39.52184
4/7/2022	3:00:00 AM	48.957	38.13103	61.5369	51.93284	47.34879	43.59858
4/7/2022	4:00:00 AM	45.83577	34.26683	59.65896	49.05879	43.78946	39.47357
4/7/2022	5:00:00 AM	45.46241	33.74577	59.77281	48.51605	43.18933	39.38679
4/7/2022	6:00:00 AM	48.1096	33.96113	63.49652	51.50602	45.92502	39.51534
4/7/2022	7:00:00 AM	44.80049	33.87627	60.0977	47.37128	43.46735	39.13991
4/7/2022	8:00:00 AM	49.24894	35.86673	69.53064	49.84288	45.56572	41.93539
4/7/2022	9:00:00 AM	46.19687	31.61761	66.47471	46.07526	40.49919	36.92506
4/7/2022	10:00:00 AM	53.76476	32.54319	71.72822	57.31044	42.72373	38.06503
4/7/2022	11:00:00 AM	52.91812	31.1563	77.81296	46.11341	39.75518	36.02749
4/7/2022	12:00:00 PM	48.42097	30.47474	69.54085	49.23831	39.84169	35.4847
4/7/2022	1:00:00 PM	44.36289	29.55186	66.66339	46.75793	38.05647	34.22031
4/7/2022	2:00:00 PM	44.17144	26.90291	70.50602	44.56529	36.44687	32.33931
4/7/2022	3:00:00 PM	42.49835	27.26976	64.12133	44.39977	35.93648	32.14323
4/7/2022	4:00:00 PM	44.68891	26.9338	66.67358	46.55651	37.13498	32.43166
4/7/2022	5:00:00 PM	45.7714	25.51136	67.16594	47.10139	35.84974	31.05053
4/7/2022	6:00:00 PM	39.28221	19.62141	64.2911	39.86168	31.53649	26.57343
4/7/2022	7:00:00 PM	36.08953	21.30297	53.94019	38.52025	33.08645	28.04087
4/7/2022	8:00:00 PM	38.6543	21.36453	56.53049	40.84353	34.04676	28.27585
4/7/2022	9:00:00 PM	42.54954	27.68952	62.78022	44.42548	38.69011	34.03394
4/7/2022	10:00:00 PM	42.96155	30.77025	56.94952	46.25533	40.63424	36.43875
4/7/2022	11:00:00 PM	40.8911	29.26092	54.13229	43.98605	39.00667	35.00939
4/8/2022	12:00:00 AM	39.56792	28.31955	53.76162	42.60236	37.52151	33.64757
4/8/2022	1:00:00 AM	40.09912	29.33008	55.48814	42.78454	37.92714	34.43003
4/8/2022	2:00:00 AM	42.42003	30.5235	58.90503	45.25139	40.02068	35.92822
4/8/2022	3:00:00 AM	48.66758	36.34603	60.84176	51.90788	46.95467	42.25945
4/8/2022	4:00:00 AM	49.44397	37.00916	62.03006	52.45098	48.07557	43.61096
4/8/2022	5:00:00 AM	48.12129	37.07231	60.21611	51.00328	46.68727	43.0189
4/8/2022	6:00:00 AM	46.95217	35.32027	58.25795	49.86523	45.77242	41.14083
4/8/2022	7:00:00 AM	47.10471	33.62222	63.24249	50.29536	44.64344	39.85229
4/8/2022	8:00:00 AM	54.01165	39.69265	76.257	55.98819	50.66087	46.31167
4/8/2022	9:00:00 AM	50.26046	33.66766	67.11947	53.66037	46.82252	40.95876
4/8/2022	10:00:00 AM	54.65456	32.28704	75.30026	57.6388	45.17575	37.96717

4/8/2022	11:00:00 AM	53.1209	32.21958	73.42499	55.79032	44.47689	38.40165
4/8/2022	12:00:00 PM	61.75943	33.82975	78.8329	66.13038	53.01532	42.06914
4/8/2022	1:00:00 PM	64.68252	36.75961	80.47277	69.14191	57.75786	44.57609
4/8/2022	2:00:00 PM	65.21695	37.86394	80.16314	69.61696	59.32189	46.74356
4/8/2022	3:00:00 PM	67.5471	39.53519	82.23576	71.8723	62.81463	49.90548
4/8/2022	4:00:00 PM	63.07001	36.8544	81.00282	67.34777	54.64106	43.94323
4/8/2022	5:00:00 PM	59.74838	35.67328	77.62523	63.51776	50.5254	41.89928
4/8/2022	6:00:00 PM	54.22226	31.56338	75.72999	56.28684	44.95	38.01479
4/8/2022	7:00:00 PM	49.85288	34.77273	68.92421	52.49661	47.2591	42.15405
4/8/2022	8:00:00 PM	47.88762	37.19739	61.48377	50.72043	46.19892	42.59546
4/8/2022	9:00:00 PM	47.60569	37.65701	60.83647	50.52543	46.18038	42.51615
4/8/2022	10:00:00 PM	49.561	39.72275	65.15497	52.35968	47.83216	44.32466
4/8/2022	11:00:00 PM	49.28142	34.0402	64.19979	52.71603	46.51791	40.68798
4/9/2022	12:00:00 AM	52.28046	29.49432	73.89873	53.4984	41.99873	36.21141
4/9/2022	1:00:00 AM	54.12411	35.30615	73.42487	57.11691	47.79981	41.87267
4/9/2022	2:00:00 AM	57.37267	36.6666	74.90293	61.03298	50.13832	42.92449
4/9/2022	3:00:00 AM	52.33078	33.53869	70.77218	55.50102	46.01299	39.78086
4/9/2022	4:00:00 AM	50.43764	33.90273	71.16774	53.18569	44.76513	39.53841
4/9/2022	5:00:00 AM	49.50638	32.28996	70.176	52.31151	43.2938	38.03938
4/9/2022	6:00:00 AM	53.18052	33.27421	74.1185	55.4178	44.44384	38.88064
4/9/2022	7:00:00 AM	58.49035	35.38899	77.11083	62.45815	50.76556	42.33458
4/9/2022	8:00:00 AM	55.67527	34.91929	74.43789	58.92268	48.05909	40.87156
4/9/2022	9:00:00 AM	50.05284	32.6149	70.28352	53.07248	42.98735	37.66317
4/9/2022	10:00:00 AM	49.41254	32.07335	71.27205	51.40227	40.97737	36.39444
4/9/2022	11:00:00 AM	51.20911	31.75595	74.08183	52.86633	41.33863	36.63899
4/9/2022	12:00:00 PM	49.51945	33.13081	72.20542	51.24634	40.88716	37.34911
4/9/2022	1:00:00 PM	51.50964	33.60361	73.52345	53.13296	42.44322	38.37237
4/9/2022	2:00:00 PM	56.88711	32.93099	75.17875	60.34969	47.35721	38.8918
4/9/2022	3:00:00 PM	59.15232	35.03259	79.14422	62.46345	48.86631	40.35533
4/9/2022	4:00:00 PM	55.69185	31.86434	74.97903	58.47386	44.30997	38.00937
4/9/2022	5:00:00 PM	57.83387	31.73525	76.9461	61.44188	48.4937	38.6148
4/9/2022	6:00:00 PM	58.82375	29.89979	76.66997	62.38021	49.37682	38.58961
4/9/2022	7:00:00 PM	53.15609	29.11823	71.95238	56.17554	44.31458	36.68814
4/9/2022	8:00:00 PM	45.44573	31.20011	67.42465	48.32677	41.97405	37.05832
4/9/2022	9:00:00 PM	44.71656	31.86269	58.1215	47.94976	42.57065	37.75774
4/9/2022	10:00:00 PM	45.43673	27.80417	69.66568	48.34995	41.68503	35.15682
4/9/2022	11:00:00 PM	45.36728	31.83897	59.39084	48.5659	43.31707	38.50163
4/10/2022	12:00:00 AM	43.4649	28.74741	59.11808	46.73498	39.21934	34.62514
4/10/2022	1:00:00 AM	51.76555	35.9685	66.85751	55.09329	49.11624	43.52682
4/10/2022	2:00:00 AM	53.34044	39.09138	70.16967	56.25663	50.94449	46.40904
4/10/2022	3:00:00 AM	47.58997	33.27305	63.3423	51.68315	43.32905	38.49647
4/10/2022	4:00:00 AM	40.12857	26.7329	53.43357	43.58242	37.34245	32.56798
4/10/2022	5:00:00 AM	37.6471	24.24745	52.19259	40.86202	34.65105	30.09469

4/10/2022	6:00:00 AM	39.62943	27.28737	54.81395	42.69764	37.22136	33.06074
4/10/2022	7:00:00 AM	42.84433	28.22247	67.3062	45.64067	40.74758	35.26822
4/10/2022	8:00:00 AM	43.633	32.32765	57.08525	46.60259	42.03196	38.00503
4/10/2022	9:00:00 AM	43.68958	33.04129	67.8194	45.87437	41.62297	38.09492
4/10/2022	10:00:00 AM	42.15843	31.58934	59.81844	44.76138	40.4067	36.83705
4/10/2022	11:00:00 AM	45.66631	31.61469	65.64097	48.29595	41.68907	37.58112
4/10/2022	12:00:00 PM	46.91443	32.35886	68.92358	48.39264	41.09891	37.42648
4/10/2022	1:00:00 PM	49.5622	33.07533	72.27075	51.04609	43.01791	39.00728
4/10/2022	2:00:00 PM	55.88077	33.66962	75.84686	58.24195	45.16809	39.3825
4/10/2022	3:00:00 PM	51.3	32.22528	72.7908	53.65872	43.00473	37.76208
4/10/2022	4:00:00 PM	49.46239	32.1426	75.40925	49.69813	41.76759	37.58969
4/10/2022	5:00:00 PM	50.31703	31.56256	72.58917	51.60097	42.1065	37.54413
4/10/2022	6:00:00 PM	48.74977	26.61314	70.61858	50.12022	40.52224	33.14166
4/10/2022	7:00:00 PM	43.44998	27.95669	61.11072	46.1781	40.67284	34.49078
4/10/2022	8:00:00 PM	43.94028	31.02294	58.91513	46.96578	41.30719	36.90636
4/10/2022	9:00:00 PM	41.48701	28.84285	54.89311	44.6465	39.45622	34.68943
4/10/2022	10:00:00 PM	44.27296	30.78041	59.57085	47.52585	41.49908	36.38773
4/10/2022	11:00:00 PM	47.50234	34.55837	64.11536	50.51211	44.32036	40.05455
4/11/2022	12:00:00 AM	48.12919	36.29201	60.21545	51.24742	46.49395	41.90051
4/11/2022	1:00:00 AM	50.8165	37.98098	65.0597	53.98307	48.89701	44.26181
4/11/2022	2:00:00 AM	56.3659	40.93475	75.64327	59.07081	50.19623	46.03687
4/11/2022	3:00:00 AM	58.17871	41.19806	76.19836	61.55058	52.03426	46.94291
4/11/2022	4:00:00 AM	50.40064	34.99413	71.40178	52.81157	45.09211	40.75999
4/11/2022	5:00:00 AM	62.76384	36.72438	79.19087	66.86229	53.73139	43.7079
4/11/2022	6:00:00 AM	62.61003	36.92602	80.10145	66.79073	54.59163	44.03586
4/11/2022	7:00:00 AM	66.51296	36.88027	80.51877	71.15006	58.63203	45.70282
4/11/2022	8:00:00 AM	68.69386	40.33017	82.40327	73.21756	63.15701	48.9955
4/11/2022	9:00:00 AM	61.07805	38.74955	80.39361	64.78638	52.21952	44.72218
4/11/2022	10:00:00 AM	68.17102	41.98214	81.48018	72.55439	63.81064	51.7315
4/11/2022	11:00:00 AM	67.92957	44.19149	81.11841	72.32392	63.20323	52.19381
4/11/2022	12:00:00 PM	71.24908	45.75594	84.22124	75.44712	68.06899	56.97019
4/11/2022	1:00:00 PM	72.61891	45.69449	85.09299	76.63513	69.79486	59.12364
4/11/2022	2:00:00 PM	70.4418	41.56725	84.26309	74.85037	65.85786	52.37189
4/11/2022	3:00:00 PM	59.77186	40.46361	78.26789	62.60524	49.88887	45.62754
4/11/2022	4:00:00 PM	57.05895	36.1749	76.7705	59.03009	46.57824	41.96475
4/11/2022	5:00:00 PM	56.19214	38.3641	74.31921	59.16909	49.79841	44.49031
4/11/2022	6:00:00 PM	54.22453	34.63968	72.9288	57.20078	46.36252	39.9718
4/11/2022	7:00:00 PM	48.65742	33.79248	70.32418	50.57096	43.94731	39.60718
4/11/2022	8:00:00 PM	47.90021	35.87528	64.56046	50.96231	45.39373	41.46259
4/11/2022	9:00:00 PM	57.09407	35.5507	78.25409	59.90251	48.82802	42.48494
4/11/2022	10:00:00 PM	55.23431	42.44581	71.46587	58.10755	53.11692	48.7492
4/11/2022	11:00:00 PM	51.13142	37.39195	69.83269	53.4249	48.32525	43.97733
4/12/2022	12:00:00 AM	50.60757	38.5345	64.64526	53.52709	48.84737	44.71651

4/12/2022	1:00:00 AM	53.06915	38.70547	72.79312	55.73193	49.01473	44.68069
4/12/2022	2:00:00 AM	49.13387	37.13443	67.52807	51.76229	46.23113	42.35408
4/12/2022	3:00:00 AM	49.49773	36.03337	67.90747	52.55362	46.3095	41.69999
4/12/2022	4:00:00 AM	48.81542	37.26035	62.68892	51.88321	47.04522	43.05918
4/12/2022	5:00:00 AM	50.74452	37.22401	69.48011	53.31348	47.17074	42.67598
4/12/2022	6:00:00 AM	48.98613	34.17509	66.59544	52.07102	45.63346	40.16575
4/12/2022	7:00:00 AM	48.22356	33.3653	65.21309	51.44763	44.31775	39.30387
4/12/2022	8:00:00 AM	53.44717	35.76012	74.12079	55.72449	46.24564	41.71002
4/12/2022	9:00:00 AM	62.97277	35.61552	86.90437	62.2822	48.99911	41.85738
4/12/2022	10:00:00 AM	64.0716	36.18068	82.45048	67.96061	54.53355	43.43529
4/12/2022	11:00:00 AM	63.27168	37.32795	80.24058	67.44821	55.47001	44.76717
4/12/2022	12:00:00 PM	60.74687	37.78035	79.10711	64.35751	51.8086	44.12538
4/12/2022	1:00:00 PM	62.61685	37.83763	79.61359	66.6288	54.01432	44.3342
4/12/2022	2:00:00 PM	61.88645	34.245	79.12612	65.92755	52.06855	41.69697
4/12/2022	3:00:00 PM	61.57123	36.73751	79.47577	64.97508	51.88204	43.25991
4/12/2022	4:00:00 PM	62.25289	37.10488	82.15651	64.81593	51.86407	43.89567
4/12/2022	5:00:00 PM	59.07791	35.18732	80.67714	60.83817	48.71441	41.54925
4/12/2022	6:00:00 PM	61.09318	31.4965	86.32152	55.49028	43.07393	37.82723
4/12/2022	7:00:00 PM	44.66279	31.4017	57.53746	47.96168	42.5014	37.51789
4/12/2022	8:00:00 PM	46.81987	33.57576	61.313	50.05624	44.5163	40.08655
4/12/2022	9:00:00 PM	46.21215	31.68002	70.2963	47.80422	42.65336	37.6621
4/12/2022	10:00:00 PM	44.33052	32.1362	64.31797	47.03919	42.16453	37.7314
4/12/2022	11:00:00 PM	46.6363	34.08665	65.41515	49.32924	44.13289	39.93875
4/13/2022	12:00:00 AM	49.73534	35.6402	68.59258	52.32285	45.7047	41.59026
4/13/2022	1:00:00 AM	48.86205	36.51701	67.70022	51.56608	46.05011	41.90053
4/13/2022	2:00:00 AM	49.68023	38.20201	63.13636	52.67688	47.86052	43.75192
4/13/2022	3:00:00 AM	47.06412	33.70687	64.47181	49.95492	43.95649	39.49398
4/13/2022	4:00:00 AM	48.93723	36.60677	61.75688	51.97962	47.13474	42.92642
4/13/2022	5:00:00 AM	46.50036	32.84668	67.69723	49.25532	43.15751	38.47762
4/13/2022	6:00:00 AM	48.92325	33.45677	72.21568	50.18691	43.52165	39.13082
4/13/2022	7:00:00 AM	46.09134	34.05396	64.73818	48.54808	43.7572	39.85005
4/13/2022	8:00:00 AM	47.11802	33.8177	68.17712	48.50342	42.7038	39.04482
4/13/2022	9:00:00 AM	58.77496	34.62593	83.22815	58.46198	46.35271	40.48784
4/13/2022	10:00:00 AM	62.45394	37.75783	81.1818	66.16621	53.40213	44.11795
4/13/2022	11:00:00 AM	64.42631	38.60468	81.90474	68.72097	57.64996	46.27727
4/13/2022	12:00:00 PM	63.12589	37.03189	79.22358	67.44014	55.92935	44.95203
4/13/2022	1:00:00 PM	63.31733	38.01188	79.19644	67.60515	56.20011	44.89676
4/13/2022	2:00:00 PM	62.58179	35.95661	80.00889	66.70957	53.42857	42.79733
4/13/2022	3:00:00 PM	63.76487	36.93546	82.77706	67.90264	55.6312	44.49692
4/13/2022	4:00:00 PM	61.48612	36.77952	78.52781	65.3882	53.00333	43.60015
4/13/2022	5:00:00 PM	63.59656	36.78469	82.66202	67.38519	55.25306	44.27275
4/13/2022	6:00:00 PM	60.07971	30.64082	82.15199	61.28066	47.22456	37.50595
4/13/2022	7:00:00 PM	47.42121	30.69881	67.39505	49.91367	43.04223	37.58876

4/13/2022	8:00:00 PM	46.06158	35.57255	59.69315	48.98698	44.26352	40.43457
4/13/2022	9:00:00 PM	47.56853	33.93892	73.40222	48.37572	43.54166	39.60225
4/13/2022	10:00:00 PM	57.35701	38.41118	77.17374	60.35358	48.10874	43.58447
4/13/2022	11:00:00 PM	55.88462	37.20286	75.69945	58.5521	46.89713	42.0125
4/14/2022	12:00:00 AM	56.23865	37.35033	75.34283	58.67515	47.55316	42.66275
4/14/2022	1:00:00 AM	55.09557	37.92776	75.08712	58.0348	47.87206	43.1935
4/14/2022	2:00:00 AM	50.68096	39.19176	68.66122	53.53526	48.18758	44.29067
4/14/2022	3:00:00 AM	51.11271	40.89675	64.43141	53.852	49.72738	46.36283
4/14/2022	4:00:00 AM	49.83947	39.22619	67.30847	52.35572	48.01915	44.50822
4/14/2022	5:00:00 AM	49.32442	37.96644	66.20213	52.13581	47.09737	43.36925
4/14/2022	6:00:00 AM	47.28673	35.7482	67.78393	49.55669	44.65999	40.89455
4/14/2022	7:00:00 AM	48.76325	34.24934	69.00865	51.15025	43.009	39.04588
4/14/2022	8:00:00 AM	54.95641	36.01617	73.30793	58.0874	47.09301	41.14551
4/14/2022	9:00:00 AM	63.09826	36.76801	86.82738	64.65993	51.52118	42.60495
4/14/2022	10:00:00 AM	67.10043	39.09826	84.76972	71.04415	60.58713	48.136
4/14/2022	11:00:00 AM	65.22116	38.22207	80.56251	69.67338	58.8248	46.40292
4/14/2022	12:00:00 PM	65.9606	38.31987	83.23723	70.17194	58.62961	46.50675
4/14/2022	1:00:00 PM	65.42585	38.05237	80.15962	69.80923	60.08522	47.17728
4/14/2022	2:00:00 PM	65.93457	37.88676	80.49282	70.25063	60.34673	46.95876
4/14/2022	3:00:00 PM	65.39476	37.21704	79.87642	69.78514	59.375	46.71839
4/14/2022	4:00:00 PM	58.37239	35.04489	76.06065	62.01586	48.90225	40.48477
4/14/2022	5:00:00 PM	57.53088	33.84687	74.76378	61.34323	48.39072	39.57777
4/14/2022	6:00:00 PM	53.28908	31.41914	73.10985	56.26714	44.75519	37.86112
4/14/2022	7:00:00 PM	57.98132	31.43724	75.7016	62.06505	46.71763	37.76179
4/14/2022	8:00:00 PM	57.78523	37.48293	75.80609	61.71849	50.09072	43.66368
4/14/2022	9:00:00 PM	46.83911	33.70778	62.8554	50.3415	42.99207	38.86213
4/14/2022	10:00:00 PM	45.63334	34.55448	62.61275	48.41573	43.00976	39.30111
4/14/2022	11:00:00 PM	46.6393	35.0259	61.74082	49.71903	44.54596	40.25535
4/15/2022	12:00:00 AM	47.24793	33.00563	65.31996	50.54698	43.86467	38.54959
4/15/2022	1:00:00 AM	42.97536	33.22979	57.11134	45.65776	41.51783	38.18768
4/15/2022	2:00:00 AM	42.07784	32.76113	55.45529	44.54419	40.73689	37.391
4/15/2022	3:00:00 AM	47.776	35.2376	62.10025	51.10597	45.38179	40.85398
4/15/2022	4:00:00 AM	48.92196	38.07648	61.60927	52.00522	47.30296	43.41487
4/15/2022	5:00:00 AM	51.59906	39.26442	64.84048	54.74679	49.64257	45.08745
4/15/2022	6:00:00 AM	49.92062	33.61874	64.97657	52.88012	47.89666	40.7
4/15/2022	7:00:00 AM	46.3498	34.65123	60.44369	49.1942	44.94797	40.40765
4/15/2022	8:00:00 AM	48.37803	34.43376	68.00381	51.24411	45.8235	40.99329

WM2: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/1/2022	10:21:11 AM	55.63508	31.84488	82.24239	55.60742	45.09527	39.09955
4/1/2022	11:00:00 AM	54.6145	32.39377	77.20621	56.11842	44.23231	38.80192
4/1/2022	12:00:00 PM	55.80603	32.09204	78.28758	58.1363	45.07731	38.55871
4/1/2022	1:00:00 PM	57.97239	31.96589	80.29661	59.73818	45.77968	39.04071
4/1/2022	2:00:00 PM	57.45142	32.3484	78.60234	59.32806	46.29845	39.1778
4/1/2022	3:00:00 PM	58.82185	32.91434	83.41654	57.86705	44.83154	39.29608
4/1/2022	4:00:00 PM	52.65697	32.91445	77.87518	54.35908	43.92137	39.38431
4/1/2022	5:00:00 PM	46.06528	31.32058	68.36544	47.93616	41.89751	37.88688
4/1/2022	6:00:00 PM	45.41231	27.22479	73.21539	46.19164	40.66516	35.33194
4/1/2022	7:00:00 PM	44.21072	26.35302	75.11201	44.98061	38.32094	33.56961
4/1/2022	8:00:00 PM	40.73934	27.06693	56.14916	43.77505	39.05678	34.37084
4/1/2022	9:00:00 PM	44.49919	30.51038	58.52919	47.69626	42.57857	38.04057
4/1/2022	10:00:00 PM	46.94087	30.9773	67.4539	49.80039	42.5052	37.53945
4/1/2022	11:00:00 PM	47.55179	31.39528	61.89468	50.83126	45.36407	39.06024
4/2/2022	12:00:00 AM	46.42018	30.53075	64.39154	49.67406	43.38878	37.9677
4/2/2022	1:00:00 AM	46.64557	31.87928	64.18203	49.51323	43.92511	39.25891
4/2/2022	2:00:00 AM	47.45098	33.15265	60.42689	50.86338	45.38219	39.74322
4/2/2022	3:00:00 AM	50.79867	36.9836	64.1172	54.07062	48.5796	43.28688
4/2/2022	4:00:00 AM	50.32489	38.39914	64.46519	53.06493	48.54641	44.66709
4/2/2022	5:00:00 AM	48.06773	35.97822	63.77025	51.16247	46.22749	42.2433
4/2/2022	6:00:00 AM	50.22387	35.98825	66.08464	53.4829	47.37839	42.5447
4/2/2022	7:00:00 AM	52.39445	37.92347	71.60028	55.33099	48.6274	44.17223
4/2/2022	8:00:00 AM	59.19742	40.86313	76.12187	62.83126	53.49858	47.50597
4/2/2022	9:00:00 AM	60.20086	36.9126	79.16376	63.68619	52.83489	44.67421
4/2/2022	10:00:00 AM	65.37803	38.57531	85.62477	68.41365	55.29196	45.70233
4/2/2022	11:00:00 AM	67.43362	35.17705	85.20441	71.09434	58.27707	44.44259
4/2/2022	12:00:00 PM	63.21372	34.40344	84.82206	65.72622	51.51494	41.1475
4/2/2022	1:00:00 PM	66.34783	34.08645	85.02795	69.55385	53.26733	40.79697
4/2/2022	2:00:00 PM	67.68118	34.62382	87.09193	71.6269	59.18995	45.21916
4/2/2022	3:00:00 PM	64.29681	33.69286	83.81514	67.45499	53.35995	40.78332
4/2/2022	4:00:00 PM	61.69388	32.59182	83.31639	64.27343	49.26114	39.30151
4/2/2022	5:00:00 PM	68.75102	32.82406	87.25834	72.33969	58.71635	43.56284
4/2/2022	6:00:00 PM	66.87787	31.60154	86.44815	69.97349	55.22719	41.83798
4/2/2022	7:00:00 PM	48.62993	29.67082	70.58974	49.18785	42.48473	37.49232
4/2/2022	8:00:00 PM	56.76695	29.87047	80.82141	55.52481	44.4998	38.86467
4/2/2022	9:00:00 PM	55.09828	32.41494	79.27312	55.24943	44.25194	39.26501
4/2/2022	10:00:00 PM	42.49056	28.84709	54.86942	45.61878	41.02708	36.51499
4/2/2022	11:00:00 PM	40.08631	27.40228	55.34854	43.01396	38.54909	34.26086
4/3/2022	12:00:00 AM	42.45033	28.62123	54.68927	45.81289	40.50858	35.4939
4/3/2022	1:00:00 AM	40.55266	24.84151	54.85125	44.35806	37.46502	32.54392

4/3/2022	2:00:00 AM	43.2297	29.02615	58.5882	45.96155	40.72419	36.32581
4/3/2022	3:00:00 AM	44.97605	30.68351	58.35836	48.34219	42.61263	38.09933
4/3/2022	4:00:00 AM	43.9807	30.22897	58.58612	47.06427	42.28688	37.93233
4/3/2022	5:00:00 AM	44.64638	31.33796	56.16291	47.52016	43.67553	38.97617
4/3/2022	6:00:00 AM	46.38282	30.53651	65.42892	47.95645	42.66791	38.18624
4/3/2022	7:00:00 AM	50.23841	32.84145	65.65348	53.57361	47.96265	40.83758
4/3/2022	8:00:00 AM	52.45399	40.53481	65.8696	55.56284	50.71312	46.61492
4/3/2022	9:00:00 AM	50.19354	33.55475	72.25984	51.57318	45.81925	40.82904
4/3/2022	10:00:00 AM	49.11525	31.41885	69.8649	51.65168	42.81536	37.9198
4/3/2022	11:00:00 AM	52.67521	31.63985	74.17463	55.38579	44.24372	38.40398
4/3/2022	12:00:00 PM	52.20678	31.5247	75.63839	54.19123	42.98772	37.88814
4/3/2022	1:00:00 PM	59.05732	32.62717	81.77508	61.23608	47.12181	39.64096
4/3/2022	2:00:00 PM	62.63136	34.04099	84.34856	64.68054	48.22283	40.90947
4/3/2022	3:00:00 PM	64.6234	34.50422	84.09091	67.20373	51.06796	41.85159
4/3/2022	4:00:00 PM	68.90424	34.4829	89.19696	72.42678	58.39475	43.88877
4/3/2022	5:00:00 PM	64.73112	33.70656	84.64329	66.88527	51.51119	41.58828
4/3/2022	6:00:00 PM	48.8813	31.79773	68.9387	50.29691	43.42296	38.90336
4/3/2022	7:00:00 PM	46.64578	32.4116	64.97201	49.20921	43.84279	38.89516
4/3/2022	8:00:00 PM	50.95394	38.14971	65.41355	54.10559	48.89593	44.46914
4/3/2022	9:00:00 PM	48.26009	34.35092	64.25903	51.40909	46.36462	41.03777
4/3/2022	10:00:00 PM	44.95643	30.77697	58.18802	48.19493	42.99025	38.72762
4/3/2022	11:00:00 PM	45.26905	30.85583	57.90053	48.47891	43.39047	38.57211
4/4/2022	12:00:00 AM	45.40323	33.14208	59.75434	48.35519	43.76819	39.44271
4/4/2022	1:00:00 AM	49.25542	37.37253	65.11322	52.0626	47.38556	43.37091
4/4/2022	2:00:00 AM	51.06853	38.63682	68.93269	53.74165	49.09629	45.13534
4/4/2022	3:00:00 AM	47.62661	36.10888	60.42056	50.46718	46.37663	42.58199
4/4/2022	4:00:00 AM	50.80621	37.8994	69.79854	52.60062	47.97996	43.9406
4/4/2022	5:00:00 AM	53.03806	38.80479	73.00611	55.34527	49.26386	44.82603
4/4/2022	6:00:00 AM	60.53945	38.86928	79.61674	63.777	53.24487	46.39774
4/4/2022	7:00:00 AM	60.50474	39.37574	80.43783	63.4424	52.7069	46.2391
4/4/2022	8:00:00 AM	60.52173	40.88858	81.65919	62.35437	52.29129	47.05737
4/4/2022	9:00:00 AM	75.55912	40.20611	89.62641	80.13393	68.85462	52.41212
4/4/2022	10:00:00 AM	77.17075	40.63803	91.21584	81.77797	71.96087	57.78137
4/4/2022	11:00:00 AM	76.05018	43.07702	90.07242	80.39249	70.27245	57.07346
4/4/2022	12:00:00 PM	78.07466	42.86726	91.35101	82.60962	73.31504	59.78639
4/4/2022	1:00:00 PM	80.63391	48.19365	92.63722	84.80985	77.52831	65.80112
4/4/2022	2:00:00 PM	77.33919	42.59345	90.91886	81.89121	72.04285	57.66393
4/4/2022	3:00:00 PM	78.41041	44.60646	92.52666	82.83796	74.11213	60.97629
4/4/2022	4:00:00 PM	79.26334	47.27833	93.50249	83.58368	75.47135	62.7499
4/4/2022	5:00:00 PM	80.51641	47.45522	93.06559	84.67217	77.46468	65.39857
4/4/2022	6:00:00 PM	80.56515	46.2804	92.33104	84.72924	77.55446	66.15069
4/4/2022	7:00:00 PM	78.3775	45.07482	91.44807	82.78701	74.05384	61.34903
4/4/2022	8:00:00 PM	78.10928	45.29951	91.73784	82.64471	72.44193	57.42207

4/4/2022	9:00:00 PM	73.85102	44.75358	90.48098	78.30744	66.26496	53.94567
4/4/2022	10:00:00 PM	73.53931	44.21075	89.52895	77.90393	65.18396	52.95005
4/4/2022	11:00:00 PM	68.44821	43.17999	87.89558	71.60489	58.02491	50.18613
4/5/2022	12:00:00 AM	67.03418	41.31827	88.36039	69.31104	55.91414	49.02719
4/5/2022	1:00:00 AM	67.96919	39.56593	88.09809	71.29406	58.20014	47.49345
4/5/2022	2:00:00 AM	73.06513	40.2036	89.53575	77.40709	65.29871	51.05918
4/5/2022	3:00:00 AM	70.32361	38.74361	88.37485	74.23644	60.64181	47.72973
4/5/2022	4:00:00 AM	71.74145	39.51642	89.06514	75.76294	63.09662	49.40032
4/5/2022	5:00:00 AM	64.18723	39.21569	86.18053	66.11392	51.75189	45.94553
4/5/2022	6:00:00 AM	70.60226	41.16214	88.95989	73.73255	60.11774	48.78544
4/5/2022	7:00:00 AM	69.91077	39.53284	89.36541	72.87884	55.06061	46.08432
4/5/2022	8:00:00 AM	73.20401	41.74649	89.75776	77.46194	66.53211	53.81023
4/5/2022	9:00:00 AM	73.10036	41.1949	91.42266	76.9862	66.23842	53.59088
4/5/2022	10:00:00 AM	72.80895	40.3224	89.17693	77.24816	64.90695	51.00372
4/5/2022	11:00:00 AM	70.49314	39.09271	86.7556	74.64978	61.86651	48.32897
4/5/2022	12:00:00 PM	73.49772	37.61416	94.3843	75.56205	60.0539	46.29762
4/5/2022	1:00:00 PM	71.56955	37.18785	90.48552	75.51188	59.88581	45.5937
4/5/2022	2:00:00 PM	70.14999	35.90989	88.86103	73.879	60.06281	45.31283
4/5/2022	3:00:00 PM	73.23944	36.65483	88.92161	77.56221	65.22548	50.13577
4/5/2022	4:00:00 PM	75.26767	39.28833	92.02069	79.47181	69.07304	55.5967
4/5/2022	5:00:00 PM	73.75396	39.30729	90.20773	78.09553	67.34077	54.19841
4/5/2022	6:00:00 PM	70.5432	35.63197	86.99105	74.65672	62.17125	48.94622
4/5/2022	7:00:00 PM	58.75661	34.60377	83.07982	60.07998	48.17689	42.36871
4/5/2022	8:00:00 PM	63.03432	37.03341	85.20434	64.90006	51.34413	44.63414
4/5/2022	9:00:00 PM	49.10654	34.46663	66.98078	52.00152	46.3487	41.72297
4/5/2022	10:00:00 PM	45.81122	33.60914	56.5797	48.79367	44.45925	40.34373
4/5/2022	11:00:00 PM	45.80224	32.90807	64.4996	48.11288	43.58481	39.45138
4/6/2022	12:00:00 AM	40.52709	28.92145	54.285	43.33073	39.3925	35.5769
4/6/2022	1:00:00 AM	42.23871	30.53988	53.41695	45.25397	40.85825	37.03593
4/6/2022	2:00:00 AM	42.56369	30.92116	52.06284	45.29289	41.56687	38.02889
4/6/2022	3:00:00 AM	47.90224	33.53487	61.92347	51.8292	44.94867	39.90998
4/6/2022	4:00:00 AM	49.66368	35.5447	62.22711	53.09582	47.81225	41.67147
4/6/2022	5:00:00 AM	46.76055	35.77633	58.03708	49.52606	45.34195	41.79306
4/6/2022	6:00:00 AM	48.18466	36.14261	62.78888	51.10342	46.73555	42.75036
4/6/2022	7:00:00 AM	48.47257	37.13419	58.42557	51.39992	47.28211	43.25555
4/6/2022	8:00:00 AM	49.69217	35.21464	70.9362	50.99608	45.81832	41.76473
4/6/2022	9:00:00 AM	56.99245	33.67873	77.60259	55.81811	45.75026	40.51839
4/6/2022	10:00:00 AM	60.90008	32.15438	88.52864	60.19327	47.92862	40.20926
4/6/2022	11:00:00 AM	64.52942	33.42729	83.34732	68.16652	54.10658	41.9267
4/6/2022	12:00:00 PM	64.36739	33.48695	85.56316	66.52402	52.48192	42.12497
4/6/2022	1:00:00 PM	60.42903	32.28103	83.67764	61.89606	47.32132	39.87123
4/6/2022	2:00:00 PM	61.13699	33.22059	84.43753	62.13436	48.68115	40.79643
4/6/2022	3:00:00 PM	58.57102	33.51633	81.11418	60.38074	47.05636	40.55433

4/6/2022	4:00:00 PM	56.15557	32.49365	79.41434	58.10469	46.07446	40.03161
4/6/2022	5:00:00 PM	51.90518	30.15961	75.60231	53.85304	42.48794	37.2427
4/6/2022	6:00:00 PM	47.61566	26.73656	72.40776	48.80103	39.64704	34.44237
4/6/2022	7:00:00 PM	40.41156	25.9776	53.13267	43.2665	38.55308	34.53528
4/6/2022	8:00:00 PM	43.44493	29.60993	57.76164	46.41941	40.8802	36.61951
4/6/2022	9:00:00 PM	45.2313	31.12289	62.09539	48.20955	42.86624	38.48288
4/6/2022	10:00:00 PM	46.15608	31.57768	59.84977	49.33044	43.48181	38.84271
4/6/2022	11:00:00 PM	46.61126	31.9875	58.07428	49.92142	44.57468	39.44847
4/7/2022	12:00:00 AM	44.0182	31.55364	56.04067	47.09374	42.46532	38.48911
4/7/2022	1:00:00 AM	45.31698	33.00869	61.96238	48.01946	43.55876	39.74427
4/7/2022	2:00:00 AM	50.2544	36.00464	62.70259	53.74205	48.43596	42.40278
4/7/2022	3:00:00 AM	51.15329	39.8324	63.13575	54.14367	49.65001	45.77977
4/7/2022	4:00:00 AM	48.39448	36.6121	61.17895	51.51446	46.72257	42.63126
4/7/2022	5:00:00 AM	48.21517	36.21865	61.62002	51.1946	46.48591	42.62593
4/7/2022	6:00:00 AM	50.62104	36.55538	65.67469	53.87428	48.74568	43.15607
4/7/2022	7:00:00 AM	48.3818	36.56321	62.49767	51.13082	47.07618	42.72492
4/7/2022	8:00:00 AM	51.66366	38.566	70.84764	52.91993	48.63484	44.9913
4/7/2022	9:00:00 AM	50.43554	34.46407	70.30666	51.28355	44.84516	40.7713
4/7/2022	10:00:00 AM	56.075	35.22527	78.6437	59.20191	46.64492	41.49205
4/7/2022	11:00:00 AM	55.60303	33.24059	79.0719	55.03036	44.92629	39.52651
4/7/2022	12:00:00 PM	58.11831	32.73425	80.44191	60.15274	46.91981	39.33336
4/7/2022	1:00:00 PM	58.93749	31.76787	80.67041	61.67419	48.10783	38.35566
4/7/2022	2:00:00 PM	57.76101	30.09	82.18049	59.0324	44.46529	37.33338
4/7/2022	3:00:00 PM	56.98009	30.20931	77.9492	59.34308	43.97005	36.90301
4/7/2022	4:00:00 PM	57.83125	29.92016	79.25948	60.4393	46.90525	37.78034
4/7/2022	5:00:00 PM	57.33125	28.8177	77.78444	59.39877	45.79504	37.27399
4/7/2022	6:00:00 PM	51.14077	25.42275	76.98265	51.19065	38.99411	33.56022
4/7/2022	7:00:00 PM	42.77665	27.26905	67.09423	45.49596	40.40788	35.132
4/7/2022	8:00:00 PM	43.00594	27.79122	58.51501	45.88068	40.44327	35.33523
4/7/2022	9:00:00 PM	46.03536	31.60747	64.43789	48.45	43.51217	39.04576
4/7/2022	10:00:00 PM	46.59148	33.74467	59.89319	49.68294	44.82606	40.58884
4/7/2022	11:00:00 PM	46.55154	32.49734	58.263	49.72027	44.82196	40.36816
4/8/2022	12:00:00 AM	43.58778	31.01841	56.42509	46.79896	41.77533	37.52527
4/8/2022	1:00:00 AM	43.21728	31.54292	58.56182	45.9758	41.34745	37.47746
4/8/2022	2:00:00 AM	45.21002	32.33283	60.89049	48.18739	43.11421	38.7509
4/8/2022	3:00:00 AM	51.10051	37.82448	63.26239	54.42363	49.33831	44.43685
4/8/2022	4:00:00 AM	51.59063	38.9896	64.01618	54.59761	50.27498	45.89021
4/8/2022	5:00:00 AM	50.98233	39.24403	62.91443	53.90145	49.59505	45.7123
4/8/2022	6:00:00 AM	50.64838	37.41137	63.36106	53.66174	49.15132	44.21067
4/8/2022	7:00:00 AM	51.81218	36.29204	69.69694	54.70567	48.15227	43.23976
4/8/2022	8:00:00 AM	57.31828	41.9793	78.13396	60.039	53.43581	48.72878
4/8/2022	9:00:00 AM	59.0397	35.83891	77.90235	62.48473	51.33209	44.14119
4/8/2022	10:00:00 AM	69.01481	35.19704	88.46998	72.59495	59.2416	45.35545

4/8/2022	11:00:00 AM	67.10584	35.09799	86.27696	70.44918	56.86385	44.36405
4/8/2022	12:00:00 PM	75.49738	38.01205	90.47754	80.16959	68.51435	52.54991
4/8/2022	1:00:00 PM	77.88961	40.0456	91.42791	82.24587	73.18637	58.79681
4/8/2022	2:00:00 PM	78.47261	42.33619	91.68871	82.83855	74.59172	61.82617
4/8/2022	3:00:00 PM	80.14316	44.30973	92.19349	84.3042	77.14651	65.03892
4/8/2022	4:00:00 PM	76.36855	40.07644	90.7468	80.98102	69.99468	55.39944
4/8/2022	5:00:00 PM	73.71866	38.53553	90.53288	78.17869	65.73434	50.53541
4/8/2022	6:00:00 PM	68.28484	34.72257	88.45023	71.20781	53.6249	42.48455
4/8/2022	7:00:00 PM	58.39067	37.00608	82.79559	58.56119	50.17313	44.94083
4/8/2022	8:00:00 PM	51.00044	38.83851	67.26789	53.67846	48.74104	44.77307
4/8/2022	9:00:00 PM	50.03283	39.01309	62.92923	53.16031	48.49304	44.62822
4/8/2022	10:00:00 PM	51.94894	41.08693	67.82662	54.84042	50.17672	46.38917
4/8/2022	11:00:00 PM	52.17096	36.37263	70.47783	55.11008	49.09573	43.5684
4/9/2022	12:00:00 AM	66.21048	32.56804	86.9342	68.02055	46.58571	40.57632
4/9/2022	1:00:00 AM	68.12494	37.53149	85.9346	71.79846	59.09412	47.51088
4/9/2022	2:00:00 AM	71.81391	39.09081	87.8549	76.05301	64.07495	50.6274
4/9/2022	3:00:00 AM	66.78419	36.93697	84.82755	70.46928	58.40931	46.97341
4/9/2022	4:00:00 AM	64.77123	36.74931	84.73456	67.97918	55.69541	45.27116
4/9/2022	5:00:00 AM	63.60715	34.89216	82.78475	66.80623	54.38633	43.69036
4/9/2022	6:00:00 AM	67.20657	36.38754	86.49265	70.28974	56.19525	44.94724
4/9/2022	7:00:00 AM	72.51736	40.33845	88.34633	77.00596	65.32911	52.90125
4/9/2022	8:00:00 AM	69.94668	37.77096	86.9561	73.80891	62.05182	49.92639
4/9/2022	9:00:00 AM	65.16298	34.99878	83.09663	68.70921	56.14392	43.92856
4/9/2022	10:00:00 AM	63.48194	33.97041	81.97252	66.8041	53.28596	41.44552
4/9/2022	11:00:00 AM	65.31733	33.64912	85.76771	68.00385	52.65475	40.81294
4/9/2022	12:00:00 PM	64.10929	34.77955	85.47792	66.7298	50.23979	40.49027
4/9/2022	1:00:00 PM	65.08089	35.48375	85.52483	67.77812	52.107	41.88623
4/9/2022	2:00:00 PM	71.10673	36.24334	88.39656	75.23626	62.50446	47.14697
4/9/2022	3:00:00 PM	72.67443	37.37172	90.89233	76.83025	63.65245	46.92573
4/9/2022	4:00:00 PM	69.9014	34.71642	88.18613	73.4618	57.53789	43.63594
4/9/2022	5:00:00 PM	71.84781	36.38217	89.65165	76.08826	63.92622	49.46156
4/9/2022	6:00:00 PM	72.68176	36.23047	89.37135	76.85434	64.69362	51.0023
4/9/2022	7:00:00 PM	67.50896	33.83748	86.38849	71.19991	58.1239	45.50174
4/9/2022	8:00:00 PM	54.98448	34.49403	79.62837	55.76882	47.16962	41.86712
4/9/2022	9:00:00 PM	48.77814	34.88516	63.94163	51.89147	46.74179	41.94716
4/9/2022	10:00:00 PM	51.57989	32.55557	79.58817	52.44802	46.5176	40.91517
4/9/2022	11:00:00 PM	48.43006	34.25248	61.66668	51.64381	46.36951	41.52403
4/10/2022	12:00:00 AM	47.2307	31.70773	62.19788	50.37936	44.25932	39.58514
4/10/2022	1:00:00 AM	56.05726	38.0208	76.23792	58.489	51.9868	46.45236
4/10/2022	2:00:00 AM	61.33763	41.06092	81.2493	63.73249	54.23745	49.19422
4/10/2022	3:00:00 AM	50.6365	35.21023	65.97298	54.51971	47.1998	41.96328
4/10/2022	4:00:00 AM	44.45141	30.43498	57.14981	47.86937	41.95672	37.2295
4/10/2022	5:00:00 AM	43.86813	29.10866	56.80827	47.25169	41.71508	36.56487

4/10/2022	6:00:00 AM	45.26743	31.52196	57.65631	48.52781	43.62	38.9567
4/10/2022	7:00:00 AM	48.05465	32.55672	74.61264	50.47558	45.54333	40.37479
4/10/2022	8:00:00 AM	50.89945	36.1397	68.38011	53.8692	47.08221	42.69565
4/10/2022	9:00:00 AM	50.72322	36.82376	73.66455	53.04755	46.70891	42.72075
4/10/2022	10:00:00 AM	50.69654	34.62459	74.43628	52.72707	45.429	41.28001
4/10/2022	11:00:00 AM	57.4856	34.64617	80.22444	59.61975	47.71226	41.92087
4/10/2022	12:00:00 PM	60.0789	34.87064	83.00043	61.92028	47.5362	41.56603
4/10/2022	1:00:00 PM	62.95158	36.31056	84.16807	65.12256	50.71296	43.43862
4/10/2022	2:00:00 PM	69.58276	36.51164	88.15086	73.00866	57.65773	44.61258
4/10/2022	3:00:00 PM	65.62117	35.01816	86.13887	68.65797	54.73654	43.17755
4/10/2022	4:00:00 PM	62.63218	34.6973	86.28057	63.62551	49.31651	41.84736
4/10/2022	5:00:00 PM	64.39178	34.89688	85.72021	66.18747	50.92186	42.49274
4/10/2022	6:00:00 PM	62.90313	30.72046	84.29993	64.75335	49.49817	39.44428
4/10/2022	7:00:00 PM	47.03006	31.74231	64.09022	49.93043	44.64067	39.15081
4/10/2022	8:00:00 PM	47.355	33.84625	60.99388	50.46003	45.20803	40.91785
4/10/2022	9:00:00 PM	45.61017	32.74218	59.24742	48.64294	44.08858	39.73628
4/10/2022	10:00:00 PM	47.62125	33.76908	62.5486	50.87402	45.30444	40.55678
4/10/2022	11:00:00 PM	49.9627	36.78149	65.73112	52.94099	47.41824	43.21306
4/11/2022	12:00:00 AM	51.15779	38.26449	65.57437	54.06282	49.30022	44.82791
4/11/2022	1:00:00 AM	53.13643	39.55161	71.40716	56.01566	50.96176	46.32416
4/11/2022	2:00:00 AM	69.11485	42.3065	87.23265	72.58308	57.22836	48.41274
4/11/2022	3:00:00 AM	71.19329	43.25165	88.11358	75.08249	62.74802	51.74867
4/11/2022	4:00:00 AM	63.38474	37.22997	85.54187	65.76672	51.24336	44.36779
4/11/2022	5:00:00 AM	75.95981	39.58606	91.3552	80.43622	68.4309	53.03239
4/11/2022	6:00:00 AM	75.91709	40.25188	91.93704	80.42385	69.41065	55.18935
4/11/2022	7:00:00 AM	78.8934	40.3513	91.61307	83.49374	73.47676	56.6587
4/11/2022	8:00:00 AM	80.59655	43.97646	92.78608	84.95706	77.10747	62.62038
4/11/2022	9:00:00 AM	74.4995	41.69796	91.54769	78.94906	66.70165	52.8608
4/11/2022	10:00:00 AM	80.56008	46.9089	92.49682	84.73169	77.69585	66.11648
4/11/2022	11:00:00 AM	80.23517	49.03673	91.86851	84.34509	77.0938	65.72124
4/11/2022	12:00:00 PM	82.68504	53.89368	94.12534	86.53117	80.64155	71.6701
4/11/2022	1:00:00 PM	83.53031	53.234	94.25913	87.20033	81.74195	73.32374
4/11/2022	2:00:00 PM	81.89239	48.41277	93.47811	86.03221	79.1133	67.15036
4/11/2022	3:00:00 PM	72.43496	42.69657	89.64693	76.43206	56.37269	49.26979
4/11/2022	4:00:00 PM	70.48173	39.94783	89.16955	73.88875	57.53881	47.90587
4/11/2022	5:00:00 PM	69.59173	41.60567	87.2041	73.23426	60.05843	49.75246
4/11/2022	6:00:00 PM	68.42229	37.79427	86.14474	72.05115	59.73886	47.43597
4/11/2022	7:00:00 PM	61.00388	36.69165	83.49406	62.79544	50.48926	43.97285
4/11/2022	8:00:00 PM	53.57723	37.8454	76.42307	54.80596	48.52736	44.21978
4/11/2022	9:00:00 PM	70.22585	38.8012	88.75792	73.66025	57.4163	47.13426
4/11/2022	10:00:00 PM	61.14771	43.93217	84.2827	62.77289	55.72166	51.036
4/11/2022	11:00:00 PM	61.26928	39.77702	83.2855	62.77584	52.63932	47.30354
4/12/2022	12:00:00 AM	56.78693	41.0933	77.09489	59.39487	52.96576	48.0153

4/12/2022	1:00:00 AM	65.23317	41.16678	86.08298	68.43056	56.43966	48.73461
4/12/2022	2:00:00 AM	59.12949	38.90653	81.17802	60.27531	49.30174	45.0011
4/12/2022	3:00:00 AM	57.1933	38.26447	80.82723	58.16593	49.75178	44.90925
4/12/2022	4:00:00 AM	54.72893	39.20992	71.53414	57.69859	51.11271	46.27312
4/12/2022	5:00:00 AM	62.46693	40.00195	84.33999	64.53	52.7541	47.01741
4/12/2022	6:00:00 AM	60.31573	36.4576	80.37604	63.37869	51.89065	44.61679
4/12/2022	7:00:00 AM	59.70593	36.50229	78.70516	62.83014	51.50189	44.12975
4/12/2022	8:00:00 AM	67.41977	39.52063	87.21054	70.41966	56.93684	47.40281
4/12/2022	9:00:00 AM	71.69971	38.65027	90.8636	75.3631	62.33304	49.17255
4/12/2022	10:00:00 AM	75.70544	39.21776	91.08053	80.12355	68.56295	54.24376
4/12/2022	11:00:00 AM	76.45059	41.7036	91.29169	80.92873	70.46166	56.7369
4/12/2022	12:00:00 PM	73.93063	41.03498	90.07876	78.27344	65.84454	51.9055
4/12/2022	1:00:00 PM	75.87758	41.0025	91.19749	80.30103	69.00842	52.73335
4/12/2022	2:00:00 PM	75.34775	38.32042	91.40107	79.81035	67.39989	50.75897
4/12/2022	3:00:00 PM	74.03346	40.30167	89.81086	78.57581	66.12042	51.74173
4/12/2022	4:00:00 PM	73.42759	39.58181	90.64117	77.47131	64.07949	49.84389
4/12/2022	5:00:00 PM	70.91804	38.48228	88.25535	74.83401	62.3202	49.19085
4/12/2022	6:00:00 PM	68.32963	34.81664	90.7526	68.2321	48.80002	42.30924
4/12/2022	7:00:00 PM	48.22634	34.69982	60.61408	51.49352	46.23423	41.58624
4/12/2022	8:00:00 PM	50.35872	36.74833	63.82413	53.53536	48.40023	43.93472
4/12/2022	9:00:00 PM	49.2269	35.47797	73.64386	50.98798	46.44039	42.05479
4/12/2022	10:00:00 PM	51.84207	35.23261	78.9557	50.98359	45.84874	41.54397
4/12/2022	11:00:00 PM	54.77012	36.19946	77.7541	56.54822	47.33017	42.97415
4/13/2022	12:00:00 AM	62.41873	37.89993	81.69983	65.27469	52.63946	45.47555
4/13/2022	1:00:00 AM	57.21245	38.56879	80.59564	57.84107	49.33128	44.7959
4/13/2022	2:00:00 AM	54.91941	39.96535	73.69778	57.8522	50.66005	46.19757
4/13/2022	3:00:00 AM	56.93593	35.90174	77.99948	59.02524	47.95931	42.61663
4/13/2022	4:00:00 AM	51.32479	38.53323	66.5479	54.34046	49.37433	45.06774
4/13/2022	5:00:00 AM	55.54131	35.4096	80.61865	55.87136	46.87476	42.10055
4/13/2022	6:00:00 AM	53.14249	36.21761	75.06676	55.26	47.23566	42.71952
4/13/2022	7:00:00 AM	55.62343	36.938	78.94257	57.02435	48.24117	43.82971
4/13/2022	8:00:00 AM	58.30614	37.08948	81.63725	58.67243	47.40679	43.17659
4/13/2022	9:00:00 AM	69.33865	37.88178	88.29746	72.60961	59.42096	47.1411
4/13/2022	10:00:00 AM	75.26005	41.74322	90.33394	79.6629	68.24868	54.36808
4/13/2022	11:00:00 AM	77.3103	42.31443	92.29943	81.75567	72.36139	59.21917
4/13/2022	12:00:00 PM	76.54099	41.03247	91.00904	81.02573	71.37601	58.38868
4/13/2022	1:00:00 PM	76.65178	41.82946	90.72704	81.11604	71.40103	57.70265
4/13/2022	2:00:00 PM	75.88205	39.31617	91.6381	80.40352	68.94598	53.67809
4/13/2022	3:00:00 PM	76.47894	41.11138	91.23495	81.07573	70.46369	55.7876
4/13/2022	4:00:00 PM	74.78599	40.48028	89.97713	79.21166	67.51951	53.84796
4/13/2022	5:00:00 PM	76.12126	40.56637	90.7393	80.67424	70.39115	56.21617
4/13/2022	6:00:00 PM	71.69196	34.44111	89.39465	75.54955	61.40696	45.79061
4/13/2022	7:00:00 PM	58.20376	34.36913	80.87954	59.28302	47.70461	41.89815

4/13/2022	8:00:00 PM	49.12614	37.27893	67.72424	51.79126	47.02566	43.0163
4/13/2022	9:00:00 PM	54.56277	36.56295	83.96663	51.23313	46.63732	42.66816
4/13/2022	10:00:00 PM	71.1475	40.06984	89.83488	75.18756	56.15643	46.20173
4/13/2022	11:00:00 PM	69.84751	39.18241	88.01967	73.58865	58.74061	46.29606
4/14/2022	12:00:00 AM	69.99647	39.61185	87.45324	73.29746	58.79722	46.76595
4/14/2022	1:00:00 AM	68.70821	40.03532	86.92363	72.45528	58.97583	47.5707
4/14/2022	2:00:00 AM	59.46869	40.87154	81.67106	62.62313	52.50842	46.90671
4/14/2022	3:00:00 AM	54.01772	42.44583	71.52838	56.33265	51.97074	48.31253
4/14/2022	4:00:00 AM	57.71335	41.13909	82.01347	59.54724	50.70478	46.7959
4/14/2022	5:00:00 AM	58.29915	39.83744	79.34369	60.95375	51.16642	46.27144
4/14/2022	6:00:00 AM	56.91313	38.22278	80.90221	57.52139	48.38631	44.09568
4/14/2022	7:00:00 AM	62.3194	36.89664	83.39997	65.00887	50.03906	42.95129
4/14/2022	8:00:00 AM	69.08384	38.88479	86.28933	72.84187	60.32488	48.12878
4/14/2022	9:00:00 AM	73.75254	39.81855	91.35887	77.9369	65.61497	51.62053
4/14/2022	10:00:00 AM	77.81931	43.76771	91.87611	82.17497	73.14843	60.78461
4/14/2022	11:00:00 AM	78.19893	42.36695	91.13055	82.66184	73.661	60.49805
4/14/2022	12:00:00 PM	78.22948	43.06601	91.97593	82.62811	73.45641	60.19386
4/14/2022	1:00:00 PM	78.63485	44.2309	91.21794	82.95097	75.00833	62.14744
4/14/2022	2:00:00 PM	78.95464	43.62683	91.82159	83.21352	75.34021	62.07271
4/14/2022	3:00:00 PM	78.50139	43.07734	91.26165	82.74929	74.52438	62.0403
4/14/2022	4:00:00 PM	72.39578	38.63469	88.25283	76.61739	64.09324	50.09228
4/14/2022	5:00:00 PM	71.89504	37.12869	87.45293	76.255	64.01466	48.73964
4/14/2022	6:00:00 PM	68.19086	35.18555	86.45903	71.83769	58.93405	45.59362
4/14/2022	7:00:00 PM	67.48027	34.86176	86.40123	71.21224	58.0661	45.06114
4/14/2022	8:00:00 PM	64.19756	39.40374	83.88534	67.20586	54.25672	46.44382
4/14/2022	9:00:00 PM	51.77168	35.88826	71.50342	54.33633	45.95497	41.55129
4/14/2022	10:00:00 PM	51.41417	36.23601	74.00962	52.93772	45.7026	41.57445
4/14/2022	11:00:00 PM	51.36318	36.83465	73.83433	53.50715	46.89796	42.42606
4/15/2022	12:00:00 AM	51.74892	35.42999	74.6172	54.00349	46.51559	41.24901
4/15/2022	1:00:00 AM	48.74417	35.27887	68.74734	50.81267	44.55208	40.84867
4/15/2022	2:00:00 AM	45.40962	35.12434	59.26677	48.07993	44.00878	40.3941
4/15/2022	3:00:00 AM	49.88189	36.95883	64.20186	53.12979	47.66645	43.29447
4/15/2022	4:00:00 AM	51.25321	39.61637	63.46293	54.45316	49.56945	45.48905
4/15/2022	5:00:00 AM	53.89723	41.04647	66.52432	57.12634	52.06276	47.45498
4/15/2022	6:00:00 AM	52.4604	36.11314	66.23783	55.64	50.63531	44.0946
4/15/2022	7:00:00 AM	50.82195	36.73848	70.76474	53.48956	47.99248	43.17028
4/15/2022	8:00:00 AM	55.14919	37.42763	73.28942	57.93678	49.91363	44.61941

WM2: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
4/1/2022	10:21:11 AM	48.2	45.6	44	43.8	44.5	44.9	41.2	40.2	42.8	39.9	44.3	39.7	40.9	40.7	37.3	38.9	35.4	35.6	32.6	31.1	31.5	32.8	32.6	31.6	32.2	33.1	30.5	30	30.3	30.9	29.8	30.5	32.3	26.7	24.3	20.5
4/1/2022	11:00:00 AM	51.2	48.7	45.6	42.7	39.2	35.7	33.1	39.2	30	28.7	28.9	30.3	29.8	28.6	26.8	21.8	19.4	17.3	13.2	8.8	5.8	1.3	1.8	4.6	7.9	0.4	-2.1	-2.1	-3.5	-3.6	-3.3	-3.1	-3.2	-3.3	-2.4	-0.6
4/1/2022	12:00:00 PM	52	49.4	46.7	43.9	40.8	37	33.8	34.7	30.9	29	35.2	40.4	41.8	32.8	37.3	30.6	28.8	24.9	21.9	20.5	22.2	16.1	8.3	2.5	-0.2	2	4	6.3	5.3	-0.8	-3	-3	-3.1	-3.3	-2.2	-0.5
4/1/2022	1:00:00 PM	54.9	52.1	48.9	46	42.6	38.9	35.8	34.4	30.9	28.6	27.7	28.3	29.2	29.1	27.3	23	19.6	17.2	13.5	8.3	4.4	2.3	3.1	0.4	-1.9	-2.8	-3.5	-3.3	-1.7	9.4	-1.9	-2.3	-2.2	-2.7	-2	-0.4
4/1/2022	2:00:00 PM	54.4	51.7	48.3	44.8	42	38.3	35.6	33.9	31.3	28.7	30	28.3	29.1	29	26.8	23.3	19.4	16.8	13.6	8.9	4.9	3.5	3.7	1.7	-1.1	-1.7	-3.1	-3	-2.4	-2	-1.7	-1.6	-1.7	-2	-1.5	-0.3
4/1/2022	3:00:00 PM	55.1	53.4	50.4	47	44.8	41	37.5	35.7	33.7	30.8	31	29.1	29.2	29	26.9	23.5	19.4	17	12.9	9	5.1	3.1	1.8	0.2	-1.5	-0.7	0	-1.8	-2.8	-2.5	-2	-1.9	-2.1	-2.3	-1.7	-0.3
4/1/2022	4:00:00 PM	49.4	46.1	43.1	40.4	39	34.9	33.9	34.9	33.5	29.7	30.9	29.4	29.6	31	28.5	23.6	19.8	16.8	14.3	7.4	4.9	5.2	4.8	5	-0.5	-1.5	-2.5	-2.9	-2.5	-2.1	-1.7	-1.7	-2	-2.3	-1.6	-0.2
4/1/2022	5:00:00 PM	40.9	38.3	36.2	34.1	37.3	32.6	31.9	32	29.6	28	27.3	27.3	27.7	27	25.2	21.2	16.9	13.9	9.3	5.3	0.5	-1.8	-2.4	-3.8	2.3	9.3	9.8	6.1	1.4	-3	-3.2	-3	-3.1	-3.2	-2.3	-0.6
4/1/2022	6:00:00 PM	37.9	37.5	36.1	34.8	38	32.6	33.1	32	30.9	28.3	27.2	27.3	26.3	26	23.4	17.4	15.8	11.2	4.6	-1.6	-4.1	-2.9	-4.1	-6.9	-1	4.4	1.9	0.4	-3.4	-4.2	-3.7	-3.4	-3.4	-3.7	-2.7	-0.6
4/1/2022	7:00:00 PM	38.5	37.3	32.7	31.2	35.1	29.5	29.1	29.9	30	29	28	28	27.3	27.5	23.5	19.4	14.6	12.3	12.4	13.7	7.2	4.2	11	14.2	16.8	17.1	18	13.7	13.6	7.2	2	-1.3	-1.5	-3.2	-2.6	3.8
4/1/2022	8:00:00 PM	27	28	29.3	31.3	36.4	30	29.5	27.9	24.5	23.6	22.3	23.3	24.4	24.4	20.5	16.2	13.4	10.9	7.3	6.4	0.1	-2.9	-4.3	-0.2	-3.5	-7.5	-6.9	-6.3	-5.6	-4.8	-4.3	-3.8	-3.6	-4.4	-3.2	-0.7
4/1/2022	9:00:00 PM	27	29.1	31.1	33.2	35.8	33.4	35.5	34.8	31.5	31.3	31.1	30.9	32.9	30.6	31.1	28.1	24.6	22.3	18.3	18.2	11.8	6	0.6	-1	-4.3	-7.8	-7.3	-6.6	-5.8	-5	-4.5	-4	-3.7	-4.6	-3.3	-0.7
4/1/2022	10:00:00 PM	32.5	33.8	37.5	40.5	39.6	34.4	34.2	32.5	31.1	31.5	32.8	32.5	32.8	32	29.1	29.6	25.3	20.6	16.7	13.4	9	4	-2.3	-7.5	-8.3	-7.9	-7.3	-6.6	-5.8	-5.1	-4.5	-4.1	-3.8	-4.6	-3.4	-0.7
4/1/2022	11:00:00 PM	31.7	33.2	34.6	35.1	38.5	32.7	31.2	34	34.9	35.7	36.5	36	38.4	37.9	36.6	29.6	25.4	22.5	17.6	14.8	9.5	2.9	-2.9	-7.6	-7.9	-7.2	-7.1	-6.6	-5.8	-5.1	-4.6	-4.1	-3.8	-4.6	-3.4	-0.7
4/2/2022	12:00:00 AM	33.2	33.3	33.9	34.5	36	31.9	33	34.3	32.6	34.9	34.9	35	37	33.4	34.6	32.3	28.4	24.5	19.9	19.5	13.3	7.6	-1.1	-5.1	-7.6	-7.5	-7.2	-6.6	-5.8	-5.1	-4.5	-4.1	-3.8	-4.6	-3.4	-0.7
4/2/2022	1:00:00 AM	35.5	34.4	33.7	34.3	35.5	35.7	34.1	35.5	32.8	35.5	33.7	33.8	36.9	33.6	32.2	32.2	27.1	21.6	17.7	15.1	10	4.4	-2.7	-7.7	-7.9	-7.3	-6.9	-6.4	-5.8	-5	-4.5	-4.1	-3.8	-4.6	-3.3	-0.7
4/2/2022	2:00:00 AM	30.1	31.1	31.9	33.8	38.1	35.2	34.1	38	36	36	35.1	36	37.6	37.1	35.2	29.3	24.9	21	16.1	12	5.8	-0.3	-6.5	-8.7	-8.5	-8	-7.4	-6.7	-5.9	-5.1	-4.6	-4.1	-3.8	-4.6	-3.4	-0.7
4/2/2022	3:00:00 AM	32.4	32.8	35.1	36.4	41.6	37.7	37.5	38.9	39.5	39.5	39.1	42.5	40.4	39.9	37.8	34.7	30	26.7	21.8	20.4	14.1	8.1	0.9	-6.7	-8.3	-8	-7.4	-6.8	-6	-5.2	-4.6	-4.1	-3.8	-4.7	-3.5	-0.7
4/2/2022	4:00:00 AM	31.1	32.7	34.2	36.8	41.5	36.4	37	38.8	38.8	38.1	38.3	39.1	40.4	39.7	40.9	34.2	30.4	27.7	22	17.6	12.4	5.9	1.3	13.3	0.2	-6.9	-7.2	-5.2	-2.6	-3.5	-4.1	-4.1	-3.8	-4.7	-3.5	-0.7
4/2/2022	5:00:00 AM	33	32.9	34.3	36.2	40.2	35.2	35.9	36.3	36	36	35.1	35.3	37.6	36.9	35.7	31.7	26.8	23.2	18.2	16.8	11.9	10.4	14.8	14.3	12.2	3.4	-1.6	-0.9	0.8	-1.9	-3.4	-3.8	-3.8	-4.7	-3.5	-0.7
4/2/2022	6:00:00 AM	34.8	34.7	38.8	39.5	39.3	37.5	36.2	37.6	37.1	37.3	38.6	40.3	40.6	37.1	36.7	38.1	32.1	26.5	21.8	20.1	14.1	8	2.3	2.7	10.2	19.4	18	14.6	9.7	1.6	-4.2	-4	-3.8	-4.6	-3.4	-0.7
4/2/2022	7:00:00 AM	45.8	43.2	41.2	40.3	40.2	37.5	37.6	39	39.6	39.6	38	39.2	39	37.2	36.9	38.1	31.5	27	23.8	21.1	15.5	10.5	6.5	5.9	19.2	27.4	27.5	27.5	25.2	17	5.7	-0.7	-2	-3.5	-3	-0.7
4/2/2022	8:00:00 AM	54.4	52.2	49.7	47.4	46.5	42.6	42.4	45.1	44.2	42.9	41.7	42.9	42.1	41.3	39.8	37.3	32.8	29.2	26	22.5	17.1	10.2	4.5	3.4	10.1	20.9	25.4	22.2	23.9	10.7	0.9	-2.3	-3	-3.5	-2.8	-0.7
4/2/2022	9:00:00 AM	56.7	54.1	51.1	48	46.2	42.8	40	41.6	40.1	37.6	36.1	37.6	36.5	38.5	37.7	30.9	27	24.5	20.2	16.3	12.1	6.4	2.4	0.1	-0.4	2.6	0.7	-0.9	-2.8	-2.7	-2.7	-2.5	-2.7	-3.1	-2.4	-0.6
4/2/2022	10:00:00 AM	62	59.5	56.5	53.6	50.6	47.4	43.5	44.2	40.8	40.2	39.8	40.5	39.3	40.8	40.8	33	29.3	26.7	22.8	18.9	16.5	12.6	8	5.9	4.6	6.6	6.1	5.3	1.7	0.3	-1.1	-0.8	-1.3	-1.7	-1	1.4
4/2/2022	11:00:00 AM	64.2	61.6	58.9	55.7	52.2	48.8	45.2	42	38.6	35.7	33.8	33.6	33.3	34.1	33.2	28.2	24.8	22.7	20.1	17	13.9	11.1	9.4	8.3	7.8	12.6	9.1	9.3	3.3	1.8	1.2	0.9	0.2	-0.6	0.2	2.4
4/2/2022	12:00:00 PM	59.6	57.6	54.9	51.9	48.6	45.1	41.5	39.7	36.1	33.6	31.6	32.5	33.4	33	31.2	28.3	23.8	21.3	17.8	15.1	10.7	7.2	8.4	9.7	7.6	4.3	2.3	1	-0.7	-1	-1.1	-0.9	-1.4	-1.8	-1.2	0.1
4/2/2022	1:00:00 PM	63.1	60.6	57.6	54.6	51.3	47.9	44.5	41.5	38.2	35.4	33.2	33	32.5	33.2	30.6	27.4	24.2	22.1	19.6	18.4	17.1	12	9.5	8.2	7.2	8.3	9.6	7.5	7.2	3.2	0	-0.2	-0.6	-1	-0.2	2.1

4/2/2022	2:00:00 PM	64.3	61.7	59.4	56.3	53.2	49.8	46.4	43.4	39.7	36.7	34.6	33	32.1	32.8	31	26.8	24.3	22.4	20	17.1	14.8	11.9	9.4	7.8	6.1	4.9	3.5	2	0.4	0.1	0	0.1	-0.4	-1.1	-0.5	1.5
4/2/2022	3:00:00 PM	60.9	58.7	55.7	52.7	49.5	45.5	41.7	38.8	35.7	33.1	33.2	31	30.3	31.7	29.8	24.5	21.6	19.5	16.4	12.6	9.1	5.9	4.4	3.3	6.3	12.1	10.9	9.4	2.7	-1.6	-1.9	-1.7	-2	-2.5	-1.8	-0.1
4/2/2022	4:00:00 PM	58.6	55.8	53.1	49.9	46	41.5	37.7	35.2	31.9	29.7	30.1	28.8	28.3	30.4	29.4	23	19.9	17.7	14.6	10.6	7.1	4.1	2.7	1.6	5.6	12.9	10.6	9.2	6.1	-2	-2.4	-2.2	-2.4	-2.9	-2.2	-0.5
4/2/2022	5:00:00 PM	65.2	62.8	60.6	58	54.3	51	47	44.4	41.1	37.9	34.9	32.7	31.1	30.4	28.6	25.7	23.4	21.7	19.9	17.1	14.5	11.9	10.8	11.4	19	28.9	21.7	30	29.8	30.1	16	7.6	7.6	4.2	3.1	2.8
4/2/2022	6:00:00 PM	63.2	61.1	58.7	56.1	52.9	49.1	45.5	42.3	39	35.4	32.8	31.1	29.4	29.9	28.6	23.8	21.4	19.5	17	13.6	10.7	7.8	6.2	5.4	7.6	14.3	15.8	18.9	13.2	9	-0.2	-1.3	-1.6	-2.4	-1.6	0.6
4/2/2022	7:00:00 PM	43.8	41.8	38.9	37.7	39	33.1	30.2	33.5	30.7	29.4	29.8	31.5	28.9	30.1	26.8	20.2	16.7	13.9	7.5	2.6	-0.3	1.3	3.9	5.5	6.6	5.7	4.3	-0.8	-4.3	-4.5	-4.1	-3.7	-3.6	-4.1	-3	-0.7
4/2/2022	8:00:00 PM	54	50.3	47	44.2	42.5	37.5	34.9	34.3	33.4	32.1	31.2	32.9	32.5	31.5	27.2	21.3	17.8	15.4	11.1	7	3.6	0.2	-1.2	-1.7	-2.6	-4	-4.7	-5	-4.7	-4.2	-3.8	-3.4	-3.3	-4	-2.9	-0.5
4/2/2022	9:00:00 PM	51.5	48.5	45.8	43.4	41.4	37.5	33.9	42.9	33.4	32.9	33.2	31.5	29.8	29.1	26.2	22.5	18.7	15.8	11.3	6.7	2.8	-1.8	-5.3	-6.2	-6.5	-6.7	-6.5	-6	-5.3	-4.6	-4.1	-3.7	-3.6	-4.2	-3.1	-0.7
4/2/2022	10:00:00 PM	28.1	28.8	30	32.3	37.9	29.9	28.7	34.9	27.3	26.2	25.7	26.4	25.8	23.5	21.8	20.1	14.3	9.8	5.3	1.3	-0.8	-4	-4.8	-6.8	-7.7	-7.5	-7.1	-6.5	-5.7	-4.9	-4.4	-3.9	-3.7	-4.5	-3.3	-0.7
4/2/2022	11:00:00 PM	28.6	28.7	29.7	31	34.9	27.5	28	30.8	23	22.6	20.7	20.4	20.6	20.4	19.5	19.6	14.1	9.3	4.7	0.8	-2.8	-6.7	-8.5	-8.7	-8.4	-7.9	-7.3	-6.6	-5.8	-5	-4.5	-4	-3.7	-4.6	-3.4	-0.7
4/3/2022	12:00:00 AM	25.9	26.5	31.4	32.8	38.7	29.7	27.5	30.5	28.9	28.3	26.3	26.1	24.5	25	25.9	19.8	15.8	11.2	3.9	-0.7	-3.9	-8.1	-9.2	-9	-8.5	-8	-7.4	-6.7	-5.9	-5.1	-4.6	-4.1	-3.8	-4.7	-3.4	-0.7
4/3/2022	1:00:00 AM	23.6	23.9	27.1	30.1	33.3	29.2	29.6	36.1	23.4	23.9	25.7	21.2	18.8	19.7	20	20.5	14.1	7.8	5.7	1.1	-2.9	-6.6	-8.5	-8.7	-8.4	-7.9	-7.3	-6.7	-5.8	-5.1	-4.6	-4.1	-3.8	-4.7	-3.4	-0.7
4/3/2022	2:00:00 AM	25.9	27.4	32.1	32.6	35.4	32.2	37.6	31.7	24.7	25.1	24.5	24.5	28.1	27.7	27.5	30	23.3	17.5	14	10.6	6.2	0.7	-4.9	-8.4	-8.5	-8	-7.4	-6.1	-5.8	-5.2	-4.6	-4.1	-3.8	-4.7	-3.5	-0.6
4/3/2022	3:00:00 AM	27.8	29.2	33	36.2	39	32.8	28.9	29.8	35.6	29.1	31.1	30.2	32	31.9	29.5	29.6	25.8	19.8	16.4	13.2	8.1	4.1	-3	-3.4	-5.4	-4.4	-6.9	-6	-5.6	-5.2	-4.7	-4.2	-3.8	-4.8	-3.6	-0.7
4/3/2022	4:00:00 AM	27.2	29.1	33.1	36	39.9	33.3	29.2	29.3	28.6	27.8	27.2	28.8	26.5	27.1	24.2	20.9	17.1	14.4	9.5	4.4	1.9	0.4	-3.4	-5.4	-8.3	-8.1	-7.6	-6.9	-6.1	-5.3	-4.8	-4.2	-3.8	-4.9	-3.6	-0.7
4/3/2022	5:00:00 AM	29.3	31	35.4	36.1	37.7	37.4	28.8	34.6	26.7	28.2	28.5	28	28.6	26.5	25.5	24.5	20	15.4	11.7	8.3	6.8	3.3	7.7	12.6	5.5	2.6	-2.9	-4.8	-4.8	-4.2	-4.1	-2.7	-3.6	-4.8	-3.6	-0.6
4/3/2022	6:00:00 AM	28.5	29.9	34.5	39.1	39.6	35	36.1	34.6	33.5	31.7	32	31.7	30.8	29.7	30.3	28.3	24.7	23	21.7	17.4	13.3	9.6	3.6	2.6	12.7	18.9	19.2	13.4	7.1	-1	-4.5	-3.4	-3.8	-4.9	-3.7	-0.7
4/3/2022	7:00:00 AM	32.6	33.3	36.2	38.4	43.2	38.1	36.5	38.7	37.1	35.8	37.5	38.7	39.2	39.9	38.6	32	28.9	27	22.2	18.9	15.1	8.9	5.1	6.4	14.2	24.8	21.9	25.1	19.1	13.4	-0.2	-2.3	-2.3	-3.7	-3.2	-0.7
4/3/2022	8:00:00 AM	38.9	36.9	38.1	38	43.2	39.1	37.8	44.2	41.7	40.6	41.1	41.1	40.4	41.1	39.5	34	30.3	27.2	22.6	17.6	13.3	6.7	0.7	-7	-6.3	-2.8	-3.7	-4.5	-4.7	-4.4	-3.9	-1.2	-2.2	-3.8	-2.8	-0.7
4/3/2022	9:00:00 AM	40.7	38.9	36.9	36.8	36.6	38.5	32.7	41.3	35.7	33.7	37.5	42.4	35	35.9	39.2	30.6	32.3	28.4	24.6	18.6	12.5	4.9	0	-2.6	-3.8	-0.9	-2	-2.6	-2.4	-2.6	-3.3	-3	-3.1	-3.4	-2.5	-0.7
4/3/2022	10:00:00 AM	45.3	42.4	39.4	36.9	35.9	33.1	31.5	33.4	31.3	29.9	30.1	28.6	28.5	30.6	28.9	24.5	19.6	16.4	12.4	8.6	4.1	1.6	1.4	-0.1	-0.3	1.1	4.6	2.8	0.9	0.4	-2.7	-2.7	-2.9	-3.2	-2.3	-0.6
4/3/2022	11:00:00 AM	48.8	46.1	43.3	40.1	38.9	35.5	34.5	36.7	34.1	33.9	35.8	33.1	33.2	33.5	33.2	26.9	22.9	20	14.4	10.1	7.8	4.1	1.5	2.8	0.9	-1.2	-2.8	-3	-3.7	-3.2	6.6	4.2	2.9	-3.1	-2.2	-0.6
4/3/2022	12:00:00 PM	48.4	45.9	43.4	39.9	38.7	34.2	33.8	35.3	31	34.5	30.4	29.9	32.1	31.8	28.4	26.3	21.7	17.2	13.4	8.8	5.2	2.6	2.8	2.4	-1.5	-4.4	-4.4	-4.3	-3.8	-3.1	-2.8	-2.6	-2.8	-2.9	-2.1	-0.5
4/3/2022	1:00:00 PM	55.9	53.1	49.9	47.4	44.5	40.8	37.5	35.2	33.1	31.1	29.9	31.7	30.4	31	30.4	25.8	21.2	17	13.3	8.4	4.4	2.7	2.6	0.7	-1	-2.9	-3.6	-3.5	-3.1	-2.3	-2	-2	-2.2	-2.5	-1.7	-0.4
4/3/2022	2:00:00 PM	58.9	57.2	54.4	51	48.5	44.1	40.3	38.8	36.3	32.7	32.1	33.2	32.8	32.8	30.6	27.6	23.1	19	14.9	10.6	7.2	4.7	3.2	1.7	-0.5	-2.5	-3.3	-3.3	-2.8	-2.2	-1.8	-1.8	-2.1	-2.3	-1.6	-0.3
4/3/2022	3:00:00 PM	61.6	58.6	55.8	52.4	49.5	45.7	42.2	40.9	38	34.7	33.7	33.2	33.4	33.1	32.7	26.6	22.8	18.7	15.5	12.3	9.3	6.5	5.1	3.9	1.9	0.1	-1.3	-1.8	-1.8	-1.5	-1.3	-1.2	-1.7	-1.5	-0.7	1
4/3/2022	4:00:00 PM	65.4	63.1	60.6	57.7	54.4	51.1	47.7	44.4	41	37.8	35.8	34.9	33.6	33.9	32.2	28.1	24.2	20.7	18.7	15.5	12.8	10.1	8.4	7.3	5.8	17	19.3	13.2	12	1.6	0.3	0.2	0.3	-0.5	0.3	2.2
4/3/2022	5:00:00 PM	61.6	58.9	56.1	52.4	49.3	45.9	42.1	38.9	36.7	34.5	34.3	35.2	32.8	33.5	34.1	28.2	23.3	18.9	14.9	11	7.6	4.3	2.8	3.7	13.1	19.4	19.5	20.8	14.7	11.9	1.2	1.8	2.1	-2.6	1.8	0.2
4/3/2022	6:00:00 PM	44.3	41.3	38.6	37.3	39.6	34.8	31.9	29.5	29.5	29.7	31.3	31.9	30.6	30.5	33.5	23.5	22.2	15.5	8.5	6.5	1.8	-3.7	-5.3	-3.1	3.2	8.6	7.3	2.3	-1.7	-3.9	-3.9	-3.6	-3.5	-3.9	-2.8	-0.7
4/3/2022	7:00:00 PM	35.1	33.8	33.6	34.3	38.1	34.6	30.8	31.9	30.4	31	33.7	34.4	36	38.2	36.7	27.1	22.5	17.1	10.6	5	-1.3	-4.8	-4.4	-1.6	-1.9	0.7	-2.2	-5.4	-5.1	-4.5	-4	-3.6	-3.5	-4.1	-2.9	-0.7
4/3/2022	8:00:00 PM	34.2	33.4	34.7	36.8	42.6	36.9	35.5	39	40.2	36.6	38.7	38.7	39.4	42.8	42.1	33.7	27.9	23.6	16.2	10.1	0.3	-6.5	-8.4	-8.3	-8.1	-7.6	-7	-6.3	-5.5	-4.7	-4.2	-3.9	-3.6	-4.2	-3.1	-0.7

4/3/2022	9:00:00 PM	32.5	33.9	34.7	35.4	38.1	35.4	32.6	37.5	35.4	34.5	34.9	36.9	36.8	38.6	40.3	31.4	26.1	20.8	14.2	10.2	2.4	-5	-8.1	-7.8	-7.8	-6.4	-6.9	-6.1	-5.5	-4.7	-4.3	-3.9	-3.7	-4.3	-3.1	-0.7
4/3/2022	10:00:00 PM	31.3	32.6	34.1	34.5	38.8	32.6	25.5	30.1	29	28.8	29	30.4	31.9	30.3	37.1	27.6	20.6	13.9	13.3	14.7	4.3	-2.8	-7.4	-8.5	-8.1	-7.8	-7.2	-6.5	-5.6	-4.9	-4.4	-4	-3.7	-4.4	-3.3	-0.7
4/3/2022	11:00:00 PM	31.8	33.3	34.4	33.1	35.8	31.5	28.3	32.1	32	30.8	31.7	33.6	32.7	33.3	37.8	28.6	23	18.7	17	16.2	6.2	2.8	-3.4	-2.6	-6.5	-7.2	-7.2	-6.6	-5.8	-5	-4.5	-4.1	-3.8	-4.6	-3.4	-0.7
4/4/2022	12:00:00 AM	32.4	33.6	35.8	34.2	35.7	33	29.6	30.6	31.3	32.7	33.1	32.7	34.2	32.6	35	30.8	25.8	19.7	15.1	13.9	4.7	-1.9	-6.2	-7.9	-8	-7.8	-7.3	-6.7	-5.9	-5.1	-4.6	-4.1	-3.8	-4.6	-3.4	-0.7
4/4/2022	1:00:00 AM	35.8	35.4	36.3	35.1	36.2	35.1	32.7	37.7	35.6	37	36.9	37.8	39.6	38.3	40	38.4	31.5	25	21	19.1	10.2	3	-4.4	-7.7	-8.1	-7.8	-7.3	-6.6	-5.8	-5	-4.5	-4	-3.7	-4.5	-3.3	-0.7
4/4/2022	2:00:00 AM	38.9	36.9	37.9	36.7	40.5	36.5	36	41.5	37.5	38.3	40	38.2	39.6	40	41.6	37.9	31.2	25.1	21.1	19	9.9	2.5	-4.9	-8.1	-8.4	-7.9	-7.3	-6.6	-5.8	-5	-4.5	-4.1	-3.8	-4.5	-3.3	-0.7
4/4/2022	3:00:00 AM	33.6	34.7	36.5	35.7	37.8	35.5	33.4	36.3	34.6	33.9	33.8	35.7	35.5	35	39.1	31.5	26.5	21.4	18.5	18.6	8.9	2	-4.4	-8	-8.4	-7.9	-7.4	-6.7	-5.9	-5.1	-4.5	-4.1	-3.8	-4.5	-3.4	-0.7
4/4/2022	4:00:00 AM	38.7	39.5	39.2	38.4	40.1	37.8	36.6	39.4	38.4	37.6	37.9	38.5	39.7	38.6	40.7	35.6	30	24	19.6	18.3	8.6	1.3	-5.3	-8.2	-8.2	-7.9	-7.3	-6.5	-5.8	-5.1	-4.5	-4.1	-3.8	-4.5	-3.3	-0.7
4/4/2022	5:00:00 AM	46.5	44.1	41.5	40.2	41.3	36.7	34.8	37.8	39.3	40.2	40	39.5	40.1	40.4	41.2	36.8	31.5	26.1	21.2	18.5	9.4	2.5	-0.3	-2.2	-3.5	-5.4	-5.8	-6.2	-5.6	-4.8	-4.4	-4	-3.7	-4.4	-3.2	-0.7
4/4/2022	6:00:00 AM	57	54.3	51.1	48.3	46.5	42.2	39.1	41.6	37.9	37.4	38.6	39	39.3	41.7	44.2	35.2	30.7	25.8	22.3	19.9	10.9	5.1	4.9	4	6.2	10.3	7.9	2	-1.5	-3.8	-3.7	-3.3	-3.3	-4	-3	-0.7
4/4/2022	7:00:00 AM	57	54.3	51.7	48.3	45.8	42.6	39.5	40.1	38.2	38.3	38.7	38.9	38.9	39.7	40.6	35.1	30.1	25.1	20.6	18.1	9.9	3.4	-0.5	-0.2	9.6	17.7	14.2	13.4	7.5	2.7	-2.1	-3.3	-3.3	-3.9	-2.9	-0.6
4/4/2022	8:00:00 AM	56.9	53.9	51.4	48.5	45.9	42	39.8	40.6	39.6	39.2	40.8	42	44.1	41.3	41.1	38	31.7	27.8	21.7	17.4	9.3	2.5	0.6	4.3	18.4	23.8	26.9	25.6	25.3	24.3	9	3.5	4.3	1.1	-0.3	-0.2
4/4/2022	9:00:00 AM	71.9	69.6	67.1	64.7	61.9	59.2	56.4	53.3	50.5	47.4	44.7	42.4	40.3	39.8	39.3	33.8	31	29.1	26.9	24.2	21.8	19.6	18.9	18.9	18.5	17.9	15.7	12.8	10	8.2	7.4	7.3	6.6	5.8	7.1	10.4
4/4/2022	10:00:00 AM	73.4	71.2	68.9	66.4	63.6	61	58.3	55.5	52.3	49.2	46.4	43.6	41.2	40	39.4	35.4	32.2	30.3	28.4	25.9	23.7	21.4	20.6	20.6	20.6	23.1	21.7	20.1	16	11.9	9.5	8.7	7.9	9	10.3	12.4
4/4/2022	11:00:00 AM	72	70.2	68	65.5	62.9	60.1	57.3	54.5	51.3	48.4	45.5	42.9	41.2	40.9	39.8	36	32.4	30.4	28	25.3	22.8	20.3	19.2	19	19.7	26	22.9	23.8	19.9	13.4	8.1	7.2	6.3	5.2	6	8.7
4/4/2022	12:00:00 PM	74	72.1	69.8	67.5	65.2	62.9	60.5	57.7	55.1	52.1	49.1	46.4	43.9	42	40.8	37.4	34.5	32.8	31.3	28.9	26.7	24.5	24.5	25.2	33.1	40.4	34.7	38.6	36.1	34.3	26.7	16.9	16.7	15.3	13.5	14.2
4/4/2022	1:00:00 PM	76.5	74.5	72.4	70.1	67.9	65.8	63.6	61.2	58.7	56.2	53.5	51	48.3	45.8	43.7	41	38.4	36.5	35	33.7	31.8	30.1	29.5	29.7	29.6	30.7	29.4	26.7	24.3	22.2	21.1	19.7	19.3	18.8	17.9	18.9
4/4/2022	2:00:00 PM	73.4	71.4	69.1	66.7	64.1	61.6	59	56.4	53.3	50.4	47.6	44.5	42.3	40.6	39.1	36.3	32.7	30.8	28.9	26.5	24.3	22.2	21.5	21.8	22.3	25.5	25.2	20.4	18.1	14.3	10.8	9.3	8.4	7.5	8.6	11.6
4/4/2022	3:00:00 PM	74.5	72.3	70.2	67.9	65.3	62.7	60.2	57.7	54.8	52	49.2	46.4	44	42.9	41.3	37.3	34.1	32.2	30.4	27.8	25.8	23.8	23.2	23.5	23.8	25.9	25.2	22.4	20.3	17.9	11.9	11	10	9.2	10.3	13.5
4/4/2022	4:00:00 PM	75.3	73.2	70.9	68.5	66.2	64	61.4	59.1	56.8	54.8	53.5	51	49.8	48.2	45.7	42.1	39.4	35.9	33.2	30.9	29.2	26.8	25.9	26.3	26.5	26	24.8	22	19.1	17.9	16.9	15.4	14.2	13.7	14	15.7
4/4/2022	5:00:00 PM	76.4	74.4	72.2	70.1	67.8	65.6	63.2	61	58.4	56	53.3	50.7	48.1	46.6	44.6	41	38.2	36.7	35.3	34.3	32.8	31.3	30	29.4	29.4	29.4	28.5	26.1	24.4	22.1	20.9	19.8	19.1	18.6	18.2	19.1
4/4/2022	6:00:00 PM	76.5	74.4	72.3	70	67.7	65.7	63.5	61	58.5	56	53.4	50.7	47.9	46.2	44.2	40.4	37.7	35.6	33.9	31.8	30.3	28.9	28.7	28.5	28.4	29.4	29.1	25.6	23.5	20.3	17.8	16.9	17.3	15.9	15.1	16.8
4/4/2022	7:00:00 PM	74.5	72.5	70.1	67.4	65	62.6	59.8	57.3	54.6	51.8	49.2	46.3	44	44.2	43.9	37.8	34.1	32.6	30.5	28.3	26.5	24	23.6	25.4	27.3	25.7	25.6	21.3	19.5	16	13.4	11.9	10.8	9.9	10.8	13.6
4/4/2022	8:00:00 PM	74.2	72	69.9	67.4	64.9	62.4	60.1	57.8	55.3	52.8	50.5	47.8	45.8	46.1	44.7	39.1	35.7	33.7	31.7	30.3	28.5	26.6	26.4	26	25.7	24.5	23.5	21.4	19.4	16.8	14.6	15.4	14.1	12.5	12.8	14.7
4/4/2022	9:00:00 PM	70.3	68.1	65.2	62.5	59.6	56.7	53.8	51.6	48.8	46	43.7	43	42.8	45.4	44.1	36.2	31.9	29.7	26.9	23.8	21.2	19	17.4	16.7	16.1	14.9	12.7	9.7	7.2	5.5	5	5.5	4.4	3.7	5	8.5
4/4/2022	10:00:00 PM	69.9	67.8	65	62.3	59.5	56.6	53.7	51.2	48.4	46	43.7	42.5	41.3	44.2	43.1	36	31.6	29	26.4	23.4	20.8	18.2	16.9	16.7	16.3	14.8	12.6	9.8	6.9	5.4	4.4	5	4	3	4.5	8.1
4/4/2022	11:00:00 PM	65.1	62.4	59.8	56.7	53.9	50.7	47.5	47	43.9	42.3	40.7	41.2	40.5	43.7	43.7	35	30	27.5	23.8	20.4	17	13.2	10.9	9.5	8.3	6.5	4.2	1.8	-0.1	-0.6	-0.8	-0.2	-0.8	-1.9	-0.9	1.6
4/5/2022	12:00:00 AM	63.3	61	58.4	56	53	49.7	46.8	47.8	45.2	42.5	40.5	42.6	41.1	44.3	45.7	35.7	31.7	28.8	24.2	20.3	16.7	11.9	9.1	7.3	5.7	3.7	1.6	-0.3	-1.5	-1.8	-1.8	-1.4	-1.7	-2.3	-1.1	1.6
4/5/2022	1:00:00 AM	64.4	62.3	59.4	56.6	53.6	50.3	46.9	44.3	42	39.8	37.8	39.6	37.1	40.1	41.2	32.4	28.3	26.4	22.6	20	16.4	12.2	9.5	7.5	5.9	3.8	1.6	-0.2	-1.3	-1.5	-1.5	-1.1	-1.6	-2.3	-1.3	1.4
4/5/2022	2:00:00 AM	69.3	67.2	64.8	62.2	59.5	56.6	53.4	50.5	47.4	44.5	41.4	40.2	37.7	39.1	40.2	32.3	29.1	27.4	25.1	22.8	19.7	16.9	15.7	15.3	14.5	12.8	10.6	8	5.4	4	3.3	3.6	2.8	1.9	3	5.6
4/5/2022	3:00:00 AM	66.7	64.5	61.9	59.3	56.3	53.2	50	47.2	44.3	41.5	39.4	39.8	37.4	39.6	41	32.4	28.8	26.6	23.5	20.9	17.3	13.6	11.7	10.4	9.1	7	4.7	2.5	0.8	0.3	0.1	0.6	0.1	-0.6	0.2	2.1

4/5/2022	4:00:00 AM	68.1	66	63.4	60.6	57.5	54.5	51.6	48.6	45.3	42.5	39.6	39.6	37.3	39.2	40.5	32.1	28.5	26.8	24.1	21.7	18.5	15.5	13.8	13	11.9	10.1	7.8	5.3	3	1.9	1.5	2	1.2	0.3	1.2	4.2
4/5/2022	5:00:00 AM	60.5	58.3	55.8	52.8	50	46.3	42.6	42.6	40.7	39.3	37.4	40.1	38.2	41.3	41.7	33.2	29.2	26.8	22.7	19.4	16.5	11.8	9.3	10.5	10.3	4.5	2	5.6	2.7	-0.7	-2.4	-2.4	-2.7	-3.5	-2.6	-0.4
4/5/2022	6:00:00 AM	66.7	64.8	62.3	59.7	57.5	54.2	51	48.6	46	43.4	41.8	41.6	39.8	41.3	41	34.3	31.8	29.1	25.7	22.4	20.1	17.1	15.3	15.2	19.1	23.3	26	27.1	30.2	15.9	6.5	5.8	2.5	1.4	1.1	4
4/5/2022	7:00:00 AM	66	63.9	61.9	59.2	56.6	53.9	50.6	48.2	44.7	42.6	40.6	39.5	39	39.5	38.5	33.5	30.2	27.8	24.7	22.2	19.2	16.3	14.9	14.6	15.2	19.5	18.1	16.9	10.7	3.5	1.8	1.9	1.1	0.2	1.6	4.3
4/5/2022	8:00:00 AM	69.7	67.4	64.4	61.9	58.9	55.7	52.9	50.6	49.2	47.8	46.3	45.8	44.8	45.7	43.3	37.8	33.6	31	27.3	23.6	21	18.2	17.1	16.7	16.4	17.6	16.6	16.3	12	6.8	4.4	4.5	3.7	2.5	4	6.8
4/5/2022	9:00:00 AM	68.9	66.5	64.1	61.1	58.2	56.1	55.1	54.9	55.9	56.7	57	56.2	55	54.2	52.4	48.4	43.8	38.7	31.2	24.4	21.1	18	16.5	15.8	14.7	13.3	11.2	8.8	6.6	5.3	4.9	5	3.9	4.4	4.8	7.4
4/5/2022	10:00:00 AM	69.1	67	64.4	62	58.9	56.2	52.9	50	46.6	44	41.5	39.5	39	40.5	39.6	32.7	30	28.2	25.3	22.2	19.7	17.3	16.3	15.7	14.5	12.9	10.8	8.3	6.1	4.7	4.1	4.1	3.4	3.2	4.4	7.6
4/5/2022	11:00:00 AM	67	64.6	62.3	59.1	56.1	53.1	49	46.4	43.1	40.1	37.5	37.4	36.8	38.2	37	30.7	28	26.3	23.2	19.6	16.9	13.9	12.4	11.6	10.3	8.8	7.1	4.6	2.8	1.8	1.3	1.7	1.1	0.7	2	5.3
4/5/2022	12:00:00 PM	68	66.2	64.2	62	59.2	57.7	56.7	56.7	57.6	58.7	59.2	58.7	58.3	58	57	54.9	52.6	49.2	45.1	39.4	39.2	35.3	28.3	20.6	17.3	15.2	15.6	13.2	9.9	8	6.3	6.2	4.2	4	3.3	4.7
4/5/2022	1:00:00 PM	67.4	65.8	63.8	61	58.2	55.7	52.7	49.1	46.8	43.1	40.1	38.4	36.5	36	34.1	29.6	26.9	25	22.5	19.7	17.3	14.9	13.6	13	11.8	10.6	9.8	6.9	5.5	2.6	2.1	2.1	1.4	0.5	1.4	3.7
4/5/2022	2:00:00 PM	66.4	64.3	62	59.4	56.5	53	49.7	46.6	43.2	40.4	37.8	36.9	35.4	34.2	33.5	30.4	27.3	23.6	20.9	18	15.5	12.8	11.3	10.6	13.9	20.1	19.5	19.5	15.4	9.7	2	0.8	0.2	-0.6	0.1	2.1
4/5/2022	3:00:00 PM	69.3	67.5	65.1	62.7	59.7	56.8	53.6	50.3	46.9	43.6	40.7	38.3	35.8	35.9	33	29.2	26.8	25.3	23.4	20.8	18.6	16.4	15.2	14.8	16	18.5	18.7	18.7	17.6	12.3	4.1	3.4	2.7	1.9	2.9	5.4
4/5/2022	4:00:00 PM	70.8	69.1	67.1	64.6	62.1	59.3	57	55.5	55.7	55.8	56.1	55.6	54.4	52.8	50.1	45.6	40	33.6	28.2	24.3	21.9	19.7	18.5	17.9	16.9	15.7	14.3	13.7	13.1	7.7	5.7	5.7	4.9	4.1	4.9	6.9
4/5/2022	5:00:00 PM	69.7	68.8	65.8	63.3	60.4	57.4	54.2	51.1	47.6	44.3	40.9	38.3	35.6	35.2	33.3	29.2	27.2	26.1	24.4	21.8	19.6	17.5	16.5	16.2	16.2	21.4	21.9	18.9	17.3	12.2	6.9	4.6	4	3	3.7	6.2
4/5/2022	6:00:00 PM	66.8	64.8	62.4	59.5	56.8	53.4	50	46.6	43.2	40.7	38.6	36.6	34.7	34.3	32.2	28.5	25.4	23	20.6	17.5	14.9	12.4	11.2	10.4	8.9	22.5	23.4	21.5	20.7	4.7	1.1	1.1	0.5	-0.4	0.2	2.5
4/5/2022	7:00:00 PM	54.8	52.9	50	46.7	45	42	38.4	39	38.8	37.7	37.6	40.4	36.1	38.6	34	27.5	23.1	20.1	14.5	8.2	3.5	0.6	-0.8	-1.6	1.7	4.6	4	6.5	3.3	-1	-3.8	-3.4	-3.2	-3.9	-2.7	-0.1
4/5/2022	8:00:00 PM	59.1	56.8	54.8	51.8	50.2	47.4	43	44.6	40.1	38.3	38	39.6	38.1	40.3	37.6	31.8	27.4	24.7	18.7	12.6	8.6	5.6	3.6	2.4	0.8	-1.2	-2.8	-3.6	-3.7	-3.3	-2.9	-2.5	-2.5	-3.5	-2.7	-0.5
4/5/2022	9:00:00 PM	31.6	32.6	34.1	37.6	43.5	37.1	34.7	38.6	35	33.4	34.2	36.1	38.3	38.5	36.9	28.7	25.7	21.9	15.3	6.8	0.3	-7.5	-9.1	-8.8	-8.3	-7.8	-7.2	-6.5	-5.7	-4.9	-4.4	-3.9	-3.7	-4.5	-3.3	-0.7
4/5/2022	10:00:00 PM	31	32.3	34	37.4	42.9	34.7	30.3	29.1	25.8	25.4	24.6	26.8	25.7	26.2	26.2	18.9	13.4	10.4	4.8	0.8	-4.6	-7.8	-8.4	-8.6	-8.2	-7.8	-7.3	-6.7	-5.9	-5.1	-4.5	-4	-3.7	-4.7	-3.5	-0.7
4/5/2022	11:00:00 PM	30.8	32.2	34.1	37	40.7	34.1	32.7	33.5	33.7	30	29.8	31.1	29.9	29.6	30.7	25.5	20.7	14.5	9.7	7.4	2.7	-1.6	-4	-7.2	-8	-8	-7.4	-6.7	-5.8	-5.1	-4.4	-3.9	-3.5	-4.7	-3.5	-0.7
4/6/2022	12:00:00 AM	28.1	29.4	30.9	31.5	34.5	31.4	28.4	28.1	24.2	23.6	21.8	21.1	23.8	22.9	24	19.7	14.1	8.9	4.5	2.8	-3.6	-7.1	-9.2	-9.1	-8.6	-8.1	-7.5	-6.8	-6	-5.3	-4.7	-4.2	-3.8	-4.9	-3.6	-0.7
4/6/2022	1:00:00 AM	28	29.6	31.4	34.2	37.6	32.9	28.3	26.4	23.1	22.2	24.6	24.5	22.8	25.3	29	18.1	13.4	9.8	6.4	6.3	0.9	-6	-8.6	-9	-8.7	-8.2	-7.6	-6.9	-6.1	-5.3	-4.8	-4.2	-3.8	-4.9	-3.6	-0.7
4/6/2022	2:00:00 AM	29.2	30.6	32.5	34.5	36.1	33.8	28	26.8	24.9	24.7	25	25.9	23.3	26	32.6	19.9	12.5	8.9	9.3	9.3	0.8	4.3	-8.9	-9.1	-8.8	-8.2	-7.6	-6.9	-6.1	-5.4	-4.8	-4.2	-3.9	-5	-3.7	-0.7
4/6/2022	3:00:00 AM	31	32.3	34.1	36.6	41.1	36.1	32.1	33	33	32.1	35.4	36.5	36.3	38.6	37.7	30.9	26.9	23.9	18	14.3	7.9	3.2	0.1	-4.1	-5.9	-2.4	-7.5	-7	-6.2	-5.4	-4.8	-4.2	-3.9	-5	-3.7	-0.7
4/6/2022	4:00:00 AM	31.6	33	34.6	36.9	41.7	37.1	33.7	33.8	35.4	34.5	37	40.3	39.7	41.5	39.3	32.2	28	24.5	18.2	14.4	7.9	1.9	-1.8	2.9	-2.6	-6.1	-7.5	-7	-6.2	-5.4	-4.8	-4.3	-3.9	-5	-3.7	-0.7
4/6/2022	5:00:00 AM	32	33.5	35	38.6	42	36.6	32	30.7	30.1	30	29.7	30.4	29.6	29.9	35.4	25	20.5	17.5	13.2	11.8	10.5	8.2	10	14.4	13.5	4	1.2	5.4	2	2.7	-4.1	-4.1	-3.8	-5	-3.7	-0.7
4/6/2022	6:00:00 AM	32.4	33.7	36.6	39.1	42.4	37.4	33.4	33.4	33.1	31.9	32.2	34.7	30.5	32.7	38.7	27.5	23.4	19.5	15	13.2	6.7	2.2	1.3	5.3	17.3	28.9	29.2	25.8	23.1	13.5	3.1	0.5	1.4	-3.7	-3.3	-0.6
4/6/2022	7:00:00 AM	33.4	33.7	36.6	40.7	40.5	38.1	35.9	37.7	34.7	34.5	34.5	33.9	31.9	32.2	38.2	27.5	22.5	19.3	16.8	14.8	9	4.2	1	2.6	7.5	17.2	19.7	17.4	16.5	10.5	1.6	3.3	3.4	-4.4	3.3	-0.7
4/6/2022	8:00:00 AM	38.1	37.1	37.1	38.4	40.1	38.8	38.9	41.2	39.8	39	37	36.1	33.1	31.1	27.2	23.1	18.2	15.4	10.3	5	0.4	-5	-1.2	-0.5	-3.6	-1.2	-2.6	-3.2	-4.3	-4.4	-4	-3.7	-3.6	-4	-2.9	-0.7
4/6/2022	9:00:00 AM	46.5	43.8	42.4	42.1	43.5	44.9	46.9	48	47.9	47.8	46.1	45.4	43.6	39.4	33.5	30.8	23.1	18.8	12.5	6.2	0.2	4.8	-4	1.2	2.1	2.8	-1.7	-2.2	3.8	3.1	-3.6	3.3	3.3	-3.7	2.7	0.7
4/6/2022	10:00:00 AM	55.4	54.7	52.1	51.4	47.9	47.8	45.5	44.3	42.9	42.7	42	41.4	41.2	40.6	38	34.9	29.8	25.1	21.9	22.8	21.6	19	19.3	15.1	14.8	13.6	11.4	10.3	6.8	7.1	5.1	4.2	3.5	1.3	2	1.6

4/6/2022	11:00:00 AM	61.4	58.9	55.7	52.3	48.8	45.4	41.6	38.1	34.3	31.6	29.2	28.9	28	27.8	25.7	22.4	19.7	17.9	15.7	12.6	9.6	6.4	4.1	3.1	8.4	17.5	18.7	21.4	17.5	12.5	1.2	-0.8	-0.5	-1.9	-0.8	0.2
4/6/2022	12:00:00 PM	59.6	56.8	54.1	51.4	48.8	48.1	49.4	50.7	52	51.9	50.7	49.6	46.8	43.4	39.4	32.9	25.2	17.4	13.7	10	6.9	3.9	1.9	0.3	-1.4	-3.4	-3.8	-3.6	-3.3	-2.7	-2.4	-2.2	-2.4	-2.9	-2	-0.3
4/6/2022	1:00:00 PM	56.4	54.5	52.1	49.7	45.4	43.7	42.8	40.2	40.3	38.9	37.6	37.7	36.9	35.1	32.8	29.6	26.6	22.9	19.1	21.9	18.8	18.6	18.3	16.2	15.3	12.2	13.6	10.3	9.3	9.4	6.4	3.7	1.2	0.1	-0.2	0.1
4/6/2022	2:00:00 PM	56.2	53.7	50.2	47.4	44.1	41.5	40.8	41.1	42.9	44.3	45.9	46.8	48.1	49.1	48.3	46.6	43.7	38	31.1	20.8	17.1	9.3	1.8	-2.5	-4.2	-4.4	-3.2	-3.6	-3	-2.9	-2.8	-2.5	-2.7	-3	-2.1	-0.5
4/6/2022	3:00:00 PM	55.2	52.8	49.5	47.1	44.4	41.3	37.7	35.3	33.4	31.2	30	30.2	28.2	27.5	24.4	19.9	14.8	11.9	9.7	5.4	2.6	1.2	1.4	0.3	-2.2	-2.9	-2	-2.3	-2	-2	-2.6	-2.5	-2.6	-2.9	-2.1	-0.5
4/6/2022	4:00:00 PM	52.2	49.5	47	44.4	42.2	39.2	37.7	36.6	35.7	34	32.5	40.3	42.6	36	29.6	33.3	26	20.4	13	6.3	1.2	2.7	7.9	9.9	3.7	-0.4	-2.2	-2.3	-3.5	-3.2	-2.9	-2.8	-2.8	-3	-2.2	-0.5
4/6/2022	5:00:00 PM	48.7	45.6	42.1	38.9	38.4	35.9	31.3	30.6	27.7	26.4	24.2	24.3	24.1	24.9	22.2	18.4	13.1	9.2	3.8	-1.1	-3.5	-4	-2.3	0	3.9	16.9	17.7	16	24.3	35.8	27	16.7	22.1	11.7	0	-0.5
4/6/2022	6:00:00 PM	42.4	40.1	37.3	35.1	35.5	35.4	32.5	33.3	33.5	34.2	33.2	31.8	29.6	27.8	25.3	22.6	17.5	10.4	1.3	-4.2	-6.2	-7.1	-6.5	-6.4	1.9	8.2	7.7	7.8	3	-2	-3.5	-3.4	-3.4	-3.9	-2.8	-0.7
4/6/2022	7:00:00 PM	26.8	27.8	30	31.3	34.7	31.7	28.4	28.2	25.7	24.8	24.8	24	22.5	21.8	20.2	16.8	12.2	6	-0.2	-3.8	-7	-7.6	-1.5	0.9	7.3	13.5	10.3	5.6	1.7	-0.5	-3.5	-3.3	-3.4	-4.2	-3.1	-0.7
4/6/2022	8:00:00 PM	27.8	30.5	33.7	36.5	38	31.3	29.8	28.6	25.4	26.7	26.8	28.5	29.7	27.7	26.7	21.9	16.9	13.8	7	4	-2.7	-5.9	-8.4	-7.9	-8.3	-7.9	-7.3	-6.6	-5.8	-5	-4.4	-3.9	-3.7	-4.6	-3.4	-0.7
4/6/2022	9:00:00 PM	29.9	32	33.2	34.9	38.3	33.1	33.4	33.4	29.3	31.8	29.9	30.9	33	35	32.3	28.1	24	18.8	12.7	8.4	2.8	-5.2	-9.1	-9.1	-8.6	-8	-7.4	-6.7	-5.8	-5.1	-4.5	-4	-3.7	-4.7	-3.4	-0.7
4/6/2022	10:00:00 PM	31.3	32.6	33.6	39.4	39.9	32.7	31.8	30.1	28.3	29.4	28.9	35.5	31.8	34	33.3	27.1	24	19.7	14	6.4	-0.6	-8	-9.4	-9.1	-8.6	-8	-7.4	-6.7	-5.9	-5.1	-4.5	-4	-3.7	-4.7	-3.5	-0.7
4/6/2022	11:00:00 PM	30.6	32.4	34.3	37.9	43.8	31.3	28.6	29	27.3	29.9	29	33.2	30.2	28	27	26.7	21.3	15	9	4.7	0.2	-5.5	-8.6	-9	-8.6	-8.1	-7.5	-6.8	-5.9	-5.2	-4.6	-4.1	-3.7	-4.8	-3.5	-0.7
4/7/2022	12:00:00 AM	32.3	33.7	34.2	36.1	36.1	30.8	30	29.3	30.5	31	28.6	30.7	30.4	28.7	29.1	24.3	19.7	15.9	9.4	6.1	0.3	-6.4	-9.1	-9.1	-8.6	-8.1	-7.5	-6.8	-5.9	-5.2	-4.6	-4.1	-3.8	-4.8	-3.5	-0.7
4/7/2022	1:00:00 AM	31.2	32.8	34.7	34.4	34.2	31.6	32.4	32.8	30.7	33.6	34.5	37	33.4	31.3	30.6	29.7	25	19.5	14.8	10.6	4.6	-2.2	-7.4	-8.8	-8.6	-8.1	-7.5	-6.8	-6	-5.2	-4.6	-4.1	-3.8	-4.8	-3.5	-0.7
4/7/2022	2:00:00 AM	32.3	33.6	36.2	36	40.1	34.5	36.8	39.8	37.5	40	38.9	38.9	40.8	40.1	38.3	35.9	32.7	25.9	21.6	16	9.9	2	-6.5	-8.9	-8.5	-8	-7.5	-6.8	-6	-5.3	-4.7	-4.1	-3.8	-4.9	-3.6	-0.7
4/7/2022	3:00:00 AM	34	34.8	36.2	37.4	43.3	35.7	37.1	38.8	38.9	39	38.9	41.3	39.5	41.5	40	36.9	32.7	26.3	22.3	16.2	10.2	2.2	-6.9	-8.9	-8.6	-8.1	-7.5	-6.8	-6	-5.2	-4.6	-4.1	-3.7	-4.8	-3.6	-0.7
4/7/2022	4:00:00 AM	32.4	33.2	34.9	36.1	40.3	35	36.1	36	35	36.5	35.1	36.3	36.8	38.4	38.1	32.7	28.3	23.6	18.5	14.5	8.8	1.2	-5	-7	-7.6	-8.1	-7.4	-6.4	-6	-5.2	-4.7	-4.1	-3.8	-4.9	-3.6	-0.7
4/7/2022	5:00:00 AM	32.9	34	36.5	37.3	38.8	34.4	34.9	37.7	34.4	36.4	35.7	38	36.4	34.6	35.3	35.6	29.3	22.8	17.2	16.2	10	2.6	10	15.4	17.9	6.6	3.9	4.8	3.7	0.4	-3.4	-3.9	-3.7	-4.9	-3.6	-0.7
4/7/2022	6:00:00 AM	33.8	35.3	37.8	39.1	41	37.1	38.3	40.2	37.4	38	38.2	40	40.4	39.4	39.8	32.2	28.6	24.1	18.3	14.3	8.6	1.1	-3.4	-2.3	8.5	15.8	13.3	14	7.2	-2.8	-4.1	-2.7	-3.8	-4.9	-3.6	-0.7
4/7/2022	7:00:00 AM	35.2	34.4	36.4	37.6	39.2	37.9	36.2	39.9	35.4	36	35.2	34.9	34.6	32.5	32.4	28.8	25.3	21.9	16.8	13.1	10.7	5.8	0.4	4	13.3	29.4	29.6	25.2	26.6	19.2	11.5	0.4	0.1	-1.2	-2.8	-0.7
4/7/2022	8:00:00 AM	36.2	35.2	35.6	37.4	40.5	39.5	40.1	44	40.3	40.5	39.4	40	42.2	40.3	35.1	33.5	29.3	23	17.3	10.1	4.1	-3.7	-7.4	-7.6	-0.8	8.4	8.4	10.8	8.9	0.9	-2.2	-2.2	-3.4	-3.9	-2.8	-0.7
4/7/2022	9:00:00 AM	41.7	39.1	37.4	37.1	39.5	39.7	40.4	42	39.2	38	36.9	37.4	34.1	30.5	29.2	24.1	20.7	17.6	11.4	5.6	0.2	2.6	6.6	9.3	14.8	24.6	27.7	26.8	26.3	20.4	10	1.3	-1.2	-2.2	-2.3	-0.6
4/7/2022	10:00:00 AM	46.3	44.3	42.4	39.6	40.4	41.3	40.7	43.6	44.2	45.2	46.1	46.4	46.1	44.9	43.4	39.4	34.4	29.4	19.3	13.7	7.5	0.6	1.6	1.7	6.9	15.1	11.8	10.8	9	7.3	-2	-2.3	-2.8	-3	-2.2	-0.6
4/7/2022	11:00:00 AM	48.1	45.4	42.3	39.6	39.1	37.4	38.3	41.1	41.5	43.1	44.3	45.1	44.8	45.3	44	41.8	37	29.4	19	12.1	6.9	2.8	2.9	4	12.4	23.8	22.3	16.9	18.2	14.4	5.3	1.4	-1.1	-1.7	-1.5	-0.3
4/7/2022	12:00:00 PM	54.4	51.7	48.8	45.4	42.8	41.3	41.5	42.1	41.4	41.4	39.6	38.4	36.2	33.3	30.4	25.3	20.1	16.8	12.1	7.3	4.5	3.5	2.6	1.6	4	12.6	11.3	9.9	7.9	8.4	0.2	1.6	1.9	-2.2	-1.5	-0.2
4/7/2022	1:00:00 PM	55.7	53.4	50.2	46.4	43.3	39.7	36.7	34.1	31.2	29.4	27.4	29.6	29.4	29.1	27.1	24.6	19.3	16.4	12.7	7.8	4.6	2.9	3.8	2.5	3.1	10.8	8	10.6	7	2.1	-1.8	-2	-2.3	-2.5	-1.7	-0.2
4/7/2022	2:00:00 PM	54.3	51.6	49.3	47	43.5	40.4	36.5	35.7	33.2	29.6	29.7	29.4	28.5	26.7	25.5	23.5	18.3	15.2	12.2	7.1	4.6	4.3	4.3	2.6	1	4	4	6.1	3	1.4	-1.7	-1.7	-2	-2.2	-1.4	-0.2
4/7/2022	3:00:00 PM	53.7	51.5	47.8	45	42.1	38.4	34.4	32.2	29.6	27.2	26.2	27.6	26.1	26.4	24.5	20.9	16.4	13.7	11.2	5.6	3.4	2.5	2.1	1.5	1.7	7.2	5.8	5.3	1.5	-2	-2.2	-2.1	-2.4	-2.5	-1.7	-0.3
4/7/2022	4:00:00 PM	54.6	51.8	48.8	46	42.9	39.7	37.6	37	35.8	34.6	32.6	31.5	28.8	27.6	25.4	22.4	16.8	13.6	11.2	9.1	4.1	4.1	4.7	3.7	0.6	1.5	-0.4	-0.2	-1	-1.8	-1.5	-1.6	-1.9	-2.1	-1.3	-0.2
4/7/2022	5:00:00 PM	54	51.4	48.2	44.5	41.5	38.6	36.9	37.1	37.8	37.8	36.6	35.5	34.1	32.5	29.6	26.2	20.4	13.6	8.7	4	1.2	1.1	0.4	-1.8	3.2	11.9	9.3	8.4	2.2	-2.5	-2.5	-2.3	-2.6	-2.9	-2	-0.4

4/7/2022	6:00:00 PM	47.8	44.7	41.8	39.9	37.2	34.3	31.7	31.7	30.8	30.1	29	27.3	25.8	24.3	20.9	16.2	10.3	5.8	2.1	-1.4	-3.7	-4.1	-2.8	-2.6	6.4	15.3	12.4	11.6	3.9	-3.4	-3.3	-3	-3.1	-3.4	-2.3	-0.5
4/7/2022	7:00:00 PM	32	29.6	30	33.4	38.9	32.2	30.4	30.3	26.1	24.3	23.5	23.2	22.1	22	20.4	18	12.7	7.5	1.2	-2.3	-4.4	-4.9	2.2	4.7	8.3	12.8	9.3	6	1.2	-2.4	-3.2	-3	-3	-3.7	-2.7	-0.6
4/7/2022	8:00:00 PM	27.1	28	29.9	32.5	38.8	31.7	28.1	27.1	24.6	26.2	26.3	34	28.7	27.8	26.1	24.7	19.8	16.1	10.9	8.8	5	0.6	-1.7	0.8	-2.1	6.8	-6.7	-6.3	5.6	4.8	-4.3	-3.9	-3.7	-4.4	-3.2	-0.7
4/7/2022	9:00:00 PM	33.9	33.6	34	35.2	38.4	34.4	33.7	32.8	30.1	32.2	29.5	31.8	34.9	36.3	30.4	31.9	25.9	19.5	16.9	12.2	8	1.5	-5.6	-8.2	-7.8	-7.5	-7.1	-6.5	5.7	4.9	-4.4	-3.9	-3.7	-4.5	-3.3	-0.7
4/7/2022	10:00:00 PM	32.3	32.8	34	35.9	41.3	31.8	29.3	32.7	32.2	32.4	31.5	35.6	33.9	36.5	31.7	28.6	22.8	19.7	14.9	9.2	4.6	-3	-7.9	-8.7	-8.4	-7.9	-7.3	-6.5	5.7	-5	-4.4	-4	-3.7	-4.5	-3.3	-0.7
4/7/2022	11:00:00 PM	32.6	33.7	34.6	37.6	42.9	32.6	31	31	29.9	31.2	30.3	32.2	30.1	30.7	28.6	26.2	20.7	17.2	12.2	6.4	1.4	-4.2	-7.9	-8.5	-8.1	-7.8	-7.2	-6.5	5.7	-5	-4.4	-3.9	-3.6	-4.5	-3.3	-0.7
4/8/2022	12:00:00 AM	32.4	32.6	32.2	33	37.4	27.6	26.1	28.2	30	31.1	27.7	31.7	30.8	30.4	28.1	29.6	22.7	17.4	13.5	9.2	4.8	-0.1	-6.3	-8.6	-8.2	-7.9	-7.2	-6.5	5.6	-4.8	-4.3	-3.9	-3.7	-4.5	-3.3	-0.7
4/8/2022	1:00:00 AM	33	32.6	31.2	31.7	32.6	28.6	27.9	31	30.2	30.9	29	32.6	31.4	31.3	29.1	30.7	23.8	17.5	13.2	9.1	6.4	1.8	-4.8	-5	-8.1	-7.9	-7.3	-6.6	5.8	-5.1	-4.5	-4	-3.7	-4.6	-3.4	-0.7
4/8/2022	2:00:00 AM	33.5	31.9	31	33.6	35.6	31.4	32.1	34.1	33.2	32.2	32.3	36.9	32.8	33.7	31.4	26.5	21.2	18.1	12.5	7.9	3.2	-3.5	-7.8	-8.9	-8.5	-8	-7.4	-6.7	5.9	-5.1	-4.6	-4.1	-3.8	-4.6	-3.4	-0.7
4/8/2022	3:00:00 AM	33.8	33.3	33.2	39.2	43.6	36.3	37	39.7	40.5	40.1	37.5	40.1	41.4	40.2	37.8	35.3	28.4	25.7	22.9	19.8	12.2	5.8	-3.1	-8.4	-8.5	-8	-7.4	-6.7	5.8	-5.1	-4.5	-4	-3.7	-4.6	-3.4	-0.7
4/8/2022	4:00:00 AM	33.3	32.5	35.2	38.8	43.5	36.2	36.4	39.4	41	41.3	39	40.9	42.5	41	37.3	37.6	31.3	25.7	21.6	18.5	13.1	7.6	-2.1	-8.1	-8.4	-7.8	-7.2	-6.7	5.9	-5.2	-4.6	-4.1	-3.8	-4.7	-3.5	-0.7
4/8/2022	5:00:00 AM	33.6	32.9	35.4	40.1	43.9	37.6	36.8	40.2	40.7	39.3	38.2	39.6	39.2	39.4	37.1	34.5	27.9	23	18	12.9	8.4	2.2	-2.4	-2.1	-3.3	-1.8	-1	0.6	-4.3	-5	-4.5	-3.9	-3.8	-4.8	-3.5	-0.7
4/8/2022	6:00:00 AM	37.6	36.1	38.1	40.2	44.3	38.2	35.9	38.7	38.4	38	37.5	39.4	37.1	38	34.7	32.4	26.6	22	17.1	13	8.8	3	-1	-1.7	7.9	16.8	16.4	13.9	9.1	-2.7	-4.5	-4.1	-3.8	-4.7	-3.5	-0.7
4/8/2022	7:00:00 AM	45.3	42.4	40.7	40.2	40.7	37.7	36.9	39.6	37.8	37	39.4	39.1	37.4	36.1	36.4	35.3	29.5	24.6	20.4	16.4	11.5	4.8	-1.3	-0.7	8.9	15.8	13.3	12.6	6.4	-2.9	-4.1	-3.9	-3.7	-4.3	-3.2	-0.7
4/8/2022	8:00:00 AM	50	47.4	44.9	43.4	44.5	41.1	41.3	44	42.9	44.2	44.1	46.2	48	43.4	41.7	43.2	37.6	33.9	31.6	29.2	29.9	33.6	28.2	27.9	29.7	27.2	27.1	22.4	21.9	22.6	22.6	22.5	19.6	15.9	13.5	10.8
4/8/2022	9:00:00 AM	55.5	52.4	49.1	46	44.4	41.2	39.6	41.1	39.4	41.1	40	40.7	43.1	39.1	37	39.6	33.8	26.9	22.7	18.2	12.7	6.7	2.4	-0.5	2	7.7	7.5	7	1.9	-2.7	-2.4	-2.3	-2.4	-2.8	-2.1	-0.5
4/8/2022	10:00:00 AM	65.6	63	60.8	57.7	54.5	51.3	48.1	45.4	42	38.5	36.4	35.3	33.5	31.5	31.7	26.5	25.6	22.4	20.3	17.2	14	11.3	9.6	8.4	10.1	17.8	18.6	16.9	18.3	7.7	1.2	1.3	0.6	0.3	1.1	2.4
4/8/2022	11:00:00 AM	63.5	61.3	58.7	56	53.4	49.4	46.5	43.7	40.8	37.6	34.5	36	34.7	35.4	33.3	28.3	24.5	22.3	19.1	15.7	12.4	9.6	8.2	7.1	5.6	3.1	1.1	0.1	0.5	0.6	-0.4	0.2	-0.7	-1.1	-0.7	0.3
4/8/2022	12:00:00 PM	71.9	69.5	67.1	64.4	61.9	59	56	53.4	50.2	46.8	44.1	41.6	39.7	37.9	35.7	32.5	29.6	27.8	26	23.5	21.5	19.3	18.1	17.4	17.1	16.9	14.7	13.6	8.9	7.1	6.3	6.3	5.2	5	6.5	9.7
4/8/2022	1:00:00 PM	74	71.9	69.7	67.1	64.7	62.1	59.4	56.8	53.9	51	48.3	45.4	42.8	40.6	38.3	35.5	33	31.3	29.8	28	26.5	24.9	24.1	23.4	23.1	22.2	20.3	17.1	15.5	15.5	13.5	13.6	11.4	10.5	11.5	14.2
4/8/2022	2:00:00 PM	74.7	72.4	70.2	67.6	65.1	62.7	59.9	57.4	54.7	51.6	48.8	46.1	43.2	41.1	39.2	35.7	33.1	31.4	29.8	27.9	25.9	24.1	23.3	23.3	23.2	23.2	22.3	19.6	16.4	14.7	12.5	11.8	11	10.1	10.9	13.7
4/8/2022	3:00:00 PM	76	74.1	71.9	69.8	67.3	65.1	62.7	60.3	57.6	55	52.3	49.4	46.7	44.2	42.1	38.9	36.2	34.2	32.5	30.3	28.6	26.7	26.1	25.9	25.9	25.1	23.6	21.2	18	16	14.3	13.8	13	12.6	13.7	16.4
4/8/2022	4:00:00 PM	72.6	70.4	68	65.5	62.9	60.4	57.7	54.7	52	49.3	46.4	45.6	45	41.5	39	37	32.3	30	27.9	25.6	23.7	21.9	20.9	20.5	19.7	18.3	16.3	14.8	11.1	9.6	9.2	9	8.6	7.7	8.4	10.9
4/8/2022	5:00:00 PM	70.2	67.8	65.3	62.4	59.7	56.8	53.8	50.9	47.9	44.9	42.2	40.2	38.3	38.7	37.6	34	29.3	27	24.7	21.9	19.5	17.3	16.3	16.1	19.3	25.3	22.1	23.5	23.7	22.3	7.7	5.8	5	4	4.9	7
4/8/2022	6:00:00 PM	64.9	62.5	59.8	56.3	53.7	50.3	47.4	44.8	42.2	39.9	37.8	37.5	36.6	39.1	38.3	31.7	26.8	24	20.5	17.2	14.2	11.4	10.4	10.1	12	14.3	12.1	11.2	2.5	0.5	0	0.2	-0.3	-0.6	0.8	3.1
4/8/2022	7:00:00 PM	54	52.3	49.4	45.9	44.9	40.9	39.2	40.1	41.1	40	39.3	40.9	40.2	41.4	40	33.3	29.5	26.2	19	13.4	8.4	2.3	-1	-1.9	3.7	10.5	10.4	11.7	5.4	-2.2	-3.4	-3.1	-3.2	-3.6	-2.6	-0.5
4/8/2022	8:00:00 PM	40.8	38.5	36.4	37.8	43.2	37.2	35.4	37.9	39.7	39.1	37.3	39.6	38.3	40	39.1	34.5	27.9	23.7	18.7	15.5	9	4.7	3.8	-2.1	-4.5	-6.8	-5.9	-5.9	-5.2	-4.4	-4	-3.7	-3.6	-3.9	-2.8	-0.7
4/8/2022	9:00:00 PM	34.6	33.3	33.2	37.5	41.8	38	35.6	38	39.3	37.9	38.5	39.2	37.6	39.6	39.3	33.5	27.5	23.6	18.6	17.4	10.2	4.4	0.9	-0.7	-3.5	-5	-4.1	-4.7	3.3	3.3	-3.1	3.1	2.9	-3.4	2.3	0.4
4/8/2022	10:00:00 PM	36.4	34.6	34.9	40.3	42.5	39.9	36.7	42.6	41.2	40	38.6	40	39.6	42.2	41.7	34.1	29.6	26.8	21.6	19.8	10	3.5	3.3	-4.9	-6.6	7.5	-7	-6.3	5.5	4.7	-4.2	3.8	3.6	-4.2	3.1	0.7
4/8/2022	11:00:00 PM	42.2	39.6	38	40	43.6	37	34.4	40.6	38.7	38.1	37.6	39.8	40.4	43.2	42	34.1	28.4	25.6	20.2	16.5	9.3	2.9	4.6	-7.2	-7.9	7.7	-7.1	-6.3	5.4	4.6	-4.2	3.8	3.6	-4.3	3.1	0.7
4/9/2022	12:00:00 AM	62.5	60.8	57.6	55	51.7	48.6	44.7	42.7	39.8	37.3	37	37	35.4	37.2	34.9	27.8	24.9	23.3	19.4	15.9	12.9	10.1	8.8	8.2	6.9	5.1	3	0.9	0.8	1.3	-1.3	-1	1.2	-1.8	0.6	2.5

4/9/2022	1:00:00 AM	64.8	62.2	59.6	56.5	53	50.3	46.2	47.1	41.2	39.5	38.5	37.9	37.8	38.8	36.5	30.5	27.6	26.2	21.9	17.8	14.9	11.9	10.5	9.8	8.4	6.5	4.2	2	0.4	-0.1	-0.2	0.2	-0.2	-1.3	-0.3	1.5
4/9/2022	2:00:00 AM	68.6	65.9	63.1	60	56.7	54.1	50.5	49.9	44.1	41.7	39.3	38.2	37.7	37.5	34.7	30.6	27.7	26.9	23.8	20.8	18.6	16.5	15.6	15.2	14	12.1	9.9	7.3	5	3.7	3.4	3.6	3.1	2.2	3.5	6
4/9/2022	3:00:00 AM	63.6	60.9	58.1	54.9	51.1	48.7	43.7	46.3	38.2	35.9	34.7	33.9	34.4	34.4	31.6	27	24.2	23.4	19.5	16	13.2	10.5	9	8	6.3	4	1.8	0	-1	-1	-0.9	-0.6	-0.8	-1.9	-0.9	1.7
4/9/2022	4:00:00 AM	61.8	58.8	55.7	52.4	48.9	46.1	42.1	43.4	37.7	35.5	35.1	35.2	35.3	35.7	32.8	27.2	23.7	23.5	17.9	13.7	12.4	8.4	6.1	5	3.2	1	-0.9	-2.2	-2.6	-2.3	-2.2	-1.8	-1.8	-2.9	-2	0.3
4/9/2022	5:00:00 AM	60.5	57.7	54.6	51.7	48	45	40.7	42.7	37.1	35	34.3	35.5	33.5	34.7	31.1	26.4	22.5	22.6	17.1	13.4	11.6	6.9	14	22.3	21.8	16.1	12	16.1	12.4	9.6	6.6	4.3	0.4	-2.8	-2.3	-0.3
4/9/2022	6:00:00 AM	63.7	61.4	58.7	56	52.9	49.7	46	43.9	39.9	37.7	36.5	35.8	35.5	36.8	36.5	28.6	25.4	24.7	20.3	16.4	13.7	11.1	13.5	16.7	19.7	23.9	23.7	22.5	22.2	16.2	8	0.8	0.7	-1.3	-0.9	1.4
4/9/2022	7:00:00 AM	68.9	66.8	64.1	61.3	58.3	55.4	52.2	49.4	45.9	43.1	41.2	38.8	39.2	38.5	36.5	31.3	28.4	27.4	24.4	21.4	19.2	17	16.3	15.9	17.4	23	24.5	32.9	36.3	13.8	11.7	8.2	11.2	8.8	4.1	6.1
4/9/2022	8:00:00 AM	66.4	64.2	61.5	58.9	55.4	52.3	48.6	47.6	42.2	39.7	38.8	35	35.3	34.8	33.2	28.7	25.9	24.9	21.9	18.7	16.2	13.7	12.5	11.8	14.4	18.8	18.1	18.6	13.4	6.1	1.6	2	1.5	0.8	2.3	5
4/9/2022	9:00:00 AM	62.2	59.4	56.1	52.7	48.8	46.1	41.3	41.3	35.9	33.9	32.3	32	32.7	31.8	31.5	27.9	22.7	20.9	17.5	13.8	10.5	7.1	5	3.6	3.7	12.1	7.8	11	5.7	-1.1	-1.9	-1.5	-1.9	-2.5	-1.3	0.9
4/9/2022	10:00:00 AM	60.1	57.9	54.9	51.8	47.8	43.7	40.6	38.3	34.6	32.8	31.5	32.2	32.6	37.9	39.1	34.1	25.7	22.3	18.2	14.8	11.4	6.9	3.3	1.7	0.7	1.7	1.7	0.5	-2.2	-2.7	-2.6	-2.3	-2.5	-3	-2	-0.1
4/9/2022	11:00:00 AM	62	59.6	56.3	53.7	50.8	47.5	43.7	41.8	38.1	36.4	35	34.8	35	35.4	33.7	31.8	29.2	25.5	21.7	20.2	18.4	14	7.7	5.6	4.3	2.7	0.8	-0.6	-1.7	-1.7	-1.6	-1.3	-1.8	-2.2	-1.3	1
4/9/2022	12:00:00 PM	60.6	58.5	56	52.4	48.8	45.3	41.9	38.8	35.3	33	31.3	32.8	32.2	33.5	31.8	27.4	23.8	21.4	17.8	13.8	10.4	6.8	6.8	7	3.1	0.7	-1.2	-1.6	-2.1	-2.2	-2.1	-1.9	-2.1	-2.6	-1.8	-0.1
4/9/2022	1:00:00 PM	61.1	59.5	56.9	54.4	51.4	48	44.9	42	38.9	36.6	34.2	34.7	34.5	35.5	34.4	29.4	26.7	24.2	22.3	20.7	21.5	17.4	8	6.7	3.9	2.9	0.3	-1.2	-1.7	-2	-1.9	-1.6	-1.9	-2.4	-1.5	0.5
4/9/2022	2:00:00 PM	67.6	65.2	62.7	60	56.9	54.1	50.6	47.1	44.1	40.7	38.1	36	35	36	34.6	31.1	28.7	26.3	23.3	19.6	17.4	14.6	13.2	12.7	13.2	17.7	14.7	13.8	8.9	4.3	2.6	2.8	2	1.3	2.6	5.2
4/9/2022	3:00:00 PM	68.7	66.8	64.6	62.2	59.5	56.4	53.3	50.2	47.1	44.3	41.9	39.8	37.6	37.7	36.1	31.5	28.6	26.4	24	22.3	20.5	17	15.4	15.3	14.5	12.7	11	9	6.7	5.1	4.2	3.8	2.8	2	2.7	5.1
4/9/2022	4:00:00 PM	66.3	64	61.6	59.2	55.8	52.4	49.3	45.7	42.5	39.3	36.9	35.7	33.8	35.5	33.7	27.2	24.4	22.5	19.6	16.7	14.4	12.1	10.9	10.4	9.1	6.9	4.6	2.4	0.9	0.3	0.2	0.3	-0.2	-0.9	0	2
4/9/2022	5:00:00 PM	68.1	66	63.7	61	58.2	55	51.7	48.3	45	41.8	38.8	36.7	36.1	35.1	32.8	28.1	25.6	23.7	21.7	18.7	16.4	14	12.8	12.2	11.3	11.6	16.4	11.7	14	10	2	2.2	1.5	0.6	1.9	4
4/9/2022	6:00:00 PM	68.8	66.9	64.6	62	59.1	56	52.9	49.6	46.5	43.1	40.4	38	35.2	35.1	33.5	28.8	26.3	24.5	22.5	19.8	17.5	15.3	14.3	13.9	14.1	17	16.8	13.9	12.9	12	4.2	3	2.5	1.6	2.3	4.7
4/9/2022	7:00:00 PM	63.9	61.7	59.4	56.4	53.4	49.5	46	42.7	39.9	37	35	34.9	32.2	34	31.5	24.9	22	20	17.5	14.3	11.7	9.2	8	7.6	6.8	15.4	12.2	12.5	6.5	0	-0.9	-0.7	-1	-1.9	-1.1	1
4/9/2022	8:00:00 PM	50.9	48.6	45	42.9	44.8	37.3	35.7	36.7	36.4	34	34.5	35.8	35.5	36.4	34.1	25.8	20.7	17	9.2	2.4	-1.1	-3.5	-4.8	-5.3	-6.1	-6.4	-6	-5.7	-5.1	-4.5	-4	-3.6	-3.5	-4.3	-3.1	-0.6
4/9/2022	9:00:00 PM	36.4	36.3	35.9	38.5	43.3	34.3	33.5	35.4	35.8	34	34.7	35.9	36	37	34.9	27.5	23.2	18.7	9.6	-0.7	-7	-9.6	-9.4	-8.9	-8.4	-7.9	-7.3	-6.6	-5.8	-5	-4.5	-4	-3.7	-4.6	-3.4	-0.7
4/9/2022	10:00:00 PM	44.5	41.4	42.2	40.5	45.1	38.6	35.5	36.1	35.7	33.8	35	35.7	36.3	37	35.5	28.6	23	19.4	10.7	0.8	4.5	6.1	6.7	6.9	7.4	7.3	7	6.4	5.7	5	4.4	3.9	3.7	4.5	3.3	0.6
4/9/2022	11:00:00 PM	33.7	33.9	34.1	37.3	42.5	33.2	31.8	33.5	36.3	34.5	35.2	36.8	37.8	38.5	36	28.2	24.2	19.6	10.4	0.4	6.7	9.1	9.1	8.9	8.4	7.9	7.4	6.7	5.9	5.1	4.6	4	3.7	4.7	3.5	0.7
4/10/2022	12:00:00 AM	33.1	33.7	34.6	37.7	41.9	31.5	30.1	31.9	32.5	32.3	34.6	34.2	34.5	36.8	34.7	27	20.9	16.2	6.4	4.3	9.2	9.6	9.2	9	8.6	8	7.5	6.8	6	5.3	4.7	4.2	3.8	4.9	3.6	0.7
4/10/2022	1:00:00 AM	48.8	45.4	42.8	43.9	47.2	42.3	40.2	46	43	42	41.7	42.6	42.2	43.4	42.8	33.7	27.8	23.3	14	4.3	0.2	3.6	3.9	6	6.2	6.8	6.7	6.5	5.8	5.1	4.5	4	3.7	4.8	3.6	0.7
4/10/2022	2:00:00 AM	57	54.6	51.5	48.6	49.2	46.2	43.4	45.1	45.2	43.5	43.6	43.9	43.5	45.1	42.2	34.4	29.3	25.2	17.4	9.8	5.8	2.6	1.1	-0.2	-1.6	3.3	-4.1	-4.7	4.4	3.9	-3.4	2.9	-2.8	-3.8	-2.7	-0.2
4/10/2022	3:00:00 AM	31.1	31.7	33.2	40.3	39.4	42.8	37.4	43.6	38.4	37.7	39.8	35.6	36.7	39	36.3	29	23.9	20.5	10.5	0.5	1.3	3.9	3.6	5.4	5.6	6.4	6.9	6.7	6	5.3	4.7	4.2	3.9	4.9	3.6	0.7
4/10/2022	4:00:00 AM	29.3	29.8	31.1	36	32.7	37.3	29	38.8	27.6	29.5	30.7	28.8	27.7	28.2	25.5	20.5	16	12.4	4.3	2.1	3.6	6.5	6.4	7.2	7.3	7.6	7.3	6.8	6.1	5.3	4.8	4.2	3.8	4.9	3.7	0.7
4/10/2022	5:00:00 AM	29.6	30.1	32.6	36.2	40.2	31.6	26.8	28	22.7	23.5	26.3	27.3	29.6	26.4	27.2	18.9	16.9	13.8	5.8	0.2	3.5	5.1	1.5	5	4.2	2.5	-0.2	-0.6	4.2	5.2	4.7	3.2	3.5	5	3.7	0.6
4/10/2022	6:00:00 AM	30.5	31.8	36	38	40.3	32.3	28.7	29.4	27.5	27	29.9	32.3	28.9	28.9	29.7	20.9	17.1	13.2	7.3	2.7	3.4	4.4	7.5	5.9	9.1	17.7	15.6	19.8	15.9	0.6	3.6	3.7	3.7	4.9	3.7	0.7
4/10/2022	7:00:00 AM	37.1	35.4	36.1	40.6	42.1	33.6	32	37.2	33.9	32.9	32.8	35.1	31.9	31	30.1	25.1	20.6	15.9	9.7	4.2	0.4	2.3	2.4	1	6	19.2	20.3	22.1	22	10.7	2.8	0.9	0.6	2.7	2.3	0.4

4/10/2022	8:00:00 AM	45.3	42.5	41.4	40.2	41.4	36.6	35.6	39.9	37.2	34.5	32.8	32.4	31.4	30	28.6	24.1	20.9	16.4	10.4	3.6	-3.6	-8.9	-8.8	-8.3	-6.9	7.5	10.2	9.4	10.2	-3.4	-4.2	-3.9	-3.7	-4.4	-3.2	-0.7
4/10/2022	9:00:00 AM	44.6	42.5	40.6	39.8	41.5	38.9	37.8	38.5	37.6	34.1	31.8	33.1	31	30.2	29.5	23.4	20.6	16.2	9.8	4.9	-2.5	-5	-2	-6.1	-5.6	-4.4	-5.2	-5	-4.6	-3	-4.2	-3.8	-3.6	-4.1	-3	-0.7
4/10/2022	10:00:00 AM	46	43.7	41.4	39.2	39.7	35.5	35.5	37.1	33.8	32.4	30.8	33	30.1	30	29	22.7	19.2	14.8	8	0.7	-5.6	-8.7	-8.3	-7.6	-7.3	-6.1	-6.1	-5.5	-5.2	-4.2	-4	-3.7	-3.5	-4	-2.9	-0.7
4/10/2022	11:00:00 AM	54	51.4	48.5	45.7	43.5	39.3	37.7	38.1	36.1	35.1	34.4	35.4	33	33	32.7	26.1	22	18.2	13	7.9	3.1	-0.4	3.4	4	3.6	-0.3	2.3	-0.3	2.6	-2.8	-3.2	-3	-3.1	-3.4	-2.5	-0.6
4/10/2022	12:00:00 PM	56.6	54.43	51.2	48.6	45.9	42.3	38.9	37.7	35.6	33.8	32.8	35.1	33.2	33.7	32.6	27.2	23.4	18.9	13.2	8.4	4.3	1.1	0.5	-2.7	-4	-1.8	-3.4	-3.9	3.5	-3.2	-3.1	-2.6	-2.9	-3.3	-2.4	-0.5
4/10/2022	1:00:00 PM	59.5	57.11	54.3	51.55	48.8	44.4	41.6	39.7	37.6	35.6	34.6	36.7	35.1	35.55	35.2	34	31.8	24.6	16.7	10.55	7.1	3.9	2.8	2.6	-0.4	0.4	-0.9	-0.7	-1.4	-2.7	-2.5	-2.3	-2.5	-2.8	-1.9	-0.2
4/10/2022	2:00:00 PM	65.6	63.39	61.6	58.8	56	53	49.6	46.7	43.5	40.6	38.3	37.6	35.2	35.9	34.7	29.8	28.5	25.9	21	17.2	14.6	11.9	10.4	9.6	8.5	6.6	4.5	2.6	1.3	0.7	0.7	1	0.5	-0.2	0.5	2.7
4/10/2022	3:00:00 PM	62.2	59.88	57.3	54	51.1	47.3	43.9	41.8	37.6	35.4	33.5	34.8	33.1	35.8	33.8	25.9	23	20	16.3	12.3	9.4	6.3	4.4	3.1	5.1	8.5	6.4	7.4	-0.7	-1.7	-1.7	-1.2	-1.7	-2.3	-1.5	0.3
4/10/2022	4:00:00 PM	59	56.44	54.3	52	49.4	45.5	42.1	40.3	37.5	35.8	34.5	36	33.8	35.2	33.5	28.1	23.9	20	15.3	10.7	8.2	5.6	4.3	3.8	3.1	3.3	1.7	-0.6	-1.8	-2.5	-2.2	-2.1	-2.4	-2.7	-1.7	0.1
4/10/2022	5:00:00 PM	60.7	58.76	56.2	53.4	50.4	46.1	42	39.4	37.3	35.1	33.7	34.7	31.8	34.3	33.6	26.1	23.4	20.5	15.9	10.9	7.8	4.5	3.2	3	14.4	21	25.9	23	23.9	14.4	1.4	-0.3	-1.7	-2.1	-1.9	0
4/10/2022	6:00:00 PM	59.5	57.72	54.3	51.2	48.6	44.1	40.4	37.6	35.7	34.2	34.6	34.7	30.7	32.8	32.5	26.2	23.4	19.6	14.2	9.1	5.6	2.2	1.5	2.2	13	25.8	26.7	24.5	25.5	13.6	7.5	1.2	-0.5	-1.3	-1.9	-0.2
4/10/2022	7:00:00 PM	34	33.77	35.2	36.88	39.5	32.8	33	35.5	37.4	35	34	34.4	30.6	34.1	33.9	25.4	20.6	15.9	8.4	0.8	-4.2	-3.4	1.5	1.7	11.5	23.6	22.6	19	15	4.3	-1.7	-2.8	-3.3	-4	-3.1	-0.7
4/10/2022	8:00:00 PM	32.9	32.77	33.1	37.3	41.1	33.2	31.9	34.9	36.4	35.8	34.6	36.3	31.6	35.1	34.6	26.6	21.5	17.5	10	-0.6	-7.7	-8.9	-8.7	-8	-7.4	-5.8	-5.7	-6.3	-5.6	-4.9	-4.4	-4	-3.7	-4.5	-3.3	-0.7
4/10/2022	9:00:00 PM	33	32.66	33.5	36.8	39.6	33.3	30.6	29.7	29.1	29.5	31.2	35	32.3	32	33.4	25.9	20.1	17	9	5.6	-4.5	-8.4	-8.6	-8.5	-8	-7.7	-6.7	-6.5	-5.8	-5.1	-4.6	-4.1	-3.8	-4.6	-3.4	-0.7
4/10/2022	10:00:00 PM	34.1	33.88	35.2	38.3	40.9	31.7	31.6	32.3	33.7	34.2	35.1	38.9	33	35.2	35.8	27	22.4	18.8	12.4	6.6	-2.6	-7.3	-7.8	-7.8	-7.9	-7.7	-7.3	-6.6	-5.8	-5.1	-4.6	-4.1	-3.8	-4.5	-3.4	-0.7
4/10/2022	11:00:00 PM	35.7	35.55	35.6	39.3	40.7	34.5	34.4	40.3	36.3	36.4	37.3	38.9	36.5	38.5	42.3	30.9	26	20.9	14.5	9.5	3.1	1.4	7.2	-7.5	-8.2	-7.9	-7.4	-6.7	-5.9	-5.1	-4.6	-4.1	-3.8	-4.6	-3.4	-0.7
4/11/2022	12:00:00 AM	40.3	38.55	37.6	40.7	42.5	37.1	33.8	38.7	37.4	37.1	38.2	39.2	39.1	41.9	40.4	32.2	27.1	22.4	15.3	10.6	2.6	1.5	1.9	-4.5	-5.1	-6.6	-6.6	-6.4	-5.8	-5.1	-4.4	-4	-3.8	-4.6	-3.4	-0.7
4/11/2022	1:00:00 AM	41.8	39.77	38.2	40.4	43.2	38.3	36.8	41.2	39.8	39.5	40.1	41.5	41.3	44.2	44.7	36.1	31.7	26.5	19.1	11.8	5.5	0.1	0.6	-4.8	-5.4	6.8	-6.9	-6.6	5.8	5.1	-4.6	4.1	3.8	-4.5	-3.3	-0.7
4/11/2022	2:00:00 AM	65.3	63.33	60.8	58	55.3	52.1	49.4	47.3	44.9	42.6	41	41.6	42.1	44.5	44.4	36.1	31.8	28.4	22.8	17.6	14.2	11.5	10.4	9.9	8.5	6.5	4.2	2	0.4	0.2	-0.1	0.3	0.2	-0.5	0.3	2.6
4/11/2022	3:00:00 AM	67.5	65.33	63.1	60.3	57.6	54.3	51.3	49	47.1	44.4	42.3	42.8	41.9	45.2	45	37.2	33.5	30.6	25.6	20.6	16.9	13.8	12.5	12	10.9	8.9	6.6	4.2	2.4	1.5	1.4	1.8	1.4	0.7	1.4	4.7
4/11/2022	4:00:00 AM	60	57.99	54.1	51.1	48.3	45.2	41.5	40.2	40	38	37.2	37.5	36.1	39.1	38.8	33.6	33.1	28.6	23.1	17.4	11.7	5.2	1.1	-0.6	-2	3.5	-4.5	-4.6	4.2	3.8	-3.4	0.5	-3	-3.7	2.8	0.6
4/11/2022	5:00:00 AM	72	70.1	67.7	65.3	62.6	60.3	57.5	54.6	51.9	48.8	45.8	43.6	41.3	42.7	40.6	35.6	32.3	30.4	27.7	24.5	22.3	20.2	19.7	19.9	19.6	18.3	16.4	13.6	10.6	8.7	7.7	7.6	7	6.2	7.2	10.1
4/11/2022	6:00:00 AM	72	70.1	67.6	65.2	62.6	59.9	57.1	54.4	51.6	48.7	45.7	43.4	40.9	41.9	40.7	35.3	32.3	30.1	27.7	24.7	22.4	20.1	19.5	19.8	19.4	22.2	19.9	15.7	12.9	9.3	7.7	7.4	6.9	5.8	6.5	9.3
4/11/2022	7:00:00 AM	74.8	72.77	70.6	68.5	66.2	64	61.8	59.3	56.7	54.4	51.6	48.9	46.4	44.9	43.1	39	36.2	34.1	31.8	29.1	27.2	25.4	25	25.6	25.7	25	23.3	20.9	18	15.6	14	13.6	12.7	11.6	12.1	14.4
4/11/2022	8:00:00 AM	76.3	74.43	72.4	70.3	68.3	66.2	64.1	61.8	59.5	57.1	54.5	51.8	49.2	47.3	45.2	41.3	38.6	36.8	34.8	32.4	30.8	29.1	28.4	29.1	29.3	28.8	27.5	25.3	22.5	20.1	18.2	17	16	14.8	14.9	16.8
4/11/2022	9:00:00 AM	70.8	68.55	66.1	63.66	61	58.3	55.5	52.8	49.7	46.9	44.2	42.4	40.4	41.7	41.5	34.9	32.5	30.6	27.8	24.3	22	19.3	18.5	18.8	18.8	19.3	17	15.1	11.3	8.5	7.1	6.6	5.6	4.7	5.9	8.8
4/11/2022	10:00:00 AM	76.3	74.55	72.5	70.1	67.9	65.8	63.4	60.9	58.4	55.6	53	50.2	47.6	46.3	45.3	40	37.6	35.7	33.5	31.1	29.5	27.6	27.3	27.5	27.8	28.4	27.1	24.9	23	19.4	16.3	15.1	14.2	12.8	13.3	15.9
4/11/2022	11:00:00 AM	75.9	74.42	72.1	69.9	67.8	65.6	63.2	60.8	58	55.4	52.5	49.9	47.3	46.7	45.8	40	37.4	35.6	33.5	31.1	29.3	27.5	27.1	27.9	27.5	26.6	25	22.8	20.1	17.5	15.9	15	13.9	12.8	13.2	15.4
4/11/2022	12:00:00 PM	78.2	76.44	74.4	72.5	70.5	68.6	66.8	64.7	62.5	60.4	58	55.5	52.9	50.5	48.2	44.9	42.4	40.2	38.1	36.4	34.8	33.2	32.9	33	33.3	32.8	31.6	29.4	27.1	24.9	23	21.8	20.3	19	18.6	20.1
4/11/2022	1:00:00 PM	78.8	77.24	75.3	73.4	71.6	69.8	68	66.2	64.2	62.3	60.1	57.8	55.6	53.3	51	48.4	46.1	43.9	42	40.3	38.8	37.1	36.6	36.3	36.1	35.8	34.8	32.8	30.7	29.1	27.5	26.9	26.5	25.6	23.9	23.7
4/11/2022	2:00:00 PM	77.3	75.66	73.7	71.9	69.9	67.9	65.9	63.9	61.5	59.3	56.9	54.3	51.9	49.3	46.7	44.3	41.9	39.7	37.7	35.9	34.4	32.7	31.8	32.2	32.4	32	30.8	28.8	26.4	24.5	22.9	21.7	22.1	20.2	19.1	19.6

4/11/2022	3:00:00 PM	68.2	66.3	64.7	62.2	59.6	57	54.1	51.5	48.8	45.8	46.7	41.4	42.4	42.7	37.8	35.2	31.7	29.7	26.8	24.3	21.6	18.3	16.4	15.9	15.4	15.8	15.5	15.9	12.3	7.8	2.5	2	1.5	0.9	2.9	6
4/11/2022	4:00:00 PM	66.5	64.8	62.3	59.6	57.2	54.2	51	48.3	45.2	42.3	40.6	38.4	39.2	40.6	34.7	31.8	28.5	26.2	23.6	20.6	18.2	15.2	13.7	13.5	15	19.1	19.5	19	14.6	9.6	1.3	0.9	0.8	0	1.2	3.8
4/11/2022	5:00:00 PM	65.8	63.8	61.4	58.6	55.7	52.6	49.1	47.9	43.5	41.4	43.5	38.6	40.4	41.3	37.4	34.3	30.2	28.2	24.5	21.4	17.4	13.2	10.4	9	10	13.9	11	14.2	0.7	-1.1	-1.2	-1	-1	-1.9	-0.6	2.1
4/11/2022	6:00:00 PM	64.9	62.5	60.2	57.2	54.3	50.8	47.6	44.4	40.8	38.3	37.5	34.8	34.1	36.3	34.3	29.5	26	23.5	20.8	17.2	14	10.1	7.6	6.5	6.1	19.2	20.6	13.4	11.6	5.6	-0.2	-1.8	-1.8	-3	-2.1	0.9
4/11/2022	7:00:00 PM	57.3	55.2	52.4	49.7	46	43.7	40.9	42.1	39.2	37.3	38.9	35.8	34.5	34.1	28.3	25.1	23.3	19.6	16.4	12.5	8.2	3.7	1.4	3.7	12.2	24.2	27.4	19.5	17.6	10.2	-0.4	-3.1	-3.2	-4.2	-3.1	-0.5
4/11/2022	8:00:00 PM	47.5	45.2	43.6	42.9	42.1	37.1	39.1	39.5	41.4	38.4	41.1	36.7	37.5	38.6	36.1	31	28.4	25.6	21.2	16.8	12.8	7	0.4	-5	-7.4	-7.4	-7.1	-6.6	-5.8	-4.9	-4.5	-4	-3.7	-4.6	-3.4	-0.7
4/11/2022	9:00:00 PM	66.5	64.5	61.6	59.2	56.4	53	50.8	47.8	45.5	42.4	41.9	41.1	42.1	44.1	43.8	36	32.6	30.7	26	21.8	18.9	14.6	12.6	11.9	11	9.5	7.2	4.4	1.9	0.7	0.5	0.8	0.8	0	1.3	3.8
4/11/2022	10:00:00 PM	56.1	53.3	50	49	49.7	43.8	45.2	48	46.2	42.7	44.5	43.7	44.8	48	48.1	39.8	36.7	34.8	29.6	24	20.4	13.6	6.6	1	-1.6	-3.2	-4.4	-5.1	-5.1	-4.7	-4.3	-3.8	-3.6	-4.5	-3.4	-0.7
4/11/2022	11:00:00 PM	57	55.1	52.3	50.6	49.4	43.9	42	43.5	41	37.7	39.4	38.8	39.7	42.1	41.6	34.8	30.7	28.9	24.2	19.7	15.4	8.5	2.4	-1.4	-2.9	-4.3	-5.3	-5.5	-5.2	-4.7	-4.2	-3.7	-3.5	-4.5	-3.3	-0.6
4/12/2022	12:00:00 AM	50.9	48.2	45.2	46.7	48.6	40.9	40.1	43.7	40.2	38.1	39.9	40.3	40.6	42.9	41.5	36.2	31.6	29.7	26.3	22.7	18.9	13	6.8	-2.3	-7.6	-7.7	-7.2	-6.6	-5.8	-5.1	-4.6	-4.1	-3.8	-4.7	-3.4	-0.7
4/12/2022	1:00:00 AM	61.6	59.1	56.6	54.1	52.1	47.2	44.6	43.2	42.2	40.4	42.8	40.5	39.8	42.2	40.5	34.2	30.6	27.8	23.1	18.5	14.4	8.7	5.2	3.6	2.3	0.6	-1.4	-3	-3.7	-3.6	-3.3	-2.9	-2.7	-3.7	-2.6	0.1
4/12/2022	2:00:00 AM	55.5	52.6	50	47.7	44.3	40.1	41.4	41	38.9	39.3	39.9	37.9	38.1	39.9	38.7	32.3	29.3	27.2	21.7	17.1	13.2	6.3	0.6	-3.4	-4.4	-5.3	-6	-6	-5.6	-4.9	-4.4	-3.9	-3.6	-4.6	-3.4	-0.7
4/12/2022	3:00:00 AM	52.7	50.1	47.6	45	45.2	39	43.9	41.5	39.5	37.3	38.3	38	39	41.4	41	33.8	31.2	29.3	23.1	17.5	15	9.7	0.5	-4.2	-5	-5.9	-6.5	-6.4	-5.8	-5.1	-4.5	-4	-3.7	-4.7	-3.5	-0.7
4/12/2022	4:00:00 AM	48.3	45.6	42.9	45.2	47.5	38.4	37.9	38.5	38.3	38.1	39.4	39.1	38.6	41.1	39.5	34.1	31.1	28.6	24.7	21.2	16.5	10.5	3.9	-4.7	-7.5	-7.3	-6.9	-6.3	-5.6	-4.8	-4.3	-3.8	-3.5	-4.4	-3.3	-0.6
4/12/2022	5:00:00 AM	59.1	56.1	53.1	51.3	49.5	43.7	42.2	39.2	39.8	37.1	38.8	40	39.3	41	40	33.9	30.4	28.5	23.9	19.7	16.1	9.9	4.9	2.6	0.7	-1.5	-2.5	-2.4	-2.2	-1.7	-1.3	-0.6	-0.9	-2.1	-1.4	0.3
4/12/2022	6:00:00 AM	56.9	54.3	51	47.9	46.7	41.5	39.5	38.6	39.1	37.1	37.6	38.1	37	40.1	38.9	32.4	28.9	26.7	21.3	16.3	12.2	5.8	2.1	1.8	10.2	18.4	18.1	16.1	12.9	2.9	-3.9	-3.7	-3.5	-4.5	-3.4	-0.6
4/12/2022	7:00:00 AM	56.3	53.4	50.8	47.5	46	41.5	40.8	38.7	37.9	36.7	37.7	37.2	37	37.8	35.1	31.8	29.1	26.4	21.9	16.7	13.7	8.1	1.2	-2	5.4	14.4	13.7	13.1	10.5	5	-3.1	-3.7	-3.6	-4.5	-3.3	-0.7
4/12/2022	8:00:00 AM	63.9	61.8	58.7	55.8	53.5	49.6	46.5	43.8	40.7	38.2	36.7	36.2	36.5	37.7	37.5	31.2	28.8	27.6	23.4	21.3	19.9	14	8	6.9	12.6	20.1	21.7	23.1	21.8	15.1	2.7	-0.5	-0.4	-2.1	-1.6	0.9
4/12/2022	9:00:00 AM	67.5	65.2	62.9	60	57.4	54.6	53.3	52.9	53.4	53.8	54.1	54.8	54	52.7	50.3	47.8	44.4	37.3	31.1	30.6	28.5	22.6	14.3	12	10.6	9	6.6	3.8	1.9	0.9	0.6	0.6	0.4	-0.6	0.6	4.4
4/12/2022	10:00:00 AM	71.6	69.7	67.4	64.9	62.5	59.9	57.4	55.2	53.4	52.8	52.4	52	51.5	50.5	49.6	47.7	45	39.6	34.2	31	29.6	24.5	19.1	18.2	17.4	16.2	13.8	11.6	8.9	6.9	6	5.8	5.4	4.1	5.2	8.3
4/12/2022	11:00:00 AM	72.5	70.4	68.4	66	63.2	60.5	57.8	54.8	52	49	46.7	44.9	43.8	43.6	42.8	40	36.7	33.2	29.3	25	23	20.6	19.5	19.2	18.4	16.9	14.8	12.4	9.9	7.9	6.9	6.7	6.1	4.9	5.6	8.3
4/12/2022	12:00:00 PM	70.1	67.9	65.8	63.2	60.5	57.6	54.8	51.8	49.2	46.6	45.5	44.9	43.9	44.1	43.1	39.2	35.2	31.1	27	23	20.5	17.9	16.7	16.4	15.7	14.2	12.1	9.6	7.1	5.3	4.5	4.5	4	3	4.4	7
4/12/2022	1:00:00 PM	71.9	69.9	67.8	65.4	62.7	59.9	57.3	54.3	51.4	48.5	45.8	43.2	40.8	40.4	39	34.3	31.3	29.5	27.4	24.7	22.6	20.5	19.6	19.5	18.9	17.7	15.8	13.2	10.7	8.9	8.2	7.7	7.4	6.6	7.8	10.3
4/12/2022	2:00:00 PM	71.4	69.5	67.3	64.6	61.9	59.2	56.4	53.7	50.4	47.5	44.7	42	39.5	38.7	36.1	33.1	30.3	28.7	26.9	24.3	22.1	19.6	18.5	18.3	17.7	16.3	14.2	11.9	9.4	7.5	6.6	6.4	6	5	6.5	9.4
4/12/2022	3:00:00 PM	70.2	68.1	65.7	63.1	60.3	57.5	54.2	51.6	49.9	48.9	48.7	48.8	48.6	48.3	47.5	45.9	42.7	37.4	30.9	24.7	20.6	17.7	16.5	16	16.1	19.7	20.6	16.4	15.7	9.4	5.1	4.4	4	3.3	4.6	7.9
4/12/2022	4:00:00 PM	69.4	67.3	64.9	62.7	60.1	57.7	55	52.1	50.4	49.8	50	50.3	50.5	51.1	50.4	49.2	45.1	40.4	34.7	28.4	28	22.6	17.8	16.7	15.6	13.9	12.1	10.1	7.5	6	6.1	5.1	4.3	3.2	4	6.2
4/12/2022	5:00:00 PM	66.9	65.5	62.7	60	57.1	54.1	51.7	50.4	49.9	48.6	47.8	47.4	46.5	45.5	43.8	39.6	36	30.8	24.4	18.9	15.9	13.1	11.8	11.1	10.1	9.6	6.3	4.5	2.2	0.8	1.7	1.2	0.3	-0.8	-0.2	1.9
4/12/2022	6:00:00 PM	63.6	61.6	59.1	56.5	53.9	51.5	51	51	51.7	52.6	52.4	52.6	51.7	51.8	50.2	47.5	43.1	37.1	28.9	24.7	23.4	16.4	10.3	9.1	9.2	12.2	8.9	7.1	2.3	0.9	-0.3	0.5	-1.5	-2.4	-1.1	2.1
4/12/2022	7:00:00 PM	31.4	31	33.7	38	41.3	38.6	35.5	38.8	34.8	33.8	36.6	36.4	35.4	34.8	32	26.6	23.8	21	14.7	9.5	2.5	-4.6	-1.9	0.2	3.5	7.1	6.6	3.4	-2.1	-4.8	-3.4	-3.2	-3.7	-4.6	-3.4	-0.7
4/12/2022	8:00:00 PM	33.2	33.6	35.8	39.2	45.7	37.8	35.9	34.6	36.2	35	35.7	37.3	37.8	39.6	39	31.6	28.9	25.3	18.4	11.5	4.7	-4.4	-7.9	-8.2	-8.1	-7.9	-7.4	-6.8	-5.9	-5.2	-4.7	-4.1	-3.8	-4.8	-3.5	-0.7
4/12/2022	9:00:00 PM	36.6	35.3	36.8	38.2	42.2	36	33.6	33.6	35	33	33.7	34.6	37.8	40.5	39.8	30.8	27	22.9	17.7	14.8	8.2	2.4	-5.2	-8.1	-8.1	-7.8	-7.5	-6.8	-5.9	-5.1	-4.7	-4.1	-3.8	-4.8	-3.6	-0.7

4/12/2022	10:00:00 PM	47	44.8	42.8	39.8	40.7	36.6	34.2	33.6	34.1	33.3	34.1	35	34.4	35	36.7	29	26.8	23.6	18.3	15.4	11.6	8.4	-1.3	-6.8	-7.2	-7.4	-7.2	-6.6	-5.8	-5.1	-4.6	-4.1	-3.7	-4.7	-3.5	-0.7
4/12/2022	11:00:00 PM	50.8	47.6	45.2	43.1	41.9	38.1	36.1	36	36.2	35.1	36.6	37.2	35.7	37.7	39.4	31.9	29.4	26.2	21.8	18.7	11.9	6.1	-0.3	-5	-6.4	-7.1	-7.1	-6.6	-5.8	-5.1	-4.6	-4.1	-3.7	-4.7	-3.5	-0.7
4/13/2022	12:00:00 AM	59.1	56.4	53.5	50.7	47.8	44.4	40.8	39.9	38.4	36.5	37.6	37.5	36.7	37.4	39.7	30.6	29.3	26.2	22	20.6	14.7	9.9	5.1	1.4	-0.6	-2.5	-3.8	-4.3	-4.1	-3.5	-3	-2.5	-2.2	-3.3	-2.3	0.5
4/13/2022	1:00:00 AM	53	50.6	47.6	45.3	44	41.7	38.8	40.8	39.9	37.4	37.7	39.1	38.1	39.7	40.6	32.9	31.2	28.6	23.6	21.4	18.1	13.8	7.9	2.5	-1	-2.1	-2.6	-1.8	-0.7	0.4	1.4	2.4	3	1.7	2.1	2.7
4/13/2022	2:00:00 AM	49	46.5	44	43.1	41.9	42.9	35.8	43.2	41.7	37.8	38	39.5	40.4	41.3	41.9	34.4	30.8	28.9	23.8	20	14.2	9	2.8	-1.9	-5.2	-6.9	-7.1	-6.6	-5.8	-5	-4.5	-3.9	-3.6	-4.6	-3.4	-0.7
4/13/2022	3:00:00 AM	53.2	50.6	47.9	45	42.5	40.3	37.2	37.6	36.2	35.1	37.7	36.6	37	36.7	38.4	31.2	28.6	26.5	21.7	19.8	18.7	15.2	4.9	-2.6	-4.9	-6.5	-6.6	-6.2	-5.6	-4.9	-4.4	-3.8	-3.5	-4.6	-3.4	-0.7
4/13/2022	4:00:00 AM	35.5	35.1	35.1	39.2	40.2	41.7	34.8	43	38.7	37.2	39.2	39.7	38.9	40.6	41.8	34.2	29.6	27.4	22.3	19.9	14.7	9.3	3.7	-2.2	-4.9	-6.4	-7	-6.4	-5.7	-4.8	-4.2	-3.7	-3.3	-4.4	-3.3	-0.6
4/13/2022	5:00:00 AM	51	49.1	47.2	43.9	43.3	40	35.8	37.4	36.9	35.1	36.3	36.6	35.7	35.7	38.6	29.1	26.1	24.6	19.6	17.4	10.8	5.8	1	1.3	-0.3	-4.4	-5.4	-5.5	-5.6	-5	-4.6	-4	-3.7	-4.8	-3.5	-0.7
4/13/2022	6:00:00 AM	46.7	44.5	42.4	40.8	40.2	39.2	34.3	37.6	36.9	35.4	37.3	36.1	39.5	44.5	42.1	31.4	30.9	27.4	21.4	18	13.4	8	2.3	-0.5	9.6	13.7	12.6	11.2	6.4	1.6	-3.4	-3.9	-3.7	-4.7	-3.5	-0.7
4/13/2022	7:00:00 AM	51.9	48.6	46	44.2	43	40.9	37	38.3	35.7	34.7	36.8	35.3	35.1	36.3	35.6	28.9	25.6	24.5	19.5	16.9	12.5	7.6	2.9	-1	1.1	7.6	5	2.6	-1.1	-4.8	-4.5	-4	-3.7	-4.6	-3.4	-0.7
4/13/2022	8:00:00 AM	54.3	52.5	49.4	47.1	44.8	41.6	39.8	39.5	37.6	36.6	37.1	34.4	35	33.8	35.4	27.5	25.4	23.5	18.9	16.4	12.7	8.6	7.8	3.8	8	10.4	9.3	5.1	0	-3.8	-4.1	-3.7	-3.5	-4.3	-3.2	-0.7
4/13/2022	9:00:00 AM	65.5	63.3	60.7	57.7	54.6	51.7	49.1	48.1	48.2	50.5	51.1	49.6	48.1	47	44.2	40.4	35.8	30	23.6	19.4	15.6	11.8	9.4	8.3	7.4	7.8	6.7	3.3	0.4	-1.3	-1.2	-1	-1.2	-2.1	-1.1	1.4
4/13/2022	10:00:00 AM	71.5	69.3	66.7	64.4	61.7	59.1	56.4	53.6	51.3	49.9	49	48.1	47.2	46.9	45.6	42.9	39.6	35.2	29.5	25.9	24	20	18.2	17.7	17.1	16.3	14	11.2	8.6	6.6	5.7	5.6	5.1	4.3	5.9	9.3
4/13/2022	11:00:00 AM	73.5	71.2	69.1	66.5	63.9	61.2	58.7	55.9	53.4	51.8	50.5	49.4	48.3	47.3	45.8	43.1	39.1	34.5	29.7	26.3	24.2	21.8	20.8	20.6	20.1	18.8	16.8	14.4	11.8	9.8	8.6	8.4	7.9	7	8.2	11.2
4/13/2022	12:00:00 PM	72.8	70.5	68.4	65.6	62.8	60.4	57.7	54.7	51.9	49.3	46.9	45.1	43.7	42.4	40.5	36.2	32.6	30.3	28	25.1	23	20.8	20.4	19.9	19.4	17.9	15.4	13.2	10.9	8.8	7.8	7.6	7.1	6.1	7.4	10.4
4/13/2022	1:00:00 PM	72.8	70.6	68.4	66.1	63.5	60.7	58.2	55.2	51.9	48.9	45.7	43.2	40.8	39	38.2	33.6	31.2	29.6	27.6	25.1	23	20.8	19.9	19.7	19.1	17.7	15.7	13.5	12.2	16.6	9.2	7.9	7.7	6.2	7.5	10.2
4/13/2022	2:00:00 PM	72	69.9	67.7	65.2	62.6	59.9	57.3	54.4	51.6	48.9	45.8	43.5	40.6	39	37.8	33	30.7	29.1	27.2	24.6	22.7	20.6	19.8	19.9	19.6	18.5	16.7	14.2	11.5	9.4	8.3	8	7.4	6.4	7.5	10.1
4/13/2022	3:00:00 PM	72.6	70.5	68.2	65.7	62.8	60.4	57.9	55.3	53.2	51.6	50.8	50	48.8	47.1	44.9	41.8	37.2	31.9	28.1	25	22.9	20.7	19.8	19.6	19.1	17.7	15.7	13.3	10.7	8.8	7.9	7.7	7.3	6.4	7.8	10.9
4/13/2022	4:00:00 PM	71.1	69	66.2	63.7	60.9	58	55.4	52.7	50.3	48.2	46.6	45.8	45.2	44.8	44	41.6	38.2	32.3	27	24.7	22.1	18.5	17.1	16.8	16	14.3	12.2	9.6	7.1	5.6	5.2	5.1	4.8	4.2	5.6	8.2
4/13/2022	5:00:00 PM	72.3	70.1	67.7	65.1	62.7	60	57.6	55.4	53.9	52	50.7	49.7	48.8	47.9	46	41.4	36.8	32	27.6	24.5	22.3	20	19	18.9	19.2	20	19.7	14.9	13.8	8.7	6.9	6.9	6.5	5.9	7.5	10.4
4/13/2022	6:00:00 PM	68.1	65.5	63	60.3	57.4	54.6	52.1	50.2	49.3	49.8	49.5	49.3	49.6	48.5	46.4	43	37.1	31.2	24.4	19.7	16.9	14.2	13.1	12.7	12.1	12.2	8.8	6.1	3.3	2	1.8	2	1.7	0.8	1.9	4.2
4/13/2022	7:00:00 PM	54.6	51.9	49.5	46.6	43.6	40.2	37.4	37.4	38.6	36.4	36.2	38.1	35.3	37.1	38	29.6	26.7	23.7	16.9	11.6	6	0.6	3.2	-4	3.6	11.3	8.1	5.8	0.2	4.1	-4	3.6	3.4	4.1	2.3	0.7
4/13/2022	8:00:00 PM	37.9	35.6	35.4	37.8	41	36.9	34.4	34.9	37.6	35.2	35.9	38	36.6	37.9	38.4	30.6	27.9	25.7	18.2	12.7	7	0.7	5.4	7.9	8.3	7.8	7.1	6.4	5.5	4.3	4.2	3.7	3.5	4.3	3.2	0.7
4/13/2022	9:00:00 PM	47.7	46.7	44.7	46	45.8	42.1	40.2	37.7	36.5	35.1	35.1	38.2	38	38.9	38.3	30.4	27.3	23.7	18	16	9	1.9	4.2	7.5	8	7.6	7.2	6.5	5.7	4.9	4.4	4	3.7	4.4	3.2	0.6
4/13/2022	10:00:00 PM	67.7	65.2	62.5	59.9	57.1	53.9	51.1	48.1	45.5	42.8	40.5	40.6	39.7	41.2	41	34.1	30.3	27.8	24.1	21.7	17.7	14.6	13.4	13.1	12.3	10.6	8.3	5.5	2.9	1.7	1.5	1.7	1.5	0.4	1.8	4.6
4/13/2022	11:00:00 PM	66.3	64.1	61.2	58.8	55.6	52.6	49.2	45.9	43.6	40.7	38.6	38.7	37.9	39.2	38.6	32.7	29.6	27.4	23.3	20.2	17.1	13.4	11.4	10.4	9.4	7.6	5.3	2.8	0.7	0.1	-0.1	0.1	0	-1.1	0.3	2.9
4/14/2022	12:00:00 AM	66.4	64.1	61.6	58.9	56.2	52.9	49.8	46.6	43.6	40.8	39	39.2	38.8	39.5	39.9	33	29.9	27.9	23.8	20.8	17.7	14.1	12.3	11.4	10.3	8.6	6.4	3.7	1.4	0.4	0.2	0.2	0.1	-1	0.1	2.6
4/14/2022	1:00:00 AM	65	62.8	60.6	57.7	55	51.3	47.9	45.7	42.4	39.7	38.2	38.3	38.7	40.3	40.1	32.9	30	27.9	23.6	20.3	17.2	13.3	11.1	9.4	7.8	5.7	3.2	0.8	0.8	1.4	1.3	1.2	1.3	2.4	1.3	1.4
4/14/2022	2:00:00 AM	55.4	52.9	50.5	47.2	46.4	42.7	39.6	41.5	40.6	39.7	38.5	39.7	40.6	42.5	42.5	36.4	33.1	31.4	26.2	23.5	22	17.1	9.5	2.6	-3	5.7	6.3	5.9	5.2	4.6	4.1	3.7	3.6	4.3	3.2	0.7
4/14/2022	3:00:00 AM	43.8	40.8	39	40.6	45.8	40.1	39.4	41.5	42.3	41.8	41.1	41.3	41.3	43.3	43.7	36.6	33.5	31.2	26.2	23.6	19	13.9	8.5	3.1	3.8	6.4	7.1	6.5	5.5	4.7	4.4	4	3.6	4.4	3.2	0.7
4/14/2022	4:00:00 AM	53.5	50.9	47.9	45.4	45.4	41.2	38.6	40.2	40.4	38.8	38.9	41	39.8	41.4	41.5	34.5	31.3	28.5	24.7	23.3	17.7	12.4	6.8	1.1	3.7	6.2	6.9	6.3	5.5	4.8	4.3	3.9	3.7	4.4	3.2	0.7

4/14/2022	5:00:00 AM	54.2	52.1	48.8	46.1	45.4	41.5	38.6	39.4	40.9	38.5	37.7	40	38.9	40.3	40.4	33.8	30.7	28.4	23.3	21	17	11.4	6.2	2.2	-1.7	-2.1	-2.9	-4.4	-4.7	-4.6	-4.2	-3.8	-3.6	-4.3	-3.2	-0.7
4/14/2022	6:00:00 AM	53.1	50.3	47.8	45.2	43.9	40.5	37.7	37.6	37.5	35.7	35.7	37.2	36	37.5	39.3	30.9	28.7	26.4	21.8	19.4	15.4	11.2	7.4	7	8.3	10.5	9.4	5.1	0.5	-4.2	-4.3	-3.8	-3.7	-4.3	-3.2	-0.7
4/14/2022	7:00:00 AM	59	56.5	53.5	50.4	47.4	45	40.7	38.5	36.9	34.4	34.3	35.7	34.5	34.5	35.5	28.6	26.1	23.9	20.3	19	14	9.7	5.9	4.7	12.5	22.8	27.3	21.6	21.8	11.3	1.5	-2.7	-3	-3.9	-2.9	-0.5
4/14/2022	8:00:00 AM	65.6	63.1	60.8	57.9	55	51.6	48.1	44.9	41.7	39	37.2	37.1	37.3	36.3	35.9	30.9	28.4	26.5	22.8	20.4	16.7	12.9	10.3	9.6	16.7	24	24	24.5	23.6	15.1	3.1	0.5	-0.2	-1.4	-0.2	1.8
4/14/2022	9:00:00 AM	69.7	67.5	65.2	62.9	60.3	57.4	55.2	53.8	54.1	53.3	53.5	53.6	52.3	50.3	48.1	45.2	41.2	35.6	29.4	24.8	23	18.7	16.1	15.5	15.1	21.8	21.5	24.3	30.1	12.3	5.6	4.1	4.2	2.7	3.3	6.1
4/14/2022	10:00:00 AM	73.5	71.7	69.5	67	64.8	62.4	60.1	58.4	57.4	57.2	57.1	56.3	55.3	54	52.4	50.1	46.6	42.2	35.9	29.1	25.9	22.8	21.5	21.5	21.9	25.3	24.2	21.9	21.6	14	9.4	8.5	8	7	8.2	11.2
4/14/2022	11:00:00 AM	74.3	72.1	69.9	67.5	65.3	62.8	60.1	57.6	54.7	51.9	49	46.3	43.7	41.6	39.8	36.2	33.9	32.1	30.2	28.2	26.4	24	23.1	23	22.8	21.8	20	17.9	15.3	13	11.3	10.9	10.4	9.5	10.5	13
4/14/2022	12:00:00 PM	74.3	72.1	69.9	67.4	65.1	62.5	60.2	58.1	56.3	54.7	53.5	52.6	50.8	49	46.7	43.5	39	34.6	31	28.7	27.1	24.8	23.5	23.4	22.7	21.6	20.2	17.7	15.5	12.9	12.1	10.8	11.2	10.2	10.3	13
4/14/2022	1:00:00 PM	74.8	72.7	70.2	67.9	65.3	62.8	60.3	57.6	54.7	51.8	49.2	46.4	43.6	41.3	39	35.6	33.3	31.9	30.2	28.2	26.4	24.2	23.6	23.6	24.2	23.5	22	20.6	16.9	14.1	11.4	10.4	10.2	9.5	10.9	13.6
4/14/2022	2:00:00 PM	75	73	70.7	68.2	65.8	63.4	61	58.4	55.4	52.7	49.7	46.9	44	41.6	39.1	36	33.9	32.3	30.8	28.8	26.8	25	24.3	24.1	24.4	25.7	25.5	21	20.3	16	13	11.7	10.8	10.6	11.6	14.4
4/14/2022	3:00:00 PM	74.6	72.5	70.2	67.8	65.4	62.9	60.3	57.6	54.8	52.1	49	46	43.2	40.8	38.2	35.3	33.1	31.5	30	27.6	25.8	23.9	23.2	23.5	23.5	22.5	20.7	18	15	12.5	10.8	10.3	9.6	8.9	10.4	13.4
4/14/2022	4:00:00 PM	68.6	66.7	64.2	61.5	58.5	55.5	52.2	49.1	46.1	42.6	39.7	37.4	35.9	36.1	33.7	29.6	27.6	26.1	23.7	20.8	18.5	15.7	14.3	13.7	13	14.9	13.3	9.4	8.2	14.4	3.7	2.1	1.7	1.2	2.9	5.6
4/14/2022	5:00:00 PM	68.4	66	63.6	60.7	57.5	54.6	51.3	47.6	44.4	41.1	38.2	36.6	35.2	34.9	33.1	29	26.8	25.2	22.9	20.2	17.7	14.7	13	12	11.5	14.2	11.4	7.7	3.7	1.3	0.8	0.8	0.5	0	1.8	4.5
4/14/2022	6:00:00 PM	65.1	62.3	59.3	56.3	53.2	49.3	46.1	42.6	39.7	36.4	34.1	33.9	33.4	35.7	33.6	27.5	24.4	22.4	19.9	17.1	14.4	10.9	8.4	6.9	8.1	10.9	11.9	5.7	1	-1.4	-1.9	-1.6	-1.7	-2	-0.9	1.9
4/14/2022	7:00:00 PM	63.8	61.3	58.4	54.9	51.9	49	46.6	46.2	47.2	48.2	48.9	49.3	48.6	48	47	45.4	42.6	37.8	30.8	23.9	20.4	15.3	8.6	6.2	9.3	16	14.7	13.6	7.3	3.5	-1.7	-1.6	-1.8	-2.8	-1.7	0.5
4/14/2022	8:00:00 PM	59.8	57.1	54.4	51.1	48.3	45.8	45.2	45.4	47	48.1	48.6	49	49	49	48.6	47	43.9	39	32.7	25.9	26.1	20.5	10.4	3.6	1.1	0.4	-0.1	-0.2	-0.5	-0.6	-0.9	-0.9	-1.4	-2.7	-2.1	0.1
4/14/2022	9:00:00 PM	46.5	43.2	40.2	37.8	39.5	36.6	34.8	36.3	40	37.4	36.2	37.4	37.8	38.8	38.4	31.6	28.6	26.3	20.6	16.2	13.7	8.9	5.8	3.3	-1.3	-3.4	-4.2	-3.9	-3.7	-3.1	-3.2	-3	-3.1	-4	-2.9	-0.6
4/14/2022	10:00:00 PM	46.3	43.8	40.2	38.1	39.3	38	32.1	37.4	35.9	35.2	35	37.4	36.8	37.5	36.1	31	28.2	24.8	20.2	17.9	16.1	12.7	11.3	12	12.8	13.7	13.4	13.2	12.1	11.4	11.2	10.8	9	6.1	4.5	3.6
4/14/2022	11:00:00 PM	45.7	42.3	39.2	37.1	38.7	39.4	32.7	40.1	37.8	36.2	35	37.1	38.4	39.3	37.2	30.3	26.5	23.8	18.6	15.1	12.9	8.7	5.6	3.6	2.1	2.3	2.1	1.8	1.2	0.9	0.6	0.5	-0.4	-2.3	-1.6	-0.1
4/15/2022	12:00:00 AM	45	41.5	38.9	38.1	43.8	37.8	35.3	38.6	39.1	37.5	36.2	38.9	37.3	39.5	37.7	31.1	28.9	25.9	20.6	18.7	16.9	17.3	19.3	18.3	18.4	14.6	13.7	13.6	13	12.2	11.1	10.1	8.7	5.7	4.6	3.5
4/15/2022	1:00:00 AM	43.6	40.8	38.1	36.4	35.9	35.8	30.6	32.5	33.6	33.6	32.4	34.6	34.9	34.3	33.2	29.3	24.9	20.5	16.7	14.3	13.1	10.2	8.3	8	7.7	8.4	8.4	8.5	7.3	6.7	6.6	5.7	4.7	1.9	1.1	1.2
4/15/2022	2:00:00 AM	30.5	30.2	30.6	35.6	39.1	35	28.5	31.3	30.8	31.3	31.5	33.7	33.4	33.7	33.4	29.5	24.7	20.4	16.4	15.2	13.5	9.9	7.4	4.9	3	2.1	1.4	1.4	0.4	0.5	0.4	-0.1	-0.7	-2.4	-1.6	-0.3
4/15/2022	3:00:00 AM	30.8	31.9	33.5	37.3	40.8	37.2	35.5	37.4	39.4	38.2	38.7	38.9	40	40.2	37.2	33.7	30.4	27.3	23.2	21	18.2	15.1	10.4	5.3	1.5	-2.6	-5.6	-6.3	-5.7	-5	-4.4	-4	-3.7	-4.6	-3.4	-0.7
4/15/2022	4:00:00 AM	29.9	31.7	35.1	39.6	42.8	38.9	36.8	40	41.1	39.9	38.3	39.6	41.2	41.6	38.3	33.2	30.1	27.6	23.2	20.2	18	13.1	9.2	5	-1.6	-6	-6.7	-6.4	-5.7	-4.9	-4.4	-4	-3.7	-4.6	-3.3	-0.7
4/15/2022	5:00:00 AM	31	32.4	35.4	40.2	46.8	43.6	37.8	43.1	40.1	39.3	38.9	41.2	43.3	45.3	44.2	37.2	33.6	31.2	26.7	24.3	20.7	15.8	11.9	7.5	7.1	16	14.4	16.1	13	0.9	-2.5	-2.6	-3.5	-4.6	-3.3	-0.7
4/15/2022	6:00:00 AM	31.1	32.2	36.3	38.9	43.4	45	37.4	43	37.8	37.6	36.9	39.6	41.3	43.3	42	34.3	31.1	28.5	24.9	22.8	19	14.9	11.3	7	11.9	21.3	19.8	22	16.5	6.7	-2.4	-1.9	-3.5	-4.5	-3.3	-0.7
4/15/2022	7:00:00 AM	43	40.5	39	38.2	40	41	35.8	42.3	36.1	34.6	34.2	35.7	36.9	38.3	36.1	30.6	27	24.7	21.4	19.3	15.6	11.1	7.5	3.7	9.8	17.1	18.6	22.7	20.8	14.4	8.5	1.7	0.6	-4	-3	-0.7
4/15/2022	8:00:00 AM	50.3	47.1	44.4	42	43.2	43.7	36.7	45	38.8	36.3	35.3	36.6	38.3	38.4	38.1	32.2	29.1	26.2	24	20.9	20.7	19.1	18	16.3	18	24.6	24.6	25.1	23.3	17.6	13.5	11.9	11.1	8.4	6.7	4.8

WM3: Overall Hourly Intervals – A-weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	11:58:36 AM	56.40488	19.40246	72.74061	44.24316	22.49021	19.92119
2/8/2022	12:00:00 PM	44.29373	0	60.21219	49.15634	22.44522	0
2/8/2022	1:00:00 PM	36.51111	0	61.3572	33.34495	13.2251	0
2/8/2022	2:00:00 PM	36.62678	0	62.64032	38.40313	0	0
2/8/2022	3:00:00 PM	33.78559	0	60.97149	28.69184	10.84616	0
2/8/2022	4:00:00 PM	38.38341	0	70.24982	23.64004	14.07711	0
2/8/2022	5:00:00 PM	22.94372	11.9813	42.28925	25.25142	20.82734	17.20072
2/8/2022	6:00:00 PM	25.49196	10.11006	43.9849	29.15668	20.19356	14.35388
2/8/2022	7:00:00 PM	25.78712	8.433874	42.7961	29.57846	20.5669	13.05126
2/8/2022	8:00:00 PM	27.17829	6.903793	45.18046	30.66814	22.53824	12.61822
2/8/2022	9:00:00 PM	14.63294	6.036374	30.76391	17.952	12.17661	9.515917
2/8/2022	10:00:00 PM	15.14442	6.015811	34.6753	17.93222	13.25487	9.584755
2/8/2022	11:00:00 PM	17.05384	6.33191	32.80428	20.10935	13.70994	9.919615
2/9/2022	12:00:00 AM	15.3169	5.378423	31.45797	18.46791	13.31147	9.536304
2/9/2022	1:00:00 AM	12.60956	5.915218	25.27055	14.95382	11.34008	8.955147
2/9/2022	2:00:00 AM	16.00714	7.419347	26.90398	18.94393	14.82618	11.16799
2/9/2022	3:00:00 AM	15.75909	7.230819	33.01097	18.41758	13.73588	11.00155
2/9/2022	4:00:00 AM	16.93471	8.353563	30.23554	19.4934	14.88946	11.8156
2/9/2022	5:00:00 AM	17.00785	9.609354	27.9447	19.06719	15.67921	13.14532
2/9/2022	6:00:00 AM	22.67274	10.70831	40.06833	25.27872	18.31654	14.38123
2/9/2022	7:00:00 AM	18.18323	10.29907	35.88502	19.44246	15.8385	13.55291
2/9/2022	8:00:00 AM	24.91624	10.4708	49.70146	23.10142	17.71895	14.68244
2/9/2022	9:00:00 AM	20.05902	9.67286	45.07374	20.7908	17.07775	13.75189
2/9/2022	10:00:00 AM	20.52535	11.13484	39.76961	22.30904	17.93993	14.99135
2/9/2022	11:00:00 AM	22.11367	11.13085	43.35334	23.70088	18.69001	15.2914
2/9/2022	12:00:00 PM	24.15949	11.04136	50.84431	23.32147	18.04382	14.64847
2/9/2022	1:00:00 PM	23.79747	10.51521	45.01246	24.85816	18.97493	14.73835
2/9/2022	2:00:00 PM	23.02448	9.920031	40.89268	25.45812	18.11555	13.65549
2/9/2022	3:00:00 PM	29.78114	16.75318	44.42053	32.93531	28.35594	23.62852
2/9/2022	4:00:00 PM	33.37146	22.2849	51.60452	34.48126	31.84699	27.33209
2/9/2022	5:00:00 PM	30.4381	17.85611	48.92711	33.07991	27.53616	22.24529
2/9/2022	6:00:00 PM	20.03742	8.805016	33.44388	23.93434	16.57018	12.01712
2/9/2022	7:00:00 PM	15.66287	7.60027	33.17201	18.52004	14.01119	11.02985
2/9/2022	8:00:00 PM	15.75462	8.496386	34.37097	18.32046	14.08397	11.5359
2/9/2022	9:00:00 PM	14.7745	6.826378	29.46103	17.70075	13.49813	10.07725
2/9/2022	10:00:00 PM	18.29579	7.384117	38.43055	19.57721	14.07749	11.21831
2/9/2022	11:00:00 PM	21.50434	10.13062	38.03974	24.3154	19.19705	14.72214
2/10/2022	12:00:00 AM	24.57231	9.822942	40.21918	27.97138	21.96354	15.08679
2/10/2022	1:00:00 AM	23.03919	8.257374	38.16016	27.00919	18.57171	11.88664
2/10/2022	2:00:00 AM	18.85976	8.778065	34.4513	21.81488	16.93956	12.53345

2/10/2022	3:00:00 AM	16.83596	8.615939	32.81339	18.78135	14.66113	12.14672
2/10/2022	4:00:00 AM	18.14514	9.052345	38.77611	20.38797	14.76727	12.18329
2/10/2022	5:00:00 AM	17.30109	10.42039	30.03322	19.39553	15.97882	13.51935
2/10/2022	6:00:00 AM	19.63292	10.07083	40.14152	20.93272	16.05262	13.35673
2/10/2022	7:00:00 AM	22.82824	9.757388	48.2025	23.18293	17.39344	13.53341
2/10/2022	8:00:00 AM	25.67332	10.94756	50.44238	23.85659	19.18999	15.72316
2/10/2022	9:00:00 AM	26.01482	11.63136	50.63225	25.82381	19.86444	15.68995
2/10/2022	10:00:00 AM	22.24236	10.48512	47.56972	21.76567	17.49026	14.31449
2/10/2022	11:00:00 AM	22.45356	9.785303	45.08315	23.03638	17.8262	13.79984
2/10/2022	12:00:00 PM	22.04577	6.874992	48.15653	19.55662	13.77206	10.60113
2/10/2022	1:00:00 PM	25.98262	8.424793	54.15531	21.7095	15.41935	12.33012
2/10/2022	2:00:00 PM	20.77745	10.09943	42.67089	20.76447	16.79714	13.66843
2/10/2022	3:00:00 PM	21.80321	10.48413	41.24627	22.37103	18.22069	14.76099
2/10/2022	4:00:00 PM	22.30154	13.93154	37.029	25.07502	20.53519	17.95884
2/10/2022	5:00:00 PM	23.96903	13.43902	44.1284	26.34658	21.08982	17.83151
2/10/2022	6:00:00 PM	28.01585	17.89587	42.43455	30.86746	26.16236	22.3668
2/10/2022	7:00:00 PM	29.82285	18.31065	44.29883	32.87267	27.71461	23.42532
2/10/2022	8:00:00 PM	28.4791	13.43416	47.9678	31.12413	25.03324	19.26502
2/10/2022	9:00:00 PM	23.72942	12.91716	39.02385	26.79833	21.24747	17.36916
2/10/2022	10:00:00 PM	23.44393	10.10506	38.07666	26.8783	20.57042	14.83378
2/10/2022	11:00:00 PM	25.2193	11.47486	41.8688	28.25578	22.41466	17.14868
2/11/2022	12:00:00 AM	20.27435	8.805195	35.56236	23.57285	17.80662	13.08566
2/11/2022	1:00:00 AM	18.27516	9.002067	30.791	20.92954	16.82126	12.8015
2/11/2022	2:00:00 AM	17.75936	8.622122	34.28205	20.06121	15.82574	12.47776
2/11/2022	3:00:00 AM	21.56655	12.1	34.25722	24.169	20.06652	16.81827
2/11/2022	4:00:00 AM	24.49448	14.80392	42.24051	26.01008	21.72741	18.94047
2/11/2022	5:00:00 AM	21.16491	12.10177	34.16146	23.74753	19.84875	15.72423
2/11/2022	6:00:00 AM	20.72664	12.15797	38.03529	23.01917	19.33648	16.64265
2/11/2022	7:00:00 AM	42.96817	12.54175	68.70822	28.75159	20.81284	17.54562
2/11/2022	8:00:00 AM	24.8755	14.81237	42.8862	27.25029	21.83676	18.79913
2/11/2022	9:00:00 AM	24.73484	12.68808	48.4373	26.23519	20.77868	17.51558
2/11/2022	10:00:00 AM	29.16054	11.64243	52.80692	27.10864	21.32372	17.06341
2/11/2022	11:00:00 AM	29.49681	7.588563	52.60478	27.36175	15.92009	11.93601
2/11/2022	12:00:00 PM	25.47089	7.179164	49.83726	25.4718	14.90711	11.01167
2/11/2022	1:00:00 PM	25.14922	9.038244	47.26111	27.11214	17.34695	13.0077
2/11/2022	2:00:00 PM	21.32926	6.683835	45.56465	23.44835	15.12632	10.64914
2/11/2022	3:00:00 PM	23.92264	8.33832	43.64229	25.97849	17.19206	12.31761
2/11/2022	4:00:00 PM	25.59439	7.29885	50.82591	21.37508	15.04137	10.9827
2/11/2022	5:00:00 PM	21.6262	9.250752	37.58465	24.45393	19.07134	13.79712
2/11/2022	6:00:00 PM	22.01346	8.355397	41.93751	25.56953	16.594	12.24624
2/11/2022	7:00:00 PM	27.99467	17.66551	41.71022	30.8899	26.23036	22.53619
2/11/2022	8:00:00 PM	29.38335	16.65043	46.43678	32.35908	26.52104	21.87813
2/11/2022	9:00:00 PM	26.82569	12.81578	42.0638	30.17531	24.1533	18.61186

2/11/2022	10:00:00 PM	23.1065	10.9226	37.50298	26.36742	20.60365	15.82255
2/11/2022	11:00:00 PM	25.02427	13.17455	40.93039	28.03653	22.46386	18.3903
2/12/2022	12:00:00 AM	20.13272	7.282175	36.78082	23.39983	15.64201	11.28164
2/12/2022	1:00:00 AM	16.91274	7.265579	29.7925	19.82465	14.34407	10.81574
2/12/2022	2:00:00 AM	17.17549	6.673919	32.52629	20.01572	13.77638	10.25975
2/12/2022	3:00:00 AM	16.89676	7.327553	30.46079	19.65862	14.46771	11.32582
2/12/2022	4:00:00 AM	15.86951	7.224199	28.64595	19.15253	13.91584	10.83536
2/12/2022	5:00:00 AM	20.44714	8.805986	33.6359	23.24584	18.75776	13.94163
2/12/2022	6:00:00 AM	20.03773	8.435295	38.14543	22.08166	17.35884	12.20383
2/12/2022	7:00:00 AM	27.01184	11.22451	45.67359	28.42661	20.56044	16.00952
2/12/2022	8:00:00 AM	26.79745	13.03395	45.09796	29.62318	21.05016	17.69486
2/12/2022	9:00:00 AM	27.14769	13.70575	43.66154	30.06769	23.01486	19.12821
2/12/2022	10:00:00 AM	29.9017	16.7864	50.23049	30.98265	24.36408	20.86129
2/12/2022	11:00:00 AM	29.331	12.6855	55.09071	28.61367	21.28277	17.67966
2/12/2022	12:00:00 PM	24.88783	13.7329	45.42855	27.12292	21.3837	18.35638
2/12/2022	1:00:00 PM	25.99874	12.95824	46.71308	28.12767	21.95262	18.39538
2/12/2022	2:00:00 PM	25.17915	10.05679	46.61187	25.40961	18.3484	14.49276
2/12/2022	3:00:00 PM	20.07602	8.490447	43.67767	21.16373	16.57156	12.81027
2/12/2022	4:00:00 PM	20.53281	8.899945	39.59081	22.93962	17.09525	13.00193
2/12/2022	5:00:00 PM	25.50416	11.78771	39.34909	28.82208	23.09575	17.64531
2/12/2022	6:00:00 PM	28.83379	18.77013	46.93783	31.66647	26.42728	22.61667
2/12/2022	7:00:00 PM	28.15662	15.20334	44.14643	31.37893	25.14514	19.59512
2/12/2022	8:00:00 PM	21.55034	8.537498	43.24938	21.55243	15.12309	11.84433
2/12/2022	9:00:00 PM	19.1444	8.899894	34.81328	22.011	17.10475	12.59945
2/12/2022	10:00:00 PM	21.51006	11.1422	34.26918	24.53852	19.65818	15.49209
2/12/2022	11:00:00 PM	20.51948	9.251036	40.95727	23.24221	18.39809	13.85385
2/13/2022	12:00:00 AM	23.33464	8.887019	45.52399	21.09015	17.04561	13.0881
2/13/2022	1:00:00 AM	20.90681	9.900935	35.24584	23.7644	18.86336	14.36953
2/13/2022	2:00:00 AM	20.89543	10.05199	33.63051	23.59209	19.54596	15.21316
2/13/2022	3:00:00 AM	20.02865	10.74634	36.36266	22.28008	18.73884	15.02828
2/13/2022	4:00:00 AM	19.72304	10.1602	31.50205	22.23457	18.50591	14.91461
2/13/2022	5:00:00 AM	20.32384	12.05783	35.01556	22.37546	19.00349	16.03121
2/13/2022	6:00:00 AM	20.73452	10.6778	38.24464	22.93642	19.03724	14.78825
2/13/2022	7:00:00 AM	43.41165	10.25001	68.72947	38.13696	28.31118	16.86682
2/13/2022	8:00:00 AM	23.56018	13.52766	43.00338	25.82596	20.79786	17.73732
2/13/2022	9:00:00 AM	23.90124	13.36209	53.5911	24.14233	20.298	17.45538
2/13/2022	10:00:00 AM	28.48037	10.28222	55.11348	24.26056	18.7864	14.83496
2/13/2022	11:00:00 AM	23.91094	9.528618	47.78612	25.07133	18.32583	13.99812
2/13/2022	12:00:00 PM	23.47852	8.477216	46.92291	21.9728	16.85658	12.80896
2/13/2022	1:00:00 PM	22.02809	4.516414	44.876	21.75859	13.42864	8.916481
2/13/2022	2:00:00 PM	28.22157	6.226483	53.30614	27.62253	17.91042	10.82079
2/13/2022	3:00:00 PM	24.40414	11.70585	43.92161	27.08995	21.26267	17.25156
2/13/2022	4:00:00 PM	21.62155	5.696981	42.90543	23.31272	14.03512	9.607431

2/13/2022	5:00:00 PM	23.07176	9.101115	41.9418	25.81849	20.65484	14.80154
2/13/2022	6:00:00 PM	20.70141	5.916105	39.31361	23.44669	17.84447	11.28327
2/13/2022	7:00:00 PM	25.27946	9.054537	42.53238	28.23125	22.52607	15.80927
2/13/2022	8:00:00 PM	24.89417	9.888759	43.23874	27.7798	22.35201	17.13263
2/13/2022	9:00:00 PM	24.17766	12.44063	40.80406	27.36328	21.14387	17.22946
2/13/2022	10:00:00 PM	21.06319	7.831024	36.59687	24.52013	17.66997	12.13159
2/13/2022	11:00:00 PM	17.93453	5.539589	34.0081	20.92947	14.89759	10.31903
2/14/2022	12:00:00 AM	20.81833	8.449324	38.73836	22.64775	17.15702	13.08404
2/14/2022	1:00:00 AM	20.07515	8.774444	42.17611	21.41699	17.27796	13.39619
2/14/2022	2:00:00 AM	19.04212	9.078619	32.02278	21.87612	17.29684	13.32637
2/14/2022	3:00:00 AM	19.50297	7.736076	32.86685	22.55887	17.36602	12.92342
2/14/2022	4:00:00 AM	18.86608	8.253288	33.23351	21.53361	17.32478	12.87057
2/14/2022	5:00:00 AM	18.47886	9.285053	33.44798	20.9433	16.676	13.24053
2/14/2022	6:00:00 AM	21.47028	8.066568	46.51751	22.90699	18.21995	12.68129
2/14/2022	7:00:00 AM	21.18702	8.533145	38.22765	23.97372	18.75858	13.19855
2/14/2022	8:00:00 AM	25.645	11.14942	56.32376	24.67592	19.4659	15.47767
2/14/2022	9:00:00 AM	23.27547	10.36291	48.69308	24.49916	19.27604	14.62745
2/14/2022	10:00:00 AM	22.3126	12.6005	38.22143	25.11033	20.4121	17.10467
2/14/2022	11:00:00 AM	22.42297	11.11407	39.49422	25.18261	20.18926	16.58333
2/14/2022	12:00:00 PM	23.93237	6.93693	45.78383	26.57788	16.50923	11.45479
2/14/2022	1:00:00 PM	36.36072	12.81204	52.88154	40.38851	30.46277	20.90919
2/14/2022	2:00:00 PM	40.56942	20.11325	71.98191	40.64683	33.45865	28.15342
2/14/2022	3:00:00 PM	34.91157	14.529	55.44451	38.60137	29.03979	20.01992
2/14/2022	4:00:00 PM	26.56704	9.120569	54.81116	27.3936	19.04345	12.91458
2/14/2022	5:00:00 PM	25.725	11.37717	45.06241	27.89885	20.72701	15.5541
2/14/2022	6:00:00 PM	27.68466	12.47491	46.20457	30.36154	22.88991	17.23849
2/14/2022	7:00:00 PM	31.56327	13.45776	48.9234	34.31292	27.92324	23.1349
2/14/2022	8:00:00 PM	28.44043	12.95047	46.82475	31.23967	23.74481	19.17643
2/14/2022	9:00:00 PM	25.4279	11.47634	44.23158	28.69426	22.92606	16.99119
2/14/2022	10:00:00 PM	21.77202	9.254672	35.49292	24.92243	19.9253	13.51886
2/14/2022	11:00:00 PM	24.33603	7.630594	38.5782	28.23481	21.48478	12.27035
2/15/2022	12:00:00 AM	24.40085	13.31573	41.45414	26.89579	21.72139	17.86154
2/15/2022	1:00:00 AM	25.107	14.52595	37.79106	28.45329	22.36928	18.44703
2/15/2022	2:00:00 AM	27.34236	16.87523	41.54623	30.17204	25.85115	21.96384
2/15/2022	3:00:00 AM	28.41511	18.54396	41.98428	31.42719	26.68209	22.98929
2/15/2022	4:00:00 AM	30.84282	20.25088	45.82284	34.84656	27.88153	24.42354
2/15/2022	5:00:00 AM	28.08234	13.33305	44.86583	31.48118	25.74367	17.58415
2/15/2022	6:00:00 AM	21.09214	6.620587	40.49608	22.61803	17.17395	12.21813
2/15/2022	7:00:00 AM	14.20778	0	35.51129	16.91999	9.251459	4.988055
2/15/2022	8:00:00 AM	19.23985	2.492778	40.03381	18.74335	12.90913	8.277033
2/15/2022	9:00:00 AM	15.2922	2.6046	36.08372	18.01382	12.64132	8.631657
2/15/2022	10:00:00 AM	15.03711	2.420266	34.92862	17.79516	11.49149	7.41257
2/15/2022	11:00:00 AM	21.24737	5.75348	52.20641	20.24064	14.82378	10.50866

2/15/2022	12:00:00 PM	18.52834	6.120487	39.45082	19.83902	13.8792	10.32652
2/15/2022	1:00:00 PM	18.63018	7.244002	43.94449	20.57574	15.18303	11.31239
2/15/2022	2:00:00 PM	22.81699	5.774243	52.24538	21.46146	12.62868	9.03353
2/15/2022	3:00:00 PM	24.42326	5.91545	45.39149	28.38085	15.48865	9.195766
2/15/2022	4:00:00 PM	29.87611	20.4051	46.80475	31.80615	27.75731	24.66215
2/15/2022	5:00:00 PM	25.52688	12.92778	40.75173	28.2915	23.42162	18.44707
2/15/2022	9:00:00 PM	36.84757	9.35277	72.80636	21.43091	16.57609	13.01525
2/15/2022	10:00:00 PM	28.04573	9.471641	55.73194	23.02899	16.51641	13.15153
2/15/2022	11:00:00 PM	27.74167	8.993974	51.51065	22.87594	16.75329	13.19505
2/16/2022	12:00:00 AM	20.5207	7.67445	44.06339	21.2109	15.14795	11.94038
2/16/2022	1:00:00 AM	18.60035	7.054863	45.52687	18.26123	13.44102	10.73091
2/16/2022	2:00:00 AM	14.94541	5.764994	38.25515	16.95026	13.00762	9.810129
2/16/2022	3:00:00 AM	14.36561	5.957848	38.20495	15.34146	12.26852	9.785079
2/16/2022	4:00:00 AM	18.72817	10.05952	38.20127	21.0823	16.71155	13.51596
2/16/2022	5:00:00 AM	22.61509	9.617033	40.28517	25.27211	18.91734	13.84452
2/16/2022	6:00:00 AM	24.37092	13.29358	41.70347	27.41027	21.83856	18.10519
2/16/2022	7:00:00 AM	24.7858	13.12065	41.19333	27.33154	22.50294	18.43608
2/16/2022	8:00:00 AM	25.79458	13.33192	42.54609	28.671	23.6431	19.29763
2/16/2022	9:00:00 AM	24.87126	11.78892	39.05757	28.10959	22.50672	17.57867
2/16/2022	10:00:00 AM	26.04801	12.28429	45.25203	28.43907	22.09024	17.61434
2/16/2022	11:00:00 AM	25.77659	9.717356	44.37701	28.64	20.35325	14.72202
2/16/2022	12:00:00 PM	20.60534	9.360472	37.99838	21.96401	17.67158	13.93384
2/16/2022	1:00:00 PM	21.43035	12.40805	35.85119	24.126	19.87882	16.80355
2/16/2022	2:00:00 PM	22.35757	8.403435	43.10848	20.85375	15.33685	12.29817
2/16/2022	3:00:00 PM	18.42212	9.194262	31.21702	21.08068	17.07711	13.21696
2/16/2022	4:00:00 PM	17.37523	9.028696	33.22402	19.03357	15.53435	12.62156
2/16/2022	5:00:00 PM	18.38678	9.150096	33.97985	20.53325	17.08594	13.41691
2/16/2022	6:00:00 PM	21.86434	9.300556	42.42568	21.35416	17.43944	13.54156
2/16/2022	7:00:00 PM	21.50941	9.438238	46.97439	22.35347	18.10216	14.094
2/16/2022	8:00:00 PM	19.29963	10.34485	36.18324	21.70133	17.70517	14.28021
2/16/2022	9:00:00 PM	21.68583	13.31721	35.11956	23.95257	20.59647	17.8476
2/16/2022	10:00:00 PM	21.63651	10.64316	48.95797	22.04902	17.86377	14.59909
2/16/2022	11:00:00 PM	19.78389	7.990901	45.57607	18.72467	14.26358	11.53902
2/17/2022	12:00:00 AM	16.62862	7.26213	37.45814	18.52325	13.73799	10.85004
2/17/2022	1:00:00 AM	19.63536	6.168309	47.85471	18.13264	13.22903	9.609299
2/17/2022	2:00:00 AM	26.53675	5.643942	53.19383	16.91367	11.97322	8.9161
2/17/2022	3:00:00 AM	20.35781	7.311063	46.62121	20.71234	14.91969	11.61613
2/17/2022	4:00:00 AM	14.35132	5.712566	38.07433	14.32692	10.6454	8.513971
2/17/2022	5:00:00 AM	21.11443	7.111839	38.48658	24.54819	18.2931	10.54095
2/17/2022	6:00:00 AM	28.72558	16.68766	44.78057	31.64218	26.95709	22.97854
2/17/2022	7:00:00 AM	30.30517	18.84727	44.96654	33.38083	27.7447	24.03252
2/17/2022	8:00:00 AM	28.4607	14.74118	43.27506	31.96794	25.11012	20.13361
2/17/2022	9:00:00 AM	26.30215	13.74581	42.64401	29.34936	23.44676	19.24308

2/17/2022	10:00:00 AM	27.32627	12.50096	43.48446	30.52814	23.81238	17.83314
2/17/2022	11:00:00 AM	26.57167	14.70743	43.17043	29.31651	23.87438	19.77195
2/17/2022	12:00:00 PM	18.93526	7.816828	34.64628	21.66016	15.68187	11.81518
2/17/2022	1:00:00 PM	19.09565	7.935442	37.96177	19.01699	14.62726	11.79623
2/17/2022	2:00:00 PM	15.01535	7.420592	29.47794	17.6759	13.85495	10.89743
2/17/2022	3:00:00 PM	20.45487	9.121423	36.75083	22.47461	17.41496	12.87263
2/17/2022	4:00:00 PM	18.24875	9.3992	28.71931	20.81555	17.17106	13.58971
2/17/2022	5:00:00 PM	19.72431	10.31202	36.92842	21.58754	17.34599	14.04568
2/17/2022	6:00:00 PM	22.2339	10.10078	43.33432	22.39476	17.54375	13.83231
2/17/2022	7:00:00 PM	20.97788	9.770858	40.89438	22.99331	18.14226	13.71258
2/17/2022	8:00:00 PM	24.42291	13.61746	50.17718	24.54924	20.9258	18.11178
2/17/2022	9:00:00 PM	21.43235	12.5556	39.32654	23.22559	19.74482	16.85148
2/17/2022	10:00:00 PM	30.57165	12.74581	55.2772	25.1935	19.78509	16.89668
2/17/2022	11:00:00 PM	32.88012	10.96288	58.28978	23.41458	18.66498	15.02382
2/18/2022	12:00:00 AM	24.81514	7.311923	49.94238	22.21838	15.12655	11.0931
2/18/2022	1:00:00 AM	22.08144	6.576889	44.38513	24.54731	15.59491	11.07413
2/18/2022	2:00:00 AM	23.26305	8.023316	41.97694	26.25684	19.53865	14.14222
2/18/2022	3:00:00 AM	24.43809	10.15389	45.73094	26.29906	20.76428	16.86929
2/18/2022	4:00:00 AM	19.05429	6.353023	36.85825	21.68339	14.83096	10.11326
2/18/2022	5:00:00 AM	19.23725	10.37919	38.98917	20.64311	16.80171	13.72683
2/18/2022	6:00:00 AM	24.63544	12.54548	40.36842	27.60356	22.21419	17.08709
2/18/2022	7:00:00 AM	26.34016	13.70625	41.13501	29.47176	23.99894	19.09324
2/18/2022	8:00:00 AM	30.37743	15.53832	48.90687	33.39731	27.06813	21.27621
2/18/2022	9:00:00 AM	23.90108	9.131583	42.72645	26.91187	19.47938	13.75362
2/18/2022	10:00:00 AM	26.93805	11.67458	47.89927	28.74803	22.00592	17.73821
2/18/2022	11:00:00 AM	22.47946	10.53312	35.92858	25.70632	20.39804	15.00359
2/18/2022	12:00:00 PM	27.51242	8.905655	52.00922	27.77286	18.46955	14.0148
2/18/2022	1:00:00 PM	20.92783	11.47738	36.92869	23.47419	19.2055	15.72274
2/18/2022	2:00:00 PM	22.48207	11.2061	46.14505	24.85496	20.12775	15.97021
2/18/2022	3:00:00 PM	22.68966	12.04124	48.6283	24.82247	20.37961	16.89504
2/18/2022	4:00:00 PM	23.8019	10.33121	45.31815	26.88949	20.71379	14.79743
2/18/2022	5:00:00 PM	22.13777	10.72341	44.27646	24.36776	18.55977	14.64818
2/18/2022	6:00:00 PM	24.79253	10.61263	44.94848	27.63947	18.45129	14.34677
2/18/2022	7:00:00 PM	30.53035	9.065253	53.48042	30.60594	20.71068	14.5021
2/18/2022	8:00:00 PM	29.15848	11.16795	49.73342	30.9025	20.01098	15.17729
2/18/2022	9:00:00 PM	26.62099	13.68251	48.48292	28.70852	22.44467	18.93888
2/18/2022	10:00:00 PM	31.80164	13.48801	55.84409	34.16882	26.09758	19.19913
2/18/2022	11:00:00 PM	35.50631	18.81007	52.86063	38.80378	31.36486	25.34912
2/19/2022	12:00:00 AM	38.14551	22.57147	53.07603	41.73495	34.67362	29.52594
2/19/2022	1:00:00 AM	42.57592	25.69252	62.48161	45.8138	39.77822	33.68282
2/19/2022	2:00:00 AM	35.93176	19.18994	51.20156	39.27667	33.19227	27.71375
2/19/2022	3:00:00 AM	31.28963	17.56205	49.04245	34.32193	27.61744	23.33113
2/19/2022	4:00:00 AM	30.91665	20.5094	47.32127	33.76219	28.41097	24.60804

2/19/2022	5:00:00 AM	29.17899	16.82472	49.09594	31.59266	26.9787	22.57673
2/19/2022	6:00:00 AM	32.93545	22.36934	48.157	35.55317	31.07952	27.54461
2/19/2022	7:00:00 AM	32.91104	17.25938	47.98159	35.92101	31.02146	25.3678
2/19/2022	8:00:00 AM	33.20451	22.66002	44.81269	35.96875	32.05823	27.7338
2/19/2022	9:00:00 AM	34.4222	25.12809	46.12098	37.13081	33.1262	29.63809
2/19/2022	10:00:00 AM	30.39862	15.62304	41.86336	34.11415	28.37513	21.48913
2/19/2022	11:00:00 AM	28.72237	15.53579	41.15974	31.89309	27.15677	22.51355
2/19/2022	12:00:00 PM	28.61292	13.86123	44.40684	31.74583	25.72082	19.62236
2/19/2022	1:00:00 PM	30.81298	20.7156	45.12254	33.5538	29.14354	25.41022
2/19/2022	2:00:00 PM	32.47145	19.51281	43.89372	35.52793	30.89744	25.6056
2/19/2022	3:00:00 PM	28.92463	19.13074	47.28274	31.65111	27.14718	23.79943
2/19/2022	4:00:00 PM	21.52155	7.503708	41.12123	21.93221	15.85633	11.99514
2/19/2022	5:00:00 PM	26.0142	5.387834	49.02201	23.75964	12.23952	8.891981
2/19/2022	6:00:00 PM	23.86087	8.967119	43.51629	25.85128	19.24807	14.50141
2/19/2022	7:00:00 PM	27.72453	8.612566	48.54097	30.52606	21.11662	14.91765
2/19/2022	8:00:00 PM	21.49943	5.455255	51.45903	19.50564	14.08276	10.23015
2/19/2022	9:00:00 PM	19.90046	1.141237	45.33329	15.27691	8.371639	5.541441
2/19/2022	10:00:00 PM	19.18525	1.276059	45.62623	18.30538	9.340005	5.841377
2/19/2022	11:00:00 PM	22.40179	2.685672	44.90618	20.96269	10.24947	6.888294
2/20/2022	12:00:00 AM	29.99837	4.295948	53.5768	32.35168	21.42152	8.639721
2/20/2022	1:00:00 AM	22.99222	8.202758	41.08513	26.34827	19.26134	13.24883
2/20/2022	2:00:00 AM	19.49092	4.084278	44.0336	20.96513	12.28201	8.052739
2/20/2022	3:00:00 AM	33.16076	4.783707	59.49177	26.86455	18.05639	9.107314
2/20/2022	4:00:00 AM	21.7239	5.787647	42.2363	23.44932	14.35449	9.50116
2/20/2022	5:00:00 AM	30.75672	6.556445	49.77516	33.75718	24.24553	11.32996
2/20/2022	6:00:00 AM	27.62656	13.832	49.20368	29.61528	22.94717	18.15353
2/20/2022	7:00:00 AM	24.6298	10.21442	47.11729	25.94941	20.66784	14.82397
2/20/2022	8:00:00 AM	26.81941	11.59968	48.14514	28.17139	21.49507	16.93987
2/20/2022	9:00:00 AM	29.40556	10.80674	48.36391	32.94974	25.36006	17.05225
2/20/2022	10:00:00 AM	31.46814	7.510784	48.37954	35.11353	26.83936	12.57295
2/20/2022	11:00:00 AM	33.01325	6.864709	56.42914	28.64121	20.46925	14.24821
2/20/2022	12:00:00 PM	18.58078	4.563465	38.64033	19.33315	10.78993	8.101137
2/20/2022	1:00:00 PM	27.66474	8.434432	44.5515	30.95252	23.31526	14.21293
2/20/2022	2:00:00 PM	29.06852	11.28599	48.68284	31.51369	22.27822	16.62686
2/20/2022	3:00:00 PM	29.07413	18.46526	41.47919	32.20253	27.40814	22.89225
2/20/2022	4:00:00 PM	28.113	17.09556	40.61121	30.83835	26.85033	22.64018
2/20/2022	5:00:00 PM	25.70717	14.60676	41.40458	28.51532	23.65242	19.86916
2/20/2022	6:00:00 PM	25.62386	4.675219	48.09008	26.15147	17.64823	11.18497
2/20/2022	7:00:00 PM	32.02432	4.617361	50.0998	35.71072	24.49814	8.624807
2/20/2022	8:00:00 PM	46.90396	21.35001	71.75637	40.62175	29.19504	25.11017

WM3: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	11:58:36 AM	59.95856	30.25099	76.86268	48.21939	35.44827	32.41306
2/8/2022	12:00:00 PM	62.26073	0	75.94068	68.84406	34.87711	0
2/8/2022	1:00:00 PM	40.2557	0	62.68108	41.77972	32.97202	0
2/8/2022	2:00:00 PM	42.04929	0	64.46026	44.37104	0	0
2/8/2022	3:00:00 PM	37.31109	0	61.27621	38.68812	31.57668	0
2/8/2022	4:00:00 PM	49.3523	0	75.46967	43.73591	35.09501	25.1177
2/8/2022	5:00:00 PM	48.68017	27.66132	72.12148	49.74298	39.93071	34.28757
2/8/2022	6:00:00 PM	53.61759	26.70791	73.58554	56.0401	40.76393	33.18806
2/8/2022	7:00:00 PM	53.5259	26.31284	74.10684	55.91101	41.871	33.28874
2/8/2022	8:00:00 PM	54.68172	25.23206	73.14579	58.07921	43.68749	32.77013
2/8/2022	9:00:00 PM	40.89771	23.6507	62.10945	42.58555	33.16441	29.51729
2/8/2022	10:00:00 PM	41.32228	24.73869	64.17036	43.07633	34.26244	30.23307
2/8/2022	11:00:00 PM	43.68863	24.66799	66.16703	45.31089	34.54115	30.4331
2/9/2022	12:00:00 AM	42.47159	24.05424	64.25148	44.58861	34.85874	30.08481
2/9/2022	1:00:00 AM	34.80706	24.46313	50.13395	37.58505	32.94014	29.61182
2/9/2022	2:00:00 AM	39.37116	27.85879	50.19144	42.26154	38.00642	33.92162
2/9/2022	3:00:00 AM	42.08417	28.09587	69.97127	42.53709	36.95111	33.31875
2/9/2022	4:00:00 AM	39.37462	28.26025	60.61859	40.33092	35.68145	32.85828
2/9/2022	5:00:00 AM	39.48311	29.9351	54.76095	41.74661	38.28446	35.07158
2/9/2022	6:00:00 AM	42.94168	32.4612	60.34313	45.90584	40.80563	37.26787
2/9/2022	7:00:00 AM	41.13269	32.07203	54.85236	43.43329	39.93679	36.9211
2/9/2022	8:00:00 AM	45.72821	31.76432	67.95835	47.34822	41.02956	37.32316
2/9/2022	9:00:00 AM	44.65741	30.20029	73.51555	43.6427	39.48649	35.83573
2/9/2022	10:00:00 AM	42.98663	32.55935	59.88446	45.33322	41.16472	37.95083
2/9/2022	11:00:00 AM	46.72201	32.89962	66.64536	49.87713	42.52385	38.62856
2/9/2022	12:00:00 PM	44.5049	33.36595	67.08515	46.23092	41.41802	38.30325
2/9/2022	1:00:00 PM	46.78982	32.66016	69.55466	48.72832	42.3104	38.47762
2/9/2022	2:00:00 PM	47.31143	32.31566	68.55275	49.59667	41.8064	37.77034
2/9/2022	3:00:00 PM	49.82872	31.63011	71.86686	51.84022	42.08205	37.66683
2/9/2022	4:00:00 PM	50.64227	32.55674	72.7829	51.66189	43.04827	38.49944
2/9/2022	5:00:00 PM	56.00871	31.31071	75.58467	58.89282	45.21329	37.28822
2/9/2022	6:00:00 PM	42.34379	29.52322	62.54574	44.30803	38.63578	34.99709
2/9/2022	7:00:00 PM	37.40631	27.87271	50.7519	39.79593	36.28288	33.10227
2/9/2022	8:00:00 PM	37.43796	26.52647	59.41272	39.00976	34.79636	31.74297
2/9/2022	9:00:00 PM	38.19089	26.80176	53.72595	40.99871	36.24738	32.46187
2/9/2022	10:00:00 PM	43.83078	29.44937	66.78253	45.66832	38.66369	35.15471
2/9/2022	11:00:00 PM	49.96523	30.29876	70.58521	52.75752	41.94777	36.20428
2/10/2022	12:00:00 AM	52.9306	32.27769	72.22371	56.22673	44.78473	38.21529
2/10/2022	1:00:00 AM	51.25711	28.33773	70.28983	54.40167	39.89423	33.86626
2/10/2022	2:00:00 AM	45.44974	29.84826	64.18588	48.58494	40.27355	35.49673

2/10/2022	3:00:00 AM	41.52704	29.73301	61.04303	43.78559	38.18089	34.89513
2/10/2022	4:00:00 AM	43.80637	28.64695	66.67768	44.44046	36.72884	33.64219
2/10/2022	5:00:00 AM	40.82155	31.57393	51.98957	43.70265	39.3834	35.94417
2/10/2022	6:00:00 AM	39.96968	30.9544	55.60085	42.19222	38.26782	35.43771
2/10/2022	7:00:00 AM	41.56894	30.9008	57.81122	43.80656	39.1664	35.93071
2/10/2022	8:00:00 AM	43.14114	32.34693	57.8386	45.7807	41.06347	37.60998
2/10/2022	9:00:00 AM	49.15244	34.04073	74.04208	49.5267	43.80383	39.66009
2/10/2022	10:00:00 AM	42.43478	32.20226	58.51155	44.49908	40.51351	37.42266
2/10/2022	11:00:00 AM	42.50187	31.35037	58.53345	44.84557	40.37196	36.94873
2/10/2022	12:00:00 PM	42.32879	29.36097	70.55531	42.17132	37.76058	34.54493
2/10/2022	1:00:00 PM	51.36752	30.24801	75.94163	48.3478	40.12724	36.13302
2/10/2022	2:00:00 PM	43.8331	31.89965	69.34477	45.12959	40.06204	36.70817
2/10/2022	3:00:00 PM	43.39777	32.44595	59.34692	45.98995	41.65519	38.04207
2/10/2022	4:00:00 PM	44.62303	34.6102	58.53549	47.52901	42.89831	39.5827
2/10/2022	5:00:00 PM	47.94629	33.12417	68.9255	50.145	42.57211	38.18801
2/10/2022	6:00:00 PM	55.95786	32.89225	73.37735	59.65838	49.20416	40.16829
2/10/2022	7:00:00 PM	58.03572	32.79743	75.57814	61.98047	51.36058	41.32265
2/10/2022	8:00:00 PM	55.80856	30.35021	75.15526	59.14186	47.48115	38.30062
2/10/2022	9:00:00 PM	50.88664	30.06996	71.67305	53.72704	42.21941	35.89551
2/10/2022	10:00:00 PM	50.58884	29.03841	70.35233	53.42907	41.64171	35.39285
2/10/2022	11:00:00 PM	52.70845	31.61825	73.80475	55.63956	43.73983	37.37674
2/11/2022	12:00:00 AM	45.41329	28.24625	67.76244	47.5575	38.26713	34.13115
2/11/2022	1:00:00 AM	41.11698	28.64845	61.623	42.86879	37.84054	34.07454
2/11/2022	2:00:00 AM	40.50854	29.27264	55.53839	43.17723	38.27297	34.72423
2/11/2022	3:00:00 AM	43.05679	32.23706	61.12577	45.37931	41.1297	37.60801
2/11/2022	4:00:00 AM	44.78402	35.36705	56.91292	47.25733	43.50794	40.41067
2/11/2022	5:00:00 AM	43.66395	33.10485	55.16336	46.49891	42.36654	38.23174
2/11/2022	6:00:00 AM	42.93367	33.22239	58.81253	45.54353	41.67997	38.43693
2/11/2022	7:00:00 AM	54.16775	33.5323	80.06436	48.13544	42.46604	38.80316
2/11/2022	8:00:00 AM	45.17443	35.03703	59.32541	47.78482	43.05387	39.78726
2/11/2022	9:00:00 AM	43.52903	33.43887	56.92209	45.95864	41.82835	38.52774
2/11/2022	10:00:00 AM	44.45798	32.98141	59.1307	47.13401	42.61278	38.44514
2/11/2022	11:00:00 AM	43.93831	29.70542	62.65367	45.94368	38.61523	35.1446
2/11/2022	12:00:00 PM	44.38627	27.6579	69.91268	45.00079	37.19814	33.20335
2/11/2022	1:00:00 PM	45.78098	27.3391	67.91696	47.32403	37.45302	32.91219
2/11/2022	2:00:00 PM	41.31706	23.95632	62.16505	43.80118	34.11772	29.53558
2/11/2022	3:00:00 PM	44.02041	23.70122	65.58003	46.24228	35.52447	29.47043
2/11/2022	4:00:00 PM	42.81149	21.51944	66.95446	40.86167	31.21402	26.82761
2/11/2022	5:00:00 PM	45.45216	22.25824	66.24635	48.12149	36.61645	29.01909
2/11/2022	6:00:00 PM	50.12381	20.21384	72.71633	50.68832	33.76716	26.03229
2/11/2022	7:00:00 PM	55.6697	29.92242	73.7782	59.46975	47.91273	37.14684
2/11/2022	8:00:00 PM	56.81908	28.65194	74.25948	60.44553	48.65642	37.25466
2/11/2022	9:00:00 PM	54.5122	25.74147	71.79174	58.10378	45.92403	34.11115

2/11/2022	10:00:00 PM	49.99133	25.69814	69.43553	53.11045	41.06089	32.86641
2/11/2022	11:00:00 PM	52.61139	28.04983	72.7439	55.73191	43.91908	34.49545
2/12/2022	12:00:00 AM	47.0857	23.98316	69.58982	48.88015	35.38695	29.90299
2/12/2022	1:00:00 AM	41.41871	22.54003	61.12479	43.8033	32.92262	28.04181
2/12/2022	2:00:00 AM	41.24594	26.482	64.09014	41.8526	35.70925	31.81526
2/12/2022	3:00:00 AM	39.14299	26.97038	58.24625	41.19783	36.53367	32.6375
2/12/2022	4:00:00 AM	34.95882	24.61986	47.05103	37.7559	33.53708	29.86998
2/12/2022	5:00:00 AM	40.15699	26.95351	52.70941	43.64745	37.78622	32.82718
2/12/2022	6:00:00 AM	40.76587	27.25338	54.13234	44.08872	38.66678	32.98441
2/12/2022	7:00:00 AM	44.82329	29.94189	61.66197	47.17764	40.26656	35.75804
2/12/2022	8:00:00 AM	45.10275	31.9386	63.08998	48.13393	41.31169	37.53297
2/12/2022	9:00:00 AM	46.87596	34.15289	60.70928	49.91289	44.00825	39.94372
2/12/2022	10:00:00 AM	48.38858	35.72206	67.72484	50.44629	44.65616	40.76825
2/12/2022	11:00:00 AM	45.94116	32.68633	64.60425	48.67424	42.54559	38.21822
2/12/2022	12:00:00 PM	45.45764	33.22226	62.53854	48.30877	42.75902	38.96268
2/12/2022	1:00:00 PM	45.8117	31.75364	62.34345	48.85316	42.62835	38.28585
2/12/2022	2:00:00 PM	44.47345	28.70201	64.37881	46.20719	39.72218	35.43095
2/12/2022	3:00:00 PM	41.84835	27.65005	57.90455	45.03121	38.98273	34.25562
2/12/2022	4:00:00 PM	42.29551	28.3931	56.93612	45.72568	39.82677	35.02912
2/12/2022	5:00:00 PM	52.02666	30.72136	70.65637	55.50579	44.90206	37.83069
2/12/2022	6:00:00 PM	56.61432	30.64608	76.55835	59.97249	48.85293	38.56151
2/12/2022	7:00:00 PM	55.57047	28.1043	74.03139	58.78438	45.77158	34.33392
2/12/2022	8:00:00 PM	41.9321	24.69737	63.67781	43.24046	34.87668	30.02931
2/12/2022	9:00:00 PM	41.21705	25.81631	61.81396	43.80072	37.02581	31.61507
2/12/2022	10:00:00 PM	43.89638	28.34664	64.14174	45.90834	37.70967	33.55921
2/12/2022	11:00:00 PM	41.32569	27.32741	63.90494	43.17548	37.93027	33.39896
2/13/2022	12:00:00 AM	40.33283	27.32101	58.31126	42.01603	36.89489	32.67054
2/13/2022	1:00:00 AM	40.95794	28.13364	52.37319	44.24542	39.09718	34.17966
2/13/2022	2:00:00 AM	42.13167	28.59417	54.06202	45.38603	40.30821	35.34785
2/13/2022	3:00:00 AM	40.80674	30.68345	53.79235	43.72668	39.15956	35.5961
2/13/2022	4:00:00 AM	42.56251	30.41887	53.92296	46.1145	40.14837	35.69097
2/13/2022	5:00:00 AM	43.55506	32.07154	55.0239	46.99461	41.67521	37.33153
2/13/2022	6:00:00 AM	41.48822	30.56057	52.67628	44.51588	40.09215	35.98039
2/13/2022	7:00:00 AM	56.61502	32.06741	80.88639	55.79236	46.64937	38.81859
2/13/2022	8:00:00 AM	44.52492	33.17453	57.61221	47.74103	42.28417	38.35577
2/13/2022	9:00:00 AM	43.52956	33.10163	56.44692	46.42955	41.84965	38.24041
2/13/2022	10:00:00 AM	43.21951	30.62535	60.14663	45.83158	40.76917	36.48415
2/13/2022	11:00:00 AM	44.12542	29.47046	62.91623	47.18736	40.9007	36.0894
2/13/2022	12:00:00 PM	42.61023	28.07772	57.79784	46.12085	39.47716	34.55746
2/13/2022	1:00:00 PM	43.77366	21.90938	67.42266	45.49015	34.49075	28.06959
2/13/2022	2:00:00 PM	49.62512	23.61248	74.27774	49.11129	35.9957	29.91384
2/13/2022	3:00:00 PM	53.01562	26.78104	75.1684	55.92137	44.19839	34.86094
2/13/2022	4:00:00 PM	43.78997	21.07719	65.74691	46.43663	34.34192	27.55006

2/13/2022	5:00:00 PM	49.63171	24.41875	71.61389	51.98359	40.58134	31.64917
2/13/2022	6:00:00 PM	47.02774	24.16838	70.21561	49.20335	39.97111	32.23756
2/13/2022	7:00:00 PM	51.7945	24.30198	72.03526	54.45626	42.74607	33.30851
2/13/2022	8:00:00 PM	52.71699	26.46612	71.94518	55.85773	43.81888	33.7181
2/13/2022	9:00:00 PM	51.91485	26.49961	72.06987	54.86892	42.1351	33.02191
2/13/2022	10:00:00 PM	47.95938	22.93654	70.02866	50.55422	37.04411	29.39392
2/13/2022	11:00:00 PM	43.42711	23.34821	66.43828	45.6796	35.97127	29.49042
2/14/2022	12:00:00 AM	42.00327	26.98254	62.50905	43.98373	37.02735	32.74657
2/14/2022	1:00:00 AM	40.15766	27.91665	57.60556	42.81906	37.53665	33.29146
2/14/2022	2:00:00 AM	40.85232	26.89739	56.44148	44.00528	37.76255	32.81012
2/14/2022	3:00:00 AM	42.02081	27.36973	58.9123	44.79849	38.26494	33.60348
2/14/2022	4:00:00 AM	38.14403	27.22326	52.95404	40.91458	36.39688	32.6964
2/14/2022	5:00:00 AM	40.32082	28.01151	53.82996	43.23116	38.03001	33.87383
2/14/2022	6:00:00 AM	41.77277	28.25387	55.74503	45.13939	39.50245	34.21959
2/14/2022	7:00:00 AM	44.34644	29.66982	60.52441	47.50537	41.68089	36.48802
2/14/2022	8:00:00 AM	46.34328	30.93532	70.07012	48.76337	42.0039	37.15192
2/14/2022	9:00:00 AM	45.70167	30.40658	67.73895	48.31299	40.99253	36.13351
2/14/2022	10:00:00 AM	49.52913	31.44662	67.20747	52.82627	44.19201	37.99408
2/14/2022	11:00:00 AM	46.95825	31.06858	65.71444	49.99984	42.55636	37.42872
2/14/2022	12:00:00 PM	51.85224	25.95696	76.04566	52.14633	38.81613	32.11199
2/14/2022	1:00:00 PM	63.32861	30.28062	79.7009	67.54887	53.96439	40.9342
2/14/2022	2:00:00 PM	63.89535	35.16865	80.62944	68.08375	56.88392	45.88861
2/14/2022	3:00:00 PM	61.7039	30.44135	80.44509	65.44364	51.27371	38.08569
2/14/2022	4:00:00 PM	53.00145	27.43539	78.70044	52.7313	39.38037	33.53184
2/14/2022	5:00:00 PM	52.64386	30.66446	74.53541	54.54187	43.29454	37.00684
2/14/2022	6:00:00 PM	55.17924	31.76578	75.46261	57.58816	45.69301	38.30041
2/14/2022	7:00:00 PM	58.63655	32.38579	76.66028	61.66699	50.69318	41.46496
2/14/2022	8:00:00 PM	55.19717	30.39713	76.4135	56.83891	44.56913	37.12124
2/14/2022	9:00:00 PM	51.70666	28.1242	73.42575	54.20084	42.36343	35.13556
2/14/2022	10:00:00 PM	47.10561	26.90586	67.91859	49.5475	38.1655	33.05278
2/14/2022	11:00:00 PM	47.47204	26.51632	68.88992	48.83293	40.43445	33.12187
2/15/2022	12:00:00 AM	45.67466	32.40811	63.12722	48.62654	43.19252	38.76758
2/15/2022	1:00:00 AM	46.82735	34.72532	59.41052	50.18599	44.69818	40.33454
2/15/2022	2:00:00 AM	46.91483	34.98779	60.91451	49.80713	45.05798	40.81878
2/15/2022	3:00:00 AM	48.83617	36.64962	68.52043	50.96704	46.15388	42.17048
2/15/2022	4:00:00 AM	52.66502	30.83192	74.29768	54.95295	43.13876	36.29756
2/15/2022	5:00:00 AM	52.3723	27.39716	75.05508	54.22718	41.18473	33.76336
2/15/2022	6:00:00 AM	44.18777	25.10196	65.28126	46.77274	37.63757	31.57001
2/15/2022	7:00:00 AM	36.90947	22.09578	58.81339	38.92303	32.01497	27.81209
2/15/2022	8:00:00 AM	36.96795	23.00695	60.02481	38.10892	31.63593	28.14107
2/15/2022	9:00:00 AM	42.03027	22.54723	66.25505	43.93959	33.72728	28.88716
2/15/2022	10:00:00 AM	39.35457	23.99387	60.67024	41.52826	34.25307	29.71222
2/15/2022	11:00:00 AM	43.34736	24.02905	66.04313	46.12273	36.11215	30.15666

2/15/2022	12:00:00 PM	41.71197	25.0242	61.75033	44.22515	35.55512	30.74004
2/15/2022	1:00:00 PM	40.90021	26.83566	60.87629	43.81113	36.29585	32.03162
2/15/2022	2:00:00 PM	39.26643	25.14373	59.43525	41.04243	34.67456	30.57767
2/15/2022	3:00:00 PM	41.67393	24.45849	67.71494	42.13	34.5477	29.72109
2/15/2022	4:00:00 PM	48.9841	32.33531	70.56422	50.35597	41.08613	37.26748
2/15/2022	5:00:00 PM	47.16128	31.05011	66.80266	49.86424	40.54207	36.40025
2/15/2022	9:00:00 PM	46.61125	32.94799	74.71042	44.02212	40.30962	37.40834
2/15/2022	10:00:00 PM	45.78765	31.8454	67.75216	44.35284	39.79737	36.86718
2/15/2022	11:00:00 PM	43.32315	31.49516	59.93723	45.9833	40.12836	36.7259
2/16/2022	12:00:00 AM	43.55484	30.39715	63.75497	45.70706	39.37086	35.74645
2/16/2022	1:00:00 AM	43.65344	29.68618	66.3344	44.5816	38.44895	35.16885
2/16/2022	2:00:00 AM	41.07313	29.17721	61.5669	42.6374	38.37621	34.87059
2/16/2022	3:00:00 AM	39.25867	28.53836	53.77374	42.05513	37.37563	33.85936
2/16/2022	4:00:00 AM	42.52271	30.92658	58.3068	45.62814	39.53142	35.93449
2/16/2022	5:00:00 AM	45.04872	29.71056	63.66378	47.97896	41.08375	35.87254
2/16/2022	6:00:00 AM	50.19159	31.62425	70.92523	52.96713	43.11588	37.70061
2/16/2022	7:00:00 AM	52.06933	31.08635	71.07999	55.17286	44.54204	37.44571
2/16/2022	8:00:00 AM	53.38086	32.17193	71.76954	56.84965	45.92294	38.4419
2/16/2022	9:00:00 AM	52.31654	32.21317	70.15361	55.66598	44.776	38.38725
2/16/2022	10:00:00 AM	51.64051	31.42431	72.52025	53.99493	42.40584	37.13336
2/16/2022	11:00:00 AM	52.28018	30.19726	73.66739	53.70334	41.67531	36.55043
2/16/2022	12:00:00 PM	41.7495	30.46623	61.34617	43.98464	39.28014	35.70436
2/16/2022	1:00:00 PM	44.98932	32.15166	63.50296	47.29839	41.49905	37.91022
2/16/2022	2:00:00 PM	40.49197	30.60213	55.7141	42.40729	38.35586	35.26446
2/16/2022	3:00:00 PM	41.98078	30.08366	62.42846	43.73464	38.76098	35.54843
2/16/2022	4:00:00 PM	38.27535	30.24382	49.65694	40.4695	37.3136	34.56052
2/16/2022	5:00:00 PM	39.71832	29.46378	51.34105	42.58264	38.37664	34.73784
2/16/2022	6:00:00 PM	41.12944	30.2815	56.08691	43.12443	39.35232	35.97548
2/16/2022	7:00:00 PM	42.00325	31.05324	54.26189	44.78311	40.54485	37.07994
2/16/2022	8:00:00 PM	43.6556	33.40312	54.82697	46.4428	42.39551	38.9771
2/16/2022	9:00:00 PM	45.09877	35.60218	56.59532	47.65629	44.04773	40.86001
2/16/2022	10:00:00 PM	42.39336	32.41997	55.65815	44.83157	41.05084	37.831
2/16/2022	11:00:00 PM	44.10812	29.05736	73.86539	44.62349	39.3442	35.23085
2/17/2022	12:00:00 AM	38.98363	28.00907	59.17597	41.40141	36.79812	33.31489
2/17/2022	1:00:00 AM	47.86659	26.59253	77.82413	43.59277	36.89442	32.62973
2/17/2022	2:00:00 AM	41.07769	25.41255	63.04647	42.95183	36.46353	32.09215
2/17/2022	3:00:00 AM	39.68357	24.10125	60.88614	41.34224	34.5456	30.06977
2/17/2022	4:00:00 AM	35.64525	23.56117	54.03234	38.09869	32.80648	29.00566
2/17/2022	5:00:00 AM	48.60009	24.99103	70.16182	51.60662	38.53037	31.39876
2/17/2022	6:00:00 AM	56.34156	29.49904	75.40511	59.83404	48.44524	38.11853
2/17/2022	7:00:00 AM	57.37784	30.47045	74.88558	61.02033	49.27328	38.48643
2/17/2022	8:00:00 AM	55.80237	27.3131	74.13157	59.3203	46.11433	35.24936
2/17/2022	9:00:00 AM	53.62835	27.23731	73.63334	56.89154	43.83343	34.13574

2/17/2022	10:00:00 AM	54.70117	27.87847	74.04181	57.63852	44.6898	35.14811
2/17/2022	11:00:00 AM	54.05447	28.7819	74.99889	56.71045	44.33404	35.53066
2/17/2022	12:00:00 PM	43.18666	25.0776	66.59754	42.27707	34.70927	30.75078
2/17/2022	1:00:00 PM	37.23083	24.52931	55.398	38.19181	33.16224	29.79328
2/17/2022	2:00:00 PM	35.00248	24.99901	59.75687	36.81363	33.03016	29.78063
2/17/2022	3:00:00 PM	39.21583	27.22904	52.94179	41.8866	36.55229	32.57887
2/17/2022	4:00:00 PM	38.14294	28.88021	49.4417	41.07491	36.75876	33.37906
2/17/2022	5:00:00 PM	38.7376	28.61933	51.833	41.46957	37.14578	33.79082
2/17/2022	6:00:00 PM	39.67428	28.78065	52.62035	42.21729	37.70638	33.99916
2/17/2022	7:00:00 PM	42.24477	31.71353	55.5003	45.19111	40.57519	36.82284
2/17/2022	8:00:00 PM	43.60378	33.83034	56.10797	46.28036	41.94023	38.61007
2/17/2022	9:00:00 PM	42.83732	32.24086	54.65718	45.58611	41.33872	37.68246
2/17/2022	10:00:00 PM	44.50749	32.36851	65.22658	46.38115	41.46781	37.68501
2/17/2022	11:00:00 PM	42.96602	31.4053	61.47025	45.14933	40.42361	36.68144
2/18/2022	12:00:00 AM	41.71178	26.04612	60.42203	44.53352	37.01624	31.85762
2/18/2022	1:00:00 AM	48.5927	25.55982	69.88011	50.94866	38.49244	31.78452
2/18/2022	2:00:00 AM	51.50436	27.15099	73.25696	54.05314	42.56674	34.6484
2/18/2022	3:00:00 AM	51.65995	26.6751	72.4944	55.01902	43.4241	34.04752
2/18/2022	4:00:00 AM	46.14194	24.21074	69.69712	48.51322	37.49521	30.53802
2/18/2022	5:00:00 AM	43.461	26.65192	64.06667	46.24927	37.87765	32.64415
2/18/2022	6:00:00 AM	51.64453	28.78949	71.49023	54.88192	43.46719	35.20908
2/18/2022	7:00:00 AM	52.61786	29.03707	72.30604	55.59329	44.86608	36.64022
2/18/2022	8:00:00 AM	57.08766	33.3242	76.57657	60.21806	48.33397	40.38575
2/18/2022	9:00:00 AM	48.36663	26.82439	71.79237	48.12643	38.97416	32.79524
2/18/2022	10:00:00 AM	52.18996	30.19617	75.71187	51.94302	41.94557	37.12044
2/18/2022	11:00:00 AM	46.6814	28.58652	67.79898	49.08631	40.10723	34.6869
2/18/2022	12:00:00 PM	50.69903	27.13764	76.35483	50.46581	38.7368	33.29889
2/18/2022	1:00:00 PM	42.76455	30.25611	62.75063	45.71709	40.21526	36.01757
2/18/2022	2:00:00 PM	44.79782	29.43104	62.49303	47.80295	41.14745	35.83374
2/18/2022	3:00:00 PM	48.38441	30.56653	67.65263	51.30976	43.26961	37.47445
2/18/2022	4:00:00 PM	47.37705	28.96741	67.10501	50.18709	42.46559	36.26348
2/18/2022	5:00:00 PM	42.71553	29.5049	59.93299	44.89182	39.04008	34.94468
2/18/2022	6:00:00 PM	51.19308	29.47955	73.64146	51.38622	39.02127	34.6399
2/18/2022	7:00:00 PM	49.73878	28.08989	69.94521	51.68531	41.8083	35.60139
2/18/2022	8:00:00 PM	49.20753	30.06001	68.94314	51.03383	40.45929	35.36519
2/18/2022	9:00:00 PM	50.68234	30.80677	70.38838	54.23375	45.01959	37.63783
2/18/2022	10:00:00 PM	58.37414	30.63548	79.4413	61.22298	47.85522	37.55456
2/18/2022	11:00:00 PM	61.76945	33.3972	79.22142	65.62945	52.52383	41.62889
2/19/2022	12:00:00 AM	64.58807	36.86016	79.71831	68.89589	57.77355	46.74583
2/19/2022	1:00:00 AM	67.73676	38.19238	81.7958	72.074	62.58661	51.62487
2/19/2022	2:00:00 AM	62.59945	34.03878	78.38023	66.87571	55.12785	44.57786
2/19/2022	3:00:00 AM	58.28485	33.04427	77.32686	61.26413	48.52744	39.77239
2/19/2022	4:00:00 AM	57.03614	34.96087	75.47184	60.21772	48.88481	41.53102

2/19/2022	5:00:00 AM	55.08168	33.65921	74.34972	58.15958	47.72661	40.5723
2/19/2022	6:00:00 AM	58.99035	37.39709	76.8103	62.57264	52.31381	44.29337
2/19/2022	7:00:00 AM	56.9087	34.52819	75.54573	59.93621	48.45381	41.95035
2/19/2022	8:00:00 AM	54.01473	38.29471	74.11951	56.20171	48.30853	43.8027
2/19/2022	9:00:00 AM	54.9948	40.74896	74.02298	57.49273	50.16911	45.80704
2/19/2022	10:00:00 AM	50.51569	36.33891	70.68414	52.95648	47.19335	42.59333
2/19/2022	11:00:00 AM	49.81325	35.96411	63.34609	52.88929	48.10212	43.49694
2/19/2022	12:00:00 PM	48.84337	33.26519	64.55361	52.08105	46.46366	40.61369
2/19/2022	1:00:00 PM	49.50562	37.92342	64.36767	52.4264	47.57919	43.36532
2/19/2022	2:00:00 PM	51.55644	38.02638	63.15728	54.61507	49.91258	45.03279
2/19/2022	3:00:00 PM	48.56021	36.06486	60.28595	51.51353	47.02268	42.68448
2/19/2022	4:00:00 PM	37.68434	25.29289	55.41714	40.05359	34.23774	30.28315
2/19/2022	5:00:00 PM	41.9329	23.98709	61.27994	45.145	34.42858	29.51204
2/19/2022	6:00:00 PM	45.10287	30.6347	60.66374	48.32873	42.28213	37.14844
2/19/2022	7:00:00 PM	46.17364	30.53552	66.9058	48.39744	41.69698	37.07547
2/19/2022	8:00:00 PM	40.0955	26.98543	58.5508	42.57287	38.97062	32.72164
2/19/2022	9:00:00 PM	35.64452	23.9418	54.73221	36.06979	31.99899	29.0297
2/19/2022	10:00:00 PM	38.75592	24.37312	54.85397	42.83558	32.88089	29.31474
2/19/2022	11:00:00 PM	39.54791	23.62573	62.30183	41.39277	32.77497	29.00763
2/20/2022	12:00:00 AM	51.83794	24.01583	73.1279	53.46282	41.37612	30.29905
2/20/2022	1:00:00 AM	43.14722	26.34668	60.65407	46.44392	39.20769	32.6211
2/20/2022	2:00:00 AM	37.17084	23.74939	55.09035	39.83938	32.84977	28.98955
2/20/2022	3:00:00 AM	50.50932	24.26271	75.32543	50.43829	36.91611	30.15267
2/20/2022	4:00:00 AM	37.98496	23.79997	59.14608	39.4672	32.51016	28.83584
2/20/2022	5:00:00 AM	55.20107	24.55777	74.73399	57.87406	41.09528	30.84738
2/20/2022	6:00:00 AM	51.17953	29.20352	71.95383	54.21089	43.17558	35.53808
2/20/2022	7:00:00 AM	48.43063	28.82731	71.12572	50.81179	40.98726	35.01969
2/20/2022	8:00:00 AM	48.24768	29.18776	67.79718	51.10729	42.01276	35.87408
2/20/2022	9:00:00 AM	56.26042	28.53794	75.74875	59.62247	45.6732	35.95442
2/20/2022	10:00:00 AM	57.83538	26.85355	76.52812	60.93906	44.65313	33.23695
2/20/2022	11:00:00 AM	46.79413	24.49388	67.80412	47.78489	39.75591	33.74478
2/20/2022	12:00:00 PM	37.27165	21.15146	59.90026	38.32249	30.02212	26.4072
2/20/2022	1:00:00 PM	52.59326	25.9805	74.76305	53.87144	43.10172	33.62559
2/20/2022	2:00:00 PM	53.92873	28.13468	76.69049	54.29762	41.81801	34.43927
2/20/2022	3:00:00 PM	48.96083	35.10754	68.5895	51.43093	46.21923	41.29621
2/20/2022	4:00:00 PM	46.72343	34.35435	59.05339	49.58292	45.36483	41.05493
2/20/2022	5:00:00 PM	49.87614	33.4761	70.06965	52.49328	44.37532	39.72484
2/20/2022	6:00:00 PM	47.01867	24.15554	73.25607	46.4795	36.33521	30.7527
2/20/2022	7:00:00 PM	58.19432	23.41475	78.66899	61.06971	42.71592	29.58333
2/20/2022	8:00:00 PM	58.81503	35.31209	77.02474	61.9777	52.56734	42.44947

WM3: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	11:58:36 AM	60.57846	34.93134	77.36344	50.43648	41.75961	38.24092
2/8/2022	12:00:00 PM	67.20591	0	83.14864	73.92931	41.41205	0
2/8/2022	1:00:00 PM	47.85706	0	70.83047	49.57924	38.58834	0
2/8/2022	2:00:00 PM	47.78733	0	69.43151	50.0586	0	0
2/8/2022	3:00:00 PM	43.59546	0	64.74482	46.03443	38.50787	0
2/8/2022	4:00:00 PM	54.88371	0	79.77722	53.58988	43.09656	33.08261
2/8/2022	5:00:00 PM	62.15082	32.7035	83.40273	64.13846	51.87029	42.34684
2/8/2022	6:00:00 PM	67.25655	31.67242	86.6439	70.33019	52.98508	40.89897
2/8/2022	7:00:00 PM	67.07656	32.21447	86.23312	70.04853	54.68647	41.8461
2/8/2022	8:00:00 PM	68.50561	31.2495	85.32635	72.33008	57.74176	41.7487
2/8/2022	9:00:00 PM	54.84666	29.30859	76.87613	56.68207	42.4502	36.9973
2/8/2022	10:00:00 PM	55.19143	30.03452	77.71196	56.98338	44.276	37.66878
2/8/2022	11:00:00 PM	57.52029	30.27168	78.95498	59.77424	44.89601	37.77934
2/9/2022	12:00:00 AM	56.53993	29.72571	78.28076	58.74154	45.11813	37.83146
2/9/2022	1:00:00 AM	42.53835	29.53899	62.1605	44.39434	40.06758	36.34063
2/9/2022	2:00:00 AM	44.51351	32.15464	55.17552	47.40359	43.17967	39.09222
2/9/2022	3:00:00 AM	53.50655	32.9979	79.55164	51.04556	43.70783	39.41921
2/9/2022	4:00:00 AM	51.36048	32.59483	75.79782	50.35667	42.61854	38.96921
2/9/2022	5:00:00 AM	46.295	34.02415	68.48524	48.00477	44.07768	40.40999
2/9/2022	6:00:00 AM	47.64496	36.06019	70.3104	50.02664	45.60626	41.93367
2/9/2022	7:00:00 AM	47.6769	35.71929	67.32919	49.44126	45.45616	42.03302
2/9/2022	8:00:00 AM	50.04374	35.69478	69.85596	52.58055	46.52607	42.49882
2/9/2022	9:00:00 AM	54.17525	34.41888	83.4973	50.57141	45.38514	41.30394
2/9/2022	10:00:00 AM	49.65473	36.25553	69.02423	51.60042	46.70353	43.00802
2/9/2022	11:00:00 AM	57.65074	37.34364	81.3854	59.69579	49.60847	44.55017
2/9/2022	12:00:00 PM	56.10323	37.51514	80.7548	57.75817	48.40309	43.96471
2/9/2022	1:00:00 PM	58.24275	37.17397	82.48271	58.80451	49.18203	44.35252
2/9/2022	2:00:00 PM	59.08792	36.82284	82.16965	60.15903	49.50851	44.27371
2/9/2022	3:00:00 PM	63.87644	36.9932	85.9345	66.5911	54.06261	45.6551
2/9/2022	4:00:00 PM	63.3033	36.34144	83.76535	66.01247	52.89274	45.29253
2/9/2022	5:00:00 PM	69.34214	35.81186	89.37608	72.92644	58.64095	44.91275
2/9/2022	6:00:00 PM	54.64801	33.80422	75.30703	56.66717	45.78148	41.11175
2/9/2022	7:00:00 PM	44.55421	32.42815	61.03	46.67627	42.53745	38.94167
2/9/2022	8:00:00 PM	49.45486	31.4527	76.27181	49.69836	41.89228	37.97543
2/9/2022	9:00:00 PM	47.20243	31.67922	69.04382	48.41487	42.63761	38.54872
2/9/2022	10:00:00 PM	57.10443	34.28326	82.11844	59.11027	47.24206	41.9185
2/9/2022	11:00:00 PM	63.71242	35.85652	83.15268	67.12786	55.02074	44.97731
2/10/2022	12:00:00 AM	66.82382	36.74708	85.21975	70.47914	58.01762	46.32958
2/10/2022	1:00:00 AM	65.35054	33.11628	83.46123	68.81122	52.21953	40.3412
2/10/2022	2:00:00 AM	58.80438	33.60369	78.12718	62.1065	49.86491	41.52453

2/10/2022	3:00:00 AM	53.64645	33.47416	75.74419	55.45855	45.00112	40.47266
2/10/2022	4:00:00 AM	57.3291	32.71987	79.55724	58.13292	44.3676	39.59207
2/10/2022	5:00:00 AM	46.57546	35.3173	61.92745	49.17914	44.721	40.91809
2/10/2022	6:00:00 AM	47.20856	34.92476	68.64471	49.23798	44.29205	40.72112
2/10/2022	7:00:00 AM	46.83278	35.08197	65.10669	48.86963	44.60445	41.06182
2/10/2022	8:00:00 AM	47.67243	36.23216	61.14446	50.33368	45.9817	42.33402
2/10/2022	9:00:00 AM	57.70316	37.82887	84.17502	53.70931	48.16044	44.13553
2/10/2022	10:00:00 AM	47.94821	36.32254	63.4558	50.37807	46.08674	42.48663
2/10/2022	11:00:00 AM	48.92645	35.23453	71.04378	50.94482	45.76772	41.92947
2/10/2022	12:00:00 PM	53.06124	34.11814	82.07738	52.37694	44.91916	40.72192
2/10/2022	1:00:00 PM	62.70258	34.87854	86.37879	60.177	48.16011	42.41561
2/10/2022	2:00:00 PM	52.83449	35.90194	78.28581	54.30309	46.68042	42.33509
2/10/2022	3:00:00 PM	51.20317	36.42493	72.08171	53.38778	46.96397	42.89524
2/10/2022	4:00:00 PM	50.39904	37.70153	70.82784	52.39141	47.29502	43.58587
2/10/2022	5:00:00 PM	60.99877	36.41398	82.58713	63.2882	51.65864	43.29685
2/10/2022	6:00:00 PM	69.75431	37.96148	86.76487	73.74345	63.42957	51.47266
2/10/2022	7:00:00 PM	71.81568	39.0595	87.06822	75.93489	65.90818	54.60427
2/10/2022	8:00:00 PM	69.48082	35.10261	87.14431	73.28074	61.40734	47.97169
2/10/2022	9:00:00 PM	64.7913	34.75213	84.33433	68.07119	55.30602	43.76688
2/10/2022	10:00:00 PM	64.66999	34.22588	83.53438	68.02552	54.55142	43.16554
2/10/2022	11:00:00 PM	66.51054	35.94859	86.05862	69.94909	56.58033	44.28753
2/11/2022	12:00:00 AM	59.04691	33.08341	80.68297	61.39849	45.95563	40.1014
2/11/2022	1:00:00 AM	51.95079	32.93145	73.77193	51.79602	43.30182	39.2335
2/11/2022	2:00:00 AM	49.32712	33.22132	69.038	50.80884	43.7405	39.75368
2/11/2022	3:00:00 AM	51.7789	35.49503	75.02106	52.80235	45.70685	41.76773
2/11/2022	4:00:00 AM	48.4624	37.88191	61.94737	50.97639	47.2753	43.92589
2/11/2022	5:00:00 AM	47.61131	36.26702	59.34912	50.40599	46.25522	42.17764
2/11/2022	6:00:00 AM	48.45803	36.47447	72.54982	50.26786	46.28957	42.75294
2/11/2022	7:00:00 AM	57.66756	36.72981	84.37009	51.43777	46.33359	42.58966
2/11/2022	8:00:00 AM	48.68936	37.64326	62.74913	51.32688	47.00256	43.47223
2/11/2022	9:00:00 AM	47.48664	36.62129	60.64121	50.01069	46.11211	42.5972
2/11/2022	10:00:00 AM	48.79551	36.2409	68.96831	51.16577	46.65336	42.52552
2/11/2022	11:00:00 AM	47.7812	33.89126	68.47499	50.07241	44.44518	40.64823
2/11/2022	12:00:00 PM	51.646	32.09307	78.30309	52.68427	44.13514	39.08232
2/11/2022	1:00:00 PM	57.6048	30.90059	79.45337	59.03779	46.10039	38.42186
2/11/2022	2:00:00 PM	53.92177	28.4963	75.77635	56.02328	43.11455	36.18498
2/11/2022	3:00:00 PM	56.329	27.67776	78.62239	58.57152	45.2777	36.01469
2/11/2022	4:00:00 PM	52.85929	25.70314	75.09434	53.91624	40.11292	33.69028
2/11/2022	5:00:00 PM	59.75091	27.95779	80.0891	62.79552	49.77273	38.36117
2/11/2022	6:00:00 PM	63.95942	25.44492	85.89744	65.29567	47.14272	34.41788
2/11/2022	7:00:00 PM	69.58235	33.9233	86.20725	73.62848	62.6083	49.26915
2/11/2022	8:00:00 PM	70.59056	34.05666	87.08269	74.59822	63.43405	49.70647
2/11/2022	9:00:00 PM	68.53073	31.27378	84.57599	72.44505	60.66319	46.19512

2/11/2022	10:00:00 PM	64.23635	30.40231	83.93849	67.61339	54.7804	42.02201
2/11/2022	11:00:00 PM	66.56018	32.23835	85.19871	70.13938	58.1707	44.82196
2/12/2022	12:00:00 AM	61.21609	28.25141	83.10742	63.45259	45.06236	36.19357
2/12/2022	1:00:00 AM	55.46184	27.46323	76.22068	57.30469	40.32861	34.16135
2/12/2022	2:00:00 AM	54.12362	30.1351	79.00408	52.49938	41.24534	36.68103
2/12/2022	3:00:00 AM	49.0187	29.97976	72.42202	47.34807	41.3732	37.07208
2/12/2022	4:00:00 AM	40.1635	28.20905	53.42769	42.91649	38.6596	34.70734
2/12/2022	5:00:00 AM	44.46148	29.72978	60.60299	47.38911	41.38902	36.72575
2/12/2022	6:00:00 AM	45.09854	31.00017	59.30236	48.40541	42.93525	37.63787
2/12/2022	7:00:00 AM	47.0013	32.60934	63.32212	49.56715	43.48996	39.17802
2/12/2022	8:00:00 AM	47.5231	34.43881	65.26956	50.42825	44.70546	40.70399
2/12/2022	9:00:00 AM	50.07191	37.12741	63.66358	53.0489	47.75756	43.51579
2/12/2022	10:00:00 AM	51.04729	37.82133	69.25318	53.56987	47.86596	43.5235
2/12/2022	11:00:00 AM	51.48323	35.17973	72.91497	54.27033	46.65504	41.60014
2/12/2022	12:00:00 PM	54.44169	35.70372	77.05291	57.36434	48.42727	42.62422
2/12/2022	1:00:00 PM	53.7664	34.15028	73.63138	56.57826	47.06162	41.46738
2/12/2022	2:00:00 PM	50.06777	31.77553	71.19985	52.59907	44.36929	39.27818
2/12/2022	3:00:00 PM	48.36441	30.63567	67.01161	51.24225	43.37439	38.13861
2/12/2022	4:00:00 PM	47.14491	31.31503	66.80069	49.90014	43.82778	38.88111
2/12/2022	5:00:00 PM	65.9356	34.54934	84.39406	69.70957	57.37798	45.66805
2/12/2022	6:00:00 PM	70.38967	34.93951	88.64609	74.19382	63.24781	50.17447
2/12/2022	7:00:00 PM	69.14242	31.14517	85.24529	72.91556	60.36799	43.72422
2/12/2022	8:00:00 PM	52.42513	27.68505	75.22989	52.63107	40.73009	34.3676
2/12/2022	9:00:00 PM	52.82514	28.52357	74.45049	55.11772	42.737	35.68089
2/12/2022	10:00:00 PM	57.04092	30.42102	78.32012	59.01776	41.91047	36.56378
2/12/2022	11:00:00 PM	51.8311	29.82733	78.44141	50.82165	41.35075	36.54242
2/13/2022	12:00:00 AM	43.53138	29.5754	60.5461	45.8666	40.38528	35.86225
2/13/2022	1:00:00 AM	44.05968	30.46	56.01185	47.30146	42.22273	37.22479
2/13/2022	2:00:00 AM	45.50445	31.02132	58.57755	48.83256	43.4335	38.27748
2/13/2022	3:00:00 AM	44.70304	33.38485	60.23086	47.61756	42.89596	38.96638
2/13/2022	4:00:00 AM	46.57262	33.2269	62.4167	49.7886	43.83974	39.28079
2/13/2022	5:00:00 AM	47.0585	34.61204	58.74709	50.44666	45.18454	40.66829
2/13/2022	6:00:00 AM	45.55228	33.48238	58.93766	48.48564	44.08324	39.87587
2/13/2022	7:00:00 AM	59.60999	35.02869	83.5089	59.59936	49.79193	42.23624
2/13/2022	8:00:00 AM	48.31282	35.86498	64.66021	51.28004	45.85754	41.73978
2/13/2022	9:00:00 AM	47.12648	35.68375	60.91597	50.05171	45.45331	41.59427
2/13/2022	10:00:00 AM	46.99686	33.41511	62.30283	49.99783	44.72812	40.21747
2/13/2022	11:00:00 AM	48.58296	31.97117	66.77673	51.84227	44.98597	39.7541
2/13/2022	12:00:00 PM	47.63397	31.22087	69.03843	50.36319	43.38912	38.34038
2/13/2022	1:00:00 PM	57.27463	26.55362	80.89864	58.85705	44.20973	34.63494
2/13/2022	2:00:00 PM	62.31551	27.78563	85.02265	63.37357	46.63314	36.83808
2/13/2022	3:00:00 PM	66.46989	32.79647	86.86624	69.88288	58.36568	46.69816
2/13/2022	4:00:00 PM	56.00802	26.253	77.23963	58.34325	44.21935	34.99381

2/13/2022	5:00:00 PM	63.36591	29.37597	84.45218	66.07791	53.55372	39.27482
2/13/2022	6:00:00 PM	60.06275	27.85713	82.90815	62.48329	49.60666	37.78971
2/13/2022	7:00:00 PM	65.59768	29.35032	84.80964	68.8074	56.52202	44.10417
2/13/2022	8:00:00 PM	66.68102	29.97651	84.4495	70.20994	58.21662	44.10862
2/13/2022	9:00:00 PM	65.96228	31.01615	84.8991	69.36983	56.33202	43.13437
2/13/2022	10:00:00 PM	62.1215	28.18642	84.12667	64.89312	50.29037	37.32601
2/13/2022	11:00:00 PM	57.0097	27.36358	78.85301	59.67015	45.75886	35.44033
2/14/2022	12:00:00 AM	53.92991	29.8892	77.28167	55.00744	43.4581	37.22691
2/14/2022	1:00:00 AM	46.90382	30.57777	68.58014	47.88228	41.40257	36.85845
2/14/2022	2:00:00 AM	48.5632	29.17664	69.92315	50.13075	41.16201	35.95698
2/14/2022	3:00:00 AM	52.9974	30.1845	72.97936	55.19518	42.34131	37.27982
2/14/2022	4:00:00 AM	42.32094	29.82409	60.44989	44.81977	40.26681	36.34442
2/14/2022	5:00:00 AM	46.10909	31.01943	64.71502	48.55809	42.69778	37.97223
2/14/2022	6:00:00 AM	45.80514	31.3999	61.41344	49.0304	43.40274	38.33944
2/14/2022	7:00:00 AM	52.91828	32.97913	74.40537	55.27206	46.47745	40.64425
2/14/2022	8:00:00 AM	56.65318	34.11996	82.68405	57.80176	48.35372	41.92573
2/14/2022	9:00:00 AM	57.91836	33.54902	81.35248	60.27677	48.37427	41.0902
2/14/2022	10:00:00 AM	62.79683	34.73683	80.54934	66.35954	55.73328	45.20115
2/14/2022	11:00:00 AM	59.47343	34.76436	80.41282	62.47982	51.81258	43.36612
2/14/2022	12:00:00 PM	64.73544	30.19956	87.54989	66.37106	49.21716	39.2451
2/14/2022	1:00:00 PM	75.47752	37.35744	90.81745	79.96686	67.80052	53.95441
2/14/2022	2:00:00 PM	76.13191	42.47511	90.18309	80.46191	70.75782	59.19031
2/14/2022	3:00:00 PM	74.04068	35.84922	90.50373	78.32797	65.24116	49.38858
2/14/2022	4:00:00 PM	65.65735	32.55707	88.35632	66.76437	48.80523	40.71777
2/14/2022	5:00:00 PM	65.79892	34.281	87.03952	68.23717	53.92679	42.78937
2/14/2022	6:00:00 PM	68.32485	35.41541	86.74782	71.59199	58.05292	45.07124
2/14/2022	7:00:00 PM	71.57644	36.61308	88.10416	75.2843	64.56754	52.35956
2/14/2022	8:00:00 PM	68.23758	34.74934	87.3708	70.78849	57.61796	45.50818
2/14/2022	9:00:00 PM	65.21335	31.69475	84.65257	68.20063	53.11071	40.92374
2/14/2022	10:00:00 PM	61.00027	30.67728	81.56705	63.89158	48.34958	39.07313
2/14/2022	11:00:00 PM	60.27962	29.7081	81.64482	60.89991	45.96338	38.3144
2/15/2022	12:00:00 AM	51.5616	34.3733	73.37282	53.61189	46.1599	41.37386
2/15/2022	1:00:00 AM	50.09932	36.51186	68.31409	52.9327	47.29796	42.76394
2/15/2022	2:00:00 AM	50.57293	36.87589	72.51595	52.82522	47.54647	43.09727
2/15/2022	3:00:00 AM	58.16506	38.51461	82.39082	58.08619	48.91671	44.49095
2/15/2022	4:00:00 AM	66.11736	34.49334	86.39592	69.14232	55.36893	43.40626
2/15/2022	5:00:00 AM	65.31309	31.22551	85.61658	68.1357	52.91031	39.86247
2/15/2022	6:00:00 AM	57.21108	29.60287	76.64361	60.30705	47.36435	38.03902
2/15/2022	7:00:00 AM	47.84332	27.04045	71.65791	46.94726	39.03464	34.69529
2/15/2022	8:00:00 AM	49.66	28.73629	73.61552	50.593	39.97828	35.51155
2/15/2022	9:00:00 AM	56.0847	28.52069	79.59417	58.38409	44.7412	37.30957
2/15/2022	10:00:00 AM	51.43323	30.28313	73.90097	53.34506	42.91662	37.77258
2/15/2022	11:00:00 AM	57.17175	30.08464	79.65699	60.45767	48.12827	39.13828

2/15/2022	12:00:00 PM	54.92585	31.47682	76.5025	57.76026	46.45597	39.12467
2/15/2022	1:00:00 PM	54.49744	31.52172	77.66343	57.40127	45.7982	39.07169
2/15/2022	2:00:00 PM	47.62909	30.02234	68.69293	49.53808	42.29696	37.66438
2/15/2022	3:00:00 PM	54.03634	30.34	78.5263	54.0099	43.5698	38.01152
2/15/2022	4:00:00 PM	62.18401	36.88327	84.33179	63.95741	50.27168	43.92488
2/15/2022	5:00:00 PM	60.7995	36.62749	79.76017	64.10611	50.93707	43.78133
2/15/2022	9:00:00 PM	50.4268	37.3114	76.70225	51.54088	46.65537	43.09731
2/15/2022	10:00:00 PM	51.34795	36.42544	70.64011	52.85055	46.97566	43.0136
2/15/2022	11:00:00 PM	49.94735	35.75326	68.79622	52.92869	46.53519	42.40989
2/16/2022	12:00:00 AM	54.98981	34.98079	78.26783	56.68851	46.76887	41.97492
2/16/2022	1:00:00 AM	56.13544	34.53338	79.57822	56.85102	46.60859	41.74243
2/16/2022	2:00:00 AM	52.00319	33.66996	77.20532	50.72016	44.81648	40.85952
2/16/2022	3:00:00 AM	48.42311	33.82681	67.5793	50.9738	44.64702	40.36324
2/16/2022	4:00:00 AM	49.62184	34.85686	66.60426	52.4517	45.72084	41.54414
2/16/2022	5:00:00 AM	56.00392	33.69642	76.94615	58.6536	47.43001	41.58997
2/16/2022	6:00:00 AM	64.004	35.76024	85.02442	67.10502	54.9611	44.96331
2/16/2022	7:00:00 AM	65.92921	36.23851	84.18825	69.61702	58.08569	46.95608
2/16/2022	8:00:00 AM	67.49294	36.65036	84.34525	71.28262	60.03753	48.64582
2/16/2022	9:00:00 AM	66.45174	37.01148	83.07158	70.05887	58.16878	47.02555
2/16/2022	10:00:00 AM	64.9621	36.61823	84.43325	68.02146	54.37858	44.42482
2/16/2022	11:00:00 AM	65.74896	35.29317	86.12384	67.98429	52.53815	43.51453
2/16/2022	12:00:00 PM	51.3991	34.43523	75.46942	52.75583	45.12508	40.9008
2/16/2022	1:00:00 PM	57.24625	36.32452	77.41598	59.8708	48.73224	43.55867
2/16/2022	2:00:00 PM	46.57524	34.7424	66.65443	48.40363	44.26381	40.68893
2/16/2022	3:00:00 PM	53.91238	34.26422	76.42294	55.47236	45.42128	41.2036
2/16/2022	4:00:00 PM	44.20983	34.45752	57.75738	46.55378	43.31963	40.02911
2/16/2022	5:00:00 PM	45.43042	33.69646	56.03399	48.22939	44.19157	40.39879
2/16/2022	6:00:00 PM	46.4712	34.54616	61.47067	48.72404	45.04703	41.44044
2/16/2022	7:00:00 PM	47.16337	35.09984	59.22259	49.9213	45.89021	42.29683
2/16/2022	8:00:00 PM	49.16794	37.90338	60.03193	51.89225	48.03893	44.43726
2/16/2022	9:00:00 PM	49.91787	39.21113	60.55868	52.49376	48.94101	45.45642
2/16/2022	10:00:00 PM	48.47308	36.93343	61.7389	51.17123	46.89382	43.23352
2/16/2022	11:00:00 PM	55.05143	34.88622	86.56216	53.68911	46.72798	41.9061
2/17/2022	12:00:00 AM	49.59631	33.06878	75.91708	51.73085	44.47858	39.8306
2/17/2022	1:00:00 AM	57.83055	32.2248	88.50232	54.11484	44.94136	39.80151
2/17/2022	2:00:00 AM	53.80278	32.02153	76.42055	55.70451	45.5059	40.06102
2/17/2022	3:00:00 AM	52.63683	29.83653	73.17888	54.77405	43.99781	37.9952
2/17/2022	4:00:00 AM	47.22745	30.26872	67.42508	49.17185	41.36161	36.81181
2/17/2022	5:00:00 AM	62.83639	30.9726	84.23595	66.05626	51.33796	39.18057
2/17/2022	6:00:00 AM	70.23084	34.81507	86.81122	74.03925	63.13357	50.61372
2/17/2022	7:00:00 AM	71.05053	34.94255	87.32121	75.12983	63.81611	50.75756
2/17/2022	8:00:00 AM	69.59841	32.35194	86.37555	73.48415	60.68338	46.98782
2/17/2022	9:00:00 AM	67.55128	33.06769	86.43814	71.292	58.29462	44.95758

2/17/2022	10:00:00 AM	68.4281	33.1919	85.69647	71.86578	58.84909	44.4267
2/17/2022	11:00:00 AM	67.73472	32.92578	86.44348	71.22045	58.56327	45.44805
2/17/2022	12:00:00 PM	56.63886	29.95541	80.83625	53.67468	41.74909	36.74404
2/17/2022	1:00:00 PM	43.75174	28.55914	66.51967	44.27405	39.01206	35.18531
2/17/2022	2:00:00 PM	44.10639	29.14626	72.89408	43.6382	39.04032	35.27372
2/17/2022	3:00:00 PM	42.59236	30.40195	55.45038	45.37796	40.59861	36.65416
2/17/2022	4:00:00 PM	42.48656	31.94282	54.79842	45.29598	41.09878	37.44756
2/17/2022	5:00:00 PM	43.06548	31.73701	56.65076	45.77741	41.67155	38.02577
2/17/2022	6:00:00 PM	44.07114	32.71415	55.79255	46.67061	42.67382	38.91924
2/17/2022	7:00:00 PM	46.59695	35.75336	59.67014	49.40214	45.30696	41.56522
2/17/2022	8:00:00 PM	47.70357	36.85788	59.56351	50.40219	46.27255	42.70077
2/17/2022	9:00:00 PM	47.4001	36.01094	62.0352	50.07378	45.88376	42.06551
2/17/2022	10:00:00 PM	48.54587	35.36438	66.86295	51.09199	45.99376	41.95223
2/17/2022	11:00:00 PM	47.28999	34.68295	64.73437	49.87942	44.96466	41.00275
2/18/2022	12:00:00 AM	53.26601	30.88316	73.85867	55.85216	45.45409	38.95897
2/18/2022	1:00:00 AM	62.25011	31.26339	83.15737	65.10048	51.4474	40.88125
2/18/2022	2:00:00 AM	64.9161	33.34741	84.60968	68.02489	56.01305	44.64385
2/18/2022	3:00:00 AM	65.46911	33.08247	84.60545	69.06533	57.65333	45.18309
2/18/2022	4:00:00 AM	60.00697	30.6523	83.14091	62.41126	49.67074	39.61499
2/18/2022	5:00:00 AM	57.08543	31.44763	78.8389	59.98221	49.67261	40.9929
2/18/2022	6:00:00 AM	65.74421	33.31097	83.88113	69.27385	57.45169	44.79394
2/18/2022	7:00:00 AM	66.28482	33.2733	84.12254	69.70802	58.27904	46.01252
2/18/2022	8:00:00 AM	70.07112	36.6612	87.14176	73.85428	61.48449	48.44528
2/18/2022	9:00:00 AM	60.99361	30.34393	83.78064	59.2541	43.99869	37.47494
2/18/2022	10:00:00 AM	64.77221	33.121	87.67053	64.88365	47.22686	40.97512
2/18/2022	11:00:00 AM	59.88321	31.994	82.32349	62.41649	48.26729	39.77697
2/18/2022	12:00:00 PM	63.22352	31.19749	86.55872	63.40166	46.67469	38.93792
2/18/2022	1:00:00 PM	50.01355	32.45744	74.76131	52.0544	44.1049	39.32483
2/18/2022	2:00:00 PM	54.95828	32.15197	75.62445	57.05178	45.849	39.346
2/18/2022	3:00:00 PM	61.26909	34.11486	81.32523	64.29531	52.51385	43.06461
2/18/2022	4:00:00 PM	58.87074	32.17675	81.04128	60.90738	46.99904	40.3074
2/18/2022	5:00:00 PM	51.50049	32.56933	70.63022	53.55352	43.77086	39.15668
2/18/2022	6:00:00 PM	63.94114	32.67932	85.47345	64.82061	43.89366	39.00617
2/18/2022	7:00:00 PM	59.58904	32.48362	81.33415	61.64873	48.42764	40.90852
2/18/2022	8:00:00 PM	58.86964	33.52692	79.12668	61.85585	48.51607	40.10016
2/18/2022	9:00:00 PM	64.24384	35.78947	82.33798	68.14781	58.29747	47.70125
2/18/2022	10:00:00 PM	71.09923	36.11627	89.47471	74.63476	61.79886	47.96875
2/18/2022	11:00:00 PM	74.12413	38.87585	90.59906	78.32354	66.48166	52.57908
2/19/2022	12:00:00 AM	76.71083	43.41468	90.36666	81.12306	71.50967	59.7354
2/19/2022	1:00:00 AM	79.25122	45.30406	91.05543	83.50108	75.52405	64.54153
2/19/2022	2:00:00 AM	75.0489	40.74713	89.70398	79.3884	68.82293	56.77301
2/19/2022	3:00:00 AM	71.16406	38.67213	88.89779	74.83684	62.32308	49.76389
2/19/2022	4:00:00 AM	70.07781	41.23001	86.29771	73.83957	62.35015	51.6341

2/19/2022	5:00:00 AM	68.59913	39.11546	86.23457	72.10255	61.25741	50.85575
2/19/2022	6:00:00 AM	72.14458	44.00539	88.29445	76.11107	66.04347	55.54049
2/19/2022	7:00:00 AM	70.01683	38.72333	87.80999	73.67553	60.54403	47.83639
2/19/2022	8:00:00 AM	66.3449	40.57649	86.19871	69.07421	56.22109	47.84347
2/19/2022	9:00:00 AM	66.9355	42.7272	85.83482	69.9357	57.3135	49.27506
2/19/2022	10:00:00 AM	60.63625	39.01533	83.21607	62.40438	51.21511	45.76606
2/19/2022	11:00:00 AM	54.54663	38.73276	74.29981	56.98454	51.2534	46.47305
2/19/2022	12:00:00 PM	53.12358	35.67759	74.01573	55.86852	49.50802	43.76702
2/19/2022	1:00:00 PM	51.93689	39.35909	68.82308	54.80452	49.686	45.18933
2/19/2022	2:00:00 PM	54.05789	39.70509	67.19394	57.16747	52.21715	47.13557
2/19/2022	3:00:00 PM	51.17422	37.43624	63.06192	54.28272	49.46738	44.63871
2/19/2022	4:00:00 PM	40.97103	27.99679	58.07679	43.42608	38.19682	34.19158
2/19/2022	5:00:00 PM	44.85366	27.68787	63.64794	48.22485	39.33661	34.53949
2/19/2022	6:00:00 PM	50.48368	33.47276	70.98075	51.95015	45.59282	40.46904
2/19/2022	7:00:00 PM	48.51519	33.47288	69.85533	50.53284	44.61259	40.24801
2/19/2022	8:00:00 PM	43.97661	30.77158	61.23887	46.45973	43.00552	37.49818
2/19/2022	9:00:00 PM	42.01263	28.43973	60.86527	43.54237	39.27665	35.67015
2/19/2022	10:00:00 PM	45.72664	29.41407	64.0473	48.72307	40.38384	36.05532
2/19/2022	11:00:00 PM	45.40641	28.45628	68.78705	46.86881	39.60048	35.47692
2/20/2022	12:00:00 AM	64.44931	29.68326	85.63543	66.02475	47.98576	37.53536
2/20/2022	1:00:00 AM	50.18992	30.50349	73.27548	52.34798	44.05471	38.05787
2/20/2022	2:00:00 AM	46.22775	28.91405	65.68524	48.56779	40.34564	36.00057
2/20/2022	3:00:00 AM	62.21396	29.67299	84.41931	64.44632	47.87923	37.65246
2/20/2022	4:00:00 AM	49.9628	28.62515	71.53057	50.37427	40.29056	35.80687
2/20/2022	5:00:00 AM	68.18555	29.25832	86.89294	71.78287	51.31777	36.91307
2/20/2022	6:00:00 AM	64.66683	34.13401	83.86191	68.12045	56.47755	45.27847
2/20/2022	7:00:00 AM	61.71748	33.56133	81.91957	64.70445	53.18892	43.38241
2/20/2022	8:00:00 AM	60.64191	32.38358	80.48482	63.99639	51.89555	41.57631
2/20/2022	9:00:00 AM	69.69507	31.9474	87.53883	73.58751	59.43345	44.0455
2/20/2022	10:00:00 AM	70.83188	30.31128	88.32607	74.65717	57.48107	38.64415
2/20/2022	11:00:00 AM	55.23186	28.3033	77.52545	55.56978	43.83497	37.76547
2/20/2022	12:00:00 PM	47.95111	25.91899	72.21239	47.41964	37.88554	33.55261
2/20/2022	1:00:00 PM	65.85172	29.73266	88.05059	67.43047	51.36421	38.71916
2/20/2022	2:00:00 PM	66.65701	31.06232	88.33374	67.82455	47.85224	38.76906
2/20/2022	3:00:00 PM	57.99559	36.85519	81.18206	58.66935	49.17669	43.94125
2/20/2022	4:00:00 PM	49.02002	36.2365	63.73475	51.87803	47.55099	43.16066
2/20/2022	5:00:00 PM	62.28805	36.21918	82.54256	65.33455	51.47222	43.42453
2/20/2022	6:00:00 PM	59.79075	28.17455	85.27411	58.71244	40.83596	35.37562
2/20/2022	7:00:00 PM	70.77458	28.03545	89.45081	74.34549	54.5401	35.81375
2/20/2022	8:00:00 PM	71.89154	43.5916	85.6577	75.65232	66.62829	55.42961

WM3: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
2/8/2022	11:58:36 AM	42.4	42.9	42	42.2	41.1	40.7	39.1	39.9	40.1	40.6	40	43.1	46.5	49.7	50.4	52.6	47.1	46.4	45.7	46	49.7	47.3	44.4	42.5	46.1	46.3	43.2	39.7	41.4	41.6	41.6	41.7	38.3	35.5	33.2	30.4
2/8/2022	12:00:00 PM	55.3	56.1	56.8	57.3	57.7	57.9	57.7	57.1	56	54.4	52.5	50.6	48.9	46.6	44.9	42.6	40.8	39.2	37.4	35.8	34.4	33	31.7	30.6	29.5	28.5	27.7	27.1	26.8	26.9	26.9	27.2	29	29.8	31.6	34.3
2/8/2022	1:00:00 PM	42.1	40.2	38.8	37.3	36	34.7	33.5	32.9	31.3	29	26.8	25.5	23.7	23.4	21.8	21.1	21	20.3	20.1	19.9	20.2	20.5	22.3	27.7	29.2	22.4	22.5	22.1	22.7	23.2	23.5	24.1	25.2	26.9	28.9	31.3
2/8/2022	2:00:00 PM	38.7	37.1	36.5	36.8	37.9	38	37.7	38.2	33.3	30.6	27.1	25.3	23.8	23.2	22.4	21.4	21.1	20.5	20.3	20.2	20.2	20.5	22.3	30.2	25.4	21.6	23.1	21.3	22	22.7	22.9	23.8	25.5	28.3	31.2	34.1
2/8/2022	3:00:00 PM	35.7	34.2	33.9	33.6	32.5	32.5	29.9	31.3	26.5	24.9	23.5	22.9	20.9	20.5	20.1	19.2	19.2	18.6	18.6	18.8	18.6	18.5	19.6	26.1	23.8	19.5	20.3	19	19.4	20.1	20.5	21.3	22.9	25.4	28.1	30.9
2/8/2022	4:00:00 PM	48.6	46.8	45.1	43.6	42.4	41.3	40.3	40.7	40.1	40.4	40.7	40.4	40.2	38.7	36.9	34.3	33.9	30.1	23.9	23.7	23.1	21.8	22.6	26.9	24.9	22.3	23.7	26.7	30.5	27.4	23.4	22.7	22.4	23.7	25.5	27.6
2/8/2022	5:00:00 PM	58.2	56.4	54	51.4	48.6	45.8	43	40.8	37.6	34.2	31	28.8	26.5	25.8	24.5	22	21.1	19.1	16.6	13.1	10.1	9.6	10.3	10.8	10.8	8.8	7.4	5.5	3.2	0.3	-0.5	-1.4	-2.6	-3.6	-2.7	-0.4
2/8/2022	6:00:00 PM	63.2	61.7	59.1	56.4	54	51	48	44.7	41.5	38.5	35.3	32.6	29.8	28.2	26.9	24.3	23.4	21.9	19.7	16.3	13.4	12	12.4	13.1	12.4	10.9	9	6.3	3.5	0.8	-0.1	-1	-2	-2.9	-1.9	0.7
2/8/2022	7:00:00 PM	62.9	61.5	58.9	56.8	54	50.6	47.7	44.6	41.3	38.5	35.8	33.4	30.9	28.8	26.9	25	23.7	22.1	19.9	16.6	13.5	12.1	12.6	13.4	12.7	11.2	9.1	6.3	3.3	0.6	-0.4	-1.2	-1.8	-2.6	-1.1	1.7
2/8/2022	8:00:00 PM	64.7	62.8	60.1	57.7	55	51.9	48.5	45.7	42.5	39.7	36.6	34.1	32.7	34.1	28.7	26.6	24.9	23.2	20.9	17.7	14.8	13.4	13.7	14.3	13.4	11.6	9	5.7	2.3	-0.1	-0.9	-1.6	-1.9	-2.8	-1.5	1.2
2/8/2022	9:00:00 PM	51.5	48.7	46.3	43.5	40.6	38.1	35	32.5	29.3	26.4	23.8	21.7	19.2	17	15.8	14.6	15.3	11.7	8.6	5.1	2.8	1.3	0.7	1	1.1	0.5	-0.1	-1.6	-3	-3.9	-3.9	-3.8	-3.7	-4.3	-3.1	-0.7
2/8/2022	10:00:00 PM	51.7	49.2	46.7	44	41.1	38.6	35.1	32.6	29.6	27.2	24.9	24	20	18.5	16.7	14.6	15.1	11.4	9.6	4.5	2.6	1.9	-0.4	0.9	1.6	1.6	-0.2	-2.2	-3.4	-3.7	-3.7	-4.3	-3.7	-4.3	-3.1	-0.7
2/8/2022	11:00:00 PM	53.7	51.6	49.6	46.7	43.9	40.7	37.5	34.4	31.8	29	26	23.7	21	19.5	17.7	16.3	16.3	13.5	11.5	7.1	4.1	1.8	1.7	2.8	3	2.9	2.6	0.6	-1.5	-2.9	-3.3	-3.5	-3.6	-4.2	-3.1	-0.6
2/9/2022	12:00:00 AM	52.9	50.7	48.6	45.1	42.1	39.1	36	34	30.5	27.9	25.5	23.9	20.3	18.9	17.6	15.3	15.5	12.2	9.2	5.7	2.5	-0.2	-0.4	0.7	1.3	1.2	1	-0.9	-2.6	-3.6	-3.8	-3.8	-3.7	-4.3	-3.1	-0.7
2/9/2022	1:00:00 AM	35	33.7	34.2	34	33.6	32.1	29.4	30.3	26.8	24.7	24.2	22.8	18.4	16.9	15.8	10.6	13.5	7.2	3.7	1.3	-0.9	-3.5	-3	-1.5	-0.3	0.2	0.4	-0.6	-2.3	-3.7	-3.8	-3.8	-3.7	-4.4	-3.2	-0.7
2/9/2022	2:00:00 AM	31.2	31	34	34.7	37.8	34.8	32.6	36.3	32.1	31.3	29.2	27.9	23.7	23.3	22.1	13.4	14.1	8	4.7	2	-0.4	-3	-2.2	-0.6	0.7	1.3	1.9	0.8	-1.4	-3.3	-3.6	-3.7	-3.7	-4.5	-3.3	-0.6
2/9/2022	3:00:00 AM	49	46.8	45.5	43.4	42.2	39.8	37.7	34.5	32.5	30.5	27.9	28.3	24.5	19.5	16.1	14.5	15.2	11.2	8.2	4.9	2.1	-0.3	-0.3	0.8	1.4	1.5	1.5	0	-2.1	-3.6	-3.8	-3.8	-3.7	-4.5	-3.3	-0.6
2/9/2022	4:00:00 AM	47.6	44.9	42.7	40.9	38.2	35.8	33.3	31.7	29.5	28	26.3	29.4	24.4	20.3	18.2	16.4	15.8	11.6	8.8	4.4	1.4	-1.2	-0.6	1.1	2.3	3.1	3.5	2.2	0.3	-1.9	-2.5	-3	-3.5	-4.4	-3.3	-0.6
2/9/2022	5:00:00 AM	38.8	37.5	36.7	36.9	37.8	34.5	32.9	35.7	32.3	31.5	28.5	28.1	25.4	24.1	20.9	17.2	15.8	11.4	8.6	2.8	-0.9	-3.5	-2.9	-1.3	-0.1	0.5	0.7	-0.5	-1.9	-3.4	-3.5	-3.6	-3.7	-4.5	-3.3	-0.7
2/9/2022	6:00:00 AM	36.6	36.1	37.4	36.9	39.4	36.3	36.1	38.9	35.5	34.8	33.6	32.7	30.9	30	28.6	25.4	22.2	17.8	12.5	9.1	7.6	1.8	0.3	1.5	2	0.7	0.8	-0.3	-2.1	-3.7	-3.9	-3.7	-3.7	-4.6	-3.4	-0.6
2/9/2022	7:00:00 AM	40.3	39	39	37.4	37.7	36.4	35.3	35.6	34.1	34.3	32.7	29.9	26.6	24.7	22.6	18.8	17.5	12	7.1	3.2	0.8	-1.2	-0.7	0.2	1.4	0.1	-0.5	-2.3	-3.7	-4.4	-3.2	-3.8	-3.8	-4.6	-3.4	-0.6
2/9/2022	8:00:00 AM	39.3	38.8	38.9	38.8	40	40.1	40.8	39.4	37.6	35.3	32.3	39.6	38.4	27.2	27.5	25.8	20.7	17.7	14.4	8	2.7	1.8	1.2	3.8	5	6	10.9	10.4	0.4	3	0.6	1.6	3.2	-4.3	-3.3	-0.6
2/9/2022	9:00:00 AM	48.8	47.7	45.3	43.3	43.8	42.1	40.2	39.3	36.3	35.1	32.7	31.5	28.3	26.7	23.1	20.1	16.8	12.3	9.2	4.8	0.1	-2.8	-0.7	0.8	0	1.9	-2.8	-3.9	4.2	3.7	12.4	8.4	3.7	-4	-2.9	-0.5
2/9/2022	10:00:00 AM	43.2	41.2	40.3	39	39	38.1	36.3	38.9	35.3	35.3	34.1	32.9	29.6	27	23.8	20.8	17.5	14.5	11.1	6.1	1.5	-0.6	-0.1	6	9.4	3.6	-0.2	-1.4	3.9	4.1	-3.9	3.7	3.6	-3.7	-2.7	-0.6
2/9/2022	11:00:00 AM	53.8	50.9	48.8	46.4	44.7	43.1	41.9	41.5	39.5	36.6	33.9	32.5	29.9	29.7	25.3	20.4	17.9	14.7	12.2	8.9	5.5	3.8	9	10.4	6.1	5.5	8.7	5.9	0.3	0.4	-2.1	-3	3.2	-3.5	-2.5	-0.6
2/9/2022	12:00:00 PM	51.9	50.1	47.6	45.5	43	40.7	38.6	38.9	35.7	33.6	31.6	30.9	29.2	27.6	24.5	20.5	18.1	14.4	11.7	8.7	4.7	3.3	8.6	9.7	9.8	11.4	17.6	14	5.8	7.2	1.3	1.9	3.2	-3.6	2.6	-0.6
2/9/2022	1:00:00 PM	53.7	52.4	49.9	47.1	46	44	42.2	41.2	38.4	35.8	32.4	30.6	28.5	26.3	22.9	19.9	18.4	15.1	13	10.5	7.6	8.2	16.7	15.1	13.4	9.1	9.9	7.6	1.4	0.7	-2.9	3.1	3.2	-3.3	-2.4	-0.5
2/9/2022	2:00:00 PM	54.6	53.3	50.8	48.3	46.6	44.3	42.5	41.3	38.7	35.8	32.7	30.9	29.3	28	25.7	23	20.7	17.4	13.9	10.6	8.1	8.4	10.4	11.4	11.4	10.1	7	2.9	0.8	2.7	-3.3	3.4	3.4	-3.5	2.5	-0.6
2/9/2022	3:00:00 PM	60.4	57.9	55.5	52.5	50	46.6	43.8	40.4	37.4	35	32.6	30.6	29.1	27.8	26.3	25.1	24.3	22.7	20.6	17.9	15.9	16.9	19.1	20.9	21.7	20.4	16.9	12.2	7.1	2.4	-0.8	2.1	2.6	-3.1	2.2	0.2

2/9/2022	4:00:00 PM	59.4	57.5	55	52.6	49.5	46.3	43.2	41.1	37.9	35.5	33.4	31.2	42.1	39.1	31	30.2	29.4	25.4	23.4	19.7	17.7	19.1	21.3	23.2	24.1	23.5	20.2	15.6	10.5	5.3	0.6	-1.8	-2.6	-3.3	-2.3	-0.2
2/9/2022	5:00:00 PM	65.3	63.4	61.4	58.8	56.3	53.4	50.6	47.7	44.7	41.5	38.4	35.3	32.7	30.6	29.1	27.9	26.9	25.6	23.7	20.7	17.9	17.7	19	20	20.1	18.7	16.3	13.2	9.4	5.4	3.3	1.3	-0.3	-1.2	0.6	3.5
2/9/2022	6:00:00 PM	50.8	48.4	46.3	43.8	41.3	39.3	36.6	35	32.5	31.2	29.5	28.8	27.2	23.3	20.7	18.7	17.4	13.8	11	7.5	5.5	6.3	7.8	8.7	8.8	7.6	5.5	3.2	1	-1.3	-2.1	-2.5	-3.3	-4	-3	-0.7
2/9/2022	7:00:00 PM	37	36.5	36.3	34.9	34.4	33.8	31.8	32	29.6	29.5	27.8	27.4	24.4	20.3	15.6	13.2	14.4	7.9	4.1	1.1	2.7	1.4	0.7	1.6	2.3	3.1	3.7	2.7	0.7	-1.8	-2.8	-3.3	-3.6	-4.3	-3.1	-0.7
2/9/2022	8:00:00 PM	45.7	43.5	40.5	37.9	35.9	33.9	31.7	30.9	28.8	27.6	24.8	23.7	20.3	20.9	15	13.3	14.8	9.7	6.5	3.4	3.3	4.4	3	2.6	3.1	3.2	3.6	2.8	1	-1.4	-2.3	-2.9	-3.5	-4.2	-3.1	-0.7
2/9/2022	9:00:00 PM	42.4	39.6	38.2	36.5	36.1	35	33.9	33	30.2	29.3	27.8	26.1	22.2	18.5	15.2	13.5	14.1	8.1	4.8	1.9	0.7	-1.5	-1.6	0.3	1.8	2.8	3.1	1.5	-0.5	-2.4	-3.3	-3.6	-3.7	-4.3	-3.2	-0.7
2/9/2022	10:00:00 PM	53.1	51.7	48.4	46.2	43.4	40.9	38.6	36.3	32.9	30.7	28.5	25.9	23.1	20.2	17.5	16.2	16	12.8	10	6.3	6	11.5	9.3	1.8	2.3	2.2	1.9	-0.1	-1.7	-3	-3.6	-3.7	-3.7	-4.3	-3.1	-0.7
2/9/2022	11:00:00 PM	59.8	57.9	55.6	53.2	50.1	47.4	44	41	37.7	34.8	31.7	28.7	25.9	23.9	22.4	21.2	20.4	18.6	16.3	12.7	9.3	7.2	6.8	7.2	6.6	5.9	5.4	2.7	0.4	-1.3	-2.6	-3	-3.2	-4	-2.9	-0.5
2/10/2022	12:00:00 AM	63	61	58.8	56	53	50.1	47	43.8	40.7	37.9	35.5	32.6	29.6	26.7	25.2	23.9	22.9	21.5	19.3	15.9	12.8	11	11	11.3	10.3	8.8	7.2	4.2	1.6	-0.3	-1.7	-2.4	-2.8	-3.6	-2.4	-0.1
2/10/2022	1:00:00 AM	61.6	59.6	57.1	54.6	51.5	48.2	45	41.8	38.5	35.8	32.6	30	26.8	25.1	23.7	22.3	21.5	20.1	17.7	14.3	11.2	9.6	9.7	10.2	9.3	8	6.2	3.2	0.7	-1.3	-2.4	-2.9	-3	-3.6	-2.2	0.4
2/10/2022	2:00:00 AM	55.3	52.9	50.1	47.3	44.6	42.1	39.4	38	35.6	33.6	31.3	30.4	27.4	23	19.9	18	17.3	14.8	12	8.3	5.5	4.8	3.2	2.2	2.3	2.2	1.6	-0.1	-1.6	-3	-3.5	-3.6	-3.6	-4.3	-3.2	-0.7
2/10/2022	3:00:00 AM	49.7	47.8	45.2	42.2	39.9	37.7	35.9	34.9	32.8	31.1	30.2	28.9	24.7	20.9	17.9	15.9	15.1	12.9	12	4.7	1.5	0.2	-1.1	-0.6	0.2	0.4	-0.3	-1.7	-2.9	-3.8	-4	-3.9	-3.8	-4.4	-3.3	-0.7
2/10/2022	4:00:00 AM	53.5	51.8	48.7	46.3	43.5	40.7	37.6	35.4	33	31.2	28.3	27.6	24.6	21.7	19.4	17.9	16.5	14.4	12.3	7.6	4.7	6.6	6	2.3	2.3	2	0.9	-1	-2.5	-3.6	-3.9	-3.9	-3.7	-4.4	-3.2	-0.6
2/10/2022	5:00:00 AM	37.5	36.6	36.9	36.3	38	35.7	35.9	35.6	34.9	33.8	30.9	30	26.3	23	19.4	16.5	15	11.4	9.2	5.7	2.7	0.4	-0.4	-0.3	0.2	0.5	-0.1	-1.3	-2.8	-3.8	-4.1	-4	-3.8	-4.5	-3.3	-0.7
2/10/2022	6:00:00 AM	41	39.4	38.8	37.3	36.3	34.3	32.5	32.9	32.1	32.1	32	30.5	28.7	26.3	24.3	21.4	18.2	13.3	10.1	5.4	1.2	-1	0	5	4.5	1.8	1.6	0.6	-2.4	-3.3	-3.9	-4	-3.8	-4.5	-3.3	-0.7
2/10/2022	7:00:00 AM	37	36.2	37.2	36.8	38	36.3	36	35.6	34.9	33.7	32.6	31	29.2	27.9	26.3	23.1	20.1	15.1	11.1	9.4	3.8	1.2	9.1	11.2	12.2	5.8	7.4	6	10	3.9	6.3	0.8	-3.8	-4.5	-3.3	-0.7
2/10/2022	8:00:00 AM	33.9	34.7	36.9	37.2	39.2	38.6	37.6	38.4	36.2	34.1	34.5	34.4	28.6	27.7	26.4	23.1	20	17.3	14.3	9.3	4.6	1.3	0.9	2.2	3	3	3.5	2.6	0.4	1	21.5	20.4	-3.5	-4.3	-3.3	-0.6
2/10/2022	9:00:00 AM	51.3	51.7	49.8	46.9	45.6	44.8	43	43.1	42.2	41.9	41.1	37.4	34.1	30.5	27.1	22.5	18.1	14.2	12	7.6	2.7	1.8	2.8	6.3	10.6	12.3	17.2	16.5	6.3	9.3	3.7	0.1	-2.1	-3.6	-2.8	-0.6
2/10/2022	10:00:00 AM	38.9	37.7	38.6	37.1	38.7	38.3	37.1	36.8	34.8	33.9	33.5	33.6	29	27.7	26.4	23.6	19.6	14.6	10.2	5.6	0.7	-2.1	1.2	4.4	4	7.1	11.8	11	0	3.1	-1.1	-2.9	-3.5	-3.7	-2.7	-0.6
2/10/2022	11:00:00 AM	42.1	39.4	39.2	37.8	40	38.6	37.2	36.8	34.8	33.1	32.2	33.4	30.1	28.5	26.4	24.2	20.1	15.9	11.1	6.6	2.2	-1.3	10.3	11.8	8.2	3.9	6.4	6.2	-1.6	-0.8	-2.8	-3.4	-3.5	-3.6	-2.6	-0.6
2/10/2022	12:00:00 PM	49.2	45.9	43.8	41.2	41.9	39.9	39	35.8	33.1	31.4	30.2	29.2	25.2	23	19.2	16.1	14.1	9.4	7	4.1	0.7	0	10.1	12.2	12.7	12.3	14	6.9	4.2	5.8	-1.1	-2.7	-3.3	-3.5	-2.5	-0.6
2/10/2022	1:00:00 PM	58.4	56.5	54.1	51.9	50.7	48.5	46.4	44.2	43.2	42	39.5	36.8	33.1	30.4	26.3	22.2	18.9	15.8	12.8	10.9	10.2	8	10.8	15.9	10.3	7.9	11.6	3.6	-0.5	-0.2	18.5	14.1	-3.3	-3.4	-2.4	-0.5
2/10/2022	2:00:00 PM	47.3	44.8	44.8	42.8	42.7	41.3	39.5	39.2	34.9	33.3	31.3	31.8	27.8	26.7	23	19.5	16.3	12.1	8.7	4.1	0.3	0.1	8.8	12.5	11.6	1.7	-1.3	-0.9	-2.9	-3.6	-3.6	-3.5	-3.5	-3.5	-2.5	-0.6
2/10/2022	3:00:00 PM	46	43.5	41.6	40.3	39.9	38.9	36.9	39.5	35.6	34.4	33	33	30.8	29.1	26.5	23	19.9	14.3	10.9	7.9	4.2	0.3	-0.5	1.5	4.7	5.9	8.8	5.8	-0.9	0.5	-2.8	-3.5	-3.5	-3.6	-2.6	-0.6
2/10/2022	4:00:00 PM	43.4	41.1	40.1	38.8	40.7	38.6	36.4	41.8	36.1	35.5	34.9	36	32	31.7	29.4	20.8	17	13	9.6	6	0.2	-2	0	-0.4	0	0.5	1	-0.7	-2.2	-3	-3.2	-3.4	-3.5	-3.7	-2.6	-0.6
2/10/2022	5:00:00 PM	57.3	55.1	52.7	49.6	47.4	43.7	41.1	39.7	37	35.1	36.2	35.3	31.4	31.7	29.3	22.1	19.6	17.1	14.2	10.3	7.8	8	9.5	10.8	11.4	9.1	5.8	1.9	-1	-2.4	-3.1	-3.3	-3.4	-3.9	-2.8	-0.5
2/10/2022	6:00:00 PM	65.9	63.9	61.6	59.3	56.1	53.1	49.9	46.6	43.6	40.9	38.4	36.6	32.8	32.3	31.3	27	25.8	24.5	22.3	19	15.9	14.4	14.6	14.9	13.8	11.9	9.4	6	3	0.8	-0.5	-1.3	1.8	-2.4	-0.9	1.6
2/10/2022	7:00:00 PM	67.9	66.8	63.1	61.1	58.4	55.4	52.2	49	45.4	42.4	39.2	36.1	33.9	32.1	30.5	29.2	28	26.6	24.4	21.2	18.3	16.8	17	17.7	16.7	14.9	12	8.4	4.9	2.2	0.8	-0.2	-0.7	-1.3	0.2	3.7
2/10/2022	8:00:00 PM	65.7	63.5	61.2	59	56.1	53	49.8	47	43.6	40.8	37.9	35.3	35.7	35	30.1	27	26.3	24.4	22.3	19.1	16	14.6	14.9	15.6	14.8	13.2	10.5	7	3.7	1.2	-0.3	-1.1	-1.6	-2.4	-1	1.8
2/10/2022	9:00:00 PM	61	59	56.7	53.8	51.1	48	44.7	41.8	38.5	35.8	33.1	31.7	28.2	26.2	25.1	23.5	22.1	20.4	18.1	14.5	11.4	9.8	9.8	10.4	9.7	9	7.8	5.6	3.1	0.7	-0.8	-1.9	-2.7	-3.6	-2.4	0
2/10/2022	10:00:00 PM	60.9	59	56.5	53.7	50.6	47.3	44.5	41.4	38.3	35.3	32.3	29.9	27.4	25.9	24.7	22.9	21.8	20.3	18	14.4	11.3	9.9	10	10.7	9.9	8.8	7.2	4.6	2	0.2	-1.5	-2.3	-2.9	-3.7	-2.7	-0.4

2/10/2022	11:00:00 PM	62.7	60.6	58.4	55.9	53	49.7	46.6	43.7	40.4	37.6	34.7	32.4	30.1	28.8	27	24.5	23.2	21.6	19.3	16.6	14.2	12.2	11.6	12.4	11.8	10	7.7	4.8	2.1	-0.1	-1.3	-2.1	-2.5	-3.3	-2.2	0.5
2/11/2022	12:00:00 AM	55.4	53.2	50.7	47.8	45.2	41.8	39	38.2	33.7	31.9	29.4	28.6	26.4	25.3	23.5	19.4	18.1	15.9	13.2	9.7	6.6	5	5.3	6.3	6.2	6.3	5.7	3.9	1.7	-0.6	-1.9	-2.7	-3.3	-4	-2.8	-0.4
2/11/2022	1:00:00 AM	47.4	45.8	43.3	41.6	40.3	36.7	35	35.9	32.2	30.9	29	29.1	24.8	24.9	23.4	16.7	15.2	11.5	8.3	4.6	1.9	0.8	1.9	3.2	3.4	4.1	4.2	2.9	0.7	-1.4	-2.6	-3.2	-3.6	-4.3	-3.2	-0.7
2/11/2022	2:00:00 AM	44.4	42.5	40.2	38.3	38.3	35.1	34.4	34.8	34.2	32.3	31.2	29.4	25.2	23.6	21.6	15.2	14.1	9.9	6.5	3.2	3.3	3.5	3.5	3.4	3	3.3	3.2	1.9	0.3	-2.1	-3	-3.4	-3.7	-4.3	-3.2	-0.7
2/11/2022	3:00:00 AM	46.6	45.2	43.1	40.4	41.2	36.5	35.3	38.2	35.2	34	32.6	32.5	30.1	31	29.4	20.2	16.8	12.9	8.7	4.1	0.6	-1.5	-0.8	0.9	2.1	3.3	3.8	2.8	0.9	-1.2	-2.2	-2.8	-3.5	-4.3	-3.2	-0.7
2/11/2022	4:00:00 AM	34.7	34.2	35.3	36.9	41	36	37.1	40	37.5	36.9	36.1	35.7	33.1	32.9	31.7	27.6	22.6	16.7	11.8	4.8	2.6	3.7	1.1	1.1	0.1	0.3	-0.1	-1.4	-3.2	-4.2	-4.3	-4.1	-3.8	-4.5	-3.3	-0.7
2/11/2022	5:00:00 AM	33.6	33.8	35.2	35.2	39.7	36.1	36.3	40.6	37.1	36.7	34.4	32.9	30	29.4	28.1	20	16.2	14.2	11.4	3.8	0.9	2.3	3.6	4.8	1.6	1.7	1.1	-0.4	-2.3	-3.6	-4	-4	-3.8	-4.6	-3.4	-0.7
2/11/2022	6:00:00 AM	39.7	38.6	38.6	37.4	39.8	37.5	37.4	39.2	35.7	34.4	33.5	32.7	29.9	27.6	26.4	19.3	16.4	12.7	9	4.6	1.8	0.9	4.1	7.2	6.2	4.5	4.7	3.2	0.7	-1.5	-2.6	-3.2	-3.6	-4.5	-3.4	-0.7
2/11/2022	7:00:00 AM	31.6	33.7	36.8	53.1	47.6	36.5	46.6	46.5	42.6	43.8	42.3	43.3	46.8	38.9	41.1	45.6	38.8	39.7	35.6	33.4	35	36	33.4	29.3	28.5	22.4	20.2	16.3	8.9	1.9	-2.9	-3.7	-3.8	-4.5	-3.3	-0.7
2/11/2022	8:00:00 AM	34.5	34.5	36.2	37.1	40.6	37	36.3	40.7	37	36.6	35.4	34.2	38.4	33.4	30.8	25	20.5	16.5	11.8	7.8	4.8	2.4	2.1	3.3	4	3.8	5.3	4.5	0.4	-1	-3.2	-3.8	-3.8	-4.5	-3.3	-0.7
2/11/2022	9:00:00 AM	35.4	34.7	36	37.3	38.9	36.5	34.7	38.2	35.4	34.3	34.4	34.1	36.1	32.2	29.2	23.6	19.6	15.4	12	7.2	1.8	-0.9	4.3	7.6	13.4	10.3	13.4	8.3	2.4	2.8	-0.8	-2.1	-3.6	-3.9	-2.9	-0.7
2/11/2022	10:00:00 AM	39.2	37.8	37.6	37.4	39.9	37.7	35.8	38.8	36.3	35.3	34.9	35.5	36.2	33.6	31.4	24	20	15	10.8	8.8	6.2	2.6	10.2	11.6	9.6	5.2	11.4	9.4	0.9	5	26	21.2	-2	-3	-2.3	-0.5
2/11/2022	11:00:00 AM	38.3	37.2	37.9	36.4	37.3	35.5	34.2	35.3	34.1	34	33.7	33.4	37	33.8	31.5	33.4	30.9	24.3	18.8	20.1	17.5	10.6	13.1	15.3	12.1	7.1	9.6	5.3	11.3	7.7	14.8	8.9	2.8	-3.3	-2.4	-0.6
2/11/2022	12:00:00 PM	46.4	44.4	42.9	41	39.6	38.7	35.2	37.3	31.1	29	28.5	32.8	41.4	27.3	22.7	27.7	17.2	18.1	10.9	8.7	4.8	0.2	6.4	6.1	7	9.4	13.4	8.4	1	2.2	-2.2	-3.2	-3.4	-3.4	-2.4	-0.6
2/11/2022	1:00:00 PM	53.7	51.9	49.1	46.2	43.8	40.5	36.9	36.7	31.3	29.5	29.4	32.5	40.9	28.1	25.7	27.5	19.6	18.8	13.4	8.6	5.6	4.5	5.1	5.3	3.9	1.9	0	-1.8	-2.6	-0.7	11.8	10.9	-1.3	-2.9	-1.9	-0.5
2/11/2022	2:00:00 PM	50.1	48.4	45.3	42.6	39.6	36.4	33.4	32	29.4	28.6	27.9	28.1	32.6	27.2	24.7	22.8	18.8	14.8	11.6	8.1	6.1	4.6	4.6	5.6	5.3	5.1	9.2	4	1.7	0.4	2.8	1.3	3.4	-3.4	-2.3	-0.4
2/11/2022	3:00:00 PM	52.7	50.3	47.8	45.3	42	38.4	36.1	34.8	32.8	31.6	30.8	31.7	35.8	29.3	26.3	27.7	23.6	18.4	14.1	10.7	7.7	6.9	7.6	8	7.3	5.5	2.9	-0.1	2.1	-3	-3.3	3.4	3.4	-3.5	-2.5	-0.6
2/11/2022	4:00:00 PM	49.1	46.8	44	41.1	38.1	34.7	31.7	30.5	26.7	24.8	24.1	27.5	35.3	38.6	31.4	22.8	21.5	14.2	10.3	8.4	6	5.2	6	5.9	5.4	4	5.1	2.6	1.4	1.2	-3	3.4	3.5	-3.7	-2.6	-0.6
2/11/2022	5:00:00 PM	56.3	53.7	51.5	48.9	45.2	41.9	38.4	35.9	32.1	29.6	28.1	26	27	24.5	22.9	21.7	20.1	17.8	15	11	8	7.5	8.2	9.5	10	6.7	6.5	5.7	3.7	1	0	1.3	-2.8	-3.7	-2.7	-0.6
2/11/2022	6:00:00 PM	60.3	57.9	55.6	53.3	50.7	47.3	44.3	41.2	37.9	34.7	31.1	28.3	25.5	23.4	22.1	20.9	20.2	18.7	16.5	12.9	9.9	8.8	8.9	9	8.3	7.6	6.9	5.1	2.6	0.2	-0.9	1.9	2.8	-3.6	-2.1	0.1
2/11/2022	7:00:00 PM	65.7	63.8	61.5	59	55.9	53	49.5	46.3	43	39.8	36.8	34.4	31.5	29.7	28.1	27	25.9	24.6	22.4	19.1	16.2	15	15.5	16.2	15.5	13.9	11.6	8.6	5.4	2.5	1.1	0.1	1.2	-2.3	1.2	1.4
2/11/2022	8:00:00 PM	66.7	64.8	62.5	59.9	57	54	51.1	47.9	44.7	41.4	38.2	35	34.4	33.3	29.2	27.8	26.9	25.5	23.4	20.3	17.5	16.3	16.9	17.8	17.2	15.7	13	9.5	5.7	2.7	1.1	0	0.8	-1.7	0.6	2.4
2/11/2022	9:00:00 PM	64.8	62.7	60.3	57.6	55.1	51.6	48.4	45.1	41.9	38.5	35.4	32.3	29.7	28	26.7	25.7	24.8	23.5	21.4	18.1	15.1	13.9	14.3	15.1	14.5	13	10.6	7.4	3.9	1.2	-0.1	0.8	1.4	-2.5	0.8	1.8
2/11/2022	10:00:00 PM	60.6	58.5	56	53.1	50	46.8	43.5	40.6	37.5	34.2	31.8	29	26.8	25.7	24.3	22.6	21.6	19.9	17.5	14	11.4	9.6	9.6	10.2	9.5	8.7	7.3	5.2	2.5	0.1	-1.2	-2	2.7	-3.5	2.5	0.1
2/11/2022	11:00:00 PM	62.7	60.9	58.4	55.6	53	49.7	46.5	43.6	40.3	36.6	33.6	31	28.8	27.4	26.2	24.7	23.4	21.8	19.5	16.1	13.2	11.6	11.8	12.3	11.5	10.3	8.6	6.1	3.2	0.6	-0.5	1.3	1.9	-2.2	0.6	1.9
2/12/2022	12:00:00 AM	57.6	55.4	52.9	50.1	47.3	44.1	40.8	37.7	34.7	31.8	28.5	26.1	23.4	21.9	20.4	19	18.5	16.8	14.3	10.8	7.8	6.4	6.7	7.3	6.8	6.4	5.5	3.5	1	1.3	-2.1	2.7	3.1	-4	-3	0.5
2/12/2022	1:00:00 AM	52.2	49.4	46.6	44	41.3	38.2	34.7	33.7	30.4	27.5	24.2	22.7	20.1	18	16.3	14.8	15.3	12.5	9.6	5.8	3.2	1.5	1.9	3.2	4	5	5.2	3.7	1.2	1.2	-2.3	2.9	3.4	-4.3	3.2	0.6
2/12/2022	2:00:00 AM	50.4	48.2	45.3	43.2	41.2	36.7	35.1	34.5	32.4	29.7	27.1	25.9	21.9	20.4	19.1	14.8	15.1	12.2	9.5	5.6	2.9	1.8	2.3	3.6	3.9	4.4	4.3	2.8	0.2	-2	-2.7	3.2	3.5	-4.4	3.2	0.7
2/12/2022	3:00:00 AM	44.8	42.2	39.6	37.8	38.1	34	32.4	34.5	31.1	30.4	28.2	27.5	23.7	23.6	21.6	14.9	14.2	11.4	8	2.9	0.3	0.8	0.3	0.8	1.4	2.2	2.5	1.4	0.5	2.4	3	3.3	3.6	4.5	3.3	0.6
2/12/2022	4:00:00 AM	30.4	29.7	29.5	29.2	32.2	29.8	28.6	30.7	27.4	25.9	25.8	24.4	21.3	21.8	21.7	13.8	14.3	11.3	8	3.1	1.5	0.5	0.6	1.4	1.2	1.9	2.6	1.7	0.2	2.3	2.9	3.2	3.6	4.6	3.4	0.6
2/12/2022	5:00:00 AM	35.9	33.8	32.4	31.7	36.3	30.6	30.2	34.1	32.8	33.5	33.3	29.6	27.8	28.8	28.2	19.5	16.9	12.1	7.8	2.4	1	0.2	0.6	2	2.8	3.9	4.3	3	0.8	1.5	2.2	2.9	3.5	4.5	3.4	0.6

2/12/2022	6:00:00 AM	31.3	31.4	31.9	32.8	38.8	33.9	34.6	37.1	33.7	32.3	31.5	29.2	27.6	27.3	26.7	21.1	18.3	13.1	7.4	4	1.9	-0.1	0.6	3.9	4.6	3	3.3	1.7	-0.6	-2.6	-3.3	0.8	-2.8	-4.6	-3.4	-0.6
2/12/2022	7:00:00 AM	31.8	31.4	32.3	35.6	36.4	32.6	31.9	36.7	33.8	34	35.5	33.3	41.8	32.3	29.7	28.9	21	21.2	13	7.9	4.3	1.3	1.6	5.3	8.7	10.8	14.8	10	2.4	3.3	-1.4	-3.2	-3.7	-4.6	-3.4	-0.6
2/12/2022	8:00:00 AM	31.1	30.7	32.7	33.5	39.3	33.8	33.5	38.2	36.2	34.7	34.1	33.2	41.5	32.4	30.3	30.5	20.2	23.3	14.3	7.5	3.4	0.7	1.3	3.4	5	5.2	6.9	3.7	-0.6	-0.8	1.7	0	-3.6	-4.5	-3.4	-0.6
2/12/2022	9:00:00 AM	34.3	34.4	36	36.6	42.7	37.1	38.1	42.8	38.3	37.5	36.7	36.2	40.2	34.5	33.9	30.3	22.2	22	13.8	6.7	1.5	-2.5	-3.1	-1	1.1	0.3	2.5	-1.3	-4.2	-4.1	-4	-3.8	-3.7	-3.9	-2.8	-0.7
2/12/2022	10:00:00 AM	40.3	37.8	36.1	36.5	42.3	35.8	34.2	41.6	37.2	37.7	37.1	38.6	44.9	36.5	33.4	34	20.2	25.7	16.5	7	0.6	-2.9	-1	0.9	1.3	2.4	5.3	1.6	-3.6	-3.1	-3.5	-3.6	-3.6	-3.7	-2.6	-0.7
2/12/2022	11:00:00 AM	45.5	43.4	40.8	39	40.1	36.4	35.1	41.8	35.8	35.7	35.1	36	39.5	32.5	32.6	33.8	26.5	18.5	11.3	4.8	1.7	0.5	1.6	6.1	11.4	15.3	20.9	16	5.8	8.6	6.1	-0.2	-2.2	-3.2	-2.5	-0.6
2/12/2022	12:00:00 PM	50.5	47.4	44.8	42.3	42.9	37.3	35.9	40.6	36	35.1	35.2	35.3	37.9	32.5	30.8	24.4	18.3	14.1	10	7	3.3	2.4	10.7	12.1	9.9	4	5.2	3.3	-2.3	-2.8	-3.3	-3.2	-3.3	-3.4	-2.4	-0.6
2/12/2022	1:00:00 PM	49.4	46.8	44.1	41.5	41.1	37.1	34.8	41.7	35.7	36.3	36.2	34.9	39.2	32.8	31.2	26.2	19.3	15.2	10.1	7.7	3.1	2.9	15.8	11.7	10.7	6.4	5.8	2.5	0.2	-0.7	5.7	6.2	-2.6	-3.3	-2.4	-0.6
2/12/2022	2:00:00 PM	44.3	42	39	37.3	39.8	34.8	33.1	39.1	33.8	33.5	32.8	33.3	40.7	30	28.6	26.5	18.4	13.9	8.4	5.6	2.2	0.2	11.9	9.7	11.3	4.6	-0.5	-2.4	-2.7	-3.7	-3.7	-3.5	-3.5	-3.5	-2.4	-0.6
2/12/2022	3:00:00 PM	42.1	40.3	37.9	36.3	38.7	34.5	31	40.7	33.7	31.1	31.4	31.2	38.7	27.6	27.1	25.9	20	17.3	11.7	6.5	2.3	-0.2	-1.1	1.8	3.6	3.4	-1.2	-0.9	-2.5	-2.6	1.8	10.4	7.5	-2.7	-3.3	-2.4	-0.6
2/12/2022	4:00:00 PM	38.4	35.8	34.1	34.7	39.4	34.6	31.7	41.2	34.4	31.3	31.3	32.1	28	28.8	27.6	22.1	19.2	12.4	7	2.2	0.6	-1	1.2	2.3	1.4	0.1	1.3	-0.7	2.8	3.3	-3.5	3.5	-3.5	-3.6	-2.5	-0.6
2/12/2022	5:00:00 PM	62.2	60.3	57.6	54.8	52	48.6	45.2	43.3	40	37.7	36	35.5	31.5	32.5	30.3	25	23	20.9	18.5	15.1	12.2	10.5	10.6	11.6	10.7	7.8	5.8	3	0.3	1.5	-2.2	2.6	-2.8	-3.4	-2.4	-0.2
2/12/2022	6:00:00 PM	66.6	64.6	62	59.7	56.9	53.7	50.7	48	44.5	41.5	38.6	36.3	33.2	32.4	31.3	27.7	26.3	25	22.8	19.6	16.7	15.4	15.9	16.7	16	14.3	11.7	8.2	4.6	1.8	0.4	0.5	-1.1	-1.9	-0.6	2.2
2/12/2022	7:00:00 PM	65.3	63.2	60.9	58.5	55.9	53	50.3	47.1	43.5	40.2	37.1	34	31.3	29.6	28.5	26.8	25.8	24.5	22.4	19.2	16.3	15.2	15.7	16.7	16.2	14.7	12.1	8.5	4.8	1.9	0.4	0.5	-1.1	-1.3	0	2.8
2/12/2022	8:00:00 PM	48.3	46.7	43.5	40.5	38.5	35.4	34.3	36.1	33	32.5	32.8	30.7	29.3	29.2	27.7	22.8	19.5	14.5	11.8	9.7	9.1	5.5	3.8	4.4	4.1	3.6	2.9	1.2	-1	2.6	-3.3	3.5	-3.6	-4.2	-3.1	-0.7
2/12/2022	9:00:00 PM	48.8	46.8	44.4	41.9	39.5	35.8	33.4	36.6	31.5	29.3	30.2	27.7	26.4	26.4	26.9	19.2	16.3	11.6	7.8	3.9	1.3	1.1	1.6	2.1	2.1	2.6	2.6	1	1.1	2.7	-3.3	3.6	-3.6	-4.2	-3.1	-0.7
2/12/2022	10:00:00 PM	53.3	51.3	48.8	45.7	42.8	39.4	36.4	36.1	32.9	30.7	30.8	30.2	29.9	28.3	28.5	21.4	18.2	15.1	11.8	7.6	5.1	4.3	4.4	5.2	5.4	5.9	5.9	4.2	1.9	0.5	-1.8	2.6	-3.3	-4.2	-3.1	-0.7
2/12/2022	11:00:00 PM	48.3	44.8	42.9	40.1	38.8	35.1	33.1	36.6	32.4	30.1	30	31.1	29.6	28.6	27.4	20.6	18.3	13.7	8.9	4.3	1.7	2.3	2.7	3	2.8	2.8	2.8	1.4	0.6	2.4	-3.1	3.4	-3.6	-4.3	-3.2	-0.7
2/13/2022	12:00:00 AM	30	28.9	28.8	30.2	35.7	29.8	31.6	35.9	32.5	31.7	31.6	30.5	28.3	27.6	28.2	29.2	24.8	17.1	9.7	7.7	6.7	3.5	1.4	1.8	2.7	3.9	4.5	3.2	0.8	1.7	-2.7	3.2	-3.6	-4.4	-3.3	-0.7
2/13/2022	1:00:00 AM	28	27.5	28.6	30.3	35.1	30.9	29.4	39.3	32.6	31.1	31.9	31.4	29.2	29.5	28.1	20.9	17.3	12.2	7.5	3.2	1.5	0.6	1.2	2.3	3.5	4.4	5.1	3.9	1.5	-1	-2	2.7	-3.5	-4.4	-3.3	-0.7
2/13/2022	2:00:00 AM	28.5	29.7	29.4	31.8	37.4	32.3	31.7	41.2	33.3	32.4	32.8	31.2	28.4	29.8	28.6	19.4	16	10.5	5.5	1.9	1.7	0.3	0.9	2.3	3.6	4.8	5.6	4.3	1.8	-1	-2	2.8	-3.5	-4.4	-3.3	-0.7
2/13/2022	3:00:00 AM	30.9	30.9	31	32.9	36.5	33.7	31.4	39	33.5	31.6	30.6	30.1	27.4	28.6	26.6	18.3	15.1	10.4	5.8	2	0.2	-1	0.6	2.7	4.5	5.9	6.6	5.3	2.8	0.2	-1.4	2.4	-3.4	-4.4	-3.3	-0.7
2/13/2022	4:00:00 AM	34.8	33.1	32.7	33.6	36.9	32.8	32	43	33.6	31.5	31.3	29.4	28.2	28.2	26.8	18.7	15.2	10.6	6.2	1.7	0.6	1.4	0.2	1.5	2.9	4	4.6	3.2	0.7	1.6	-2.6	3.1	-3.6	-4.5	-3.3	-0.7
2/13/2022	5:00:00 AM	28.3	30.3	31.5	32.8	37.6	34.6	33.5	44.1	33.9	33	32.2	29.9	27.9	28.6	27.4	18.8	15.4	13.9	12.8	2.7	3.7	1.3	1.3	1.9	2.1	2.9	3.4	2	0.5	2.6	-3.3	3.6	-3.7	-4.6	-3.4	-0.7
2/13/2022	6:00:00 AM	32.2	32.6	32.7	33.1	37.1	33.3	32.4	40.8	32.7	31.6	30.8	29.9	26.6	27.9	29	18.1	15	10.9	6.7	3	0.9	0.7	2.5	7.4	7.9	5.3	5.9	4	0.9	1.5	-2.7	3.3	-3.6	-4.5	-3.4	-0.7
2/13/2022	7:00:00 AM	29.8	30.7	32	52.5	50.5	35.7	50	50.9	49.6	46.3	46.5	48.3	43.3	44.3	46.4	41.4	40	40.3	39.6	34.9	31.9	30.8	31.7	33	31.6	28.6	24.6	18.7	12.8	14.9	3.5	0.5	-2.8	-4.2	-3.3	-0.7
2/13/2022	8:00:00 AM	31.9	31.4	33.4	39.8	40.2	34.9	35.5	41.6	39	35.8	35.8	32.9	30.4	31.3	30.8	23.1	19.4	17.8	14.9	10.5	6.7	6.8	8.8	8.9	5.4	3.7	3.7	1.8	0.7	2.5	-3.4	3.7	-3.7	-4.5	-3.3	-0.7
2/13/2022	9:00:00 AM	32.7	31.8	33.1	35.5	39.3	35	33.7	40.4	37.3	34.9	35.9	32.5	30.4	30.6	29.7	21.6	17.2	12	7	4.2	2	0.6	1.2	1.3	1.2	1.7	2	1	7.4	4	17.4	17.2	0.1	3	2.1	0.6
2/13/2022	10:00:00 AM	35.5	33.6	32.8	34.5	39.3	33.4	31.2	41.4	33.7	32.6	32.8	32.8	30.2	34.5	30.1	22.8	20.1	13.2	11	6.8	2.2	4.8	16.3	14.3	12	11.3	16.7	14.2	5	8.6	23.8	18.7	2.8	3.1	2.4	0.5
2/13/2022	11:00:00 AM	41	38.6	36.5	35.3	37.3	34.6	33	42.2	34.7	34.3	35.3	32.6	33.7	33.8	32.2	22.8	20.3	16.7	10.1	5.6	3.5	0.2	2.6	2.7	0.8	2.2	3.3	4.1	4.2	4	3.7	3.6	3.5	3.5	2.5	0.6
2/13/2022	12:00:00 PM	40.5	37.8	36.4	34.9	36.7	32.9	31	41.4	33	34.5	34.4	33.4	28	27.6	25.3	18.9	15.9	11.8	7.2	8.7	8.2	0.7	0.6	1	2.1	3.2	3.8	4	3.7	2.5	1.9	17.6	2.9	3	2.2	0.5

2/13/2022	1:00:00 PM	53.6	51.3	49.2	46.1	43.3	40.3	36.7	35.3	31.9	29.6	29.9	28.9	27.3	28.5	22.5	17.7	15.6	12.7	10.2	6.8	3.8	2.7	3.4	4.5	8.5	9.8	14.7	12.9	-1.1	-0.3	-2.5	-3.2	-3.3	-3.2	-2.2	-0.5
2/13/2022	2:00:00 PM	58.4	56.2	54.3	51.4	49.2	46.7	43.2	40.1	36.8	34.2	32.1	36.2	36.9	37	33.2	31.2	27.2	20	17.5	15.3	12.6	11.5	12.2	13.3	12.5	10.3	6.9	3.1	-0.3	-1.8	-1.4	-2	-2.4	-2.5	-1.4	0.1
2/13/2022	3:00:00 PM	62.4	60.5	58.7	56.1	53.2	50.4	47.2	44.4	41.6	38.7	35	31.5	29.1	27	25.4	23.8	22.6	21.1	19	15.8	12.7	11.6	11.6	11.8	10.5	7.7	4.4	1.2	-1.1	-2.2	-2.4	-2.4	-2.6	-2.8	-1.6	1.6
2/13/2022	4:00:00 PM	52.3	49.8	47.9	44.9	41.4	38.9	36.7	35.7		33.2	32.6	32.2	30.7	28.7	26.8	25.2	20.8	15.6	10.6	7.7	4.7	3.6	3.7	3.6	2.1	0.6	-2.6	-3.6	3.9	3.8	-3.6	3.5	3.5	-3.5	2.5	-0.6
2/13/2022	5:00:00 PM	59.6	57.4	55.2	52.7	49.9	46.5	43.7	41	37.6	34.9	31.9	29.9	28	27	24.8	22.6	21	19.3	16.9	13.5	10.7	10.1	10.9	11.6	10.6	7.2	3.3	0.2	-2	2.9	-3.1	3.1	3.2	-3.6	2.5	-0.4
2/13/2022	6:00:00 PM	56.4	53.9	51.6	49.3	46.5	43	40.6	42.1	36.4	33.6	31.1	29.5	27.4	27.1	26.2	20.3	18.2	15.9	13.2	11.1	6.6	6.2	5.7	5.7	4.5	2.3	0.7	-1.1	2.6	3.3	-3.4	3.2	3.4	-3.8	2.8	-0.6
2/13/2022	7:00:00 PM	61.7	59.8	57.5	55.1	51.9	49	45.6	42.6	39.4	36.4	33.8	31.6	29.6	28	27.2	26.1	23.6	21.3	18.8	15.5	12.6	11.6	12.2	13.3	12.9	11.2	8.5	4.5	0.7	1.4	-2.1	2.5	2.7	-3.2	2	0.4
2/13/2022	8:00:00 PM	63	60.7	58.5	56	52.8	49.9	46.8	43.5	40.2	37.2	34.1	31.3	28.8	27.5	26.1	24.2	23.1	21.8	19.6	16.2	13.1	11.7	11.7	12.2	11.3	9.8	7.8	4.7	1.7	0.3	-1.2	1.7	2.3	-3	2	0.4
2/13/2022	9:00:00 PM	62.2	60.2	57.8	55.1	52	49	45.8	42.8	39.4	36.6	33.2	30.8	28.3	26.8	25	23.6	22.6	21.1	18.8	15.3	12.2	10.8	10.9	11.3	10.5	9.2	7.6	4.8	1.8	0.3	-1.2	1.8	2.4	-3.2	2.2	0.1
2/13/2022	10:00:00 PM	58.1	56.9	53.9	51	48.1	44.7	41.5	38.7	35.4	32.4	28.9	26.6	24.5	23.2	21.9	20.4	19.6	18	15.5	12	9	7.4	7.4	8	7.4	6.8	5.9	3.7	1.2	0.8	-1.7	2.3	2.9	-3.7	2.8	-0.5
2/13/2022	11:00:00 PM	53.2	51.6	48.4	45.4	43.1	40.3	37	36.4	32.3	30.3	27.2	25.8	23.6	23.9	22.4	17.1	15.8	13.2	10.3	6.5	3.2	1.4	1.5	2.4	2.8	3.6	3.6	1.9	0.4	2.1	-2.7	3.1	3.4	-4.1	3	0.7
2/14/2022	12:00:00 AM	50.2	47.9	45.3	42.5	40.2	36.7	34.3	36.4	32.2	31.1	29.4	29.1	27.6	28.7	27.9	22.8	20.4	14.2	10.5	5.3	2.2	0.1	0.4	1.4	2.1	2.7	2.8	1	1.2	2.7	-3.2	3.4	3.6	-4.1	3	0.7
2/14/2022	1:00:00 AM	41.2	38.9	37	34.5	36.8	32	30.2	38.2	32	30.3	29	28.8	27.1	28.5	26.8	22.4	19.9	13.4	5.6	1.5	0	1.8	1.6	0.5	0.7	1.9	2.3	0.8	1.2	2.8	3.3	3.5	3.6	4.2	3.1	0.7
2/14/2022	2:00:00 AM	43.8	41.6	38	35.4	36	32.3	29.8	40.8	30.9	29.4	27.9	28	25.6	27.7	27.4	17.3	13.8	8.3	4.8	1.8	0.5	2.1	0.9	0.9	2.5	3.7	3.9	2.2	0.3	2.1	3	3.3	3.6	4.2	3.1	0.7
2/14/2022	3:00:00 AM	49.4	46.7	43.8	40.7	39.2	35.1	32.5	40.3	32	29.5	28.2	28.2	26.8	28.4	28.1	18.6	15.1	11.2	7.8	4	0.8	1.1	1.1	0.4	0.4	1.1	1.3	0.1	1.9	3.2	3.6	3.7	3.7	4.2	3.1	0.7
2/14/2022	4:00:00 AM	32.1	30.1	29.7	30	34.2	30.7	29.1	35	30.3	29.7	27.9	27.5	25.5	27.2	27.3	17.2	13.6	9.2	5.2	1.1	1.3	0.1	0.5	1.2	2.3	3.2	3.6	2.2	0.2	2.3	-3	3.3	3.6	4.3	3.2	0.7
2/14/2022	5:00:00 AM	39.1	37.4	35.2	34.3	35.4	33	31.2	39.6	31.4	30.3	28.5	27.7	26	27.6	26.7	17.3	14	10	7.3	0.8	1.6	2.4	1.8	1.3	0.5	0.2	0.3	0.9	2.4	3.5	3.8	3.8	3.7	4.3	3.2	0.7
2/14/2022	6:00:00 AM	33.5	33.3	32.9	35.1	36.2	33	31.3	41	33.1	32	31.7	29.8	28.2	29.3	27.8	20.4	16.8	12.4	7.1	1.4	0	1.4	2.4	9.5	12.3	4.6	5.2	2.7	0.3	2	3.2	3.4	3.7	4.3	3.2	0.7
2/14/2022	7:00:00 AM	48.3	46.2	43.8	40.7	39.4	37.1	34.9	43	36.2	34.9	34.3	31.2	29.2	29.8	27.5	21.5	18.6	15	9.7	4.6	0.1	2.3	1.3	0.5	3.1	5.1	5.4	0.3	2.4	3.3	2.1	3.4	3.7	4.2	3.1	0.7
2/14/2022	8:00:00 AM	52	50.6	47.9	46.4	43.9	40.7	38.6	43.8	35.6	35.5	35.8	32.5	30.6	31.3	29.4	22.3	17.4	12.9	8.2	5.2	1.5	1.8	16.3	17.5	18.7	7.6	3.7	5.7	4	0.8	2.5	3.6	3.7	4.1	3	0.7
2/14/2022	9:00:00 AM	54.1	52	49.3	46.6	44.6	40.7	38.2	40.9	36	34.1	33.3	31.9	29.7	30.5	28.4	22.1	18.4	15.2	11.8	7.8	3.5	1.7	1.1	11	8.2	0.7	-0.7	-3.3	2.5	1.9	15	10.9	3.2	3.6	2.8	0.7
2/14/2022	10:00:00 AM	58.8	57.2	54.6	51.9	48.8	46.1	42.9	43.8	38.1	35.8	34.3	31.6	29.7	30.1	27.7	22.1	19.5	17.4	14.6	11.1	7.6	6.1	7.6	7	5.2	1.8	-0.2	-2.2	3.8	3.9	-3.5	3.4	3.3	-3.7	2.7	0.6
2/14/2022	11:00:00 AM	55.7	53.7	50.7	48	46.3	42	39.8	41.7	37	35.5	33.3	33	30.4	31.3	30	21.7	18	14.6	11.6	8.3	5.3	3.8	4.9	7.7	5.1	0.1	-2.1	-3.6	4.1	-4	-3.1	3.3	3.4	-3.6	2.6	0.6
2/14/2022	12:00:00 PM	60.4	58.9	56.8	54.4	52.2	49.1	46.9	44.3	40.8	38	34.9	32.2	29.3	27.4	26.2	22.7	21.1	19.5	17.6	14.5	11.6	10.6	11.1	12	11.3	8.4	5.2	2.2	0.6	-2	-2.4	2.2	2.6	-3	-2	0.2
2/14/2022	1:00:00 PM	71	69.3	67.3	65.5	63.7	61.2	58.9	56.1	53.2	50.5	47.3	44.2	41	38.2	35.9	33.9	32.4	31.2	29.4	26.7	24	23.1	23.6	24.9	25	24	22.1	19.2	15.2	11	7.9	6	4.4	3.5	4.6	7.6
2/14/2022	2:00:00 PM	71.6	69.9	68.3	66.2	64.2	61.7	59.3	56.5	53.5	50.7	47.5	44.7	41.8	39	37.3	35.9	34.2	33.8	31.4	31.2	32.1	30	28.7	28.5	30.4	28.8	27	26	24.3	20.8	24	21.1	18.8	16.9	13.8	14.3
2/14/2022	3:00:00 PM	69.4	68.1	66.1	64.1	62	59.7	56.9	54.1	51.4	48.3	45.5	42.3	39.1	36.5	34.4	32.6	31.2	29.9	28	25.3	22.7	21.9	22.4	23.7	23.7	22.6	20.5	17.4	13.3	9.4	6.8	5	3.3	2.5	3.9	6.6
2/14/2022	4:00:00 PM	61.4	59.6	57.7	55.5	53	50	48	46.1	43	39.4	36.7	33.9	31.9	29.1	27.3	24.5	22.9	21.3	19.5	16.5	13.8	13.1	14.6	16.2	16.4	12.2	9.1	7.2	4.7	1.7	-0.5	1.6	2.3	-2.9	1.8	0.2
2/14/2022	5:00:00 PM	61.6	59.9	58	55.6	52.5	49.8	46.7	45	41.1	38.8	36.5	34.2	32	31.5	30.3	25.4	23	20.9	18.7	15.5	12.4	11.4	11.7	12.4	11.7	9.9	7.1	3.7	0.2	1.6	-2.2	2.5	2.7	-3	1.7	0.3
2/14/2022	6:00:00 PM	64.2	62.3	60.5	58	55.3	52.5	49.5	47.9	43.7	40.7	38.3	34.9	32.2	31.9	30.3	26.4	24.8	23.4	21.3	18.2	15.4	14.3	14.9	15.7	15.1	13.3	10.3	6.4	2.3	0.1	-1.1	1.5	1.8	-2.3	1.2	1.2
2/14/2022	7:00:00 PM	67.4	65.6	63.6	61.1	58.8	56.3	53.8	51.1	47.5	44.5	41.6	38.4	35.7	34	32.2	30.1	28.6	27.2	25.1	22.2	19.3	18.5	19.3	20.4	20	18.4	15.5	11.7	7.3	3.6	1.7	0.6	0	-0.3	1.2	3.7

2/14/2022	8:00:00 PM	64.2	62.1	60.2	58	55.2	52.9	50	47.5	43.7	40.8	37.8	35.4	33.2	32.6	31.1	27.7	25.8	23.8	21.7	18.7	15.8	15	15.8	16.8	16.3	14.4	11.3	7.4	3.1	0.1	-1	-1.6	-1.9	-2.5	-1.4	0.6
2/14/2022	9:00:00 PM	61.3	59.4	57	54.5	52	48.8	45.8	43.6	39.9	37.2	35	32.2	30.2	29.7	27.9	24.5	22.7	21.1	18.9	15.8	13	12.4	13.3	14.3	13.4	10.7	6.4	2	-1.3	-2.8	-3	-3.1	-3	-3.4	-2.3	0
2/14/2022	10:00:00 PM	57.3	55.1	52.8	50.2	47.3	43.6	40.6	38.5	35.2	32.5	30.6	27.6	25	24.2	22.7	20.4	19.3	17.5	15.1	11.8	9.4	9.3	10.7	11.7	10.7	7.6	2.9	-0.8	-3.1	-3.8	-3.7	-3.7	-3.5	-3.8	-2.8	-0.6
2/14/2022	11:00:00 PM	56.2	54.5	52.3	49.5	46.8	43.3	40.3	41.2	36.2	34.5	34.3	32.8	30.7	32.1	29.2	23	20.1	17.7	14.7	11.1	9	9.8	11.2	11.9	12.3	10.6	7.8	4.3	0.8	-1.8	-2.6	-3.1	-3.4	-3.9	-2.8	-0.5
2/15/2022	12:00:00 AM	45.7	43.2	41.3	39.7	38.6	36.9	36.2	43.1	35.9	36.4	39.2	34.6	33.6	33.5	30.5	24.9	21.5	17.6	12.3	9.9	8.3	5.4	5.7	5.2	4.8	4.3	3.6	1.5	-0.4	-2	-3	-3.5	-3.6	-4.1	-3	-0.7
2/15/2022	1:00:00 AM	39.6	37.7	34.9	36.5	38.7	35.9	37.1	43.9	38.6	37.9	41.2	35.3	34.8	35.8	31.7	24.8	20.7	16.3	10.1	3.5	-0.1	-0.9	1.9	0.4	-0.5	-0.6	-1.1	-2.2	-3.4	-4	-4.1	-4	-3.8	-4.2	-3.1	-0.7
2/15/2022	2:00:00 AM	41.4	39.9	36.7	36.9	40.7	36.9	35.6	42.8	39	38.3	37.8	38.1	36.3	37.6	35.5	27.3	22.8	19.1	13.4	6.1	8.5	8.8	3.6	3.9	3	2.3	0.8	-1	-2.7	-3.5	-3.9	-3.9	-3.7	-4.2	-3.1	-0.7
2/15/2022	3:00:00 AM	54	52	48.8	46.2	45	40.7	39.4	43.5	40.1	39.8	39.1	38.9	37.1	39.1	35.8	27.7	22.9	19.2	14.9	10	7.7	8.5	10	10.5	10.9	9.3	6.8	3.7	0.6	-1.4	-1.9	-2.2	-2.1	-2.9	-2	-0.1
2/15/2022	4:00:00 AM	62.2	60.2	57.8	55.8	53	50.1	46.7	43.6	40.6	37.9	35.6	33.4	31.4	31.3	29.3	26.6	25.1	23.7	21.5	18.4	16.3	17.3	19.2	20.4	21.2	20.4	18.4	15.9	13.8	13.4	15.5	14.2	15.1	12.8	12.2	14.8
2/15/2022	5:00:00 AM	61.1	59.3	57.2	55.3	52.6	50.4	47.2	44.1	40.7	37.5	34.7	32	30.3	30.1	28.3	24.8	23	21	18.6	15.4	13.6	14.9	16.9	18.1	18.3	16.7	13.9	11.4	9.6	10	11.4	10.4	11.6	10	10.1	12.7
2/15/2022	6:00:00 AM	53.3	51.5	49	46.2	43.1	40.5	36.3	38.9	31.6	31.1	31.3	28.5	27.3	25.8	24.2	21.8	18.9	14.5	9.7	8.3	6.5	6.8	7.7	7.8	6.3	4	3	2.6	3.5	5.7	6.5	6.3	7.5	6.4	6.8	8.3
2/15/2022	7:00:00 AM	43.8	41.5	39.2	36.9	34.5	32	29.2	33.4	28	27	25.7	23.4	22.5	20.2	17.1	13.2	8.1	5.2	2.8	0.9	3	4.4	4.5	1.7	-1	1.9	-3.4	-4.4	-3.7	-1.2	-0.5	-1.7	-1.7	-2.7	-1.8	0.7
2/15/2022	8:00:00 AM	45.7	43.7	41.6	38.9	36.3	32.9	29.6	28.6	27.7	26.3	22.9	22.7	21.7	19.7	17.5	14.4	9.7	6.7	5.1	5.6	6.8	7.5	7.7	7.1	6.7	6.2	9.9	10.5	0.6	3.4	4.1	1.4	0.4	-1.9	-1.2	1.9
2/15/2022	9:00:00 AM	52.4	50.3	47.9	45.2	42	38.1	35.2	32.7	30.3	29.2	25.2	23.1	21.4	19.4	15.9	12.7	8.5	6.5	5.5	3.8	4.3	6	6.9	5.6	3.4	0.7	-2.1	-3.3	3.2	2.9	1.2	0.9	2.4	3.7	2.7	0.1
2/15/2022	10:00:00 AM	47.1	45.6	43.2	40.5	39.1	36.2	34.4	32.4	30.1	28.1	25.5	23.4	22.1	18.8	15.4	16.3	10.4	7.1	6.7	3.6	4.2	4.2	3.9	1.6	0.9	2.9	3.5	4.1	4.6	4.1	5.9	4.5	0.8	3.8	2.8	0.5
2/15/2022	11:00:00 AM	53.6	51.1	48.9	46.3	43.4	39.8	37.1	34.3	31.4	30.1	27.4	25.2	23.8	21.7	19.2	17.7	12.7	9.1	7.8	4.4	5.1	6.5	7.3	6.9	5	1.7	0.3	0.7	1.7	0.8	17.8	13.6	2	2.6	1.9	0
2/15/2022	12:00:00 PM	51.1	49.2	46.6	43.7	41.3	38.4	35.2	33	30.3	29.6	27.7	26.4	25.3	24.6	22.9	19.8	15	10.6	7.8	4.4	4.1	4.4	5	5.1	3.2	1.7	1	0.2	0.6	1.1	6.4	3.8	0.6	2.8	2	0.7
2/15/2022	1:00:00 PM	51.3	48.4	45.7	42.5	39.8	36.9	34.2	32.3	30.3	29.6	27.9	26.9	24.7	23.2	20.9	18.6	15	11.3	9	5.1	2.4	2.8	3.9	4.3	3.8	1.9	1.4	1.7	4.9	7.3	8.1	1.6	1.3	3.4	2.5	0.5
2/15/2022	2:00:00 PM	43	40.6	38.6	36.7	35.1	33.6	31.7	31.1	30.3	30.1	29.1	29.1	28.4	28.4	27.9	24.6	21.3	16.3	8.6	3.8	0.9	1.5	1.2	1	0.7	0.7	0.4	3.2	6	5.3	14.7	14.2	9.7	0.5	1.1	0.4
2/15/2022	3:00:00 PM	50	48.1	45.9	43.3	40.5	38.3	34.5	33.1	31.8	30.1	29.5	28.9	26.4	25.4	22.2	20.3	18.8	16.9	14.6	12.3	10.4	11	14.2	15.8	16.7	13.7	9.4	6.5	2.8	0.7	-2.9	3.4	3.4	3.9	2.9	0.6
2/15/2022	4:00:00 PM	58.3	56.7	53.7	50.9	48.3	45.1	42.9	40.1	37.9	36.1	34.4	33.3	33.1	32.3	31.2	29.3	27.1	24.3	21.3	19	16.8	16.7	18.2	19.5	19.9	18.9	15.5	11.2	6.7	1.9	-0.9	2.3	3	3.8	2.8	0.3
2/15/2022	5:00:00 PM	57.2	54.9	52.3	49.9	46.7	43.9	40.6	37.8	35.3	33.6	31.8	31.4	29.8	29.1	28.1	25.6	23.3	20.5	17.8	14.2	12	12.5	14	14.6	14.5	12.5	9.2	5.6	2.2	0.6	-1.4	2.3	3	3.1	4.1	3	0.6
2/15/2022	9:00:00 PM	36	40	42.3	39.1	38	40.3	38.6	35.9	36.4	39.6	39.3	35	32.6	37	36.4	31.7	27.6	25.1	22.1	25	27.3	28.8	24.9	28.4	24.3	26.3	20.7	23.9	21.9	20.8	18.4	19.7	15.9	11.9	10.2	7.2
2/15/2022	10:00:00 PM	44.8	43.3	42.2	40.5	39.9	37.6	35.6	36.2	32	30.7	35.6	42.9	36.9	25.4	31.3	26.8	24.3	21.8	18.4	9.7	2.8	8.5	15.5	16.1	19.9	8.1	6.7	8.4	8	1.9	-0.8	3.2	-3	-3.9	2.9	0.6
2/15/2022	11:00:00 PM	43.4	41.7	40.4	39.1	39.6	38.1	38.2	37.5	35.6	34.5	33.7	33.9	31.5	29.9	27.9	24.2	21.9	15.8	10.2	8.9	5.1	0.7	10.9	11.2	9.7	0.3	-2.5	-3.7	4.2	2.9	23.4	23.7	3.2	-3.7	2.7	0.6
2/16/2022	12:00:00 AM	51	48.7	46.6	43.7	42.2	39.5	37.9	36.6	34.4	33.6	31.9	31.3	29.7	28.3	24.3	21.2	17.3	12.4	9.1	6.1	2.1	0.4	10.1	8.5	6.5	1.1	-2.5	-3.5	-4	-4	-3.3	3.2	3.3	3.8	2.8	0.7
2/16/2022	1:00:00 AM	50.8	50.8	48.9	46.1	44	40.8	37.7	35.7	33	31.1	28.9	26.7	24.5	21.6	18.1	16.1	14.3	10.2	7.2	4	0.1	1.9	2.3	2.5	2.8	3.8	4.3	4.3	3.3	3.3	12.2	13.3	8.4	1.7	1.6	0.1
2/16/2022	2:00:00 AM	47.5	46.1	42.9	41.5	39.8	37.6	35.8	35.3	33.2	32	29.6	26.5	23.6	21	17.4	14.5	13.1	7.8	4.9	2.2	1.1	3.3	0.9	0.6	2.4	4.1	4.7	4.8	4.6	3.8	6.1	3	3.5	3.7	2.7	0.7
2/16/2022	3:00:00 AM	42.8	40.8	39.1	36.9	40	39.5	32.7	31.8	30.6	28.6	27.5	25.5	22.2	20	16	13.3	13	7.6	4.3	2.1	0.5	3.3	2	6.5	0.5	2.9	3.2	4	4.1	3.7	3.7	3.6	3.5	3.7	2.7	0.7
2/16/2022	4:00:00 AM	43.8	41.4	39.7	38.5	39.2	37.8	37.4	37.6	35.9	34.9	33.3	31	28.2	26.4	24	18.8	15.3	9.8	5.5	3.5	0.1	3.1	4.3	1.2	1.3	2.7	0.1	1.3	2.7	3	2.5	2.7	3.3	3.9	2.9	0.7
2/16/2022	5:00:00 AM	51.9	49.8	47.3	44.7	43.8	40.5	38.5	38.2	35.6	34.8	33.9	34.3	32.5	30.8	28.9	24	20	15.3	10.6	6.5	3.4	1.4	1.2	3.8	6.4	3	2.3	1.1	-1	2.5	-3	-3	3.4	4.2	3.1	0.7

2/16/2022	6:00:00 AM	60.3	58.2	55.9	52.7	50.1	46.7	43.9	41.3	38.1	35.9	34.1	33.6	30.9	31.8	30.1	23.9	21.6	19.7	17.2	13.8	11	8.7	8.5	8.8	8.2	7.2	5.9	3.7	1.1	-1.1	-2.2	-2.7	-3	-4	-3	-0.5
2/16/2022	7:00:00 AM	62.2	59.9	57.9	55.2	52.3	49.1	46	42.9	39.6	36.9	34.1	32.3	30.4	29.9	27.6	24.1	23.1	21.4	19.1	15.8	12.7	10.5	10.5	10.9	10.2	8.8	7	4.4	1.7	-0.5	-1.7	-2.2	-2.6	-3.5	-2.5	0.1
2/16/2022	8:00:00 AM	63.8	61.7	59.4	56.3	53.5	50.4	47.1	44.2	41	37.7	35	32.8	32.5	29.3	26.6	25.3	24	22.5	20.3	17.4	14.6	12.2	12.3	12.8	11.9	10.1	7.7	4.8	1.9	-0.4	-1.4	-1.9	-2.3	-3.3	-2.3	0.2
2/16/2022	9:00:00 AM	62.8	60.7	58.2	55.3	52.3	49.3	46	43	40	37.3	34.5	32.5	29.7	28.7	25.9	24.2	23.1	21.7	19.5	16.2	13.1	11.2	11.3	12	11.2	9.5	7.1	4.2	1.4	-0.7	-1.7	-2.2	-2.5	-3.5	-2.4	0.4
2/16/2022	10:00:00 AM	61	58.8	57.1	54.6	52	48.8	45.6	43.4	39.6	37	34.9	32.9	31.2	30	29.2	26.9	24.5	21.9	19.2	15.9	13.1	11.4	12	13.2	13	11.8	9.4	6.5	3.3	0.8	-0.7	-1.5	-1.9	-2.9	-1.8	0.9
2/16/2022	11:00:00 AM	61.6	60.1	57.9	54.9	52.4	49.8	46.6	43.6	40.6	37.8	34.7	32.2	29.9	28.4	27	24.5	23.2	21.8	19.7	16.5	13.5	12.2	12.8	14	13.7	12.6	10.5	7.3	3.8	0.9	-0.5	-1.5	-2	-3.2	-2.2	0.1
2/16/2022	12:00:00 PM	46.5	45.2	42.7	40.7	39.8	36.5	35.4	35.7	33.4	32.5	31.1	30.4	29.3	28.3	26.8	22.1	19.4	14.1	8.3	3.7	1.2	-0.1	0.4	1.9	2.9	3.8	3.8	2.4	0.5	-1.6	-2.4	-3	3.5	-4.4	-3.3	-0.7
2/16/2022	1:00:00 PM	53.6	50.9	48.7	45.9	44.2	41.2	39	38.2	34.7	33.6	32.3	31.7	30.2	29.5	28	20.9	17.5	14.5	11.3	7.9	5.2	3.4	3.9	5.3	5.4	4.9	3.7	1.8	-0.5	-2.3	-3.1	-3.4	-3.5	-4.4	-3.3	-0.7
2/16/2022	2:00:00 PM	38.1	37.4	37.7	37.4	37.3	35.1	34.6	34.5	31.9	31.8	30.5	30	29.2	28.6	27.1	24.2	20.7	18	15.4	14.7	14.4	7.1	1.1	0.9	0.7	0.8	0.5	-0.9	-2.8	-3.9	-4.2	-4.1	-3.8	-4.6	-3.4	-0.7
2/16/2022	3:00:00 PM	50	47.6	45.1	43.7	41	38.3	36.7	35.3	31.9	30.5	30	28.5	25.7	25.2	22.4	18.2	15.9	12.4	9.4	5.7	2.8	0.8	1	3	3.8	4.3	3.9	2.4	0	-2	-3	-3.4	-3.6	-4.5	-3.4	-0.7
2/16/2022	4:00:00 PM	32.3	33.4	35.6	35.7	36	34.8	33	33.7	29.6	28.6	28.1	28	26	23.6	21	17.4	14.9	11.2	7.3	2.3	1.2	2.3	0.8	1.8	2.1	3	3.2	1.8	-0.5	-2.7	-3.2	-3.5	-3.7	-4.6	-3.4	-0.7
2/16/2022	5:00:00 PM	32.8	35	36.4	36.9	37.7	34.4	34.4	35.4	31.5	31.2	29.6	28.8	27.1	26.8	22.9	18	15.4	10.9	7.2	2.6	0	-1.2	0.4	4	3.1	3.1	3.4	1.7	-0.7	-2.8	-3.4	-3.6	-3.7	-4.7	-3.5	-0.7
2/16/2022	6:00:00 PM	33.4	34.6	37.5	37.6	39	36	35.1	36.1	33	32.8	31.3	30.5	28.4	28.1	27	24	20.6	15.5	12.4	12.5	12.7	9.3	1.6	2.7	3.5	3.1	2.9	1.2	-1	-2.8	-2.9	-3.2	-3.7	-4.7	-3.5	-0.7
2/16/2022	7:00:00 PM	33.3	34.9	37.2	38.6	38.9	37.8	37	37.4	34.3	33.1	33	30.3	30.3	27.4	25.4	20.3	17.2	12.2	7.8	3.6	1.9	-0.6	1.6	3.7	2.1	2.3	2.4	0.8	-1.4	-3	13.9	13.8	8.6	-1.6	-2.6	-0.6
2/16/2022	8:00:00 PM	34.3	36.4	39.7	40.2	41.8	40	38.7	40.5	36.4	34.4	32.6	31.2	28.4	26.8	25.7	18.5	15.2	10.4	5.8	3.4	1.2	-1.5	0.3	2	2.7	1.7	2.8	1	-2.5	-3.5	-3.9	-3.9	-3.8	-4.6	-3.4	-0.7
2/16/2022	9:00:00 PM	36	37.8	40.1	40.1	41.8	39.9	39.1	41	37.8	37.2	36.4	34.6	31.9	30.4	27.9	21.9	17	12.6	8.3	4.3	0	-3.4	-2.2	-0.6	0	-1.1	1.8	0.2	-4.2	-3.9	-3.7	-3.6	-3.4	-3.8	-2.8	-0.7
2/16/2022	10:00:00 PM	39.9	38.3	39.3	39.7	39.3	37.8	36.2	37.8	34.1	33.1	35.6	30.9	28.5	27.2	25	19.9	16	11.9	8.8	7.4	4.9	1.4	8.9	10.9	9.9	3.3	10.2	8.1	0.9	3.3	1.1	-2.4	-3.4	-3.8	-2.8	-0.7
2/16/2022	11:00:00 PM	51	46.3	48.7	43.9	41.7	40.8	39.2	38.8	35.3	33.4	32.8	30.2	27.9	26.5	23.9	20.3	16.7	11.3	9.5	9.2	7.4	4.2	5	6.3	6.8	0	-1.6	-2.6	-3.3	-3	-3.6	-3.2	-3.4	-3.7	-2.7	-0.6
2/17/2022	12:00:00 AM	45.5	43.1	40.6	38.7	37	35.5	33.2	32.7	29.5	29.2	28.8	27	25.8	23.4	20.8	17.4	14.9	10.4	7.4	4.7	2.4	-0.4	0.6	1.1	-1.2	-1.8	-2.6	-3.4	-3.8	-3.6	-3.6	-3.5	-3.4	-3.6	-2.6	-0.6
2/17/2022	1:00:00 AM	53.2	49.6	49.7	47	48	45.6	44.3	42	39.7	37.4	35.6	31.3	28.4	24.8	21.2	17.4	15.2	10.9	8.3	5.8	2.9	1.9	9	8.3	3.8	-0.1	-1.9	-3.2	-3.6	-3.7	-3.6	-3.5	-3.3	-3.6	-2.6	-0.6
2/17/2022	2:00:00 AM	49.7	47.7	45.8	43.3	40.7	38.9	35.9	33.4	30.6	27.8	25	21.5	17.6	15.5	14.2	13.5	13.8	10.2	9.1	7.1	4.1	3.1	15	14.6	15.6	5.7	6.6	1.9	1.1	1	23.9	19	-3	-3.1	-2.4	-0.5
2/17/2022	3:00:00 AM	48.9	46.6	44.4	41.3	39.2	36.6	33.4	31.3	28.8	27.8	26.4	24.6	23.1	21	19.7	17.7	16.7	13.3	10.3	7.6	5.1	4.9	6.8	7.1	5.7	3.1	0.4	1.8	7.5	4.5	13.9	11.2	4.9	-1.7	-2.2	-0.5
2/17/2022	4:00:00 AM	43	40.7	38.9	36.7	34.8	34.3	30.2	29.1	26.9	24	21.8	18.2	15.7	13.7	12	12.2	12.6	7.4	4.9	3.2	1.5	-0.5	3.6	3.9	1.5	-0.5	1	-1.2	-2.3	-3.1	6.1	5.6	2	-2.7	-2.6	-0.6
2/17/2022	5:00:00 AM	59.1	57.3	54.5	51.6	48.8	45.5	42.2	39.3	36	33.1	30.3	27.6	25.3	23.8	22.3	20.9	19.8	18.2	15.9	12.3	9	6.9	6.7	7.5	7.6	5.4	3.8	2	0	-2	-0.5	-1.6	-2.7	-3.6	-2.5	-0.1
2/17/2022	6:00:00 AM	66.5	64.3	62	59.5	56.7	53.6	50.5	47.2	44	40.7	37.2	34.3	31.5	29.9	28.7	27.5	26.4	25.3	23.3	20.1	17.1	15.5	16.2	17.1	16.5	14.9	12.5	9.6	6.7	3.7	2	0.6	-0.5	-1.6	-0.1	2.5
2/17/2022	7:00:00 AM	67.1	65.2	63.1	60.4	57.6	54.6	51.8	48.6	45.4	42.2	39	36.1	33.4	31.7	30.4	29.1	27.9	26.5	24.5	21.5	18.5	17	17.7	19	18.6	17.2	14.5	10.9	7.2	4	2.2	1.1	0	-0.6	1.2	4.5
2/17/2022	8:00:00 AM	65.8	63.7	61.4	59	56	52.9	50.3	46.9	43.6	40.4	37.2	33.9	32	30	28.5	27.3	26.2	25	23	19.9	16.8	15.1	15.7	16.8	16.4	14.9	12.2	8.7	5	2	0.5	-0.4	-1.1	-2.3	-0.6	1.7
2/17/2022	9:00:00 AM	63.8	61.7	59.4	56.6	53.9	50.9	47.8	44.5	41.4	37.9	34.5	31.6	29.3	27.7	26.5	25.3	24.3	23.1	21	17.7	14.5	12.8	13.3	14.4	13.9	12.5	10.3	7.3	4.3	1.5	0.2	-0.9	-1.6	-2.2	-1.1	1
2/17/2022	10:00:00 AM	64.4	62.8	60.4	57.7	54.8	52.2	48.7	45.8	42.6	39.5	36.3	33.8	31.2	29.7	28.2	26.4	25.1	23.8	21.6	18.5	15.5	13.8	14.3	15.3	14.8	13.4	10.9	7.6	4.3	1.7	0	-0.9	-1.5	-2.6	-1.1	1.5
2/17/2022	11:00:00 AM	63.8	61.9	59.7	57.1	54.3	51.5	48.4	45	41.8	38.5	35.5	32.2	29.9	28.1	26.9	25.4	24.4	23.2	21.1	17.8	14.7	13	13.6	14.7	14.1	12.7	10.6	7.8	4.9	2.1	0.7	-0.7	-1.5	-2.7	-1.6	0.9
2/17/2022	12:00:00 PM	52.2	51.7	48.6	45.5	42.4	39.8	36.8	34.5	32	30.9	28.8	26.4	25.1	23.2	21.7	18	16.3	13.6	11	8	5.5	4.3	4.9	6.1	6.1	5.4	4.7	3	0.6	-1.5	-2.6	-3.2	-3.4	-4.3	-3.1	-0.5

2/17/2022	1:00:00 PM	37.8	35.2	33.8	34.1	33.4	30.3	28.9	30.6	29	29.6	28.3	27	26.2	26	24.8	21.1	17.7	11.1	8.4	7	4.6	1.2	0.1	1.9	3	3.7	4.1	2.7	0.3	-2	-3	-3.4	-3.7	-4.5	-3.3	-0.7
2/17/2022	2:00:00 PM	38.4	36.4	36.5	35.3	32.9	31	29	30	26.4	25.9	24	22	20.1	20.5	18.9	13.3	13.1	8.7	6	3.5	1.2	-0.2	0.3	2	2.9	3.2	3.3	1.9	-0.4	-2.4	-3.3	-3.6	-3.7	-4.5	-3.4	-0.7
2/17/2022	3:00:00 PM	28.5	28.1	30.7	32	33.1	30.3	30.2	34.2	31.9	31.8	30.7	29.4	27.5	28.2	28.3	21.9	17.6	10.9	8.1	5.6	3	0.1	-0.2	1.7	2.6	3.5	4.1	2.8	0.3	-1.9	-2.8	-3.3	-3.6	-4.6	-3.4	-0.5
2/17/2022	4:00:00 PM	30.2	29.9	30.9	32.5	33.8	30.6	29.3	36	30.6	29.7	27.8	27.1	24.9	26.2	24.5	17	14.3	8.9	5.9	3.3	1.2	-0.6	-0.1	2.1	3.3	4.4	4.4	5	3.6	1.2	-1.4	-2.4	-3.1	-3.6	-4.6	-3.4	-0.7
2/17/2022	5:00:00 PM	29.9	30.3	32.3	33.1	35	31.6	29.4	35.8	31.2	29.9	28.8	28.3	26.9	27.5	24.8	19.4	15.7	10.2	6.8	4	1.9	0.6	2.2	7.8	9.8	4.5	3.9	2.5	0.2	-2.2	-3.1	-3.5	-3.7	-4.7	-3.5	-0.7
2/17/2022	6:00:00 PM	30.7	31.1	33.5	34.3	35.8	33.7	32.6	35.6	31.1	30.9	31.1	28.5	28.3	27.5	26.6	21.8	18.7	13.4	9.5	8.4	6.3	3	3.3	10.3	15.2	8.5	5.4	3.8	1.1	-1.5	-2.4	-3.2	-3.6	-4.6	-3.5	-0.7
2/17/2022	7:00:00 PM	30.8	32.8	36.5	37.1	38.2	35.9	34.2	38.7	35.5	34.9	33	30.9	31	28.7	24.9	21.4	17.5	12.7	9.5	8.2	5.6	5.4	5	5.8	4.7	4.3	6	3.5	-1	-1.5	-0.5	-1.5	-3.4	-4.6	-3.4	-0.7
2/17/2022	8:00:00 PM	33.2	33.8	37.3	38	39.5	35.7	33.9	40.2	35.2	36	36	33	31.6	31.4	28.6	22.6	17.8	12.8	8.5	6.4	3	1.2	11.7	13.4	16.7	6.4	3.1	3.7	0.1	-2.4	11.6	7.5	-3.7	-4.6	-3.4	-0.7
2/17/2022	9:00:00 PM	36.2	35.3	36.8	36.4	38.4	36.6	33.5	41.2	33.3	33.1	34.6	30.7	30.8	30	28.3	21	16.6	11.2	7.2	4.7	1.5	0.9	3.4	6.7	10	3.6	-2.2	-3.4	-4.1	-4.1	-3.9	-3.6	-3.5	-3.9	-2.8	-0.7
2/17/2022	10:00:00 PM	37.7	36.3	36.5	37.2	41	35	33.3	41	34.9	34.9	35.3	33.5	34.4	35.9	31.5	25.2	23.7	17	11.5	4.6	1.2	-1.3	5.8	25.2	24.5	12.6	15.8	12.9	4.1	-2.9	-3.6	-3.7	-3.6	-3.7	-2.7	-0.7
2/17/2022	11:00:00 PM	37.8	35.9	36.3	36.2	38.2	34.1	33.4	39.5	34.8	34.5	32.9	32.6	29.1	30.1	31.2	28.3	20.1	12.7	9.2	6.7	5.1	1.9	0.9	20.4	28.7	22.7	17.7	23.4	16.5	7.9	6.5	-2.2	-3.1	-3.4	-2.5	-0.6
2/18/2022	12:00:00 AM	49.5	47.4	44.7	42	39.8	36.7	34.1	36	31.6	30.6	30.2	29.9	28.4	27.7	26.5	20.8	17.5	12.7	8.8	7.5	5.5	3.2	4.7	21.3	13.7	6.1	11.7	2.5	-1	-2.9	-2.6	-3.1	-3.1	-3.3	-2.3	-0.6
2/18/2022	1:00:00 AM	58.4	56.4	53.9	51.9	48.8	45.6	42.5	39.8	36.3	33.6	31	29.4	28.3	26.9	25.1	23	20.6	17.8	15.2	12.4	9.2	7.4	9.9	10.6	7.5	3.6	0.4	-2.1	-2.9	-3.3	-3.2	-3.1	-3.1	-3.3	-2.3	-0.5
2/18/2022	2:00:00 AM	60.9	59.8	56.8	54.7	51.6	49.1	45.8	42.8	39.8	37	33.8	31.3	28.9	27.2	25.2	23.1	21.4	19.7	17.6	14.4	11	9.6	9.8	10.3	9	6.2	2.6	-0.6	-2.4	-2.9	-2.9	-2.8	-2.9	-3.1	-2.3	-0.5
2/18/2022	3:00:00 AM	61.4	59.9	57.6	54.6	51.8	48.8	45.7	42.6	39.4	36.3	33	30.1	27.5	28.8	28.2	26.4	24.3	20.5	18.1	14.8	11.5	10.1	10.4	10.8	9.5	6.5	2.8	-0.5	-2.3	-3	-2.8	-2.8	-3	-3.1	-2.1	-0.1
2/18/2022	4:00:00 AM	56.3	54.2	52.2	49.1	45.6	42.5	39.7	37.4	33.9	33.3	30.4	29.1	27	24.6	22.3	19.5	17.4	14.6	12	8.5	5.3	3.8	4.2	4.5	3.3	1.1	-0.8	-2.5	-3.7	-3.8	-3.6	-3.5	-3.5	-3.6	-2.6	-0.6
2/18/2022	5:00:00 AM	53.4	51.2	48.9	46.1	42.9	39.6	36.8	36.1	32.5	30.1	28.6	25.6	23.5	24.5	21	17.4	16.4	14.2	11.3	7.6	4.4	3.3	5	7.8	10.7	4.9	1.6	0.1	-1.7	-3	-2.2	-3.1	-3.5	-3.9	-2.8	-0.7
2/18/2022	6:00:00 AM	62.1	60.4	57.4	54.7	51.6	48.5	45	43	39.3	36.6	33.8	31.6	29.8	28.8	26.8	24.5	23.3	21.8	19.5	16.2	13	10.9	10.7	11	9.7	7.6	4.8	1.9	-0.4	-2	-2.6	-2.7	-2.6	-3.5	-2.5	-0.2
2/18/2022	7:00:00 AM	62.4	60.5	58.1	55.5	53	49.6	46.7	44.5	40.5	37.4	34.4	31.8	30.1	30.3	28.9	25.3	23.9	22.6	20.4	17.1	14	12.6	13.6	14.7	14.3	12.4	9	4.9	1.3	-1.1	-2.1	-2.5	-2.7	-3.3	-2.2	0.3
2/18/2022	8:00:00 AM	65.8	64.3	62	59.8	57.1	54.6	51.8	49.7	46	43.1	40.1	37.3	34.8	34.3	32.8	28.6	27.1	25.8	23.9	20.9	17.8	16.8	17.9	19.1	18.6	16.9	13.8	9.6	5.2	1.8	0.2	-0.7	-1.2	-2.1	-0.9	1.2
2/18/2022	9:00:00 AM	57	55.1	52.6	50.4	47.7	44.6	42.6	42.2	38.3	35.5	32.9	32.1	30.5	31.5	30.9	23.8	20.8	17.6	14.7	11.5	8.5	7.5	8.5	9.5	8.9	7.4	5	2.3	0.1	-1.4	-2.7	-3.1	-3.2	-3.7	-2.6	0.1
2/18/2022	10:00:00 AM	60.6	58.5	56.8	54.8	52.3	49	46.2	45.9	41.5	38.4	35.7	34.6	32.6	33.5	31.7	25.3	22.8	21	18.8	15.7	12.9	12.3	13.4	14.8	14.8	13.6	10.8	7.3	3.5	0.7	-1.1	-2	-2.4	-3.4	-2.6	-0.1
2/18/2022	11:00:00 AM	56.1	53.9	51.8	49	46.1	42.7	39.8	39.4	36.1	33.9	31.7	29.8	29.3	30.3	29.8	22.5	19	16.5	13.4	9.8	7	6.5	7.5	8	6.9	4.7	1.5	-1.4	-3.2	-3.9	-3.9	-3.8	-3.6	-4.1	-3.1	-0.7
2/18/2022	12:00:00 PM	59	57.3	55.1	52.8	50.4	47.8	44.8	44.7	39.8	37.1	35.1	32.5	30.7	30.5	29.6	30.8	29.6	23.9	19.2	18.1	15.4	11.6	11.8	12.7	11.8	9.7	6.5	2.8	0.5	-2.4	-3	-3.2	-3.2	-3.8	-2.8	-0.4
2/18/2022	1:00:00 PM	44.4	42.5	40.1	38.5	39.3	34.7	31.6	42.1	33.6	31.8	29.7	29.5	28.8	30.5	29.3	20.6	15.7	10.9	6.7	3.9	1.7	2	3	3	2	1.7	1.5	0.3	-1.6	-3.1	-3.6	-3.6	-3.7	-4.3	-3.2	-0.7
2/18/2022	2:00:00 PM	50.8	48.4	46.2	43.6	41.8	38	35	44	33.8	32.3	30.6	29.6	28.9	31.1	29.9	21.4	17.4	13.6	10	6.8	4	3.3	4.6	5.7	5.1	5.2	3.7	2.1	11.5	6.3	-2.9	-3.3	-3.6	-4.2	-3.2	-0.7
2/18/2022	3:00:00 PM	57.5	55.5	52.7	50	47.2	44.1	40.9	45.3	36.2	33.8	32.1	29.6	28.7	28.6	28.5	21.7	19.5	17.4	14.5	10.9	7.6	6.7	7.5	7.9	6.7	4.8	1.5	-0.9	12.2	2.9	-3.6	-3.6	-3.5	-4.1	-3.1	-0.7
2/18/2022	4:00:00 PM	54.9	52.7	50.5	47.8	45.1	42	38.6	44.7	36	35.2	36.1	31.6	32.1	33.5	31.2	23.2	19.2	15.7	12	8.1	4.8	4	4.5	4.6	3.3	2.1	-0.2	-2.1	10	3.5	-4	-3.9	-3.7	-4.2	-3.1	-0.7
2/18/2022	5:00:00 PM	46.9	45	42	39.9	37.5	35	33.6	42.3	32.2	30.3	30.8	27.6	27	28.4	30.3	19.9	16.2	11.9	7.4	3.9	1.6	1.2	4.2	11	11.3	6.2	7.8	4	6	1.2	-2.8	-3.6	-3.8	-4.3	-3.2	-0.7
2/18/2022	6:00:00 PM	59.3	58.1	56.6	53.6	51.5	48.5	45.6	43.8	39.7	37.2	35.1	32	29.9	29.1	28.7	25.3	23.2	20.5	17.3	13.9	10.8	9.7	10.6	14	11.1	8.7	6	2.9	0	-1.9	3.6	0.1	-2.1	-3.6	-2.9	-0.5
2/18/2022	7:00:00 PM	54.9	53.1	51.1	49.7	47.2	42.9	43.5	43.7	43	38.5	38.9	39.2	34.3	33.8	36.7	32.1	29.5	27	24.9	21	16.9	15.6	15.7	16.1	16.3	7.3	4.5	2.5	-0.7	-3.5	-3.8	-3.8	-3.6	-4.1	-3	-0.6

2/18/2022	8:00:00 PM	54.2	52.2	49.9	49.8	45.9	41.6	44.2	42	43	39.1	37.5	39.9	32.4	34.3	35.2	27.3	27.1	25.5	23.7	18.7	14.4	12.1	17.3	16.4	15.2	8.4	6	1	-2.9	-3.7	-2.8	-3.2	-3.7	-4.1	-3	-0.7
2/18/2022	9:00:00 PM	60.4	58.3	56.3	53.4	50.6	47.7	44.5	42.3	39	36.1	34.4	32	30.4	29.9	28.8	25.8	23	20	17.2	14	10.7	10.5	16.3	18.3	18.3	10.5	7.9	3.9	-1.9	-2.8	-3.4	-3.4	-3.2	-3.7	-2.7	-0.5
2/18/2022	10:00:00 PM	66.5	65.4	63.2	61.1	58.7	55.9	52.9	50.8	47.7	44.6	42	39.2	35.8	33.8	31.8	29.6	28.4	27.4	24.9	22.1	19.1	18	19.9	20.7	20.5	18.9	17.5	14	9.3	5.8	2.9	1.2	0.2	-0.8	0.4	3.3
2/18/2022	11:00:00 PM	69.7	67.9	66.2	64.2	61.9	59.6	57.1	54.6	51.5	48.3	45.5	42.2	39.6	38.7	34.7	32.9	31.7	30.3	28.5	25.7	23	22.1	23	24.5	24.6	23.6	21.4	18.1	13.8	9.5	6.5	4.6	3.1	2.3	4	6.5
2/19/2022	12:00:00 AM	72	70.6	68.8	67	64.9	62.5	59.9	57.4	54.4	51.5	48.5	45.4	42.3	39.7	37.4	35.4	34	32.8	31.1	28.4	25.6	24.6	25.6	27.1	27.3	26.4	24.3	21.1	16.9	12.7	9.6	7.1	5.6	4.7	6.3	9.4
2/19/2022	1:00:00 AM	74.4	72.9	71.4	69.5	67.7	65.6	63.4	61	58.2	55.6	52.8	50	47	44.2	41.9	39.7	38	36.7	35	32.5	30.1	28.9	29.8	31.3	31.6	31.1	29.5	26.8	23.4	19.7	16.9	15.3	13.6	12.3	12.5	14.2
2/19/2022	2:00:00 AM	70.5	68.9	67.3	65.1	63.1	60.5	57.8	54.9	51.9	48.9	45.9	42.6	39.5	38.2	35.2	33.4	32.1	31	29.2	26.3	23.4	22.7	23.7	25.2	25.1	23.8	21.4	18	13.7	9.9	7.9	5.8	4.5	3.5	4.7	7.4
2/19/2022	3:00:00 AM	66.9	65.1	63.3	60.9	58.8	56	53	50.2	47.5	44	41.3	38	35.3	33.2	31.4	29.5	28.1	26.8	24.9	21.8	18.8	18.1	19.2	20.5	20.1	18.3	15.3	11.5	7.5	4.1	2.3	0.9	0	-0.9	-0.3	2.3
2/19/2022	4:00:00 AM	65.8	64.2	62.1	59.9	57.4	54.8	51.6	48.8	45.4	42.6	39.7	37.3	35.2	33.5	31.7	29.8	28.4	26.6	24.4	21.3	18.4	17.8	19	20.3	19.7	17.5	13.9	9.7	5.1	1.5	0.1	0.6	-1.2	-1.5	-0.3	2.8
2/19/2022	5:00:00 AM	64.6	62.7	60.6	58.2	55.4	52.2	49.2	46.7	43	40	36.9	34.2	32.2	32.8	33.7	27.8	26.1	24.9	22.5	19.8	17.1	15.6	16.8	18.1	17.3	14.9	11	6.5	2.2	0.5	-1.6	1.9	-2.2	-2.9	-1.9	0.1
2/19/2022	6:00:00 AM	68	66.3	64	61.8	59.4	56.3	53.7	51.2	47.5	44.6	41.6	38.7	36.2	34.8	33.3	31.3	29.9	28.5	26.5	23.4	20.5	19.8	21.2	22.6	22.1	20.2	16.8	12.6	7.9	4.1	1.9	0.8	0.1	-0.9	0.2	3
2/19/2022	7:00:00 AM	65.9	64.2	62.1	59.8	57.4	54.3	51.1	48.8	45.3	42.7	39.9	38	36.3	36.9	35.1	30.3	28.4	27.1	24.9	21.7	19	19.2	21	22.6	22.8	21.5	18.9	15.4	10.9	6.4	3	1	0.3	-1.4	0.6	2.3
2/19/2022	8:00:00 AM	62.3	60.5	58	55.4	53.2	50.5	47.5	47.5	42.9	40.6	39.4	39.7	38.2	39.7	40.2	31.1	27.4	25.1	22.2	18.6	16.2	17.3	19.7	21.5	22.2	21.1	18.4	14.6	9.9	4.9	1.1	1.1	2.2	-3.3	2.3	0.2
2/19/2022	9:00:00 AM	63.1	60.7	58.4	56	54	50.9	47.7	48.9	44.5	42.3	42.7	41.5	40.7	41.7	40.9	32	28.4	25.9	23.2	19.9	17.6	18.4	20.7	22.6	23.3	22.3	19.5	15.6	10.9	6	1.8	0.6	1.8	-2.9	1.9	1.1
2/19/2022	10:00:00 AM	56.4	54.3	51.7	49.9	47.7	44.3	42	46.6	41.3	39.9	40	38.6	37.7	38.1	36.9	27.5	23.6	20.8	17.9	14.8	12.8	14.2	16.6	18.6	19.1	18	14.8	10.7	6.4	2.8	1.3	0.7	0.8	-0.3	0.2	1.7
2/19/2022	11:00:00 AM	46.5	44.7	41.6	41.4	46.5	39.3	39.5	47.3	41.7	40.1	41	39.2	38	39.2	37.3	26.9	20.9	16.3	10.7	6.8	4.7	5.9	7.8	8.7	8	6.3	3.8	2.1	0.9	0.8	1.6	1.5	2.1	0.9	1.1	1.9
2/19/2022	12:00:00 PM	44.6	42.3	40.3	40.2	44.6	38.5	38.2	45.9	40.1	39.4	40.3	38.6	37.6	38.7	37.6	28.5	23.1	18.2	11.9	8.9	6.2	2.8	2.2	2.6	2	1.4	0.8	-0.5	-1.6	-2.5	-2.6	-2.7	-2.4	-3.3	-2.4	-0.2
2/19/2022	1:00:00 PM	36.6	35.4	33.4	35.1	41.1	38.4	36.5	47.2	39.7	38.7	40	37.7	38.8	41.2	40.5	30.7	25.4	20.8	12.7	2.7	-1.2	-0.7	0.7	1.3	0	-0.3	-0.9	-1.8	-2.7	-2.8	-2.5	-2.2	-1.7	-2.6	-1.8	0.1
2/19/2022	2:00:00 PM	35.1	33.7	33.8	37.9	46.7	39.4	39.3	47.4	42.5	42	44.2	40.4	40.8	43.2	41.9	31.9	26.3	21.4	13.3	3.1	-1.7	-1	-0.1	0.7	0.2	0.3	0	0.1	0.6	1.8	3.4	3.5	4.6	3.6	4.1	4.9
2/19/2022	3:00:00 PM	30.7	30	30.8	35.8	43.1	36.5	37.4	45.7	40.5	39.4	39.9	37.9	36.7	38.7	38.8	27.4	21.7	16.3	7.9	0.3	-3.6	-2.9	-1.6	-0.7	-0.8	0.6	0.3	0.8	10.6	8.3	4.9	4.4	5.2	3.5	3.6	4.7
2/19/2022	4:00:00 PM	30.5	29	28.1	28.7	31.8	27.1	25.3	32.4	28.2	27.3	28.5	27.8	28	29.4	27.2	23.3	24.3	17.3	9.9	-0.7	-3.4	-2.9	-1.5	-0.9	-1.5	-1.7	-2.4	-2.4	-2	-0.7	0.8	1.3	2.6	2.1	3.1	3.8
2/19/2022	5:00:00 PM	29.3	30.2	31.5	31	35	32.1	30	39.2	33.3	31.3	32.4	31.5	31	30.9	29.6	28.7	29.1	23.1	16.1	10.6	6.5	0.7	0	8.3	13.2	5.9	5.8	2	4	2.6	-0.3	-0.7	0.4	-0.3	0.6	2.1
2/19/2022	6:00:00 PM	44	42.2	39.3	37.1	37.1	36.7	32.5	44	35.9	35	37.5	32.2	32.2	32.9	31	25.2	20.6	14.9	7.5	6.5	3.8	0.1	0.5	7.6	11.2	0.8	-0.9	-2.8	-1.7	-2.6	-1.3	-1.4	-1.1	-2.1	-1.2	1.1
2/19/2022	7:00:00 PM	37.6	35.3	34	33.8	35	34	33.4	40	35.5	35.8	37.7	40.1	39.2	34.7	33.9	31.3	25.8	21	16	12.2	8.2	3	1.4	1.1	0.7	0.9	0	-2.3	-2.5	-3.3	3.6	-2.7	-3.9	-4.6	-3.4	-0.7
2/19/2022	8:00:00 PM	32.2	31.5	31.5	32.6	33	31.8	30.8	38.7	31.3	32.8	32.1	25.7	26.9	27.1	21.3	16.3	13.2	9.2	9.3	7.3	8.3	5.4	8.9	12.2	9.5	8.2	11.8	8.4	0.5	1.9	7.3	3.4	-3.3	-4.4	-3.3	-0.6
2/19/2022	9:00:00 PM	35.4	33.8	32.4	32.1	31.7	29.6	28.6	28.9	26.7	26.1	25.6	25.9	25.1	24.9	24.4	21.5	15.8	11.3	4.3	0.9	2.2	3.7	1.3	2.8	5.3	6	9	3.7	0.9	1.1	11.9	5.6	0.3	1.5	1.3	0.1
2/19/2022	10:00:00 PM	40.7	38.5	36.3	34.4	32.2	30.4	28.9	28.8	26.9	33.9	35.4	25.8	22.2	20.3	18.8	15.2	11.3	6.4	2.5	1.7	3.6	0.3	8.4	10.6	7.7	3	9.6	7.5	1	0.8	1.9	1.7	1.7	3.2	2.5	0.6
2/19/2022	11:00:00 PM	39.6	37.5	35.4	33.6	32.6	31.4	31.4	31.9	32	31.8	31.2	30.2	29.3	28	27.1	25.2	22.1	17	13.3	14.5	13.4	9.4	1.4	1.1	0.9	0.4	1.9	1.4	3.1	2.9	2.8	2.3	2.4	2.8	2.3	0.4
2/20/2022	12:00:00 AM	60.1	58.5	56.8	54.1	51.7	48.5	45.6	43.8	40.6	38.6	36.9	35.9	34.4	34.7	33.6	33.2	31.2	26.5	20.2	17.1	16.2	13	12.9	13.7	13.6	13.3	11.3	9.8	9.4	9.4	10.4	9.8	10.4	9.2	9.4	9.3
2/20/2022	1:00:00 AM	45.3	42.8	40	37.9	38.3	34.2	33.2	39.5	33.3	34.1	35.3	33.1	32.2	32.2	30.1	24.9	20.8	15.6	9	4.9	2.6	-1	3.2	5.1	1.2	-3.2	-4	4.4	4.4	4.2	-3.9	3.7	3.4	-3.8	2.8	0.6
2/20/2022	2:00:00 AM	41.8	39.5	37.2	35.6	33.6	31.1	29.6	29.1	28.4	28.1	27.6	26.9	26.2	25.8	24	21.1	18.7	15	9.2	4.2	3.1	3.8	3.5	2.9	4.2	4.2	2.9	2.6	1.4	1.4	1.5	0.8	0.1	-1.4	0.8	0.7

2/20/2022	3:00:00 AM	58.2	56	54	51.6	49.4	46.6	42.4	39.7	37.2	34.2	32	35.5	38.2	42.9	38.1	31.4	33.7	27.6	22.1	24.2	24.7	22.9	18	11.7	8.5	5	0.9	-1.9	-3.4	-3.8	-3.8	-3.6	-3.4	-4	-2.9	-0.3
2/20/2022	4:00:00 AM	46.4	44	41.1	38.1	35.8	33.2	31	28.8	27.1	26.3	25.8	25.4	25.1	25	24.5	23.3	22.5	18.9	12	7.3	5.2	7	8.6	11.4	9.5	6.9	3.4	0.5	-2.3	-3.5	-4.2	-4	-3.7	-4.3	-3.2	-0.7
2/20/2022	5:00:00 AM	64	62	60.3	58.4	55.5	52.4	49.5	46.9	43.7	40.7	38	35.5	33.7	33.4	37.3	31.7	28.4	26	22.7	19.6	17.1	16.1	17	18.4	18.2	16.5	13	9.2	4.9	1	-0.8	-1.3	-1.1	-1.9	-0.7	1.8
2/20/2022	6:00:00 AM	60.7	59	56.5	53.9	51.1	48.2	44.9	42.1	39.3	36.1	33.9	32.3	31.2	34.3	35.1	27.3	25.4	23.8	19	16.1	14.1	12.1	12.7	13.9	13.2	10.9	6.7	3	0.1	-0.8	-0.1	0.4	1.3	0.6	1.4	2.7
2/20/2022	7:00:00 AM	57.9	55.8	53.4	51	48.4	44.9	42.7	40	36	33.4	31.6	33.6	32.7	32.5	27.5	24.3	25.3	18.7	15.6	11.7	9	8.7	10.4	11.7	10.8	8.2	3.8	0.6	-1.4	-1.7	-0.9	-0.5	0.4	-0.4	0.3	1.9
2/20/2022	8:00:00 AM	56.7	54.8	52.3	49.7	47	43.9	41	42.1	37.1	35.6	35.1	34.3	33.2	33.8	33.2	29.6	26.2	21.7	18.4	17.2	14.9	11.6	7.7	7.9	6.6	4.1	0.8	-1.9	-3.5	-4.1	-4.1	-3.9	-3.7	-4.4	-3.3	-0.7
2/20/2022	9:00:00 AM	65.7	63.8	61.7	59.1	56.4	53.8	50.7	47.9	44.6	41.6	38.6	35.5	32.8	31.2	29.6	27.9	26.5	25.1	22.9	19.7	17	16.3	17.4	18.5	18.1	16.7	14	10.2	6.3	3	1	-0.4	-1.1	-2.3	-1.1	2
2/20/2022	10:00:00 AM	66.7	64.6	62.9	60.8	58.3	55.5	52.5	49.8	46.5	43.4	40.3	37.6	35.4	33.6	32	30	28.3	26.5	24.2	21.1	18.6	18	19.3	20.7	20.5	19.5	17	13.4	9.4	5.9	3.4	1.3	0.3	-0.8	0.9	4.2
2/20/2022	11:00:00 AM	51.1	48.6	46.2	43.1	41.7	37.9	36.6	38.7	36	35.5	35.6	34.7	34.2	34.7	35.1	38.7	37.6	29.4	23	17.6	11.4	6.8	3.3	3.7	2.4	0.8	-1	-3	-4.1	-4.5	-4.3	-4.1	-3.8	-4.5	-3.4	-0.7
2/20/2022	12:00:00 PM	43.8	42.1	39.1	36.8	35	31.1	29.2	28.8	26.3	26.6	26.5	26.3	26.7	26.4	24.8	21.8	18.6	13.9	8	1.4	-2.2	-3.5	-2.7	-1.6	-1.4	-1.5	-2.1	-3.4	-4.2	-4.5	-4.4	-4.2	-3.8	-4.5	-3.4	-0.7
2/20/2022	1:00:00 PM	62	60.2	57.3	54.8	52.1	50	46.2	45.2	41.4	38.8	38.3	34.2	34.1	34.2	33.5	27	24.1	21.8	18.9	15.4	12.9	12.4	13.6	14.9	14.7	13.6	11.2	7.6	3.9	0.8	-0.7	-1.3	-1.2	-1.6	-0.5	2.2
2/20/2022	2:00:00 PM	62.3	60.9	58.5	56.4	54.2	51.2	48.2	46.5	43.7	40.1	38.4	35.7	34.2	33.7	32.7	27.2	25.2	23.2	20.6	17.4	14.9	14.6	16	17.6	17.8	17.1	15	11.7	7.7	4.3	2.1	0.7	0.6	-0.3	0.7	2.9
2/20/2022	3:00:00 PM	53.4	51.6	49.2	46.3	45.8	41.3	39.1	45.5	39.3	37.8	38	36.8	37	38.8	38.1	29.3	24.8	20.5	14.2	8.7	6.8	7.5	9.2	10.5	10.1	8.6	5.4	1.7	-1.2	-2.5	-2.1	-1.8	-1	-1.7	-0.7	1
2/20/2022	4:00:00 PM	32	31.1	30.4	33.7	40.3	34.5	34.5	41.7	37.7	37.9	38.4	36.9	36.6	39	36.9	28.8	23.1	18.7	10.9	2	-3.2	-3.6	-2.2	-1.4	-1.7	-1.9	-2.6	-3.3	-3.5	-3.1	-2.3	-2	-1.4	-2.3	-1.5	0.2
2/20/2022	5:00:00 PM	58.2	56.4	54	51.5	49.4	46.3	43.6	43.7	39.2	37.3	36.2	33.9	33.1	34.7	32.7	25.3	21.2	18.4	14.5	10.4	8.5	9	10.5	11.5	11.7	8.6	5	1.6	-0.5	-0.9	0	0.3	1.3	0.4	1	2.5
2/20/2022	6:00:00 PM	55.7	53.8	51.6	49.4	46.8	44.3	41.3	40.9	35	32.3	30.7	28.9	28.4	29.1	27.3	21.3	17.6	14.9	11.8	9	6.6	8.7	17.2	18.2	18.3	9.9	9.8	9.9	0.8	-1.4	-3	-1.9	-3.3	-4.4	-3.3	-0.6
2/20/2022	7:00:00 PM	66.3	64.8	63	60.5	58.5	56	53.3	50.4	47.7	44.5	41.5	38.6	36	34.2	32.3	30.2	28	26	23.7	20.8	18.8	18.8	20.7	21.9	21.5	20.1	17.8	14.5	9	5.4	7.4	3.9	0.7	-0.6	0.5	3.4
2/20/2022	8:00:00 PM	67.6	66.5	63.8	61.2	58.4	55.7	52.5	49.6	46.5	43.8	40.3	37.7	36.1	39.8	42.7	40.5	36	36.5	39.7	35.6	36.8	34.4	35.7	36.2	36	38.7	34.1	32.7	30.9	33.6	29.4	28	26.7	23.5	20.9	17.9

WM4: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
7/12/2021	5:24:32 PM	43.56807	16.77594	69.51205	41.65925	31.48554	21.08795
7/12/2021	6:00:00 PM	43.98523	15.60304	57.83765	44.87776	37.98047	25.61204
7/12/2021	7:00:00 PM	33.80532	13.36317	51.78884	37.7295	20.75888	17.23667
7/12/2021	8:00:00 PM	34.99109	13.85539	47.93261	40.1631	28.99872	19.00441
7/12/2021	9:00:00 PM	39.04604	28.22966	51.56599	41.21494	38.49243	35.21665
7/12/2021	10:00:00 PM	41.12084	32.09896	47.32448	43.78332	40.5202	37.28082
7/12/2021	11:00:00 PM	39.28128	30.00059	48.33248	41.5288	39.11243	34.52635
7/13/2021	12:00:00 AM	35.9106	28.91767	43.61711	38.71164	35.00587	31.9621
7/13/2021	1:00:00 AM	34.08749	25.24123	41.06583	37.37086	32.94056	29.22618
7/13/2021	2:00:00 AM	28.48929	8.782143	38.1593	32.76574	24.51323	15.4974
7/13/2021	3:00:00 AM	27.65542	10.93822	38.60028	32.17626	24.33903	18.0314
7/13/2021	4:00:00 AM	23.99745	9.26698	45.39547	25.36818	20.55449	16.76262
7/13/2021	5:00:00 AM	23.97861	10.38794	44.63369	25.39297	17.98549	14.77379
7/13/2021	6:00:00 AM	26.98208	11.25946	45.30282	31.1228	19.59144	15.84207
7/13/2021	7:00:00 AM	36.09033	10.00455	54.69545	41.19603	18.82848	14.60338
7/13/2021	8:00:00 AM	37.6057	30.28004	53.27439	39.22668	36.74456	34.19668
7/13/2021	9:00:00 AM	38.69305	26.14031	57.12697	40.92756	36.13771	30.98739
7/13/2021	10:00:00 AM	49.74758	23.99725	60.17727	55.9677	33.42026	29.24465
7/13/2021	11:00:00 AM	42.95847	17.0208	59.52038	39.09865	27.70164	20.62753
7/13/2021	12:00:00 PM	53.93889	21.31303	61.99025	58.25671	51.51592	33.25673
7/13/2021	1:00:00 PM	51.91914	18.04006	61.65763	57.75107	44.96401	30.27957
7/13/2021	2:00:00 PM	42.99902	15.50226	58.10286	44.26248	31.31001	20.40501
7/13/2021	3:00:00 PM	42.68348	14.08362	63.96293	43.42496	30.78544	18.98474
7/13/2021	4:00:00 PM	45.16328	15.46229	66.32015	47.59436	36.38172	22.84514
7/13/2021	5:00:00 PM	44.83362	21.04178	63.72087	48.41007	40.09539	30.89065
7/13/2021	6:00:00 PM	45.57617	29.86371	65.43806	48.73809	42.46091	36.6006
7/13/2021	7:00:00 PM	43.44607	21.23	57.355	47.35097	40.01566	31.06391
7/13/2021	8:00:00 PM	39.083	15.19551	62.25077	42.57961	31.6126	21.63092
7/13/2021	9:00:00 PM	41.26869	35.52208	53.0828	43.41192	40.65182	38.53124
7/13/2021	10:00:00 PM	41.31925	31.22066	48.48319	44.19965	40.53988	36.29983
7/13/2021	11:00:00 PM	40.70085	31.76727	46.69046	42.87145	40.35418	37.57462
7/14/2021	12:00:00 AM	35.35529	26.16668	47.64915	37.70349	34.85843	31.18095
7/14/2021	1:00:00 AM	30.85172	13.16752	44.27618	35.12026	28.39355	21.7157
7/14/2021	2:00:00 AM	33.89033	15.91255	42.42818	38.41514	31.9421	24.17185
7/14/2021	3:00:00 AM	29.35727	8.485986	44.08945	32.83062	26.74288	20.97119
7/14/2021	4:00:00 AM	23.96809	8.574	47.13748	25.10873	18.11842	14.03378
7/14/2021	5:00:00 AM	21.58805	9.838803	42.5911	22.80669	18.37945	14.89965
7/14/2021	6:00:00 AM	28.58842	11.44246	50.54529	32.47099	24.29226	17.71156
7/14/2021	7:00:00 AM	36.081	13.33738	54.17709	40.73417	22.80641	17.59332
7/14/2021	8:00:00 AM	41.80945	26.34012	68.31257	42.75646	39.74166	34.79834

7/14/2021	9:00:00 AM	43.88008	34.78317	58.7493	46.09922	40.45392	37.91512
7/14/2021	10:00:00 AM	49.52493	28.76745	63.16657	54.29967	39.45132	32.64834
7/14/2021	11:00:00 AM	51.41773	27.27807	64.61	53.94735	43.2454	36.71413
7/14/2021	12:00:00 PM	40.8637	16.00006	54.71951	45.94631	30.90849	22.6731
7/14/2021	1:00:00 PM	43.2025	17.22285	56.00433	47.67495	35.07224	24.73883
7/14/2021	2:00:00 PM	45.74981	13.63157	58.76157	52.90262	28.13762	19.50424
7/14/2021	3:00:00 PM	55.13111	14.23473	67.14134	60.21503	33.6895	20.92246
7/14/2021	4:00:00 PM	54.61466	13.34891	67.29636	58.43627	38.13324	25.87274
7/14/2021	5:00:00 PM	48.35232	12.26604	60.04043	53.61045	40.60185	21.08583
7/14/2021	6:00:00 PM	47.14524	11.94245	58.17055	52.78525	38.06893	15.68522
7/14/2021	7:00:00 PM	32.4644	11.17432	51.55507	25.26587	18.44441	14.73658
7/14/2021	8:00:00 PM	37.36341	10.16942	47.43381	42.43579	31.4452	21.07544
7/14/2021	9:00:00 PM	43.29702	35.88426	59.29491	45.43272	42.76222	40.01593
7/14/2021	10:00:00 PM	41.17362	31.48283	51.84705	43.83682	40.28095	36.49719
7/14/2021	11:00:00 PM	39.07459	18.43039	45.34708	42.53265	38.07281	28.37799
7/15/2021	12:00:00 AM	38.78046	18.1332	45.67562	42.32389	37.80999	29.3474
7/15/2021	1:00:00 AM	34.3966	19.55791	54.35694	37.2469	31.16923	25.54806
7/15/2021	2:00:00 AM	36.03287	20.89378	42.02533	38.97278	35.21362	30.84153
7/15/2021	3:00:00 AM	25.65161	6.023885	38.08601	30.77717	18.5767	12.63432
7/15/2021	4:00:00 AM	21.15922	7.118579	39.72631	21.84325	17.32774	13.52152
7/15/2021	5:00:00 AM	29.18866	9.098319	59.09929	25.53894	19.62999	15.95456
7/15/2021	6:00:00 AM	29.10402	8.234275	50.8996	30.68651	19.23056	13.34185
7/15/2021	7:00:00 AM	35.91136	9.170399	53.75511	38.44577	28.62012	14.52958
7/15/2021	8:00:00 AM	36.91236	28.18459	50.02675	39.81084	35.44094	33.01552
7/15/2021	9:00:00 AM	45.16045	26.49542	62.83576	40.97078	35.34679	31.34366
7/15/2021	10:00:00 AM	43.89585	23.48373	62.43594	48.09066	31.96893	28.27666
7/15/2021	11:00:00 AM	39.20689	18.3417	55.00433	42.82515	28.87322	24.41281
7/15/2021	12:00:00 PM	44.51533	17.2005	60.30772	47.95916	33.31062	23.70487
7/15/2021	1:00:00 PM	45.98858	14.77404	60.63536	48.06553	34.98907	22.19286
7/15/2021	2:00:00 PM	45.51561	13.6162	58.92217	48.34307	32.88708	19.68193
7/15/2021	3:00:00 PM	45.0446	15.68926	55.98411	49.12386	42.43739	26.94771
7/15/2021	4:00:00 PM	40.70292	14.36655	58.42748	44.30442	33.0498	20.48533
7/15/2021	5:00:00 PM	49.95379	19.95876	64.92096	50.55063	42.53682	29.90395
7/15/2021	6:00:00 PM	35.7822	13.50271	58.47817	37.84313	25.55121	18.19706
7/15/2021	7:00:00 PM	28.60308	13.05669	48.46292	31.84358	26.76468	19.218
7/15/2021	8:00:00 PM	37.30798	14.50241	47.10326	42.27874	31.54402	23.96059
7/15/2021	9:00:00 PM	43.29011	34.23394	47.81074	45.4944	43.08036	39.12933
7/15/2021	10:00:00 PM	40.62354	32.85173	53.64902	42.95967	39.94943	37.06012
7/15/2021	11:00:00 PM	39.33077	29.99548	46.0916	41.51046	39.17254	35.28433
7/16/2021	12:00:00 AM	25.80703	11.4103	43.99562	25.90975	20.44622	15.63942
7/16/2021	1:00:00 AM	37.34575	6.80939	64.91119	25.70796	18.56885	12.968
7/16/2021	2:00:00 AM	22.79799	4.818045	38.58143	23.57387	15.88975	11.84001
7/16/2021	3:00:00 AM	24.8529	5.712298	47.61885	26.02341	15.74568	12.64696

7/16/2021	4:00:00 AM	20.30299	9.558521	40.87655	23.42763	18.39414	14.69437
7/16/2021	5:00:00 AM	22.60709	11.90959	46.84476	24.49911	20.10487	16.8149
7/16/2021	6:00:00 AM	33.28257	13.03301	61.08085	33.52723	23.65784	18.79288
7/16/2021	7:00:00 AM	35.12451	10.34291	60.28426	36.12881	20.23082	15.1346
7/16/2021	8:00:00 AM	36.87113	24.01341	50.74898	39.02588	36.10276	33.1723
7/16/2021	9:00:00 AM	39.23001	23.65913	66.05137	37.36557	33.43692	29.58919
7/16/2021	10:00:00 AM	32.20508	19.16087	48.61307	34.9862	30.44828	27.52588
7/16/2021	11:00:00 AM	44.24655	16.71074	57.57294	48.16579	30.25241	25.64729
7/16/2021	12:00:00 PM	43.18008	13.71974	56.58086	48.83331	30.42282	22.16086
7/16/2021	1:00:00 PM	40.52544	12.37452	56.93122	45.74051	24.56292	17.17386
7/16/2021	2:00:00 PM	43.04408	12.74562	56.44666	47.86099	25.45917	18.13714
7/16/2021	3:00:00 PM	44.00816	11.99708	64.90184	47.84922	33.0736	18.75469
7/16/2021	4:00:00 PM	45.02206	12.62546	58.69544	46.42	34.54564	22.65029
7/16/2021	5:00:00 PM	49.20083	12.987	64.35201	46.83378	28.30454	18.3283
7/16/2021	6:00:00 PM	50.54866	11.49678	64.55314	46.8649	28.01055	22.63487
7/16/2021	7:00:00 PM	25.86792	8.818439	45.33024	28.71179	22.95435	13.95686
7/16/2021	8:00:00 PM	37.22548	11.02409	64.67483	41.98708	30.44496	19.87089
7/16/2021	9:00:00 PM	41.57758	31.96029	53.64294	43.64203	41.04497	38.54742
7/16/2021	10:00:00 PM	36.94211	20.857	46.46318	40.56802	34.66671	27.94271
7/16/2021	11:00:00 PM	38.38693	30.84122	42.71501	40.28707	38.26102	35.49213
7/17/2021	12:00:00 AM	37.03034	13.6731	45.57158	40.7034	36.25726	23.17577
7/17/2021	1:00:00 AM	28.97415	16.6891	43.40083	32.89363	25.45709	21.78744
7/17/2021	2:00:00 AM	23.25653	6.486677	36.1167	27.31453	19.40185	12.64714
7/17/2021	3:00:00 AM	20.21783	7.246602	45.82451	22.07047	17.69107	13.83288
7/17/2021	4:00:00 AM	24.53514	5.56569	51.1921	21.15936	15.96034	12.34603
7/17/2021	5:00:00 AM	21.69594	6.041158	38.83995	23.77566	19.06399	14.53505
7/17/2021	6:00:00 AM	26.79033	5.826874	46.86048	30.63324	19.43289	13.9513
7/17/2021	7:00:00 AM	26.9448	6.963916	50.31499	27.2421	20.95152	15.85288
7/17/2021	8:00:00 AM	33.60747	6.194278	46.41626	36.36266	32.79403	20.21748
7/17/2021	9:00:00 AM	34.11768	14.26112	46.42683	37.86153	31.98349	23.91495
7/17/2021	10:00:00 AM	34.65331	13.44498	53.98138	34.22299	27.8519	21.93158
7/17/2021	11:00:00 AM	44.978	14.37698	60.10249	47.458	31.45715	20.11639
7/17/2021	12:00:00 PM	46.68494	17.18428	60.52466	43.29218	28.91876	22.02213
7/17/2021	1:00:00 PM	43.10076	16.51882	58.68413	45.18642	30.10557	22.03723
7/17/2021	2:00:00 PM	46.2172	13.39257	60.11511	46.38565	27.75247	18.91858
7/17/2021	3:00:00 PM	44.92982	14.92003	59.21498	50.50131	32.68602	22.53947
7/17/2021	4:00:00 PM	40.33453	18.67589	55.28345	43.38173	30.90736	23.92033
7/17/2021	5:00:00 PM	37.84432	13.69967	51.65727	42.93522	30.98176	18.85729
7/17/2021	6:00:00 PM	40.91284	13.6375	55.28939	44.75717	30.91246	22.14047
7/17/2021	7:00:00 PM	29.87353	10.60661	52.23753	32.80913	26.74467	21.79369
7/17/2021	8:00:00 PM	40.33286	17.48004	50.70285	45.12699	35.05547	26.21842
7/17/2021	9:00:00 PM	45.65236	39.64102	49.86397	47.49397	45.44693	43.15256
7/17/2021	10:00:00 PM	44.28881	36.93736	48.23115	46.38882	44.21038	41.43904

7/17/2021	11:00:00 PM	43.09787	36.35795	50.30522	44.53423	42.90897	40.98082
7/18/2021	12:00:00 AM	39.26583	29.1631	57.63344	41.34913	38.43008	35.03624
7/18/2021	1:00:00 AM	31.21739	17.90912	45.05511	34.11464	29.53084	24.88594
7/18/2021	2:00:00 AM	29.08242	6.875372	38.45082	32.82853	27.57614	18.03071
7/18/2021	3:00:00 AM	26.16075	8.679362	58.71637	26.63214	20.08163	14.99992
7/18/2021	4:00:00 AM	22.13055	9.3274	44.73372	24.51456	20.08842	15.71215
7/18/2021	5:00:00 AM	30.76394	8.684107	56.92749	24.79586	18.52577	14.36788
7/18/2021	6:00:00 AM	26.02769	10.37775	45.12148	27.23565	21.02963	16.97189
7/18/2021	7:00:00 AM	28.58802	10.49891	56.75288	29.51565	22.03735	17.08641
7/18/2021	8:00:00 AM	30.79033	9.640929	48.76993	33.67783	28.37238	19.76852
7/18/2021	9:00:00 AM	31.83103	17.56414	53.4917	32.84102	29.09503	26.04085
7/18/2021	10:00:00 AM	36.40861	13.49953	62.40065	35.64339	26.53931	18.08277
7/18/2021	11:00:00 AM	33.9881	12.63684	53.00816	36.99052	20.65834	16.90265
7/18/2021	12:00:00 PM	41.16888	12.00953	57.64686	34.14822	20.55214	15.63798
7/18/2021	1:00:00 PM	43.55459	11.42923	60.19121	35.69896	25.56987	14.95088
7/18/2021	2:00:00 PM	43.89621	11.27173	58.32106	39.09417	27.49174	14.53441
7/18/2021	3:00:00 PM	44.39556	11.03223	59.25217	49.521	31.15192	17.45208
7/18/2021	4:00:00 PM	39.12605	10.36134	58.19205	39.48416	21.56676	13.85636
7/18/2021	5:00:00 PM	36.83741	16.88272	55.97411	40.28008	31.56665	24.22164
7/18/2021	6:00:00 PM	40.62369	17.14534	61.23769	44.44799	30.17856	21.89436
7/18/2021	7:00:00 PM	40.92265	23.82262	58.48481	44.64366	37.40326	30.39627
7/18/2021	8:00:00 PM	44.68539	29.33811	60.68435	48.46185	41.42603	35.23694
7/18/2021	9:00:00 PM	45.12645	34.34061	63.04638	47.51167	43.66204	40.9096
7/18/2021	10:00:00 PM	44.47199	37.68995	51.19327	46.3392	44.17623	41.92644
7/18/2021	11:00:00 PM	44.22177	38.2151	56.98562	45.87638	43.81599	42.02655
7/19/2021	12:00:00 AM	43.04478	38.86372	46.88795	44.6807	42.86648	41.04896
7/19/2021	1:00:00 AM	42.45537	35.49816	46.97544	44.34015	42.27709	39.53147
7/19/2021	2:00:00 AM	40.68185	23.07208	46.76061	43.02267	40.59063	34.06879
7/19/2021	3:00:00 AM	38.15749	28.81032	43.90237	40.89732	37.50912	32.94011
7/19/2021	4:00:00 AM	36.32751	13.51619	48.21291	40.7646	32.65527	25.32353
7/19/2021	5:00:00 AM	23.66385	13.17552	43.25821	26.45261	22.13257	18.0191
7/19/2021	6:00:00 AM	26.97181	9.833397	51.81657	27.11511	19.00589	14.43382
7/19/2021	7:00:00 AM	27.34611	10.6263	53.88575	28.57798	20.39017	15.89938
7/19/2021	8:00:00 AM	33.4436	10.07467	53.76731	34.14712	21.38907	15.77125
7/19/2021	9:00:00 AM	39.55683	22.60918	57.11556	43.25817	35.53391	28.91531
7/19/2021	10:00:00 AM	38.94519	21.37868	54.91369	42.72271	34.88498	28.18004
7/19/2021	11:00:00 AM	36.07565	11.9943	53.9684	39.72723	29.09458	19.16781
7/19/2021	12:00:00 PM	47.21665	11.88496	58.92271	53.74545	33.31259	23.44735
7/19/2021	1:00:00 PM	39.84457	12.38416	55.76369	43.8242	30.97989	21.40256
7/19/2021	2:00:00 PM	34.84279	8.158147	62.35683	37.57058	16.77153	12.6559
7/19/2021	3:00:00 PM	36.23607	8.243611	54.41389	40.22444	29.46369	12.90078
7/19/2021	4:00:00 PM	40.0277	19.5822	61.91897	43.75445	35.39201	27.21269
7/19/2021	5:00:00 PM	35.08978	18.09169	50.88344	38.75606	31.06487	24.74482

7/19/2021	6:00:00 PM	36.89152	12.76253	55.31071	40.81829	28.45322	19.27725
7/19/2021	7:00:00 PM	39.18737	26.2504	52.43419	42.37763	37.23895	32.71396
7/19/2021	8:00:00 PM	42.9553	33.90718	53.1165	45.6997	42.13885	37.65088
7/19/2021	9:00:00 PM	51.13177	40.54833	57.50748	53.76771	50.4023	44.07328
7/19/2021	10:00:00 PM	45.86285	38.23439	60.57749	46.87421	43.63508	41.75234
7/19/2021	11:00:00 PM	41.92934	36.73196	46.09505	43.16078	41.97287	39.78677
7/20/2021	12:00:00 AM	38.93292	27.85467	45.15431	41.56436	38.11696	35.48957
7/20/2021	1:00:00 AM	40.62666	34.47916	47.59961	41.83611	40.5021	39.07742
7/20/2021	2:00:00 AM	40.83336	35.55774	46.37822	42.22582	40.68206	39.21024
7/20/2021	3:00:00 AM	35.0186	10.50772	43.86157	39.69413	29.38992	17.34058
7/20/2021	4:00:00 AM	26.97715	9.119416	55.90357	24.628	18.46491	14.15647
7/20/2021	5:00:00 AM	24.33785	8.691257	50.16462	25.36128	19.12063	14.39104
7/20/2021	6:00:00 AM	27.65901	9.22708	50.78745	27.85665	19.6128	14.82831
7/20/2021	7:00:00 AM	29.45693	7.399114	53.6028	30.20156	16.84587	12.34914
7/20/2021	8:00:00 AM	36.0566	18.51731	54.28314	38.45972	33.70892	30.22116
7/20/2021	9:00:00 AM	40.5151	22.12505	62.91926	41.66636	36.05337	31.17965
7/20/2021	10:00:00 AM	39.65925	27.19361	54.97064	41.70902	37.07607	33.55878
7/20/2021	11:00:00 AM	41.31189	13.787	56.57052	45.92919	33.83546	22.47243
7/20/2021	12:00:00 PM	39.28055	13.41957	56.28706	42.7759	27.0202	18.37134
7/20/2021	1:00:00 PM	49.34137	12.48443	66.22706	52.52678	29.45084	18.41375
7/20/2021	2:00:00 PM	37.08227	11.52769	54.91315	40.11631	24.56163	15.54761
7/20/2021	3:00:00 PM	38.62767	24.80639	55.81155	42.79025	32.09343	29.90446
7/20/2021	4:00:00 PM	39.35213	28.30862	51.83732	43.52347	34.49208	30.54459
7/20/2021	5:00:00 PM	36.77108	29.39514	56.38404	37.5369	33.34597	31.62748
7/20/2021	6:00:00 PM	40.64563	30.16991	60.29577	43.88664	35.48955	32.86208
7/20/2021	7:00:00 PM	44.9524	32.64104	62.87449	47.78425	39.00526	35.68885
7/20/2021	8:00:00 PM	40.9624	32.2106	48.14067	44.87033	38.91896	34.90998
7/20/2021	9:00:00 PM	45.86172	36.38341	52.73422	48.52195	45.46104	39.70682
7/20/2021	10:00:00 PM	43.31043	37.55668	48.82107	45.86677	42.38311	40.01084
7/20/2021	11:00:00 PM	43.53577	35.97812	50.77109	45.93486	42.84668	39.77515
7/21/2021	12:00:00 AM	40.0176	32.22163	55.83761	42.14947	38.97671	35.25162
7/21/2021	1:00:00 AM	39.93703	34.51556	45.61817	41.66678	39.65716	37.32786
7/21/2021	2:00:00 AM	38.23323	31.74467	44.15717	40.82991	37.51473	34.58371
7/21/2021	3:00:00 AM	37.28299	30.31678	42.74687	38.82496	37.02305	35.1304
7/21/2021	4:00:00 AM	37.04117	31.10465	41.66859	38.58294	36.86348	35.21094
7/21/2021	5:00:00 AM	36.17736	30.51641	48.15903	38.41182	35.68328	33.12131
7/21/2021	6:00:00 AM	36.0084	31.7378	49.83669	37.37813	35.65604	33.85952
7/21/2021	7:00:00 AM	35.54457	29.65389	49.13237	38.09629	33.63486	32.0448
7/21/2021	8:00:00 AM	37.6929	30.08528	57.55232	38.82897	35.4379	33.39228
7/21/2021	9:00:00 AM	40.67321	30.652	64.01451	42.09563	39.15819	35.09027
7/21/2021	10:00:00 AM	39.28338	29.52277	52.20906	41.69092	38.60023	33.84041
7/21/2021	11:00:00 AM	41.17828	28.88877	59.15941	42.72602	35.037	31.19109
7/21/2021	12:00:00 PM	42.96598	28.51153	59.38072	38.06307	32.53913	30.77033

7/21/2021	1:00:00 PM	47.43518	28.6246	67.75458	40.70246	33.11092	31.00618
7/21/2021	2:00:00 PM	44.46589	28.26563	61.18324	42.75093	33.38152	31.25735
7/21/2021	3:00:00 PM	50.0198	28.42423	62.42675	52.52729	35.97778	30.90324
7/21/2021	4:00:00 PM	42.24573	28.66697	61.58717	35.56903	32.97277	31.09167
7/21/2021	5:00:00 PM	46.4641	29.04799	61.06349	49.69054	33.44353	31.06578
7/21/2021	6:00:00 PM	33.97834	29.8567	49.37681	35.09247	33.41552	31.94957
7/21/2021	7:00:00 PM	33.64351	29.40212	41.96917	35.57807	33.0285	31.45126
7/21/2021	8:00:00 PM	44.52449	30.10947	57.07491	48.49119	40.87725	32.87754
7/21/2021	9:00:00 PM	48.34736	40.38299	55.39713	50.21196	48.30847	45.28121
7/21/2021	10:00:00 PM	47.37486	41.96984	52.59044	49.13725	47.07424	44.87204
7/21/2021	11:00:00 PM	45.73361	39.74783	50.79818	47.5654	45.52887	42.67623
7/22/2021	12:00:00 AM	43.95737	38.24161	50.88744	46.01653	43.70573	40.7718
7/22/2021	1:00:00 AM	45.55973	36.60716	54.46104	47.05581	45.4601	43.25518
7/22/2021	2:00:00 AM	45.24419	36.61938	52.01625	47.3073	45.12892	41.95377
7/22/2021	3:00:00 AM	40.8515	30.63826	47.4459	44.77542	38.68746	33.74589
7/22/2021	4:00:00 AM	37.33586	30.62615	47.86563	39.45781	36.92585	34.00749
7/22/2021	5:00:00 AM	39.50228	33.22805	57.84265	41.60371	38.31405	36.12236
7/22/2021	6:00:00 AM	37.95188	31.2989	48.52093	40.86067	36.59327	33.91289
7/22/2021	7:00:00 AM	38.18137	31.91659	55.72463	39.97701	35.81422	34.16624
7/22/2021	8:00:00 AM	37.1537	30.90791	51.95986	39.36806	35.88256	33.7417
7/22/2021	9:00:00 AM	37.81719	29.7729	55.92725	39.86392	34.14146	32.10453
7/22/2021	10:00:00 AM	42.02239	29.11242	59.07233	41.62158	33.16313	31.29511
7/22/2021	11:00:00 AM	39.80301	28.50315	61.18696	37.18098	32.31099	30.67775
7/22/2021	12:00:00 PM	43.87593	14.07384	67.8275	44.16897	32.06256	21.73902
7/22/2021	1:00:00 PM	46.03982	11.48236	67.91425	50.48897	26.41187	16.82065
7/22/2021	2:00:00 PM	29.45144	9.592046	53.07733	30.43362	19.71193	13.77752
7/22/2021	3:00:00 PM	34.11845	10.25944	52.38731	36.08631	21.42938	14.60839
7/22/2021	4:00:00 PM	26.39355	10.61896	38.94528	30.99668	14.69501	12.75591

WM4: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
7/12/2021	5:24:32 PM	51.79905	28.02189	76.37365	51.69133	39.75465	33.49837
7/12/2021	6:00:00 PM	46.63147	23.33245	69.91755	47.43583	37.80307	29.52182
7/12/2021	7:00:00 PM	36.23024	22.19593	56.21398	38.65186	29.97719	26.8185
7/12/2021	8:00:00 PM	45.02488	23.85989	69.59575	44.55852	34.47718	28.97451
7/12/2021	9:00:00 PM	52.04531	29.72968	74.24139	54.20782	42.2019	36.35779
7/12/2021	10:00:00 PM	45.39656	31.42753	69.14554	46.10412	40.32101	36.74479
7/12/2021	11:00:00 PM	43.01477	31.10937	60.45879	45.24258	40.7709	36.35878
7/13/2021	12:00:00 AM	39.86179	29.16249	54.69809	42.71695	37.72321	33.68229
7/13/2021	1:00:00 AM	39.9214	27.32992	53.40622	43.23257	37.40436	32.5485
7/13/2021	2:00:00 AM	39.77972	24.60239	54.02588	43.5494	37.00404	31.29015
7/13/2021	3:00:00 AM	38.59158	22.95734	54.99858	42.05276	34.96297	29.6774
7/13/2021	4:00:00 AM	42.52911	24.24029	61.49151	45.28378	36.73097	30.92955
7/13/2021	5:00:00 AM	42.29068	24.65455	64.72402	44.97938	36.37448	31.2382
7/13/2021	6:00:00 AM	41.70284	24.98653	61.9309	44.50471	35.34325	30.92426
7/13/2021	7:00:00 AM	45.52183	25.85539	63.57509	46.55572	37.80443	32.62497
7/13/2021	8:00:00 AM	50.46014	32.07826	63.203	53.2108	49.66527	38.5265
7/13/2021	9:00:00 AM	49.53761	27.72194	66.57222	53.02968	45.16624	33.50775
7/13/2021	10:00:00 AM	50.53232	27.56696	68.64298	55.60094	41.12241	34.11371
7/13/2021	11:00:00 AM	52.47599	28.07387	72.63327	54.29922	40.31431	33.7365
7/13/2021	12:00:00 PM	58.18791	32.09948	76.21162	61.41407	52.93449	45.72499
7/13/2021	1:00:00 PM	54.10874	30.00114	73.64958	57.99539	45.36107	37.02514
7/13/2021	2:00:00 PM	49.59922	30.70622	72.11705	50.06752	42.17212	37.4001
7/13/2021	3:00:00 PM	54.14303	26.62417	78.29757	55.61457	42.27279	33.85134
7/13/2021	4:00:00 PM	67.77485	31.26307	83.62995	72.26493	59.56489	43.02372
7/13/2021	5:00:00 PM	69.29304	37.83978	82.2263	73.80788	64.67152	50.87567
7/13/2021	6:00:00 PM	70.03152	42.03675	82.26498	74.16936	66.92435	55.22371
7/13/2021	7:00:00 PM	69.23599	35.85739	81.49868	73.5823	65.17962	51.61186
7/13/2021	8:00:00 PM	55.66149	28.04691	76.04847	58.2585	42.26751	34.80526
7/13/2021	9:00:00 PM	47.31795	34.4257	72.47042	48.11458	40.78148	37.94179
7/13/2021	10:00:00 PM	48.47428	30.2885	70.18035	49.79077	40.58263	35.74763
7/13/2021	11:00:00 PM	40.7573	30.88155	55.49942	43.05559	39.74401	36.7192
7/14/2021	12:00:00 AM	39.45105	26.5627	56.34538	42.29918	37.0134	32.17114
7/14/2021	1:00:00 AM	38.42143	21.3251	53.13772	42.14262	35.6159	28.54027
7/14/2021	2:00:00 AM	45.78972	28.48209	58.25858	49.50491	42.9642	36.49929
7/14/2021	3:00:00 AM	41.06669	23.06774	56.874	44.5196	37.69785	30.62779
7/14/2021	4:00:00 AM	40.41686	25.47633	56.99208	43.31167	36.54871	31.73389
7/14/2021	5:00:00 AM	37.19979	24.70459	56.40964	39.63194	34.02413	30.1082
7/14/2021	6:00:00 AM	38.59742	26.26085	55.66829	41.39099	35.39431	31.56571
7/14/2021	7:00:00 AM	41.81368	30.62659	58.68428	44.75477	39.18848	35.61858
7/14/2021	8:00:00 AM	49.09798	30.43111	77.10725	44.27796	40.44001	36.35123

7/14/2021	9:00:00 AM	44.86711	33.99398	60.15029	48.10272	40.91463	37.74604
7/14/2021	10:00:00 AM	49.7653	28.9116	70.4056	53.70516	39.95706	33.52423
7/14/2021	11:00:00 AM	54.64453	28.73145	73.65956	57.36151	44.42795	36.59109
7/14/2021	12:00:00 PM	55.66297	26.20525	78.22077	57.00184	40.71777	32.98307
7/14/2021	1:00:00 PM	51.8869	26.28623	75.3417	53.29942	39.72063	32.47201
7/14/2021	2:00:00 PM	56.44998	26.98354	78.65453	59.4506	43.64039	33.81627
7/14/2021	3:00:00 PM	59.32598	25.79363	78.44732	61.85851	41.83577	32.76145
7/14/2021	4:00:00 PM	54.92811	24.84238	73.34705	57.92381	40.25667	31.98167
7/14/2021	5:00:00 PM	49.49765	23.83988	71.19643	52.39405	40.21369	30.29135
7/14/2021	6:00:00 PM	46.53815	22.35922	65.8438	51.35407	37.82344	28.29692
7/14/2021	7:00:00 PM	38.60005	19.88694	61.79162	36.12353	28.34203	24.85508
7/14/2021	8:00:00 PM	37.10095	18.00586	52.47235	41.59026	31.48095	24.41935
7/14/2021	9:00:00 PM	46.39234	34.25953	66.77781	48.61795	41.4942	38.43157
7/14/2021	10:00:00 PM	42.9164	30.12837	65.00787	43.96463	39.02761	35.17021
7/14/2021	11:00:00 PM	38.27526	20.9921	51.94127	41.50565	36.92315	28.71077
7/15/2021	12:00:00 AM	38.97083	20.66597	57.30307	41.6182	36.67506	29.23284
7/15/2021	1:00:00 AM	42.23606	22.44123	64.90878	42.40544	33.46481	28.06683
7/15/2021	2:00:00 AM	37.54637	22.56901	56.14989	40.0815	34.93987	30.63154
7/15/2021	3:00:00 AM	33.17384	19.40598	48.09357	37.08919	29.79988	25.35545
7/15/2021	4:00:00 AM	31.69779	19.7199	46.12514	34.50823	29.6418	25.7543
7/15/2021	5:00:00 AM	34.88992	22.82129	59.00115	36.70508	32.31099	28.69109
7/15/2021	6:00:00 AM	38.90521	25.02629	57.15073	41.67731	35.16217	30.96923
7/15/2021	7:00:00 AM	41.67951	25.20998	61.93501	43.61091	35.90341	31.02812
7/15/2021	8:00:00 AM	39.54064	28.28528	55.19676	43.17747	36.79614	33.4352
7/15/2021	9:00:00 AM	50.32638	27.54947	74.55556	47.28251	37.76782	32.89338
7/15/2021	10:00:00 AM	45.45294	26.51477	67.95593	49.03299	36.91454	31.74788
7/15/2021	11:00:00 AM	44.33729	25.64169	65.79512	46.28012	38.26787	31.5463
7/15/2021	12:00:00 PM	52.03567	25.32296	72.91268	54.21171	39.535	31.12628
7/15/2021	1:00:00 PM	53.03792	27.01725	76.64696	54.25027	40.84534	33.09235
7/15/2021	2:00:00 PM	53.24112	26.90147	74.48133	55.45106	41.19125	33.19246
7/15/2021	3:00:00 PM	55.7543	26.26804	75.91438	57.9496	44.75242	34.26753
7/15/2021	4:00:00 PM	56.06976	26.82821	75.50487	59.22833	44.66733	33.98783
7/15/2021	5:00:00 PM	55.50792	25.28633	79.80248	55.56802	43.0929	32.9872
7/15/2021	6:00:00 PM	49.45704	23.41359	75.17768	49.51674	35.143	29.00648
7/15/2021	7:00:00 PM	36.578	20.54649	62.48875	36.9184	30.75808	26.307
7/15/2021	8:00:00 PM	37.48779	18.84239	53.52717	41.79817	31.37965	25.43644
7/15/2021	9:00:00 PM	42.36441	32.67357	58.7519	44.53951	41.62895	37.60216
7/15/2021	10:00:00 PM	43.45262	31.3472	68.23166	44.01806	38.94972	35.6266
7/15/2021	11:00:00 PM	39.54692	28.69117	53.96056	42.38666	37.83695	33.93529
7/16/2021	12:00:00 AM	35.28633	21.07175	52.92721	36.71814	30.26767	26.04702
7/16/2021	1:00:00 AM	38.18858	18.42711	65.24066	34.23526	28.22614	23.90214
7/16/2021	2:00:00 AM	29.21121	17.81112	45.30475	31.70732	26.69816	23.01645
7/16/2021	3:00:00 AM	35.81213	18.89226	57.62001	36.64681	28.72733	24.63477

7/16/2021	4:00:00 AM	32.43922	21.08178	46.82199	36.3952	29.5575	26.03039
7/16/2021	5:00:00 AM	35.74061	24.58498	52.71	38.23993	33.43079	29.81138
7/16/2021	6:00:00 AM	48.67059	27.15254	79.23269	42.03057	35.45483	31.93118
7/16/2021	7:00:00 AM	49.08198	25.64024	80.89088	44.42356	35.08249	31.08195
7/16/2021	8:00:00 AM	40.01037	26.9048	58.52985	42.52645	37.52623	34.06651
7/16/2021	9:00:00 AM	53.73174	26.18716	78.97372	50.3843	37.22415	32.28409
7/16/2021	10:00:00 AM	37.60193	23.98792	56.97254	39.88926	34.3014	30.43694
7/16/2021	11:00:00 AM	43.91452	22.70681	60.34361	47.38843	35.51668	28.67525
7/16/2021	12:00:00 PM	44.90812	23.14449	66.74506	48.39846	34.76127	28.63758
7/16/2021	1:00:00 PM	53.23285	24.87076	77.05688	52.79466	38.64561	31.81534
7/16/2021	2:00:00 PM	53.73855	27.11837	75.48631	55.26277	40.77523	33.68767
7/16/2021	3:00:00 PM	54.08501	23.91016	79.9213	52.44777	38.18257	30.83238
7/16/2021	4:00:00 PM	51.64323	24.42202	74.30743	53.2294	39.42224	30.7182
7/16/2021	5:00:00 PM	52.7393	24.9357	74.23665	51.89652	37.93422	31.52566
7/16/2021	6:00:00 PM	49.8732	22.52107	69.74274	47.09625	33.05743	28.39554
7/16/2021	7:00:00 PM	37.0482	18.85589	63.31617	35.3318	28.31803	24.1167
7/16/2021	8:00:00 PM	42.27455	18.93252	71.02763	43.42209	32.58352	25.24255
7/16/2021	9:00:00 PM	43.95072	30.56213	67.23594	43.81682	40.01847	37.11076
7/16/2021	10:00:00 PM	37.21113	21.54939	52.74108	39.80457	33.73901	27.76502
7/16/2021	11:00:00 PM	37.49965	29.7018	45.71005	39.52283	37.12994	34.3318
7/17/2021	12:00:00 AM	38.55758	22.56211	56.31213	40.03768	35.50164	27.14391
7/17/2021	1:00:00 AM	33.29875	20.9764	55.67995	34.7255	28.6931	25.50992
7/17/2021	2:00:00 AM	30.23598	19.18669	49.76638	32.97617	27.27949	23.72637
7/17/2021	3:00:00 AM	29.10816	17.71716	48.86214	32.61303	26.92398	23.13307
7/17/2021	4:00:00 AM	29.67239	17.4229	56.49978	30.4289	26.07564	22.91104
7/17/2021	5:00:00 AM	33.2295	20.06613	50.71261	36.31798	30.79211	26.03693
7/17/2021	6:00:00 AM	36.74587	21.36871	56.85567	39.52057	31.32463	26.88166
7/17/2021	7:00:00 AM	37.40656	24.27073	55.21013	39.2983	33.73762	29.9202
7/17/2021	8:00:00 AM	39.50492	24.52964	59.14169	42.01057	35.81381	30.38714
7/17/2021	9:00:00 AM	42.51682	26.10647	62.98883	45.62543	38.4278	32.41391
7/17/2021	10:00:00 AM	47.63039	31.11471	66.74026	50.33358	42.96466	37.9823
7/17/2021	11:00:00 AM	48.25576	28.06109	66.89759	50.69784	42.36822	34.73549
7/17/2021	12:00:00 PM	51.11842	33.9616	69.09858	54.12232	46.46006	41.29343
7/17/2021	1:00:00 PM	51.70512	33.32903	73.85928	54.56296	47.57711	41.10712
7/17/2021	2:00:00 PM	50.96862	27.25467	71.1242	54.04239	44.51094	35.71792
7/17/2021	3:00:00 PM	52.29566	32.41266	72.48649	55.75676	47.28419	40.07988
7/17/2021	4:00:00 PM	50.93453	37.43479	67.13705	54.03622	48.53094	43.61523
7/17/2021	5:00:00 PM	48.31962	25.06872	66.42351	52.0765	42.30214	31.90387
7/17/2021	6:00:00 PM	50.14326	25.0753	70.2187	52.4765	38.79323	30.85417
7/17/2021	7:00:00 PM	43.15196	20.20386	66.78444	42.95548	30.27917	25.92573
7/17/2021	8:00:00 PM	39.35389	21.55863	56.71497	43.81739	34.53854	27.8597
7/17/2021	9:00:00 PM	44.06721	37.90798	52.98646	45.96768	43.77654	41.45052
7/17/2021	10:00:00 PM	43.12067	35.33677	52.95965	45.21709	42.79357	39.86555

7/17/2021	11:00:00 PM	41.82873	34.78631	51.33006	43.42989	41.51966	39.43075
7/18/2021	12:00:00 AM	39.86281	28.10755	60.05923	42.00243	37.20528	33.81271
7/18/2021	1:00:00 AM	37.23517	20.84625	56.9187	37.65179	30.89803	26.64168
7/18/2021	2:00:00 AM	30.96697	18.29538	46.45199	33.83793	29.09866	23.60585
7/18/2021	3:00:00 AM	31.47541	18.32814	60.45419	32.77917	28.00853	24.16851
7/18/2021	4:00:00 AM	31.96301	19.39473	50.14675	35.06211	29.59	25.30895
7/18/2021	5:00:00 AM	34.14026	21.33636	56.72097	35.10598	30.22673	26.71608
7/18/2021	6:00:00 AM	35.81405	23.05695	52.7223	38.26954	33.15291	29.02879
7/18/2021	7:00:00 AM	45.37215	24.84785	77.20797	44.01616	34.11509	30.05399
7/18/2021	8:00:00 AM	38.56936	22.34051	58.09722	41.62813	33.55892	28.29161
7/18/2021	9:00:00 AM	42.2344	22.26102	64.69178	42.43092	33.4244	28.94437
7/18/2021	10:00:00 AM	48.24674	22.82896	78.55274	43.716	34.13303	27.99497
7/18/2021	11:00:00 AM	41.49907	23.4924	66.19615	42.43906	33.29145	28.76775
7/18/2021	12:00:00 PM	47.77522	23.45423	71.37672	46.69619	33.58238	28.47965
7/18/2021	1:00:00 PM	43.99297	22.16362	64.09971	42.40577	32.10071	27.31684
7/18/2021	2:00:00 PM	45.73963	22.23413	68.65083	45.16496	33.87003	27.70981
7/18/2021	3:00:00 PM	55.18207	21.34615	77.15968	53.64069	35.18029	26.96826
7/18/2021	4:00:00 PM	61.87468	20.32151	79.08999	65.67901	42.12415	25.98846
7/18/2021	5:00:00 PM	64.08065	30.40302	80.18272	68.40159	56.59949	42.84123
7/18/2021	6:00:00 PM	65.70446	30.64015	81.88524	70.39451	52.74119	37.69485
7/18/2021	7:00:00 PM	67.41552	35.66834	81.52417	71.79151	62.54671	49.38391
7/18/2021	8:00:00 PM	68.93399	40.53744	82.5416	73.22855	64.78601	52.81914
7/18/2021	9:00:00 PM	66.22274	36.00774	81.62938	70.74278	58.74784	44.96098
7/18/2021	10:00:00 PM	53.62319	35.95984	76.34634	54.97037	42.92848	40.22517
7/18/2021	11:00:00 PM	43.31503	36.45636	62.4446	44.35722	42.08018	40.27443
7/19/2021	12:00:00 AM	41.63471	37.11068	53.75279	43.16261	41.18236	39.33576
7/19/2021	1:00:00 AM	42.4126	33.82818	57.63799	44.59143	40.69517	37.89171
7/19/2021	2:00:00 AM	45.87774	23.26721	68.4302	47.21245	39.2531	32.93995
7/19/2021	3:00:00 AM	37.09866	27.7574	45.80115	39.78934	36.33109	31.99735
7/19/2021	4:00:00 AM	43.92491	21.71386	64.99871	43.81926	34.12031	28.26675
7/19/2021	5:00:00 AM	34.02986	22.82263	47.85969	37.3577	31.88555	27.72267
7/19/2021	6:00:00 AM	41.07206	21.78838	64.3059	43.51434	31.71698	26.78254
7/19/2021	7:00:00 AM	42.50439	23.93312	61.96736	45.86431	35.02717	29.50668
7/19/2021	8:00:00 AM	53.48772	24.83025	76.45139	49.63195	35.62298	30.22557
7/19/2021	9:00:00 AM	66.37662	34.88341	81.33549	70.79565	60.71818	48.44252
7/19/2021	10:00:00 AM	65.94909	34.79727	79.93253	70.45024	60.24372	47.25037
7/19/2021	11:00:00 AM	62.8121	23.21868	79.57962	66.94583	51.36637	31.7754
7/19/2021	12:00:00 PM	47.84222	23.40443	66.7456	52.97498	36.75808	30.41963
7/19/2021	1:00:00 PM	45.68296	24.69108	66.11413	48.59096	37.47199	31.00589
7/19/2021	2:00:00 PM	50.91839	22.24584	80.90306	48.72687	36.81382	28.87855
7/19/2021	3:00:00 PM	63.43309	22.12625	79.22395	67.92532	51.26371	29.60589
7/19/2021	4:00:00 PM	66.62727	34.24834	81.40034	71.07271	60.59456	46.29864
7/19/2021	5:00:00 PM	63.43674	31.93762	79.04945	67.84804	56.81413	43.94075

7/19/2021	6:00:00 PM	61.85142	24.3897	79.18161	65.80871	50.31783	35.24447
7/19/2021	7:00:00 PM	63.68267	33.80906	78.27461	67.98207	57.25422	45.43852
7/19/2021	8:00:00 PM	60.53381	33.67029	78.49827	64.36643	53.11372	41.89797
7/19/2021	9:00:00 PM	63.7126	39.57139	78.72399	67.99858	57.41076	46.07525
7/19/2021	10:00:00 PM	62.03991	37.12708	79.38586	65.91762	52.54682	42.44192
7/19/2021	11:00:00 PM	48.26566	35.46066	71.1227	50.63144	42.46471	38.88075
7/20/2021	12:00:00 AM	39.0881	27.1987	53.53977	41.7327	37.62312	34.61295
7/20/2021	1:00:00 AM	41.39083	33.006	58.16967	42.47536	39.35109	37.67819
7/20/2021	2:00:00 AM	42.26757	34.1508	60.99782	44.42817	39.94016	37.98317
7/20/2021	3:00:00 AM	39.04719	23.83181	57.61068	42.09383	34.34057	29.58817
7/20/2021	4:00:00 AM	37.64833	20.33819	60.23684	37.74297	30.78412	25.9821
7/20/2021	5:00:00 AM	32.9719	20.53392	52.96622	35.4384	29.73895	25.57197
7/20/2021	6:00:00 AM	43.07224	22.15739	64.14598	45.73738	34.82254	28.67872
7/20/2021	7:00:00 AM	39.16933	23.0766	58.20814	42.09604	33.62821	28.5972
7/20/2021	8:00:00 AM	41.26418	23.43476	61.35148	43.49637	35.80573	31.21771
7/20/2021	9:00:00 AM	55.04984	25.13988	80.41328	53.51735	38.46158	32.35045
7/20/2021	10:00:00 AM	47.08917	27.60022	71.05263	47.47292	37.36092	33.4758
7/20/2021	11:00:00 AM	45.11181	23.82848	66.88572	47.31906	36.0858	29.81336
7/20/2021	12:00:00 PM	50.82358	24.10854	75.86614	49.45246	34.66528	29.04439
7/20/2021	1:00:00 PM	59.40738	25.90784	81.81662	61.46696	44.80853	32.80444
7/20/2021	2:00:00 PM	49.64242	24.15497	71.83575	50.67002	36.92142	29.94781
7/20/2021	3:00:00 PM	50.21832	34.45822	72.92641	51.56183	40.98685	38.0449
7/20/2021	4:00:00 PM	50.54182	35.42371	71.67261	51.80436	41.09228	38.36991
7/20/2021	5:00:00 PM	49.58454	36.54913	72.45406	46.37852	40.84825	39.16051
7/20/2021	6:00:00 PM	64.28837	37.22006	81.69134	68.55408	42.51232	39.94709
7/20/2021	7:00:00 PM	62.46991	39.06125	80.73988	66.43211	48.68268	42.64279
7/20/2021	8:00:00 PM	44.67606	38.50087	57.35567	47.27576	43.43688	41.09384
7/20/2021	9:00:00 PM	49.2907	39.25094	67.85211	51.51927	45.95797	42.13727
7/20/2021	10:00:00 PM	44.86413	39.27904	56.09783	47.01673	43.8698	41.89416
7/20/2021	11:00:00 PM	45.75344	38.63121	59.91307	48.03371	44.10596	41.79711
7/21/2021	12:00:00 AM	44.21211	38.07016	61.37918	45.97816	42.84655	40.68522
7/21/2021	1:00:00 AM	44.33053	39.36943	54.52018	46.11691	43.62271	41.92109
7/21/2021	2:00:00 AM	42.94389	38.20774	48.07919	44.67997	42.61117	40.81017
7/21/2021	3:00:00 AM	43.01918	37.52639	48.01011	44.47061	42.86705	41.12551
7/21/2021	4:00:00 AM	43.57894	38.03013	51.48995	45.31255	43.0974	41.30546
7/21/2021	5:00:00 AM	42.86839	38.01466	50.70464	44.68943	42.3983	40.66052
7/21/2021	6:00:00 AM	43.70793	38.15448	58.40828	45.83072	42.54486	40.7394
7/21/2021	7:00:00 AM	42.84561	37.19871	55.07643	44.95315	41.71297	40.00127
7/21/2021	8:00:00 AM	44.94274	37.24655	68.22067	45.62066	41.79303	39.88982
7/21/2021	9:00:00 AM	54.51741	36.74495	80.70512	52.79965	43.81655	40.27679
7/21/2021	10:00:00 AM	46.56524	36.11576	64.13107	50.2005	42.14484	39.21683
7/21/2021	11:00:00 AM	45.30225	36.11525	60.82354	48.39524	42.06952	39.09241
7/21/2021	12:00:00 PM	53.79448	35.4731	75.216	54.6083	41.50589	38.4314

7/21/2021	1:00:00 PM	57.5737	35.87595	84.06182	56.23988	43.68368	39.19346
7/21/2021	2:00:00 PM	54.24715	35.63927	76.83172	53.41541	42.07736	39.09618
7/21/2021	3:00:00 PM	52.73898	35.62669	73.07474	53.57638	41.92575	38.91146
7/21/2021	4:00:00 PM	53.41913	36.42874	78.09587	47.51677	41.21747	39.33632
7/21/2021	5:00:00 PM	53.1945	36.63231	73.92079	55.65255	42.31789	39.42276
7/21/2021	6:00:00 PM	42.39237	37.24367	57.63976	43.83357	41.47093	39.91777
7/21/2021	7:00:00 PM	44.79463	37.52047	67.171	45.69668	41.69417	40.00211
7/21/2021	8:00:00 PM	45.81832	38.52558	58.85117	48.6926	44.16603	41.21719
7/21/2021	9:00:00 PM	48.87255	41.8664	66.09105	50.25952	48.30498	45.76337
7/21/2021	10:00:00 PM	47.86218	42.62279	55.43426	49.50659	47.53477	45.5658
7/21/2021	11:00:00 PM	46.88996	41.35985	53.28013	48.61144	46.64314	44.28964
7/22/2021	12:00:00 AM	46.727	40.55797	67.02505	47.88036	45.35727	43.16896
7/22/2021	1:00:00 AM	55.7922	39.85056	77.43968	55.36374	46.48924	44.4437
7/22/2021	2:00:00 AM	46.53212	39.99455	57.16598	48.29123	46.19026	43.77203
7/22/2021	3:00:00 AM	45.02447	39.22803	53.41775	47.35784	44.28584	42.02979
7/22/2021	4:00:00 AM	45.245	38.70993	57.43568	47.55022	44.10736	42.08631
7/22/2021	5:00:00 AM	50.67287	40.42247	63.31447	54.54932	47.58085	43.65025
7/22/2021	6:00:00 AM	50.12835	39.70385	60.96736	53.67093	47.73572	43.4388
7/22/2021	7:00:00 AM	49.70034	40.05076	66.39236	52.13953	47.28302	44.0899
7/22/2021	8:00:00 AM	49.06797	38.94753	65.33204	51.48671	45.62155	42.64353
7/22/2021	9:00:00 AM	54.70202	37.55453	75.36101	55.01982	44.6648	40.79264
7/22/2021	10:00:00 AM	47.73004	36.59004	68.42305	48.53303	41.78014	39.53609
7/22/2021	11:00:00 AM	43.94458	36.21134	63.5285	44.40633	40.92857	39.01537
7/22/2021	12:00:00 PM	58.40951	26.12057	82.16183	55.16013	41.6161	33.15787
7/22/2021	1:00:00 PM	61.49181	25.40269	84.86446	64.08982	43.67098	31.87078
7/22/2021	2:00:00 PM	46.10855	23.95356	69.14268	48.03822	34.70812	29.74587
7/22/2021	3:00:00 PM	50.40229	23.51282	73.08591	51.10854	36.93018	30.71338
7/22/2021	4:00:00 PM	36.52471	23.16284	47.29512	39.75507	33.86686	30.58116

WM4: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
7/12/2021	5:24:32 PM	63.8727	33.30559	85.60497	65.22508	51.32538	41.22382
7/12/2021	6:00:00 PM	57.76588	28.45753	81.16956	58.9293	45.15587	36.71967
7/12/2021	7:00:00 PM	46.19774	26.02929	68.97582	46.53303	37.33651	33.129
7/12/2021	8:00:00 PM	57.77555	27.69466	82.50116	54.32148	40.58085	34.8757
7/12/2021	9:00:00 PM	64.90411	32.38223	84.49918	68.13634	53.0451	40.75336
7/12/2021	10:00:00 PM	56.64689	33.05741	80.34381	56.79299	43.32743	38.96665
7/12/2021	11:00:00 PM	49.09803	33.03965	68.47406	51.43075	44.05338	39.19829
7/13/2021	12:00:00 AM	44.39162	30.92485	65.59622	46.71101	40.94292	36.53289
7/13/2021	1:00:00 AM	46.48177	29.82675	65.17878	49.7999	42.01583	36.40527
7/13/2021	2:00:00 AM	45.30444	27.98047	65.67414	48.03183	40.9044	35.36287
7/13/2021	3:00:00 AM	48.69672	27.20675	69.24828	51.90684	42.12793	35.52346
7/13/2021	4:00:00 AM	51.80902	28.45669	70.265	55.22915	45.41701	37.50292
7/13/2021	5:00:00 AM	55.19205	28.7518	76.30797	58.11851	45.74356	37.39848
7/13/2021	6:00:00 AM	52.18312	29.12264	75.24665	52.03957	40.79635	36.20384
7/13/2021	7:00:00 AM	51.09333	29.88961	72.10156	53.02577	42.93529	37.45525
7/13/2021	8:00:00 AM	54.60272	37.16764	73.94279	57.30958	52.02487	43.45606
7/13/2021	9:00:00 AM	57.38785	32.78147	76.08606	60.30994	49.4365	40.17593
7/13/2021	10:00:00 AM	60.35602	32.33644	79.75025	64.23901	50.99622	40.92585
7/13/2021	11:00:00 AM	64.90853	31.65763	83.64673	67.87181	51.197	39.66451
7/13/2021	12:00:00 PM	68.92969	35.61137	86.79688	72.61388	59.52009	48.17935
7/13/2021	1:00:00 PM	63.9566	34.40632	84.47326	65.98471	51.16613	42.6701
7/13/2021	2:00:00 PM	61.48869	35.11726	84.04184	61.71966	49.65331	43.44846
7/13/2021	3:00:00 PM	62.45574	30.87202	86.74086	62.46422	49.03339	40.21029
7/13/2021	4:00:00 PM	78.29139	35.09822	91.76684	82.98153	72.45653	55.18749
7/13/2021	5:00:00 PM	80.22456	42.48947	91.64813	84.47275	77.16895	64.92036
7/13/2021	6:00:00 PM	81.0099	50.17188	91.93284	84.75822	78.93315	69.19315
7/13/2021	7:00:00 PM	80.27986	43.17317	91.09683	84.26711	77.61823	65.63174
7/13/2021	8:00:00 PM	68.22489	32.08757	87.86939	71.7042	52.05515	40.1881
7/13/2021	9:00:00 PM	59.03939	35.92724	83.31077	60.61616	44.78429	40.44357
7/13/2021	10:00:00 PM	61.39902	32.02886	83.43925	62.54937	43.83908	38.41231
7/13/2021	11:00:00 PM	45.79641	32.31265	68.14413	47.26713	42.24904	38.70771
7/14/2021	12:00:00 AM	44.4228	29.00359	65.44828	46.53471	40.46094	35.58766
7/14/2021	1:00:00 AM	42.62386	24.979	59.91773	45.94434	39.37912	32.93681
7/14/2021	2:00:00 AM	49.90142	31.29865	67.85627	53.27143	46.60082	40.12983
7/14/2021	3:00:00 AM	44.94077	27.10235	61.7545	48.36084	41.70225	35.13707
7/14/2021	4:00:00 AM	43.70295	28.67917	60.30827	46.82539	40.55893	35.72308
7/14/2021	5:00:00 AM	44.14459	28.31023	69.90043	44.49886	39.19639	35.02665
7/14/2021	6:00:00 AM	42.45312	30.05117	59.33277	45.12321	40.12886	36.26488
7/14/2021	7:00:00 AM	46.7566	33.68699	65.14029	49.96092	44.0457	39.80782
7/14/2021	8:00:00 AM	51.41262	34.70796	77.98687	50.45555	46.39472	41.79689

7/14/2021	9:00:00 AM	50.41401	39.85389	65.76352	53.26455	46.9403	43.6478
7/14/2021	10:00:00 AM	57.77497	34.39008	81.22878	59.77884	46.43416	39.75093
7/14/2021	11:00:00 AM	66.37789	33.17716	85.0184	69.79176	55.58148	43.19605
7/14/2021	12:00:00 PM	67.55107	30.27764	88.52131	70.08668	52.33317	40.01285
7/14/2021	1:00:00 PM	64.52775	31.27077	86.92993	66.695	51.32441	40.33306
7/14/2021	2:00:00 PM	68.76334	33.04035	88.80323	72.42359	57.42077	43.8604
7/14/2021	3:00:00 PM	69.89666	31.68553	88.66909	72.94956	54.39502	41.67963
7/14/2021	4:00:00 PM	64.80689	30.1991	84.08223	67.32135	50.88159	39.84307
7/14/2021	5:00:00 PM	57.93915	29.23474	81.46287	59.20787	46.46505	38.09084
7/14/2021	6:00:00 PM	55.56406	27.82252	79.45632	57.61774	44.27597	36.56432
7/14/2021	7:00:00 PM	42.45993	24.79182	65.8208	41.78777	36.24323	32.22253
7/14/2021	8:00:00 PM	40.31953	22.86752	57.52806	43.86134	35.77225	30.47827
7/14/2021	9:00:00 PM	48.00888	34.98166	68.56114	50.10412	42.75555	39.43122
7/14/2021	10:00:00 PM	44.53513	31.09501	66.43326	45.97852	40.61001	36.57417
7/14/2021	11:00:00 PM	43.58187	24.79225	66.65052	45.27425	39.08528	32.46338
7/15/2021	12:00:00 AM	44.6294	24.1596	69.03966	45.04004	38.70131	32.41281
7/15/2021	1:00:00 AM	46.04499	26.09077	68.04198	47.7225	38.21594	32.8056
7/15/2021	2:00:00 AM	46.53385	25.794	71.24466	47.62863	38.80055	33.88158
7/15/2021	3:00:00 AM	38.5305	24.19477	60.56298	41.15346	35.41534	31.26485
7/15/2021	4:00:00 AM	38.07329	24.91947	54.96179	40.65463	36.16403	32.1147
7/15/2021	5:00:00 AM	40.09943	27.32431	61.18324	42.41218	38.17109	34.33919
7/15/2021	6:00:00 AM	42.93909	29.08178	59.57211	45.73138	40.45163	36.2021
7/15/2021	7:00:00 AM	44.95648	29.03352	63.6802	47.61401	40.76981	35.91551
7/15/2021	8:00:00 AM	45.64196	34.06663	62.79544	48.7877	42.98544	39.59254
7/15/2021	9:00:00 AM	53.18275	32.79322	76.23111	52.43161	43.65505	38.8493
7/15/2021	10:00:00 AM	54.81252	31.23774	81.42399	56.52874	44.30354	38.06304
7/15/2021	11:00:00 AM	54.21227	29.67865	78.09683	55.42568	43.56806	36.68927
7/15/2021	12:00:00 PM	64.37139	29.21557	84.79589	67.09834	49.86857	37.9077
7/15/2021	1:00:00 PM	64.44543	31.72743	87.77874	66.16263	49.93611	40.09277
7/15/2021	2:00:00 PM	65.78087	32.25171	86.11618	68.72398	53.34778	41.31288
7/15/2021	3:00:00 PM	68.13091	32.30735	87.43665	71.00523	55.5012	43.01059
7/15/2021	4:00:00 PM	68.83321	32.93808	86.23416	72.63669	58.44046	43.75769
7/15/2021	5:00:00 PM	66.75841	30.62157	88.57534	68.59681	53.40852	41.49875
7/15/2021	6:00:00 PM	58.25661	29.13444	81.11174	60.00685	46.51804	37.92292
7/15/2021	7:00:00 PM	48.76214	25.22801	76.03736	48.14167	39.09604	33.98298
7/15/2021	8:00:00 PM	41.24048	23.02192	63.14088	44.3051	36.06148	30.67274
7/15/2021	9:00:00 PM	46.39495	33.52438	70.53781	47.57363	42.86991	38.72334
7/15/2021	10:00:00 PM	44.24911	32.13173	68.49908	45.20463	40.17565	36.73229
7/15/2021	11:00:00 PM	43.26339	29.76368	64.96744	45.92326	39.61837	35.41898
7/16/2021	12:00:00 AM	39.05664	24.27002	58.15157	40.94596	34.86844	30.75847
7/16/2021	1:00:00 AM	40.68325	22.2991	66.51477	39.42303	34.09822	29.76429
7/16/2021	2:00:00 AM	35.01521	22.18221	52.71011	37.70962	32.7632	28.82236
7/16/2021	3:00:00 AM	41.68947	22.75257	64.17419	42.78565	34.70427	30.21009

7/16/2021	4:00:00 AM	37.82059	25.14734	54.79499	40.68042	35.69447	31.95517
7/16/2021	5:00:00 AM	40.586	28.61259	58.25906	43.17465	38.71842	34.88094
7/16/2021	6:00:00 AM	55.56094	30.51522	86.40329	45.53235	40.07342	36.37205
7/16/2021	7:00:00 AM	55.41604	29.51164	87.857	48.60118	40.29488	35.98825
7/16/2021	8:00:00 AM	46.46938	31.80686	64.74972	49.35564	44.01367	40.2854
7/16/2021	9:00:00 AM	55.90935	31.59629	80.10459	54.84617	43.65766	38.46943
7/16/2021	10:00:00 AM	48.25273	28.56076	70.02136	49.81266	41.08028	36.66041
7/16/2021	11:00:00 AM	50.52652	26.76321	72.27602	52.95751	40.99162	34.80252
7/16/2021	12:00:00 PM	56.13843	27.5861	79.87532	57.29086	42.68442	35.36477
7/16/2021	1:00:00 PM	61.93368	29.55158	84.3664	62.36619	46.87059	38.51327
7/16/2021	2:00:00 PM	65.91645	32.29281	85.94297	68.36187	52.49446	41.90498
7/16/2021	3:00:00 PM	59.91882	28.40396	83.6284	60.03615	45.16123	37.25426
7/16/2021	4:00:00 PM	63.99384	29.59935	87.32085	66.07683	50.33171	38.00819
7/16/2021	5:00:00 PM	63.89494	30.14616	85.20077	64.16073	48.31632	39.06367
7/16/2021	6:00:00 PM	58.42902	27.5387	81.36885	57.50618	42.67792	35.6237
7/16/2021	7:00:00 PM	47.61185	24.77762	75.24102	43.7699	36.57063	32.25968
7/16/2021	8:00:00 PM	44.10067	23.5749	72.02392	45.62551	36.4697	30.84301
7/16/2021	9:00:00 PM	44.74922	31.36958	67.56007	45.09303	41.13011	38.04775
7/16/2021	10:00:00 PM	39.47298	23.83919	57.42726	41.74774	35.95457	30.64509
7/16/2021	11:00:00 PM	39.54207	30.49739	53.37391	41.6307	38.60703	35.58336
7/17/2021	12:00:00 AM	40.08885	24.0871	58.48565	41.57768	36.8916	29.6721
7/17/2021	1:00:00 AM	36.11412	22.66762	56.60905	38.45443	32.54196	28.78467
7/17/2021	2:00:00 AM	34.41817	22.07799	55.75012	37.03466	32.207	28.36826
7/17/2021	3:00:00 AM	33.38119	21.36873	49.98181	36.46428	31.9931	28.12508
7/17/2021	4:00:00 AM	34.29759	21.23742	61.73189	35.34457	31.60584	28.06788
7/17/2021	5:00:00 AM	38.18728	24.16858	55.30521	41.4094	35.79994	31.05831
7/17/2021	6:00:00 AM	44.3942	25.71957	65.96601	46.0454	37.18158	32.75596
7/17/2021	7:00:00 AM	41.65385	27.78749	59.14474	43.95923	38.75538	34.7342
7/17/2021	8:00:00 AM	49.1588	28.73924	72.81064	50.86167	42.09771	35.86727
7/17/2021	9:00:00 AM	51.21013	30.10878	77.1784	52.31176	43.43024	37.44663
7/17/2021	10:00:00 AM	58.57059	34.00223	77.563	61.79725	50.13663	41.96509
7/17/2021	11:00:00 AM	56.40836	30.91263	77.11013	58.17721	46.17239	38.39754
7/17/2021	12:00:00 PM	54.68347	35.37621	73.73684	57.03822	48.0127	42.74133
7/17/2021	1:00:00 PM	60.09615	35.07295	84.57039	61.34484	49.72575	42.9388
7/17/2021	2:00:00 PM	59.52911	30.44785	82.65055	60.94504	47.86925	39.34439
7/17/2021	3:00:00 PM	60.49428	34.37839	83.04517	61.99502	49.70566	42.22141
7/17/2021	4:00:00 PM	56.75551	38.51653	78.39144	58.72809	50.07809	44.93187
7/17/2021	5:00:00 PM	57.69216	27.9872	80.32629	59.10713	45.30189	35.78111
7/17/2021	6:00:00 PM	62.75912	29.01664	81.59913	65.77129	51.79833	38.65639
7/17/2021	7:00:00 PM	55.36678	23.48169	78.59422	52.59472	35.97309	31.15055
7/17/2021	8:00:00 PM	42.8807	24.54384	70.9951	45.20819	37.0427	31.43276
7/17/2021	9:00:00 PM	45.5765	38.69276	67.11422	47.14367	44.66469	42.29185
7/17/2021	10:00:00 PM	44.04362	35.98033	55.33277	46.18777	43.65849	40.64011

7/17/2021	11:00:00 PM	43.22222	35.42997	59.24923	44.62206	42.43515	40.19571
7/18/2021	12:00:00 AM	43.9461	29.04375	65.57631	45.92332	38.72089	34.99195
7/18/2021	1:00:00 AM	39.77135	23.3249	59.62481	41.06542	34.26145	30.03528
7/18/2021	2:00:00 AM	35.71153	22.29807	55.60341	37.86436	33.53452	29.03385
7/18/2021	3:00:00 AM	38.94803	22.18481	65.94384	38.43581	33.34996	29.23608
7/18/2021	4:00:00 AM	36.99617	23.87295	55.72037	39.77012	35.00005	30.7173
7/18/2021	5:00:00 AM	38.71921	25.60628	58.62675	40.82692	36.40851	32.5082
7/18/2021	6:00:00 AM	40.65287	27.40188	58.0383	43.33783	38.68592	34.52225
7/18/2021	7:00:00 AM	52.14218	28.87598	84.87353	47.23618	39.55778	35.37085
7/18/2021	8:00:00 AM	50.22273	27.14043	70.61198	53.40097	41.97461	34.93848
7/18/2021	9:00:00 AM	46.63005	26.72081	68.58886	47.94442	39.55799	35.01964
7/18/2021	10:00:00 AM	51.63222	26.57327	79.68997	51.7092	40.78058	33.93778
7/18/2021	11:00:00 AM	50.04882	26.34739	73.54116	52.45938	40.51567	34.02761
7/18/2021	12:00:00 PM	60.33964	27.5508	83.34237	60.45093	43.06331	34.9636
7/18/2021	1:00:00 PM	54.19734	26.46712	77.01319	55.83131	41.31573	34.31183
7/18/2021	2:00:00 PM	56.58992	26.84919	80.9229	56.88237	43.13027	35.00247
7/18/2021	3:00:00 PM	67.11112	25.80291	90.05274	66.82019	46.25488	34.45389
7/18/2021	4:00:00 PM	73.63509	25.76577	89.43886	78.17031	55.69478	34.71492
7/18/2021	5:00:00 PM	76.14402	35.75105	90.91237	80.59853	70.62007	57.00187
7/18/2021	6:00:00 PM	76.93899	34.35484	91.53319	81.74851	67.09652	47.34507
7/18/2021	7:00:00 PM	79.01416	41.99158	91.23415	83.17404	75.596	63.78631
7/18/2021	8:00:00 PM	80.14732	47.5766	91.71869	84.16424	77.42535	66.98104
7/18/2021	9:00:00 PM	77.84131	39.19623	90.58862	82.43475	72.60647	57.14266
7/18/2021	10:00:00 PM	66.28965	36.88575	87.31244	68.85404	48.88227	41.3804
7/18/2021	11:00:00 PM	47.78063	37.31303	73.27356	46.50963	43.06545	41.18868
7/19/2021	12:00:00 AM	43.06561	37.94065	58.98535	44.51771	42.20698	40.2631
7/19/2021	1:00:00 AM	51.29052	34.78524	70.2458	53.91677	42.68838	39.06735
7/19/2021	2:00:00 AM	58.3418	25.40898	80.07936	60.34942	42.49585	34.75706
7/19/2021	3:00:00 AM	39.90277	28.84759	56.81698	41.9921	37.88603	33.58662
7/19/2021	4:00:00 AM	52.11188	24.87243	72.93796	54.68099	42.09468	32.65433
7/19/2021	5:00:00 AM	39.21358	25.93948	53.49687	42.65366	36.96654	32.30393
7/19/2021	6:00:00 AM	50.43848	25.91616	76.52805	47.24996	36.77521	32.18931
7/19/2021	7:00:00 AM	51.56284	28.17197	73.13709	54.50652	42.47949	35.60744
7/19/2021	8:00:00 AM	65.79333	28.64849	87.20371	61.61231	40.14269	35.22718
7/19/2021	9:00:00 AM	78.11553	41.43007	91.73221	82.43926	74.14114	62.71009
7/19/2021	10:00:00 AM	77.79243	39.07478	90.21419	82.18665	73.66692	61.41368
7/19/2021	11:00:00 AM	74.69866	29.13334	89.88876	79.3001	65.5704	42.3882
7/19/2021	12:00:00 PM	57.08596	28.49538	78.89094	60.01115	43.92654	36.74998
7/19/2021	1:00:00 PM	57.62424	28.94176	77.09479	60.38825	46.6769	38.01243
7/19/2021	2:00:00 PM	55.82997	26.90013	83.21668	56.49129	44.25095	35.95073
7/19/2021	3:00:00 PM	75.33548	26.92269	89.32021	80.13461	65.33331	37.06989
7/19/2021	4:00:00 PM	78.23427	40.18346	90.88897	82.6273	74.07705	60.49646
7/19/2021	5:00:00 PM	75.75756	38.57422	90.04844	80.16998	70.73997	58.12921

7/19/2021	6:00:00 PM	73.78749	29.94307	89.47097	78.36882	64.56024	47.53562
7/19/2021	7:00:00 PM	75.6565	40.7135	88.60738	79.92173	70.80789	59.42892
7/19/2021	8:00:00 PM	72.72755	37.45408	88.37302	76.91202	66.87621	54.65304
7/19/2021	9:00:00 PM	75.62246	42.16534	89.61207	80.05546	70.43684	57.63852
7/19/2021	10:00:00 PM	73.94728	38.45202	90.19615	78.35984	66.1078	51.92133
7/19/2021	11:00:00 PM	60.98482	36.33567	82.54841	64.00312	51.39869	41.24996
7/20/2021	12:00:00 AM	44.8991	28.91478	65.11395	47.06886	39.97266	36.45203
7/20/2021	1:00:00 AM	47.16877	33.78911	66.50198	49.40517	41.8165	38.9074
7/20/2021	2:00:00 AM	52.77567	35.02115	73.35367	55.87475	44.59508	39.51134
7/20/2021	3:00:00 AM	49.96987	27.76504	71.46318	51.73776	40.13707	34.94504
7/20/2021	4:00:00 AM	42.1191	24.68534	64.06365	43.11104	36.7996	32.15379
7/20/2021	5:00:00 AM	38.46021	25.27945	56.88131	40.83784	35.78659	31.61431
7/20/2021	6:00:00 AM	54.74526	27.30206	75.33263	57.87697	43.92076	35.20739
7/20/2021	7:00:00 AM	50.10258	27.21044	70.20306	53.32812	42.61824	35.09754
7/20/2021	8:00:00 AM	50.34812	28.61753	70.08994	52.97491	42.75534	37.56994
7/20/2021	9:00:00 AM	59.88633	30.38322	87.26575	57.73543	44.82021	38.63093
7/20/2021	10:00:00 AM	59.45126	32.71516	82.4771	60.61716	45.55662	39.51061
7/20/2021	11:00:00 AM	57.04919	28.32414	78.72614	58.47504	44.08548	36.13141
7/20/2021	12:00:00 PM	61.75138	28.38392	86.0905	61.06413	44.49809	35.83877
7/20/2021	1:00:00 PM	69.81714	29.70835	88.15617	73.48731	55.8514	38.85133
7/20/2021	2:00:00 PM	62.38807	27.88085	84.73037	64.14984	45.61443	36.34427
7/20/2021	3:00:00 PM	61.1263	35.23021	83.12874	63.17333	46.5857	39.88672
7/20/2021	4:00:00 PM	62.88762	35.96553	84.56498	64.88255	48.60079	40.33449
7/20/2021	5:00:00 PM	52.67791	36.79904	75.86762	52.22572	42.73301	39.9
7/20/2021	6:00:00 PM	75.23626	37.41685	90.77284	80.36438	44.32023	40.46994
7/20/2021	7:00:00 PM	74.15027	39.61165	90.7402	78.89224	60.21339	44.24175
7/20/2021	8:00:00 PM	48.23235	38.73663	69.63296	50.11716	44.75119	41.78443
7/20/2021	9:00:00 PM	60.79486	39.53149	81.16733	63.43819	49.27346	42.74621
7/20/2021	10:00:00 PM	46.18189	39.57908	63.06829	47.98558	44.49476	42.36329
7/20/2021	11:00:00 PM	48.62126	38.9329	68.81799	50.04247	44.85704	42.29897
7/21/2021	12:00:00 AM	45.06043	38.2501	62.85776	46.98993	43.36435	41.04202
7/21/2021	1:00:00 AM	45.14888	39.57796	56.35529	47.18187	44.24672	42.33032
7/21/2021	2:00:00 AM	43.45397	38.35914	51.12411	45.27468	43.05376	41.12156
7/21/2021	3:00:00 AM	43.69911	37.70182	50.97277	45.36179	43.38132	41.47796
7/21/2021	4:00:00 AM	45.01059	38.35574	53.94757	47.12228	44.28186	42.03883
7/21/2021	5:00:00 AM	44.25073	38.29893	56.53696	46.35411	43.48455	41.35702
7/21/2021	6:00:00 AM	45.91752	38.48552	70.31664	47.65741	43.80212	41.52488
7/21/2021	7:00:00 AM	44.82908	37.683	57.37326	47.43525	43.33315	41.10255
7/21/2021	8:00:00 AM	51.73534	37.81883	73.80913	53.67158	44.57351	41.48071
7/21/2021	9:00:00 AM	57.3418	37.8421	84.69204	56.02609	47.2385	42.72901
7/21/2021	10:00:00 AM	50.15978	36.77137	68.84267	53.41043	45.29303	41.05494
7/21/2021	11:00:00 AM	50.12807	36.73148	69.54313	52.88664	44.44986	40.50199
7/21/2021	12:00:00 PM	63.80521	36.19171	85.17265	64.0082	46.81837	40.49946

7/21/2021	1:00:00 PM	63.40035	36.62805	87.13131	64.25805	48.20653	41.12364
7/21/2021	2:00:00 PM	65.99974	36.38607	88.01114	66.42698	48.53032	41.23802
7/21/2021	3:00:00 PM	57.17675	36.25822	78.81362	57.97927	45.20288	40.57797
7/21/2021	4:00:00 PM	55.7293	36.7721	81.06106	51.93697	42.70345	40.15956
7/21/2021	5:00:00 PM	62.71992	36.98526	83.51609	65.34619	49.43174	40.54905
7/21/2021	6:00:00 PM	49.97625	37.50605	71.59191	51.77485	43.27445	40.63888
7/21/2021	7:00:00 PM	56.42885	37.79874	80.90425	57.27803	44.25851	40.75689
7/21/2021	8:00:00 PM	47.11226	38.75893	68.02113	49.57723	44.83901	41.66926
7/21/2021	9:00:00 PM	49.61642	42.30668	68.07656	51.03553	48.95208	46.32848
7/21/2021	10:00:00 PM	48.52174	43.05039	61.51578	50.15275	48.10051	46.06021
7/21/2021	11:00:00 PM	47.39858	41.67043	56.02268	49.15447	47.08929	44.67555
7/22/2021	12:00:00 AM	53.74245	40.86908	76.03958	54.46831	46.38402	43.66862
7/22/2021	1:00:00 AM	67.17591	40.19955	87.90685	68.21509	47.85657	45.01416
7/22/2021	2:00:00 AM	49.83917	40.3051	69.10991	51.22888	46.87302	44.282
7/22/2021	3:00:00 AM	45.75238	39.43617	61.55242	48.08967	44.79083	42.40314
7/22/2021	4:00:00 AM	46.68253	38.96605	60.87956	49.68044	44.77541	42.53524
7/22/2021	5:00:00 AM	51.89617	40.81826	65.31418	55.72682	48.73169	44.49367
7/22/2021	6:00:00 AM	51.31805	40.35422	62.34427	54.85815	48.9218	44.45899
7/22/2021	7:00:00 AM	53.36558	40.74759	72.09661	56.14577	49.15105	45.37345
7/22/2021	8:00:00 AM	52.26912	39.84083	70.43849	54.65322	47.47902	44.15382
7/22/2021	9:00:00 AM	56.87763	38.23332	77.76633	57.41786	46.85565	42.37555
7/22/2021	10:00:00 AM	55.05968	37.10954	80.25243	54.75813	44.78226	40.9536
7/22/2021	11:00:00 AM	53.25734	36.6959	75.86081	53.44463	43.65472	40.37396
7/22/2021	12:00:00 PM	65.08773	30.22978	87.17213	65.44614	48.95419	38.94896
7/22/2021	1:00:00 PM	67.71414	30.28329	88.83669	69.98606	50.99589	39.23032
7/22/2021	2:00:00 PM	59.52424	29.00759	81.3732	62.12717	45.08338	36.61577
7/22/2021	3:00:00 PM	63.03907	28.97994	83.75192	65.05232	47.11331	38.75184
7/22/2021	4:00:00 PM	43.46316	30.46987	55.19502	46.72937	40.74445	36.50334

WM4: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
7/12/2021	5:24:32 PM	59.4	57.8	55.7	53.8	52.1	49.2	45.2	42.1	39.3	36	34.6	32.9	31.6	31.8	29.3	28.8	28.1	33.9	36.7	31.7	25.9	22.8	26.3	28.5	19.5	24.8	25.7	23.8	24.9	21.4	22.6	39.4	42.1	23.2	16.6	11.5
7/12/2021	6:00:00 PM	53.3	51.7	49.4	46.9	44.3	41.4	38.5	36.2	33.9	32	31.3	29.7	28	26.7	25.2	26.5	24.5	20.5	17.3	24.3	14.7	12.7	12.5	11.4	11	13	12.2	12.8	11.2	16.3	19.3	40.9	44.2	23.3	17.6	11.8
7/12/2021	7:00:00 PM	42	39.5	37.6	34.9	31.6	29.2	26.8	26.1	24.1	23.6	22.6	21.8	21.1	20.3	17.5	16.8	16.4	14.4	14.8	21	14.6	11.6	12.6	14.7	12.8	12.5	8.9	7.8	15.5	6.8	11.9	30.9	33.1	13.7	11.3	4.4
7/12/2021	8:00:00 PM	53.8	51.7	49.6	47.2	44.9	41.9	38.5	37.8	32.5	30.7	29.3	27.9	26.5	25	22.8	20.8	17.8	16	15.3	14.2	14.4	14.7	15.1	15.1	14.7	13.4	13	12.5	32.4	27.4	4.5	12.4	10.1	12.1	5.4	1.8
7/12/2021	9:00:00 PM	60.5	58.9	57.5	54.7	52.2	48.7	45.9	44	39.5	36.1	33.1	32	35.6	37	30.4	23.5	24.3	19.5	17.1	14.9	15	14.3	13	10.3	9.1	8.1	7.2	17.8	35.9	33.5	5.4	8.6	12.5	14.6	7.6	1.6
7/12/2021	10:00:00 PM	52.1	49.9	49	47.1	44.8	41.3	38.1	38.5	32.4	29.5	27	25.1	21.2	21	19	15	13.6	12	14.6	13.2	14.7	11.5	10	9.1	7.5	7	6.6	29	39.5	26.8	2.2	8.6	7.4	9.8	1.7	3.9
7/12/2021	11:00:00 PM	43.6	41.2	38.4	36.4	37.1	32.8	32.5	40.3	32.8	32.2	30.8	29.1	26.6	26.9	26	27	24	18.1	14	9.6	13.1	9.6	8.4	5.3	5.2	5.1	1.8	31.7	37	10.6	3.9	8.4	2.6	5.5	0.4	1.8
7/13/2021	12:00:00 AM	37	35	32.5	30.7	33.1	28.8	29	37.8	29	29.6	29	25.5	23.8	25	22.9	17.9	15.4	12.6	15.8	11.9	13.9	10.1	10.4	7.8	6.5	6.6	10.3	33.5	28.1	3.3	5.1	2.8	1	-1.3	-1.2	0.2
7/13/2021	1:00:00 AM	40.9	38.7	36.4	33.7	33.1	31.3	28.6	39.8	27	27.6	26.5	24.7	21.6	23.1	21.8	16.8	14.5	11.6	14.4	9.3	14.1	10.2	11	7.6	6.4	6.6	13.2	32.2	22.8	3.3	6.1	1.8	0.3	-1.3	0.3	-0.5
7/13/2021	2:00:00 AM	38.2	36.1	34.3	32.3	32.5	29.5	26.5	41.2	26.7	27.4	26.1	22.6	19.4	22.9	19	12.8	10.9	8.3	10.3	5.7	10.2	7.6	6.4	3.5	3.5	4.9	15.9	26.5	9.1	3	2.4	0.1	-2.1	-3.3	-2.7	-0.7
7/13/2021	3:00:00 AM	44.5	42.2	39.8	37.2	36.1	31.9	28.9	37.7	26.1	26.5	26.1	23.4	18.9	18.7	18.2	14.7	12	8.9	10.9	6.5	10.7	8.6	7.8	5.2	4.7	5.7	18.4	25.1	0.9	2.7	2.1	0.7	3.8	5.7	1.6	-0.2
7/13/2021	4:00:00 AM	47.4	45.5	43	40.3	37.8	35.2	33.3	39.6	32.3	32.3	32.5	31.8	30.8	30.1	26.9	23.7	22.1	17.5	11.3	7.2	9.8	9.1	7.2	3.3	4.1	6.1	14.7	14.5	0.6	1.9	1.2	0.7	-2	-2.1	-2.4	-0.6
7/13/2021	5:00:00 AM	51.1	49.4	47.2	44.4	41.7	38.5	35.5	38.1	29.6	27.9	24.9	23	19.4	19.8	19.2	14.8	14.5	12.1	13.6	22.8	12.2	8.9	8.7	6.7	9.9	8.7	8	16.8	0.5	0.4	0.1	0.2	-1.9	-2.5	-2.2	-0.6
7/13/2021	6:00:00 AM	47.7	46.4	43.7	41.1	38.8	36.2	34	36.2	31.9	32	30.4	29.8	28.7	27.8	25.8	23.6	20.2	16.1	17.8	27.2	17.7	12.7	14.1	11.2	8.7	9.5	7.3	6.6	1.6	0.3	-0.5	-0.2	-0.8	-0.9	-1	-0.1
7/13/2021	7:00:00 AM	45	43.1	40.5	38.6	37.1	34.3	32.2	40	33.2	40.3	40.6	32.6	33	24.8	23.3	23.5	28	19.5	16.9	29.9	20.5	19	18.1	17	14.5	16.6	19.9	18.4	9.2	7.5	7.4	15.4	30	36.9	31.7	18.9
7/13/2021	8:00:00 AM	47	45.3	43.2	41.2	40.8	37.7	36.9	42.1	36.3	47.6	47.3	29.7	24.6	23.8	23.1	18.4	15.9	15.4	14.7	19.9	13.6	10.7	9.8	9.1	9.8	10.4	12.7	13.1	14.5	10.7	10.5	25.6	32.3	39.7	33.6	22.6
7/13/2021	9:00:00 AM	52.5	50.9	48.2	46	43.1	40.4	38	36.9	36.4	45.6	45.6	34.3	30.5	32.7	23.7	25.2	23.2	17.8	17.4	22.2	15	12.1	10.9	10.3	19.8	25.5	9.7	6	7.9	7.1	12.7	32.2	34.2	39.3	31.6	22
7/13/2021	10:00:00 AM	55.7	53.8	51.6	49.2	46.4	43.7	40.7	38.6	38.7	35.3	33.3	32.5	30.4	28.9	28.8	25.9	23.9	21.2	20.4	18.6	16.8	13.8	12.4	11.7	9.3	8.4	6.2	5.9	8.2	13.4	25.7	48.5	48.2	35.3	29.6	23.3
7/13/2021	11:00:00 AM	60.3	59	56.9	55.2	52.7	49.8	46.7	43.2	42.2	37	35.4	34	28.7	27.9	28.9	25.1	25	23.1	23.3	22.2	20.1	16.8	16	15.1	12.7	10.2	7.7	6.5	6.8	9.2	17.6	41.3	41.8	24.1	17.9	12.4
7/13/2021	12:00:00 PM	63.9	62.6	60.9	59	56.9	54.3	51.3	47.8	45.6	48.3	47.8	35.2	32	30.1	31	27.4	27.5	25.8	26.8	26.5	22.5	19.3	18.8	17.9	15.5	13.2	10.7	10	12.6	16.8	27.8	51.6	53.8	34.2	27.1	21.7
7/13/2021	1:00:00 PM	58.9	57.1	55.7	53.9	51.7	48.9	45.6	43.2	42.7	43.3	42.1	32.3	30.1	28.6	31.8	27.9	24.2	21.9	22.1	21.1	19.7	16.1	15.8	15.8	13.1	11.3	9.2	8.3	9.8	13.9	24.2	50.3	51	31.7	26	19
7/13/2021	2:00:00 PM	57.2	55.3	53.6	50.6	48.8	45.8	42.6	40.3	41.6	36.2	35.5	32.2	27.7	27	28.3	24.6	24.5	22.6	23.5	27.2	21.4	17.7	17.5	18.4	17.4	14	13.4	13.7	12.2	10.8	17.7	38.8	43.6	25.4	14.7	12
7/13/2021	3:00:00 PM	56.9	55.6	53.8	52.8	50.1	48.4	48.2	47.6	46.1	45.1	44.6	42.7	41.6	40.1	37.7	35.9	34.7	32	32.9	33.2	31.5	30.5	30.3	29.7	28.4	28.1	27.9	27.1	26.1	24.8	24.9	37.1	36.5	22.3	21.2	25
7/13/2021	4:00:00 PM	73.1	71.7	70.3	68.8	66.9	65.3	63.4	61.3	59	56.9	54.9	52.8	51.4	49.5	47.4	44.9	42.2	38.7	35.8	35.1	34.6	33.6	32.9	31.8	31.5	31	29.7	28.3	26.7	24.4	22.4	20.6	18.8	18.3	17.8	17.9
7/13/2021	5:00:00 PM	75	73.7	72.3	70.9	69.1	67.2	65.2	62.9	60.3	57.7	55	52	48.9	45.9	42.9	40.6	38.5	36.7	36.1	34.5	32.5	33.9	34.8	33.8	33.6	33.1	31.5	29.7	27.4	24.4	22.7	21.3	19.8	19.1	18	18
7/13/2021	6:00:00 PM	76	74.4	72.9	71.6	69.8	68	65.9	63.7	61.1	58.5	55.7	52.7	49.8	46.7	43.9	41.4	39.5	37.6	37.7	36.6	33.4	34.5	35.3	34.2	34.1	33.6	32	30.1	27.9	24.9	23.1	21.9	20.5	19.7	19	19.1
7/13/2021	7:00:00 PM	75.1	73.8	72.3	70.9	69.2	67.3	65.1	62.8	60.2	57.5	54.6	51.5	48.5	45.2	42.3	39.5	37.2	35.3	33.7	31.9	31.2	32.9	33.6	32.2	32.1	31.3	29.4	27.2	25.2	21.9	20.9	19.2	18.1	16.9	16.2	16.3
7/13/2021	8:00:00 PM	63.7	62.2	60.4	58.4	56	53.4	50.2	48.1	44.4	41.3	38.7	36.5	34.5	33.1	31	27.8	24.7	22.2	20.4	19.3	18.4	19.3	22.8	26.2	28.3	22.5	15.4	20.3	36.5	19.5	8	7.6	5.2	4.9	3.7	2.9
7/13/2021	9:00:00 PM	54.7	53.2	50.9	48.8	45.9	42.8	39.2	39.2	33.6	30.6	29.1	27.6	33.4	37	30.1	22.4	21.3	18.3	13.3	12	12.9	11.7	10.1	7	6.4	6	1.4	26.9	39.7	27.4	3.3	8.3	12.2	17.6	15.3	13.8

7/13/2021	10:00:00 PM	57.4	55.3	53.6	51	47.9	44.8	41.9	39.9	35.4	32.8	30.8	29.3	27.2	25.9	24.7	21.9	18.9	15.8	14.7	10.4	12.4	13.1	12.1	10.6	8.7	7.4	3.8	33.3	39.2	18.2	5.7	8.6	5.5	10.9	7.3	8.4
7/13/2021	11:00:00 PM	39.5	37	35.2	33.9	35.6	29.6	27.9	33.6	27.1	27.3	24	24.4	19.4	18.5	16.9	11.7	10.2	8.5	12.2	6.6	11.7	10	9.6	9	6.5	6.7	15.1	38.5	32.6	4.3	7	4	6.6	9.5	4.4	0
7/14/2021	12:00:00 AM	37.1	35.2	33.6	32.3	34.9	29.4	29	35.8	29.6	29.7	27.8	27.3	24.4	24.7	25.3	20.5	17	13.5	14.1	9.2	15	12.6	14.3	10.9	7.1	7.7	20.1	33.7	14.9	4	5	0.3	0.3	-1	-1.6	-0.3
7/14/2021	1:00:00 AM	32.5	30.8	29.5	29.1	34.8	28	27	37.3	28.7	28.8	27	27	21	22.8	24.2	14.6	12	11.4	15.7	8.2	12.8	12	13.6	11.9	8.5	9.5	25.9	26.2	2.2	3.3	2	1.2	-2.2	-3	-2.7	4.3
7/14/2021	2:00:00 AM	38.8	36.3	33.8	36.7	40.3	36.6	30.5	47.2	33.4	32.8	31.4	31.5	24.3	26.6	26.1	17.1	11.6	8.2	11.1	9.9	11.9	8.7	10.2	9.8	7	7.1	24.3	31.7	8	2.5	4.4	1	3	-2.9	-1.9	8.9
7/14/2021	3:00:00 AM	31.7	30.4	30.4	34.6	35.8	31.3	28.7	40.8	31.7	31	30	29.8	26.1	26	23.7	22.1	22.4	15.3	11.9	5.1	10.3	10.1	9.9	8.5	6.5	7.4	18.8	26.7	6.4	1.2	1.6	-0.2	-1.4	-3.4	-2.8	-0.7
7/14/2021	4:00:00 AM	29.4	29.1	29.1	31.8	35.1	29	29.3	38.3	31.8	31.5	31	30.1	28.6	28.2	27	25.2	22.6	17.8	12.8	8.1	13.3	11.9	11.7	10.5	6.3	8	7.1	14.1	1.4	2.2	1.2	0.5	2.5	-2.4	-2.5	-0.7
7/14/2021	5:00:00 AM	39.3	33.9	33.1	33.7	33.8	30.7	28.1	35.8	27.1	27.5	25.8	25.4	23.4	22.9	21.4	18.1	15.1	11.7	12.5	11	12.4	11.4	10.2	9.1	9.1	10.4	8.8	9	5.7	5	3.9	3.6	0.9	-0.7	-1	-0.2
7/14/2021	6:00:00 AM	30.5	30.4	31.2	30.9	32.7	29.7	30.4	34.6	33.5	30.6	27.6	26.9	23.8	21.2	19.8	18.4	18.4	15.5	18.9	27.1	17.3	14	15.6	15.1	13.8	16.1	18.5	17.3	12.4	7.6	2.3	0.8	1.9	-3	-2.4	-0.5
7/14/2021	7:00:00 AM	30.9	31.1	33.8	38.2	40.2	33.1	33.7	36.6	33.2	32.6	31.3	30.2	26.6	24.1	21.8	21.3	25.2	22.1	20.3	27.2	23.9	19.5	18.8	18.3	18.2	21	23	21.3	17.5	11.3	9.4	16.4	27.7	36.9	31	21.2
7/14/2021	8:00:00 AM	38.3	36.2	35.5	35	39.3	33.9	31.1	34.8	30.6	30.5	30.8	42.6	46.1	38.3	31.7	32.7	28.1	20.7	20.3	24.4	21.7	17.6	13.7	12	16.8	24.5	32.3	27.9	23.4	12	11.4	21.2	34.4	42.4	38.2	32.7
7/14/2021	9:00:00 AM	40.6	38.5	36.7	35.4	37.7	33.1	34.4	36.2	32.8	33.9	37.9	28.4	25.5	23.5	22.7	20	18.6	17.1	17.5	21.4	15	11.7	10.5	10.7	8.8	9	7.3	6.4	6.2	7.7	18.8	39.7	40.5	43.5	39.6	35.8
7/14/2021	10:00:00 AM	52.2	50.5	48.7	45.9	42.8	39.9	38.2	36.2	33.6	40.7	38.6	28.4	31.4	23.1	20	18.5	16.7	16.6	16.1	13.6	11.8	11	10.1	10.4	12.6	8.4	7.3	8.3	9	12.2	25.2	48	47.8	41.1	37.4	33.5
7/14/2021	11:00:00 AM	61.6	60.5	58.1	56.3	53.7	51	47.4	44.3	40.9	38	35.2	32.2	29.1	27.6	25.7	24.8	23.6	22.3	22.7	23	17.2	16.3	15.8	14.6	13	11.2	9.5	10.1	11	14.9	24.7	49.5	50	44.3	42	33.5
7/14/2021	12:00:00 PM	62.7	61.1	60.1	58	55.8	53.4	50.8	47.6	44.3	42.1	43.9	39	32.4	30.9	29.6	26.3	24.7	23.8	24.8	25.4	19.9	19.1	19.4	18.6	17.3	15.8	13.3	11.5	9.3	8.9	12.8	34	37.7	40.8	37.3	30.8
7/14/2021	1:00:00 PM	59.9	58.7	57	54.2	51.8	49.6	46.2	43.1	39.1	36.3	32.6	30	27.4	26	25.4	25.6	24.8	23.6	22.8	22.3	19.6	19.5	19.4	17.8	16	14.4	11.7	9.8	9.4	11.3	19.5	41.2	42.4	21.4	14.4	8.6
7/14/2021	2:00:00 PM	64.1	62.6	60.9	59.2	56.8	54.4	51.3	48.4	44.6	41.4	38.3	35.2	31.3	28.7	27.4	26.6	25.6	24.3	24.8	26.6	20.5	19.7	19.6	18.3	17.6	14.8	11.9	10.3	10.1	11.5	21.5	44.6	43.9	25.1	21.9	14.6
7/14/2021	3:00:00 PM	64.7	63.2	62.1	60.1	58.2	56.3	53.9	51.1	48.2	45.4	43.2	38.9	35.7	33	30.4	28.4	27.8	25.7	27.3	27.5	21.4	20.6	20.6	20.7	19.8	18.4	16.4	15	15.1	17.7	26.6	54.5	52.9	26.2	21.7	16
7/14/2021	4:00:00 PM	59.9	58.3	56	54	51.8	48.9	45.3	42.4	38.8	35	32.3	28.4	25.9	24.3	23.5	23.2	22	21.1	20.4	22.5	17	16.5	16.9	16.2	14.7	15.2	16.4	12.4	12.3	17.9	27.7	53.6	52.9	32	26	17.2
7/14/2021	5:00:00 PM	53	51.3	48.5	45.8	43.3	41.3	38.9	37.5	33.9	32.9	33.9	42.3	31.2	28	26.5	25.6	24.3	22.9	21.5	26	18.8	18.7	17.7	18.1	17.9	15	15.2	14.4	14	18.3	27.2	46.9	47.2	26.2	21.3	14.5
7/14/2021	6:00:00 PM	50.8	48.9	46.5	43.1	40.7	36.8	34.2	31	28.1	26.4	23.9	21.5	20	20.1	19.7	19.1	18.8	17.7	16.7	23.7	14.1	13.2	12.7	10.9	10.2	14.7	16.6	17.5	17.9	21.1	27.9	46.4	44.7	23.1	18	7.2
7/14/2021	7:00:00 PM	33.2	32.3	32.2	30.1	28.7	27.9	28.1	28.5	29.3	31.1	30.8	30.3	28	26.7	24.8	22.3	18.3	13.8	12.2	18.3	12.4	9.7	9.4	9.9	8.9	7.9	5.9	6.6	14.6	12.8	8.9	32	27.5	6.6	2.6	0.8
7/14/2021	8:00:00 PM	31.6	30.3	28.9	27.3	26	24.1	25.3	27	24.8	23.8	21.6	21.6	20.3	18.3	16.5	16	14.1	11.6	12.7	13.7	15.3	13.6	9.1	6.3	6.7	8.7	7.7	31.5	34.4	4.1	2	4.2	-0.4	3.3	-0.3	-0.3
7/14/2021	9:00:00 PM	29.4	28.8	28.7	28.4	28	29.2	36.2	40.7	38.9	34.5	34.2	34.5	35.9	36.3	31.6	26	23.3	21.1	17.6	16.3	18.3	15.8	13	16	19.4	17	22.8	39.4	38.5	7.7	7.6	8.1	5.7	5.6	0	0
7/14/2021	10:00:00 PM	33.7	31.3	29.8	27.9	26.6	27.1	27	28	27.5	28.1	28.3	29.5	33.5	36.8	29.6	23.3	20.4	14.9	11.6	10.1	13.4	11	6.5	2.2	3.8	5	20.5	37.7	35.9	3.9	6.1	6	4.2	3.7	-0.9	-0.5
7/14/2021	11:00:00 PM	38.1	35.8	34	30.9	28.5	27.1	26.4	24.5	22.7	21.7	18.7	19.4	15.8	14.3	11.7	10.5	9.7	8.5	10.3	4.3	10.4	9.2	4.5	0.8	1.8	2.6	17.6	35.4	34.3	3.6	5.2	4.6	1.8	2.1	1.7	0.8
7/15/2021	12:00:00 AM	39.3	36.9	35	32.9	30.5	28.2	27	26.3	25.6	26.8	24.6	23.6	23.2	22.6	21.5	19.1	15.7	12.2	11.2	5.6	11.7	10.1	6.8	2.1	1.8	3.4	22.5	36.5	30.3	2	4.8	2.2	1.2	-1.8	-2.2	0.4
7/15/2021	1:00:00 AM	38.8	36.5	35	32.9	32.3	31	31.7	35.9	31.2	30.9	30.2	30.1	30.2	29.5	30	35.2	33	24.1	16.4	9.9	13.1	10.2	7.8	2.8	2.3	4.9	22.7	31.2	6.1	1.7	3.6	0.3	1.6	-3.4	2.7	0.5
7/15/2021	2:00:00 AM	42.2	39.9	38.1	35.2	32.2	30.1	27.6	32.8	21.9	24.4	17.2	16.5	12.1	11.5	12.8	13.4	14	11.8	13.9	9.2	14.6	11.5	9.6	3.9	2.6	4.6	25	34.2	14.9	2.2	5	0.2	1.6	-1.3	1.8	0.4
7/15/2021	3:00:00 AM	31.5	28.8	28.3	26.7	28.6	24.6	22.9	22.2	25.5	22.7	21.7	16.6	19.3	14.9	10.7	10.9	9.5	11.1	6.1	12.2	10.4	8.8	2.8	2.2	4.9	20.4	20.9	0.6	0.2	0	0.5	1.9	-2.5	1.5	0.3
7/15/2021	4:00:00 AM	29.7	28.8	28.4	28.5	30.1	26.3	24.3	29.2	22.7	23.6	18.9	16.9	13.5	13.5	12.7	12.3	12	9.9	11	8	12.4	12.2	9.7	5.5	5.6	7.6	13	14	0.6	0.2	-0.2	0.4	2.7	-1.7	2.4	0.6

7/15/2021	5:00:00 AM	28.7	29	29.2	30.2	33.9	28.3	26.7	30.9	26.1	25.8	21.7	19.2	15.6	15.8	16.2	14.7	14.5	13.5	14.3	17.5	17.1	15.9	14.5	23.2	23.2	17.3	12.3	13.6	12.2	10.9	10.1	9.1	7.5	5.3	3.7	2.8
7/15/2021	6:00:00 AM	31.5	30.7	31.3	31.1	35	30.8	29.6	35.7	29.9	29.3	27.9	26.8	25.1	23.8	22.6	23	26.3	20.2	16.7	28	18.7	18.7	17.7	17.1	15.8	14.6	12.1	11.8	7.9	5.6	4.9	4.5	3.2	2.9	3.5	2.9
7/15/2021	7:00:00 AM	32.6	31.7	32.3	31.9	31.2	30.7	30.6	35.3	31	31.4	29.4	28.8	29	31.4	30.9	27.4	31.4	25.2	20.6	28.1	24.8	23.4	21.9	21.5	18.5	16.4	15	14.2	13.4	9.8	10	17.6	29.1	35.7	31.1	21.2
7/15/2021	8:00:00 AM	36.1	34.2	33.3	32.1	33.3	32.5	34.2	33.8	32	28	25	21.9	20	17.4	16.3	14.9	19.1	13.1	14.6	27.9	15.7	11	9.4	8	6.5	9.3	7.8	6.2	4.9	3.1	7.9	19.2	31.1	38.7	36.1	28
7/15/2021	9:00:00 AM	43.2	41.1	38.9	37.4	36.5	36.7	38	38.4	39.2	39.3	37.7	43	44.8	40	34.4	34.2	28.1	23.2	20.3	22	17.3	13.9	8.9	8.4	7.6	7.7	6.8	4.1	6.6	11.4	24.1	44.2	41.4	38.1	33.2	24.5
7/15/2021	10:00:00 AM	50.5	48.4	45.2	43	39.9	36.5	34	32.7	31.9	35.7	37.7	30.1	21.2	18.9	18.6	17.2	15.9	16.8	15.7	19.8	14.8	11.3	14.1	25.9	22.3	21.6	9.9	9.2	8.1	9	17.8	42.6	41.5	34.9	28.6	18.5
7/15/2021	11:00:00 AM	49.6	47.8	46.2	42.9	40.7	38.1	35	32.7	31.9	36.4	38.2	32	25.1	18.7	17.6	16.7	15.7	15.4	14.8	14.7	11.6	10.5	9.6	10.9	8.2	7	7.4	5	5.4	7.8	16.3	37.8	36.9	31.9	26.8	19.5
7/15/2021	12:00:00 PM	59.7	58.4	56.5	54.6	52.2	49.2	46.1	42.6	40.8	36.3	34.9	32.2	27.1	26.7	25.9	22.9	24.9	23.7	21.7	23.1	17.7	16.7	15.2	14.7	18.8	22.6	10.9	7.9	11.1	11.6	19.2	41.7	44.5	27.8	23.1	18.2
7/15/2021	1:00:00 PM	59.9	58.1	56.6	54.2	52	48.9	47	45	44	41.6	38.9	38.2	33.5	30.3	31.2	27.5	27.7	25.1	24.4	23.3	22.9	20.2	19.1	18.7	17.3	15.8	13.8	10	10.3	13.8	23.6	43.3	45.9	26.7	22.3	14.8
7/15/2021	2:00:00 PM	61.4	59.8	57.9	55.4	53.2	50.4	47.6	44.3	41.6	38.4	35.1	33.1	30	27.8	26.4	24.6	23.6	23.1	21.4	21.8	17.8	16.9	16.7	15.3	13.8	11.8	9.8	8.5	8.8	11.4	20.8	43.7	44.7	24.7	19.5	9.8
7/15/2021	3:00:00 PM	63.5	62.1	60.2	58.4	56.2	53.4	50.5	47.1	44.3	41.1	38.1	35.6	33.2	31.2	29.6	28.4	27.1	25.7	24.9	26.1	22.6	21.2	21.1	19.9	18.5	17.3	15.3	12.8	11.6	14	21	43	44.2	24.7	19.1	12.6
7/15/2021	4:00:00 PM	64.2	62.8	61.3	59	56.9	53.6	50.9	47.4	44.4	40.5	37.5	34.2	31.4	29.2	27.7	27.1	25.7	24.5	24.9	27.1	20.2	19.5	19.5	18.1	16.7	16.6	16.5	13.8	16.9	16	19.9	39.2	38.6	17.6	12.2	5.8
7/15/2021	5:00:00 PM	61.5	60.9	58.8	56.8	55	52.7	50.1	47.3	44.8	41.2	38.6	34.9	32	29.6	27.3	25.6	24.5	23.3	23.3	27.3	19.4	18.5	18.4	17.5	16.7	15.9	14.3	12.8	16.6	18.5	26.1	49.1	47.8	29.4	26.5	16.9
7/15/2021	6:00:00 PM	54.1	51.5	49.7	47.3	44	41.6	38.4	36.8	37.1	37.4	38.1	39.9	41.1	41.2	39.5	36.9	33.8	29.4	20.6	24.1	16.2	13.3	13.7	13	10	8.8	8	7.3	20.9	17.7	11.6	30.2	30	9.3	4.2	2.1
7/15/2021	7:00:00 PM	44.8	42.8	40.4	38.5	35.1	31.5	28.8	26.6	23.9	23.4	22.1	22.3	22	21.7	20.4	19.8	17.7	14.9	15	15.1	15.8	13.9	16.1	17	11.3	8.7	8.6	13.7	25	16.5	2	1.9	1.6	3.6	1.4	0.7
7/15/2021	8:00:00 PM	34	32.3	30.4	28.5	26.3	24.8	25.1	25.2	24.3	24.4	23.5	23.3	22.9	22.2	21.6	19.8	17.1	14.2	13.3	11.8	14.7	13.6	13.6	13.1	7.9	5.7	8	33.3	32.9	2.6	3	4	1.3	1.9	-0.3	-0.3
7/15/2021	9:00:00 PM	40.1	38.7	34.6	32.8	30.6	27.3	25.8	25.9	22.9	23.3	23.8	26.7	23.8	23.7	26.3	19.4	15.6	11.7	10.3	10.6	11.1	8.1	10.7	10.5	4.7	2.7	12.9	39.1	39.2	6	8.9	6.9	2	-0.5	-1.9	-0.5
7/15/2021	10:00:00 PM	26.2	25.8	25.6	25.6	25.2	22.9	25.1	26.7	26.2	27.9	28.2	29.4	33.9	38.8	32.8	24.6	24.4	20.1	12.6	12.2	13	11.1	7	7	5.8	7.3	20	38.2	32.5	2.7	6.3	2.4	2.9	-2.4	-2.4	-0.5
7/15/2021	11:00:00 PM	36.7	34.7	31.9	29.3	27.5	25.5	26	25.5	25.1	26	25.8	26.6	25.6	24.9	26	21.5	19.3	14.4	18.4	12.6	13.1	10.6	9.8	10.3	6.1	5	16.5	36.7	32.4	2.1	5.8	2.2	3.6	-0.6	-1.6	-0.4
7/16/2021	12:00:00 AM	31.1	29.3	28.3	26.2	25.8	25	26.1	26.3	26.2	27.8	26	26.5	25.1	23.9	22.3	21.2	18.7	15.7	22.3	16.7	15.1	11.4	13.3	14	8.5	6.7	12.2	19.8	-1.2	-0.8	-0.1	-1.8	-3.2	-3.8	-2.9	-0.6
7/16/2021	1:00:00 AM	32	30.2	29.4	27.2	27.1	25.1	24.4	22.9	22.9	24.6	20.9	21.6	18.5	17.2	14.9	11	10.8	8.8	11.1	20.8	28.3	28.6	32.8	30.8	23	25.9	22.4	13	1.8	1.2	0.6	-0.2	-0.9	-1.9	-1.3	-0.1
7/16/2021	2:00:00 AM	26.8	26.1	26.1	24.4	26.5	22.7	22.5	21.3	18.8	23.1	18.2	17.7	14.2	14	10.8	10.6	10.6	8.6	9.4	6.6	10.3	9.6	7.2	3.5	3.6	7	20.1	4.9	-0.7	0.7	0.3	-0.2	-1.5	-2.3	-1.7	-0.2
7/16/2021	3:00:00 AM	35.6	33.5	31.7	29.8	29.2	31.1	27.2	27.8	27.9	27.5	25.1	24.4	23.1	22.2	21.2	23.4	26	18.6	16.5	16	14.3	10.3	8.8	4.9	3.8	5.7	19.1	6.6	1	1.3	1.1	1.7	1.7	0.4	0.5	0.8
7/16/2021	4:00:00 AM	29.4	28.6	28.2	28	28.4	25.4	24.1	27.2	22.5	25.5	22.9	21.8	16.9	22	20	12.9	12.9	11.1	11.2	9.5	12.9	12.8	12	8.5	6.7	8.8	3	5.1	0.2	0.7	0	0.6	-1.1	-2	-1.8	-0.3
7/16/2021	5:00:00 AM	28.5	28.8	30.7	30.2	32.2	29.3	29.2	33.5	27.2	27.3	24	24.6	21	19.3	18.7	16.7	14.8	13.3	13.1	13.6	13.9	14	13	11.3	9.5	10.7	9.5	8.6	6.7	5.7	6	6.5	5.5	3.9	3.4	2.1
7/16/2021	6:00:00 AM	44.8	44.7	42.7	45.9	50.8	47.7	41.2	43.6	39.3	36.7	36.7	34	31.6	30.1	29.1	28.1	26.1	22.6	22.2	28.9	24.1	22	20.4	22	23.1	20.1	20.2	18	14.7	13.6	17.3	19.4	15.7	11.7	12.8	21.1
7/16/2021	7:00:00 AM	39.9	40.8	42.7	47.5	51.2	46.5	41.1	43.2	41.8	38.6	37.2	34.2	31.6	29.9	29.3	29.4	32.3	24.9	23.3	31.1	25.3	23.8	23.2	23.6	20.7	18.2	18.2	17.5	15.8	14.8	15.8	23.6	23.2	28.1	27.1	22.1
7/16/2021	8:00:00 AM	38.1	36.3	35.3	35.1	34.3	32.1	32.9	33.7	31.2	30.2	28.9	26.6	24.6	23.4	21.6	19.6	20.4	13.9	12.3	24.6	13.7	13.1	12.1	13	9.8	11.9	10.6	8.2	5.5	4.7	8.1	18.2	30.8	38.7	36.4	26.4
7/16/2021	9:00:00 AM	42.7	41.2	40.7	40.8	42	42.9	44.2	45.1	45.4	45.1	44.2	45.6	45.2	43.8	42.5	41.8	39.3	36.2	29.5	24	15.8	11	7.6	6.8	7.2	8	6.9	5.6	5.2	4.9	6.2	15.8	28.9	36.5	31.3	19.6
7/16/2021	10:00:00 AM	43.7	41.8	39.7	37.2	35	32.6	31.8	32.5	27.3	25.1	21.9	21.4	18	16.6	17.7	16.6	14.3	16.5	16.5	17.3	10.4	9.7	10.1	12.8	13.1	8.7	6.8	6.9	6.2	4.3	6.7	22.4	28	33.4	28.8	17.6
7/16/2021	11:00:00 AM	44.4	42.3	40.2	36.4	34.1	31.2	29.6	29.7	34.6	28.4	27.8	27.4	27.1	25.9	24.3	21.8	19.1	16	14.8	16.1	11	9	8.4	8.6	6.2	4.6	3.1	3.1	5.5	9.8	18.5	42.3	43.4	33	27.2	16.2

7/16/2021	12:00:00 PM	51.7	50	48.1	44.7	42.5	39.1	36.6	33.4	32.9	27.8	26	24.7	22.6	20.4	18.7	18.1	16.9	16.1	15.2	14.8	11.7	10.7	10.7	11.3	18.3	15.3	13.2	6.3	5.6	10.2	18.8	41.2	42.5	30	24.1	13.6
7/16/2021	1:00:00 PM	57.1	55	53.3	51.2	49.4	47	45.9	45.7	46.5	47.2	44.4	41.5	38.7	36.6	35.1	31.9	26.6	22	19.5	18.7	15.9	15.6	15.7	14.5	14.2	11.6	8.6	6.5	5.4	5.9	12	37.4	40.1	26.2	21.8	11.6
7/16/2021	2:00:00 PM	61.1	59.6	58.5	56.3	54.1	51.6	48.3	45.2	42.1	39	36.4	33.6	33.2	31.6	26.9	26.8	26	24.7	24.4	24.7	20.6	20.3	20.4	19.2	17.3	15.6	12.8	10.5	9.3	10	17.6	39.1	43.5	25.3	18	10.2
7/16/2021	3:00:00 PM	54.4	52.7	50.7	47.7	44.7	42.3	43.2	41	43.6	43.1	41.9	47	47.2	46.4	39.2	38.2	39	37.6	29	22.9	17.3	14.8	15.1	18.3	15	13.6	12.7	13.2	11.7	10.8	18.6	41.7	41.3	20.3	16.5	10.5
7/16/2021	4:00:00 PM	59.7	58	55.9	53.4	51.4	48.5	45.5	42.8	40.1	37.5	35.1	33.5	30	27.8	25.7	24.1	23	21.4	20.8	24.4	18.1	17	17	15.5	13.8	12.1	9.6	7.8	15.3	12.9	19	43.1	44.4	22.7	19.1	10.3
7/16/2021	5:00:00 PM	59.4	57.7	55.6	53.1	51.3	48.4	45.5	43.2	41.3	40.1	37.8	35.1	32.9	31.5	30.3	28.3	25.9	23.4	22.1	21.7	19.1	19	19.2	17.7	16.4	15.5	14.2	12.8	18.8	20.7	17.6	47.7	48	32.5	29.2	17.7
7/16/2021	6:00:00 PM	53	51.4	49.5	47.4	43.7	40.2	37.4	33.8	30.4	27.6	25.4	25.1	23.1	24.5	27.8	22.5	21.2	24	18.8	20.6	17.1	16.8	15.1	15	14	11.9	10.5	8.5	25.4	22.6	18.7	49.3	49.1	30.8	25.8	14.9
7/16/2021	7:00:00 PM	43.3	41	40.2	36.7	34.3	31	29	28.4	26.8	26.6	26.3	26.7	26	24.1	21.7	19.5	19.1	13.2	10.9	16	10.7	8.8	10.2	11.6	11.8	7.5	4.3	10.5	22.4	7.7	1.8	5.4	2.6	3.4	2.6	0.9
7/16/2021	8:00:00 PM	31.5	30	29	28.1	28.9	29.7	30.5	32	32.4	33	32.4	33.6	32.2	30	27	28.8	26.3	27.1	27.1	28	25.5	19.8	15.2	15.8	11.8	8.8	10.7	33.5	29.4	0.8	3.6	2.3	1.3	-0.6	-1.5	-0.2
7/16/2021	9:00:00 PM	27.2	26.7	26.1	24.6	24.6	24.5	25	25.2	25.7	29.2	28.8	29.3	37.8	37	33.1	22.4	19.2	11.5	8.5	6.9	8.7	7.7	2.1	0.7	2.7	3	25.8	39.1	33.4	15.1	9.1	5.7	5.6	1.4	-0.4	-0.2
7/16/2021	10:00:00 PM	29.5	28.3	27.1	24.4	24.1	23.3	23.9	23.7	23.5	24.6	24.3	24.9	24.7	22.8	21	17.9	13.7	8.4	7.1	8.4	13.3	13.6	8	6.4	6.9	9.8	30.1	34.1	17.5	4.5	5.9	2.4	2.5	0.9	6.9	9.6
7/16/2021	11:00:00 PM	28.9	27.1	26.3	25	25.5	23.7	24.4	23.1	20.6	22.3	21	21.1	18.8	14.1	9.8	6.9	5.5	5.7	5.5	8.9	12.4	12.1	9.2	8.6	7	8.4	32.2	35.4	6.5	5.1	6.9	4.2	7	0	6.6	10.3
7/17/2021	12:00:00 AM	27.1	26	25	23.1	23.6	23.4	25.1	25.8	25.5	26.9	26.4	26.7	28.1	29.5	24.2	21.7	18.4	12.6	13.4	10.4	12.5	11	11.3	12	11.7	11.4	27.1	34.9	19.5	2.8	5.1	1.2	5.4	0.8	3.9	11
7/17/2021	1:00:00 AM	24.4	24.7	24.8	23.4	25.7	22.6	24.2	22	20	22.1	19.8	19.6	25	26.8	21.3	12.6	11.3	8.7	10.8	8.1	12	12.1	11.8	11.4	10.8	11.1	26.7	13.7	2.5	2.4	-0.8	-0.9	-3.2	-3.9	-2.9	-0.6
7/17/2021	2:00:00 AM	25.6	25.7	25.1	22.5	21.2	20.4	22	20.9	20	23.3	21.6	19.9	21.5	19.1	11.6	11.1	11.4	9.5	11.7	7.4	10.4	9.5	7.4	6.3	5.1	6.9	20.4	7	-2	-0.5	-0.8	-1.1	-3.2	-3.9	-2.9	-0.7
7/17/2021	3:00:00 AM	24.2	24.2	23.7	21.4	22.1	20.4	20.4	22	19.4	23.2	17.6	21.6	17.4	10.2	10	11.7	11.9	9.7	12.9	9.4	15.5	13.1	11.3	6.8	5.4	9.6	2.7	4.6	-0.8	0	0.8	0.8	-2	-2.6	-2	-0.4
7/17/2021	4:00:00 AM	25.3	24.7	25.4	22.5	22.8	22.9	24.5	20.4	19.2	21.6	17.1	18.4	12	10	9.9	10.8	10.7	9.1	12.5	15.4	20.3	14.8	19.2	13.1	11.5	12.6	5	4.9	-0.2	-0.5	0.4	0.7	-1.7	-3	-2.2	-0.4
7/17/2021	5:00:00 AM	25.8	26.1	27.6	28.9	31.8	25.6	27.1	27.3	22.8	26.7	23.5	21	18.3	19.5	14.7	15.4	15.7	14.8	18	19.4	14.5	12	10.4	5.2	2.9	6.2	2	3.1	-0.2	-1.1	-0.6	3	0.7	-3.6	-2.8	-0.7
7/17/2021	6:00:00 AM	39.3	37.5	35.3	33.2	32.9	29.8	28	28.5	26.4	27.4	26	26	25.8	23.8	22.9	21.3	18.8	15.5	20.5	27.6	15.3	12.8	11.9	9.3	6	8.5	5.5	4.6	11.9	4.9	-1.1	2.3	-1.2	-3.8	-2.9	-0.7
7/17/2021	7:00:00 AM	32.8	31.7	31.7	30.4	30.8	28.9	28.3	29.9	29	30.3	27.4	27.2	26.4	26	25.6	23.4	20.1	17.5	20.8	21	15.4	13.5	14.1	13.4	8.2	15.2	17.8	16.2	12.8	3.4	-1.3	4.6	3.3	7.4	2.1	-0.1
7/17/2021	8:00:00 AM	44.4	43	39.7	37.9	36.4	32.5	31.3	31.6	30.1	28.8	27.4	27.3	26.6	26.3	25.3	23.5	20.8	16.4	14.6	22.4	13.2	7.2	6.1	6.3	4.2	8	5.6	6.1	2.4	2.2	5.4	15.3	28.3	35.8	30.4	20.5
7/17/2021	9:00:00 AM	46.9	43.9	42.2	39.4	38.2	33.8	32	36.3	33.6	33.4	31.9	36	27.8	26.8	26.2	23.8	21.2	17.5	14.1	23.9	12.2	8.6	7	7.1	6.1	5.7	7	11	3.7	4.8	5	14.4	27.7	36.5	29.8	21.3
7/17/2021	10:00:00 AM	54.6	52.5	49.9	47.3	45.4	40.9	38.6	39.9	38	36.8	35.1	40.5	33.8	34.8	32	26.6	23.7	20.6	17.9	23.2	15.5	11.4	12.4	18.8	17.8	14.7	8.3	8.4	5.7	4.5	11.3	31	30.8	30.8	24.7	15.8
7/17/2021	11:00:00 AM	51.8	49.6	47.2	44.4	42.1	38.4	36.3	36.4	37.2	35.4	34.4	42.1	32.8	35.2	30.8	32.1	31.5	25.8	24.8	23.4	19.8	13.8	12.3	14	11.1	8.2	6.8	3.5	5.1	7.4	17.9	44.2	42.2	31.3	26.3	15.4
7/17/2021	12:00:00 PM	47.2	44.8	42.5	39.5	36.9	33.5	32.9	33.7	41.4	34.9	37.7	48.4	36.7	31.3	40	29.5	27	20.8	19.2	17	18.4	14	12.6	14.3	12.7	13.9	12.3	8.8	7.8	7.5	17.7	46.6	42.2	28.6	23.8	9.5
7/17/2021	1:00:00 PM	54.9	53.7	51.9	49.5	46.5	44.2	41.8	38.3	42.9	36.9	37.9	48.3	34	31.8	39	29.4	27.7	23.5	24.6	25.7	24.7	19.9	19.1	22	19.8	19.8	18	12.3	8.2	8.6	17.3	40	42.6	25.1	17.8	14.1
7/17/2021	2:00:00 PM	54.6	52.9	51	48.6	45.5	42.2	39.1	36.8	41.8	39	36.3	46.4	32.7	30.5	37.3	28.3	26.3	22.1	21.8	24.6	20.8	16.7	17	19.4	16.5	15	12.8	8.2	7.5	10.6	19.7	39.5	47.7	29.6	23.2	15.9
7/17/2021	3:00:00 PM	55.3	54.1	51.9	50.1	47	44.1	41.1	38.5	43.3	38.1	39.1	48.6	35.5	34.9	38.3	32.6	32.4	28	29.2	26.9	29.8	25.1	22.7	25.3	22.9	24.5	23.5	16.4	12.9	10.7	18.5	41.9	44.1	26.1	18.9	12.5
7/17/2021	4:00:00 PM	51.3	49.9	46.9	44.6	40.7	38.4	36.4	35.1	43.4	36.3	39	48.9	35	32.7	37.3	27.4	25.7	21.9	22.8	22.8	24.5	20.5	19.4	22.1	20.8	21.7	20.4	12.8	8.1	9.4	15.1	38.9	36.5	19.4	18.7	6.2
7/17/2021	5:00:00 PM	53.4	51.6	49	46.5	43.2	39.5	36.9	34.5	40.2	34.4	34.9	45.2	31.7	29.9	32.6	24.2	22.2	17.3	16.6	19.6	15.8	14.2	15.8	17.3	18.3	16.6	17.4	14.7	12.2	8.8	13.2	34.8	37	18.1	11.8	5.7
7/17/2021	6:00:00 PM	58.6	57	54.6	52.3	49.3	46.3	42.9	40.2	37.9	37.1	37.4	38	33.8	31.1	28.6	26.1	24.1	21.9	21.6	23.2	19.5	17	18.4	20.4	19.9	19.9	20.8	17.9	18.3	15.7	19.6	39.1	39.1	18.8	19.2	14.1

7/17/2021	7:00:00 PM		51	49.5	47.5	45.3	42.4	38.6	35.6	33.4	31.1	31.1	33.2	31.8	30	22.4	20.9	19.7	18	17	15.4	16.6	13.5	12	13.4	14.1	18.2	11.7	9	17.5	25.5	20	3.1	16	13.6	1.8	0.5	0.6
7/17/2021	8:00:00 PM	36.2		34.2	29.9	28.1	28	24.3	24.3	25.3	22.8	23.4	22.2	22.1	19.5	16.5	15.8	15.6	14.1	12.5	13.8	10.4	11.4	11.2	10.5	11.4	14.1	8.1	10.9	33.9	37.7	7.6	3.7	5.7	1.1	4.1	1.5	1.1
7/17/2021	9:00:00 PM	34.4		32	28.2	26.7	26.7	21.9	22.2	25.9	21	22.6	20.7	19.2	18.4	17.1	14	10.7	12.5	6	7.4	9.3	11.3	9	8	8.7	6.3	3.7	18.6	39.6	42.9	10.3	7.5	10.2	2.6	2.6	-1.4	0.4
7/17/2021	10:00:00 PM	24.6		24.6	24.1	23.1	24.2	22.8	24.4	23.2	22.6	28.5	27.6	22.8	25.2	26	20.8	17.9	16.8	10.3	10	8.9	11.9	7.4	5.2	5.1	4.2	2.8	15.3	40.7	39.5	5	10.4	7.6	4.4	1.1	-1.2	0
7/17/2021	11:00:00 PM	31.5		28.88	27.3	25.6	25.1	23.6	24.4	21.6	20	27.6	23.9	20.7	20.9	20.8	12.1	13.8	14.2	8.5	6.3	9.5	14.3	13.7	12.7	13.8	10.2	6.9	18	41.3	32.8	4.1	10.9	2.4	4	-1.7	-2.2	-0.4
7/18/2021	12:00:00 AM	37.9		35.5	33.1	30.7	27.8	26.5	27.2	26.3	25.9	27.6	26.8	27.1	25.4	25.1	24.2	22.4	21.4	15.4	15.4	16.6	21.5	25.8	21.8	19.3	15	11.5	31	36.5	11.2	5.8	9.8	1.2	3.3	-2.8	-2.3	-0.3
7/18/2021	1:00:00 AM	27.9		27	26.5	25.8	26.8	27.6	28.6	28	28	28.3	27.3	28	27.1	24.6	22.9	25.2	24.7	19.4	12.7	10.9	12	12.8	10.3	5.2	5	7.7	28.3	22.3	1.2	5.4	1.1	0.3	-2.1	-1.6	0.6	6
7/18/2021	2:00:00 AM	28.1		26.55	25.6	24	25	24	24.1	20.9	19.2	21.1	18.3	16.6	13.7	12.5	12.2	14.7	11.3	11.3	10.6	9.5	11.8	13.1	9.6	7.4	5.3	8.2	26.8	18.1	0.2	3.7	-0.9	-1.6	-1.7	-2.1	-0.5
7/18/2021	3:00:00 AM	33.2		32.3	31	27.1	26.3	24.2	24.8	22.5	20.5	23	20.5	17.7	15.4	19.8	15.6	16.7	13.8	13.6	14	12.2	13.2	14.5	11.4	10.8	11	17	19.6	15.2	12.6	12.9	7.8	8.6	9.4	8.6	6.5	3.1
7/18/2021	4:00:00 AM	26.4		27.4	28	27	28.4	24.5	25.3	24.7	23.7	25	23.1	20.3	15.8	14.1	15.8	18.8	15.2	14.2	13.9	12.7	15.5	16.4	13.6	10	7.4	7.5	5.2	6.7	3.4	2.5	-0.6	-0.05	-1.6	-3.2	-2.7	-0.6
7/18/2021	5:00:00 AM	28.7		28.87	28.4	28.3	31.5	25.1	25.7	25.7	23.5	23.2	22.6	21.9	16.2	18	20.2	16.5	15.3	12.3	12.9	15.9	15.2	13.3	21.1	24.4	25.9	17.8	14.5	12.8	11.8	7.3	4.3	2	-0.3	-2.1	-2	-0.5
7/18/2021	6:00:00 AM	28.5		29.77	30.5	30.2	32.9	29.6	30.7	29.9	28.6	28.1	24.7	23.4	21.9	20	20	19.1	15.3	14	14.4	18	18.8	15.6	16.4	17	18.1	12.4	12.4	10.3	7	3.9	-0.8	1.3	-2.2	-3.7	-2.8	-0.7
7/18/2021	7:00:00 AM	41.8		41.77	43.7	42.6	46.2	41.6	38.6	40.3	37.7	35.5	34.1	33	31.9	28.8	27.2	25.1	21.2	18.9	19	21.4	20	19.9	18.4	17.7	15.8	14.5	12.9	12.3	11.8	9.1	12	12.6	8	5.5	3.6	11.55
7/18/2021	8:00:00 AM	46.2		44.11	41.6	39.3	36.7	34	31.9	30.6	27.7	28.1	25.6	24.6	22.6	20.7	18.1	16.3	14.2	10.7	10.7	15.1	13.5	9.6	8.6	8.6	9.1	9.3	7.5	7.6	6.6	4.3	7.6	21.9	26	31.3	25.1	16.1
7/18/2021	9:00:00 AM	40.6		37.7	35.9	33.2	31.4	30.4	30.2	30.4	30.2	30.5	29.6	29	36.8	37.1	27.4	27.6	26.6	17.4	16.6	19.9	14.3	11.3	9.1	9.4	11.3	13.4	14.8	17	14	8.5	6.8	14.4	26	31.7	25.3	15
7/18/2021	10:00:00 AM	44.5		42.11	39.3	36.9	34.2	32.9	32.9	38.7	41.4	38.6	38.3	38.6	39.2	42.7	34.9	31.8	31.9	24.6	21.4	18.4	13	10.5	9.5	10.1	9.3	11.1	10.3	9.8	10.1	7.7	15	33.2	31.9	30.7	23.7	15.9
7/18/2021	11:00:00 AM	45.9		43.3	40.8	38.6	35.7	32.8	31.2	31.7	29.8	29.6	28.5	28.2	31.8	35.9	28.9	22.3	21.2	18.1	13.9	12.3	12	9.6	9.2	9.9	9.4	9.5	10.9	12	10.1	6.8	11	32.4	31.4	19	13	5.5
7/18/2021	12:00:00 PM	55.8		54.63	52.3	50.3	48	44.4	40.8	37.8	34.7	32.4	30.5	29.1	27.8	26.1	24	21.6	19.2	16.7	15	13.8	11.8	10.9	13.7	15.6	16.2	10	6.8	6.7	5.5	7.5	18.3	40.7	38.3	18.2	17.9	10.2
7/18/2021	1:00:00 PM	49.9		47.66	45.2	42.8	40.2	36.7	33.2	30.6	28.2	26.3	24.5	23.1	25	26.1	20.7	17.3	15.6	13.5	12.5	17.6	9.8	7.8	7.1	7	5.7	6.8	4.2	4.7	4.5	6.1	15.5	41.8	42.8	20.7	15.5	12.22
7/18/2021	2:00:00 PM	52.2		50.55	47.9	45.6	42.6	38.7	37.5	34.3	32.3	31.1	30.5	29.5	28.9	27	25.1	23	20.7	18.6	16.7	18.4	13.1	12.2	12.1	12.2	10.1	7.1	5.1	3.8	4.1	6.7	16	40.8	44.2	23.8	21.5	13.9
7/18/2021	3:00:00 PM	62.4		60.88	59.2	57.5	55.6	52.8	50.1	47.2	44.4	41.1	37.9	35.4	33.6	33.9	31.1	28.5	27.4	26.1	24.5	23.2	21.3	20.5	20.5	20.2	18.5	16.7	14.7	13.5	11.8	10.8	17.5	42.3	43.6	23.5	18	10.8
7/18/2021	4:00:00 PM	68.8		67.22	65.8	64.2	62.3	59.8	57.4	54.9	52.1	48.6	45.5	42.7	39.4	36.2	33.5	31.5	29.8	27.9	26.8	26.8	24.2	25.8	26.4	24.8	24.4	23.7	22.1	19.7	17.7	15.6	15.6	34.4	35.8	16.5	11.6	11
7/18/2021	5:00:00 PM	71.3		70.4	68.4	66.4	64.6	62.2	59.6	56.8	53.7	50.4	47	43.7	40.6	37.5	34.9	32.6	30.8	29.2	28.3	26.8	25.4	26.9	27.3	25.4	24.3	24.1	22.5	20.3	17.6	21.1	14.4	14	12.7	11.7	10.9	10.9
7/18/2021	6:00:00 PM	72		70.55	68.9	67.3	65.6	63.7	61.6	59.2	56.7	53.8	51	47.9	44.7	41.8	39	36.2	34.1	32.1	31.6	30.8	28.1	29.6	30.6	29.7	29.6	28.4	26.9	25.2	23.3	20.9	18.5	17.4	15.9	14.3	13.5	13.3
7/18/2021	7:00:00 PM	74		72.72	71.2	69.5	67.7	65.5	63.2	60.6	57.8	54.8	51.5	48.1	44.8	41.9	39	36.6	34.7	33	32	30.1	29.1	30.8	31.4	29.9	29.4	28.3	26	23.8	24	23.3	18.3	17.6	16.5	15.2	14.7	14.9
8/18/2021	8:00:00 PM	75.2		73.66	72.2	70.6	68.9	66.9	64.7	62.3	59.7	57.7	53.9	50.8	47.8	45.3	42.5	39.3	37.2	35.7	35.8	34	31.3	32.6	33.4	32.3	32	31.3	29.5	28	36.8	30.8	20.9	20.3	18.7	17.5	16.4	16.4
7/18/2021	9:00:00 PM	73		71.55	69.9	68.2	66.4	64.3	61.8	59.3	56.6	53.7	50.7	47.7	44.2	41.4	38.7	36.8	34.8	33.3	34.7	32.3	29.1	29.8	30.5	29.1	28.5	27.7	25.8	25.1	41.4	35.2	18.5	18.7	16.9	16.2	15.1	14.8
7/18/2021	10:00:00 PM	61.9		60.25	58.5	56.5	53.6	51	48.4	45	41.5	38.1	34.6	31.4	28.3	26.5	23.9	21.9	20.7	19.1	19.1	19.4	15.2	15.6	15.4	13.3	11.9	10.6	8	20	42.5	36.5	7.1	11.7	7.4	5.1	2.6	3.7
7/18/2021	11:00:00 PM	41.2		39.88	38.2	34.8	32.2	30.3	28.3	26.6	25.9	27.1	26.6	26.4	25.1	24.1	21.2	18	15.2	10.8	13.9	9.4	11.1	16.7	21.5	18	21.3	18.2	10.2	28.1	42.7	31.3	4.5	10.7	3.1	4.4	1.7	4.6
7/19/2021	12:00:00 AM	28.9		27.77	26.7	25.4	26.6	23.7	24	23.3	23.2	22.8	22.7	22.7	19.3	18.1	16.6	13.1	8.9	7	6.6	6.7	8.7	7.2	7.3	8	7.8	7	6.5	33.7	41.3	11.3	5.9	10.5	2.6	5	2.3	2
7/19/2021	1:00:00 AM	47		44.88	42.6	40.3	37.1	34.3	31.8	28.8	26.6	25.3	23.4	21.4	19.2	17.7	15.1	13.8	10.6	8.4	7.3	5.6	8.8	6.2	5.6	4	5.1	6	3.9	33.1	40.7	16.9	6.9	12.1	2.3	4.7	1.2	8.1

7/19/2021	2:00:00 AM	53.9	52.3	50.8	48.4	45.5	42.6	39.1	35.9	31.7	28.7	25.5	22.5	19.4	18	15	15.9	13.3	12.4	11.9	9.7	12.1	9.6	8.9	6.3	5.9	8.7	4.4	33.7	38.3	8.2	7	9.8	1.6	1.7	-0.8	1
7/19/2021	3:00:00 AM	31.4	29.5	27.5	25.3	27.2	22.1	23.5	23.6	20.4	20.6	17.4	17.6	15.2	13.5	10.1	10.4	5.6	6.2	7.1	6.7	10.1	7.7	8.4	8.8	9	10.6	10.9	35.5	31.5	4.1	6.4	2.3	0	-3	-2.6	-0.6
7/19/2021	4:00:00 AM	47.5	45.7	43.1	40.3	37.6	35	35.1	37.5	36.3	35.2	35.2	33.4	32.1	30.2	28	26.2	23.8	19.5	12	8	8.3	6.2	4.8	2.3	5	7.4	6.3	32.3	31.6	4.2	5.9	4.3	-0.7	-0.8	-1.2	-0.5
7/19/2021	5:00:00 AM	25.9	26.5	27.7	27.9	34.3	26.6	25.1	31.7	23.7	24.5	21.9	22.7	20	19.9	18.5	12.3	7.6	7.2	7.4	9.8	10.9	9	11	12.3	13.5	14.5	15.4	13.8	9.5	6.9	3.8	3.6	4.3	-2.8	-2.3	-0.3
7/19/2021	6:00:00 AM	44.5	44.4	43.4	40.6	37.8	34.8	32.6	33.1	31.7	31.6	31.8	31	29.9	28.7	26.7	23.9	18.7	14.8	12.5	18.3	14.7	11.4	14.7	16.2	20.2	15.9	12.4	13	9.1	4.4	0.9	0.5	0.9	0.9	-0.6	-0.2
7/19/2021	7:00:00 AM	47	45	42.9	40.7	38.5	36	35.2	35.2	33.7	33.9	32.7	32.2	31.2	30.4	28.5	26.4	22.8	17.5	14.7	23.9	15.5	12.1	14.9	16	16.6	14.2	10.9	6.2	4.7	2.4	1.1	11.3	4.6	5.4	0.6	-0.1
7/19/2021	8:00:00 AM	61.1	59.9	58	55.7	53.6	51.5	48.9	45.6	42.7	39.6	36.8	35	32.8	30.8	29.2	26.1	23.1	21.1	22	34.2	20.2	17.4	18.6	20.9	22	17.7	12.6	13.5	11.3	8.7	6.7	4.4	3.4	2.4	2	3.1
7/19/2021	9:00:00 AM	73.1	71.9	70.3	68.6	66.7	64.6	62.2	59.4	56.3	53.3	50	46.7	43.3	40.3	37.5	35.7	33.7	31.7	30.2	29.1	28.2	29.9	30.3	28.6	28	26.9	24.6	22.3	20	17.2	17.8	16.2	15.6	16.2	15.1	13.4
7/19/2021	10:00:00 AM	72.8	71.6	70.1	68.2	66.3	64.1	61.6	58.9	55.8	52.7	49.5	46.1	42.8	39.7	37.2	36	34.3	31.3	29.7	28	27.5	29.2	29.6	27.7	27.1	25.8	23.4	21	18.8	16.1	16.9	15.5	17.5	23.9	19.7	13.9
7/19/2021	11:00:00 AM	69.8	68.4	67	65.1	63.2	61.1	58.4	55.6	52.6	49.5	46.2	42.9	39.4	36.4	33.6	31.6	29.7	28	26.7	25.3	24.6	26.2	26.6	24.8	24.2	22.9	20.6	18.5	16.7	14.1	15.1	13.7	20.7	27.2	21.8	12.2
7/19/2021	12:00:00 PM	52.4	50.4	48.3	45.5	42.5	39.7	36.8	35	33.9	33.3	33	32.9	31.5	30.5	29.2	25.8	22	18.5	18.1	20.1	15.4	11.5	15.1	18.1	19.4	12.4	11.3	11	10.6	12.6	23	46.9	43.9	33	29.2	19.4
7/19/2021	1:00:00 PM	53.8	51.7	48.9	46.1	43.6	40.5	38.1	36.7	35.6	34.7	32.7	31	31	29	26.7	23.2	18.8	15.5	14.3	15.2	10.5	9	14.6	17.2	14.8	8.1	4.8	3.7	2.9	5.5	14.5	38.2	38.4	28.2	24	13.8
7/19/2021	2:00:00 PM	48.7	47.3	45.4	43.9	43.5	43.2	42.9	42.7	41.9	43.2	43	43.6	41.2	39.4	38.1	34.8	29.8	24.2	19.3	16.5	9.4	8.4	7.3	9.2	6.3	5.2	5.5	2.2	1.4	2.4	10.8	32	28.8	6.7	3.8	0.6
7/19/2021	3:00:00 PM	70.4	69.1	67.6	65.8	63.9	61.6	59	56.2	53.2	50	46.7	43.3	40	37	34.5	32	30.1	28.5	27	27.1	24.8	26.3	26.7	25.3	25.3	22.9	20.4	18.7	16.9	14	14.5	13	12	11	10.5	10.7
7/19/2021	4:00:00 PM	73.2	72	70.4	68.7	66.9	64.7	62.3	59.7	57	54.1	50.8	47.3	44.2	40.9	37.7	35.6	33.7	32.2	31.2	29.6	28.8	30.1	30.6	29	28.6	27.3	25.3	22.8	21.3	17.9	18	16.7	15.7	14.5	13.8	13.7
7/19/2021	5:00:00 PM	71	69.6	68	66.2	64	61.7	58.9	55.7	52.5	48.9	45.4	41.8	38.4	35.3	32.7	30.7	29.2	27.9	26.8	25.6	24.4	25.9	26	23.8	22.8	22.2	18.4	16.4	15.7	12.3	13.7	14.8	13.7	11.4	10.5	9.8
7/19/2021	6:00:00 PM	68.9	67.5	66.1	64.3	62.2	59.9	57.4	54.7	51.6	48.4	45.2	42.4	38.8	35.8	33.3	32.4	31.2	28.7	31.3	30.7	25.3	25.1	25.6	25	24.8	23.5	21.1	19.2	26	13.3	12.8	12.1	11.4	10.9	9.9	9.1
7/19/2021	7:00:00 PM	70.6	69.5	67.9	66.3	64.4	62	59.3	56.1	52.8	49.4	45.9	42.3	38.9	36.2	34.1	32.1	30.5	29.6	31.7	32.1	26.1	25.2	25.4	24.5	24.2	22.5	19.5	21.2	34.6	12.9	12.8	12.9	12.2	11.1	10.3	9.3
7/19/2021	8:00:00 PM	67.8	66.5	65.1	63.4	61.3	58.7	55.8	52.6	49.2	45.8	42.3	38.5	35.5	33	30.9	29	27.5	26.6	30.4	31.1	22.9	21.7	21.6	20.2	19.4	18.3	14.6	32.3	40.8	11.1	11.1	12.4	10.1	11.3	8	6.6
7/19/2021	9:00:00 PM	70.7	69.4	67.9	66.1	64.2	61.7	59.1	56.2	52.8	49.4	46.1	42.5	39.2	36.4	34.7	33.6	31.2	30	34.3	32.9	26.5	25.8	26.1	25.3	24.9	23.7	21.2	48.7	43.2	14.9	22.3	16.8	15.2	14.1	10.9	10.2
7/19/2021	10:00:00 PM	68.9	67.8	66.2	64.6	62.5	60.3	57.5	54.5	51	47.8	44.4	41.1	38.8	39.7	34.5	32.5	30.6	29.2	31.8	31.5	25.6	24.5	24.5	23.4	23.2	22.3	19.2	43.6	35.3	13.2	16.9	12.8	12.8	12.5	9.5	9.2
7/19/2021	11:00:00 PM	56.9	54.9	53.2	50.4	48.1	44.7	41.4	40.1	35.1	31.8	29.8	27.4	24.8	22.6	21.6	21.6	17	16	17	13.8	15.2	11.9	11.9	8.5	8.5	14	16.2	40.4	28.4	5.2	12.9	5.6	7.2	7.1	3.1	1.6
7/20/2021	12:00:00 AM	39.4	37.2	35.2	32.8	32.7	28.6	28	31.2	23.5	23.9	22.8	21.5	19.8	20.6	18.4	19	14.2	14.9	13.5	10	15	12.6	12.9	9.6	9.2	15.9	26	37.3	12.3	5.5	9.2	4.2	5.6	5	0.8	4.9
7/20/2021	1:00:00 AM	42	39.6	37.6	34.4	32.6	30.8	30.9	31.4	29	28.7	27.2	25.8	24.7	24.3	24.4	28.1	24.8	17.4	12.8	8.6	13.1	9.8	9.5	6.5	6.4	13	29	38.9	8.1	6.4	12	4.4	6.1	-0.7	-1.6	14.1
7/20/2021	2:00:00 AM	48.7	46.6	44.3	41.8	39.3	36.3	33.6	32.5	27.4	25.2	23.1	21.4	18.6	18.1	17.3	17.8	13.4	13.3	12.8	9.8	15	11.9	11.5	7.9	7.9	14.6	25.4	39.4	8.9	5.8	11.4	4.9	8.5	1.4	0.6	3.2
7/20/2021	3:00:00 AM	45.9	43.9	41.2	39.1	36.9	33.3	31.4	33.1	26.9	26.6	23.9	23.5	18.7	16.3	16.1	17.4	11.7	11.7	11.2	7.5	13.5	11.4	10.1	6.7	6.9	13.4	23.6	33.2	3.5	2.7	6.8	2.4	3.4	-2.3	-2.3	-0.6
7/20/2021	4:00:00 AM	33.5	32.8	31.5	29.7	32.6	28.9	29.7	30.7	29.2	29.8	28.4	27.8	26.6	26.5	24	21.8	20.1	18.9	18.7	19.2	19.3	17.5	15.5	15.2	13.2	15.1	13	12.9	11.6	11.4	10.5	10.1	9.3	6.7	5.1	3
7/20/2021	5:00:00 AM	29.6	29.2	29.2	28.3	28.5	27.3	27.3	27.3	24.9	24.5	23.3	21.2	18.3	16.6	15.2	17.9	13.5	12.9	12.9	13.3	14.8	12.8	13.8	13.1	18.3	15.4	7.3	8	5.1	1.8	-0.1	-0.1	-2.4	-3.2	-2.3	-0.4
7/20/2021	6:00:00 AM	50.8	48.7	46.6	43.6	40.8	38	35.7	34.2	33.1	32.6	31.3	31.1	30.6	29.9	27.6	26	23.3	22.6	21.6	21.2	18.7	14.7	14.8	14	17.4	16.5	8.7	9.1	6.8	4.2	2.5	4.1	0.6	-0.5	-0.2	0.8
7/20/2021	7:00:00 AM	46.3	43.8	41.5	38.8	36.3	33.4	31	30.8	30.8	28.3	26.9	26.9	26	24.8	22.5	20.6	19.2	17.7	14.9	27.4	18.5	13.8	14.4	17.3	22.4	17.1	12.9	11	11.1	7.7	4.6	7.2	10.8	17.5	11.6	3.1
7/20/2021	8:00:00 AM	45.3	43.4	41.8	39	36.7	35.1	35	34.7	33.7	32.9	30.3	25.7	22	18.8	14.9	15.9	18.7	18.9	11.3	23.1	20.1	13.9	21.6	18.8	22.4	17.7	15.7	12.5	13.2	8.9	7.8	15	30.6	37.6	31.4	19.2

7/20/2021	9:00:00 AM	52.2	52.6	49.8	46.8	45.6	47.3	45.2	46.2	46.9	47.6	46.9	45.8	44.7	45.2	44.4	40.9	36.8	32.4	25.3	20.5	15.5	11	16.2	17.9	14.7	11.4	8.1	8.9	7.3	5.9	8.2	22	35.4	39.6	32.8	23.5
7/20/2021	10:00:00 AM	54.7	53.3	51.9	49.7	47.5	43.9	41	37.9	34.9	31.5	28.3	26.1	23.6	21.5	19.8	18.2	16.4	15.5	18.2	27.3	13.1	12.6	14.4	23.1	17.1	11.4	9.4	9.8	10.2	9	14.1	34.2	37.8	38.6	31.1	24.1
7/20/2021	11:00:00 AM	52.7	51	48.8	46.5	43.9	41.3	37.8	35.8	32.4	29.5	26.9	24.3	21.5	19.5	18.7	18.2	15.8	15.1	18.6	15.5	13	14.9	19.7	24.8	22.8	15.3	14	15	16.2	13.3	21.6	38.2	40.1	36.1	27	20.7
7/20/2021	12:00:00 PM	57	55.4	53.8	51.6	50.1	46.9	45	42.9	41.6	41.6	40.2	37.7	34.7	30.6	27.1	23.3	19.5	17.5	16.7	18	13.7	12.9	16	16.6	17.1	11.5	12.1	10.2	7.3	7.3	15.8	38.8	35.4	23	16.2	12.2
7/20/2021	1:00:00 PM	64.7	63.5	62.1	60	57.7	55.6	53.1	50.9	49	48.5	47.8	47	45.8	45.8	44.4	41.3	37.4	32.7	27.6	26.1	19.6	19.1	19.5	19.4	19.5	15.7	13.2	10.9	10.7	13.7	24.1	49.5	43.1	24.8	21.7	13
7/20/2021	2:00:00 PM	58.1	56.5	54.4	52.1	49.7	46.8	44	41	37.3	35.1	33.7	33.8	31.7	29.8	28.6	25.4	22.9	20.4	19.4	21	14.9	13.4	15.6	19.4	17.9	13	11.6	10.2	8	7.1	15.2	36.3	33.4	14.1	11.5	5.9
7/20/2021	3:00:00 PM	57	55.1	52.5	50.1	47.5	45.5	43.3	41.4	40.5	39.7	38.4	39.8	38.4	35.8	34.2	32.1	31.7	31	28.1	27.2	23.8	20.2	20.1	19.3	17.2	15.2	14.1	13	11.9	11.2	14.6	36.2	35.3	15.4	12.3	7.2
7/20/2021	4:00:00 PM	58.6	56.9	55.1	52.4	50	46.9	44.3	41.5	39.4	37.9	36	34.8	33.4	32.5	32.1	30.3	31.2	30.8	28.9	28.3	23.8	20.2	20	18.1	17.5	16.3	15.5	13.4	11.1	10.4	17.8	37.9	35.1	12	9.2	4.3
7/20/2021	5:00:00 PM	44.5	42.8	40.4	37.7	37.6	38.1	39.1	40.6	39.8	39.7	40.5	40.1	40.3	41.3	39.9	37.3	35.6	33.8	30.4	29.1	23.4	20.6	20.6	19.8	20.7	19.7	17.9	17.7	14.8	10.4	9.5	27.6	23.5	3.9	1.2	1
7/20/2021	6:00:00 PM	70	68.8	67.3	65.7	64.1	62.4	60.3	57.8	55.3	52.7	49.8	46.8	44	41.7	38.9	36.7	36.1	34.4	32.8	30.4	28.4	28.9	29.7	29.2	30.3	29.1	27.1	25.4	22.6	19.4	17.1	15.3	13.9	13.2	11.9	12.2
7/20/2021	7:00:00 PM	69.3	67.9	66.4	64.4	62.5	60.2	57.8	55.2	52.5	49.6	47	44.8	43.3	42.1	39.8	38.7	38.9	36.6	35.9	34.6	33.6	33.9	34.1	34.1	33.9	33.2	32.3	31.8	31	29.4	29.3	30.1	29	27.9	27.8	28.4
7/20/2021	8:00:00 PM	41.1	38.3	36.4	34.1	37.4	31.9	29.6	37.5	30.2	29.8	29.4	28.9	30.3	34.8	31.8	32.5	35.4	32.9	30.1	26.8	24.4	22.2	23	23	26	26.4	26.7	37.3	29.5	14.3	10.4	6.9	5.1	-0.1	-1.5	-0.3
7/20/2021	9:00:00 PM	56.8	55.5	52.6	49.5	46.8	43.5	40.1	36.9	33.2	30.8	28.8	27.3	29.9	35.2	33.9	33.8	35.4	32.6	30.7	27.2	24.9	22.7	23.1	23.9	27	26.4	26.2	40.9	41.5	12.8	12.2	11.3	6.6	4.7	4.5	6.9
7/20/2021	10:00:00 PM	34.9	32.9	30.3	28.8	29.3	27.6	26.1	27.1	27	28.8	28.4	28.5	30.8	34.7	32.8	32.6	35.1	32.5	29.9	26.7	24.5	21.6	21.7	20.6	23.1	23.9	30.4	40.5	32.5	14.2	13	8.8	6.2	1.4	-0.6	7.1
7/20/2021	11:00:00 PM	40.8	39.3	36.9	34.7	33.4	30.3	29.9	31.3	30.5	32.1	32.3	32.2	32.9	35.4	33.9	33.4	35.1	32.6	30	27.3	24.7	21.3	20.5	19.2	21.4	22.2	27.4	40.9	33.5	13.3	12.9	8.8	6.5	1.5	-0.8	0.1
7/21/2021	12:00:00 AM	27	27	28.4	27	27.5	27.8	28.6	30.6	29.7	30.3	30.2	29.6	30.8	34.7	33.6	33.7	35.9	33.3	30.2	27.4	25.7	23.5	24.9	25	26.4	26.3	34.1	32.2	19.2	15.7	10.3	8.1	2.5	-0.7	-1.8	-0.6
7/21/2021	1:00:00 AM	25.8	26.1	26.7	26	31.7	28.1	27.4	30.3	28.2	29.7	29.7	29.4	30.8	35	34.4	34.2	36	33.4	30.8	28.2	25.6	23	23.7	24.5	27.5	28.1	34.8	28.4	19.9	15.5	8.6	7	0.8	-2.1	-2.5	-0.3
7/21/2021	2:00:00 AM	25.3	24.6	24.7	23.6	25.4	24.8	21.2	24.4	20.9	24.4	24.4	24.8	28.4	33.7	33.5	33.5	35.8	33	30.4	28.3	25.3	23.1	23.5	24.3	27.2	28.3	30.8	24.7	20	15.3	9.5	6.4	1.1	-2.9	-2.8	-0.7
7/21/2021	3:00:00 AM	25.5	25.7	25.6	24.8	30	25.8	22.9	26.3	22.1	25	25.1	25.5	28.6	33.7	33.5	34	36.3	33.4	30.3	28.7	25.5	23.4	23.6	23.8	26.5	27.1	25.6	24.4	20.4	15.6	9.3	5.6	1	-3	-2.9	-0.7
7/21/2021	4:00:00 AM	27.7	28.8	28.4	29.8	35.3	28.7	26.8	34.4	26.9	29	29.7	28.4	29.8	34.3	33.6	33.9	35.9	32.8	30.3	28.2	25.1	22.6	22.9	23.6	26.6	26.9	25.2	24.5	20.3	15.1	8.3	4.2	0.5	-3.3	-3	-0.7
7/21/2021	5:00:00 AM	30.3	30.1	30.4	29.8	29.9	28.2	26	32.7	26.2	27.6	27	27.3	28.7	33.1	32.8	33.7	35.8	32.9	30.5	28	25.3	22.6	22.6	22.5	25.1	24.9	23	22.6	18.3	13.1	6.7	9.5	0.9	-3.7	-3	-0.7
7/21/2021	6:00:00 AM	33	36	33.5	32.2	31.8	31.1	30.8	34	32.2	32.3	31	30.6	31	33.7	32.8	33.4	35.7	32.8	30.5	27.8	25.1	22.3	21.9	21.5	24.1	24.4	22.9	22.9	20.2	15.6	7.7	4.1	0.6	-2.9	-2.7	-0.6
7/21/2021	7:00:00 AM	30.9	30.7	31.6	30.9	31.5	30.2	29.5	33	30.5	30.7	30	29.3	29.9	32.8	32.3	32.1	34.7	32.4	29.9	29.9	24.8	22	20.6	19.1	20	19.8	17.8	17.4	15.2	11.1	9	14	23.7	31.1	25.6	16.9
7/21/2021	8:00:00 AM	46.4	44.4	41.9	40.1	37.9	36.5	37.2	38.5	35.5	35.6	33.7	30.7	28.3	32.2	31.5	30.8	33.6	32.2	30.5	29.5	24	20.7	19.3	17.5	19.5	22.7	25.2	24.1	19.4	11.5	8.7	18.9	32.1	35.4	29.6	18.5
7/21/2021	9:00:00 AM	44.1	43	47	43.2	44.2	43.5	44.9	46.2	47.2	48.3	47.8	46.6	44.2	42.2	39.3	35.3	34.2	32.2	30.5	28	24.4	21.5	20.1	19.1	18.5	20.4	25.2	23.1	11.7	10.8	12	23.2	37.8	39.1	31.9	20.5
7/21/2021	10:00:00 AM	42.9	39.9	37.7	35.4	33.7	31.7	29.4	32.2	29.8	39.7	40.8	38.6	35.9	34.9	32.2	30.9	31.9	31	30.2	27.4	24.9	22.1	21.5	20.2	19.9	18	14.4	13.7	12.2	8.4	8.3	25.5	37.1	38.6	30.6	20.1
7/21/2021	11:00:00 AM	42.9	41	38.1	36.3	37.2	35.8	33.5	34.4	32.6	38.1	38.4	31.3	27.9	32.1	30.6	30.1	31.3	30.6	29.4	27	24.6	21.1	20.8	19.7	22.8	24.2	16.8	15.4	14.2	11.4	14.8	38.2	37.2	36.9	35.1	19.6
7/21/2021	12:00:00 PM	58.8	57.6	55.6	53.7	51.3	49.4	47.3	45.9	45.2	45.5	43.8	40.8	38.7	37.7	35.9	34.1	33	31.4	29.9	28	24.8	21.5	20.8	18.7	18.2	17.3	16	15.1	14.3	12.6	18.9	42.4	37.8	16.4	12.2	5.8
7/21/2021	1:00:00 PM	57.5	55.6	53.7	52.3	49.9	48.4	47.7	47.5	47.8	48.7	48.5	48.4	49.5	48.5	45.6	42.5	39.4	34.5	30.7	27.1	24.7	21.2	20.6	18.6	18.8	18	16.6	15.9	14.2	13.8	21.6	43.3	47.1	28.4	22.9	18.6
7/21/2021	2:00:00 PM	61.2	59.8	57.8	56.7	54.3	52	49	45.7	42.7	40.9	38.1	33.8	31.9	33.4	32.3	31.4	33.1	32.1	30.8	28.8	26	24	24.3	23.3	23.2	22.5	21.3	19.9	18.1	17.5	20.3	40.6	44.3	25.3	19.7	15.5
7/21/2021	3:00:00 PM	49.1	46.5	43.9	43.2	41.8	42.5	43.7	44.6	44.7	44.8	43.6	40.6	38.1	36.8	34.7	32.4	33.1	32	29.8	27.9	23.9	20.6	20.1	18.3	18.8	17.5	18.4	18.2	17.8	18.5	26.6	48.1	49.2	27.5	26.3	18.1

7/21/2021	4:00:00 PM	44.5	42.6	41.1	39.4	39.5	41.4	43.1	44.2	45.4	46.3	45.1	43.9	43.8	43.6	42.2	40.6	38	33.9	30.1	29.3	24.6	21.2	20.7	19.4	20	19.7	19.7	17.1	14.1	17.4	39.8	37.8	16	15.1	7.1
7/21/2021	5:00:00 PM	58.1	56.5	54.3	51.2	48.8	47	45.5	45.2	44.9	44.2	43.6	41.1	39.1	39.3	36.7	33.3	32.3	31.5	29.5	27.6	23.9	21.2	22.4	22.9	26.2	20.8	18.5	19	18.9	19	20.2	45	44.5	21.4	19.1	10.6
7/21/2021	6:00:00 PM	46	43.4	40.8	37.3	33.9	31.1	28.8	27.6	25.9	26	25.3	24.7	33.2	35.2	31.7	30	32.2	32.3	30.2	27.7	23.6	21	20.7	20.2	22.2	19.8	17.7	16.8	15.2	10.8	5.6	3.5	1.7	1.8	0.7	0.9
7/21/2021	7:00:00 PM	52.7	50.6	47.9	44.6	42.6	39	35.1	32	29.8	28.3	26.7	25.8	33.9	35.8	31.8	30	32.3	32.2	30	26.6	23.3	20.5	19.1	18	18.9	18.1	16.5	15.6	20.3	18	7.1	4.6	0.9	1	0.3	0.2
7/21/2021	8:00:00 PM	35.2	33.4	31.4	29.6	26.8	25.1	24.9	27.7	24.5	26.4	25.4	25.3	35.4	38.2	32.6	31.1	33.4	32.7	30.3	27	23.8	21.8	22.3	24.6	28.2	27	24.4	31.7	42.5	21.1	8.9	11.4	4.9	12.7	8.5	4.7
7/21/2021	9:00:00 PM	30.6	30.7	28.8	30	27.6	25.9	26.3	27.9	26	28.1	27.6	28.4	37.8	41.1	36.1	32.3	34.1	33.2	30.7	27.2	24.2	22.7	23.8	24.5	27.7	27.9	26	41.9	45.3	17.4	12.7	14.2	9.6	15.3	11	6.2
7/21/2021	10:00:00 PM	29.9	28.6	27.4	25.5	24.5	24.1	24.7	23.7	24.2	28	27.4	27.3	35.4	40.2	33.5	32.3	34.1	33.1	30.8	27.3	24.4	23.1	23.4	24.2	27.2	27.9	25.8	42.6	43.1	14.5	13.2	12.8	10.7	17.6	14.7	5.5
7/21/2021	11:00:00 PM	26	25.6	25.4	24.1	24.8	25	25.5	24.8	24.6	26.7	26.5	26.4	34.7	39.9	33.2	32.4	34.4	33.6	31	27.4	24.5	22.6	23.5	24.9	28	28.2	30.9	43.5	30.8	16.2	15.1	8.4	10.5	15.7	11.2	2.8
7/22/2021	12:00:00 AM	48.7	47.2	44.9	42.2	40.3	37	34	32.8	32.1	31.9	30.2	29.6	33.7	38.7	32.9	32	34.1	33	30.5	26.7	24.1	21.2	21.8	20.8	22.7	22.8	27.1	41.2	34.9	13.3	13	8.1	8.3	10.2	6	0.6
7/22/2021	1:00:00 AM	62	61	59.6	57.9	55.1	53.7	50.6	47.8	44.8	42	38.9	36.9	37.2	40.1	34.8	33.3	34.7	33.4	31.7	28.4	25.1	22.7	23.3	22.6	24.8	25.2	23.4	34.1	43.5	15.7	11	13.3	9.1	17.4	14.1	6.7
7/22/2021	2:00:00 AM	43.2	40.9	38.8	35.6	33.1	30.2	27.8	26.8	24.3	27.1	25.8	25.6	33.8	39.6	33.2	31.7	34	32.4	30.9	27	24.4	22.1	23.2	23.1	25.6	26.4	24.7	36.5	42.7	15.4	11.5	11.6	8.7	17.3	13.8	8.4
7/22/2021	3:00:00 AM	29.3	28.9	27.6	26	28.9	26.5	25.2	28.9	24.7	27.1	26.2	26.2	33.9	39.8	34	32.3	34.6	32.5	31.6	27.9	25.3	23.1	24.2	26.1	29.1	29	28	36	27.8	14.8	10.3	6	3.6	5.5	6.5	2.7
7/22/2021	4:00:00 AM	27.3	27.4	27.4	27.2	31.3	28.4	39.4	36.8	27.7	29.2	28.1	28.1	34.4	39.9	34.1	32.3	34.6	32.3	31	27.7	25.2	22.5	23.3	24.8	27.6	27.5	25.8	24.4	19.6	14.5	8.4	5	0.7	-2.3	-2.1	-0.3
7/22/2021	5:00:00 AM	34	32.6	32.1	31.7	32.3	33	35.8	38.5	36.6	45.5	47.6	32.5	35.8	40.6	35	33.1	34.9	32.7	32.2	29.5	27.2	24.7	26	28.7	31	30.2	27.5	25.9	20.4	15	9	5.4	0.1	-2.7	-2.6	-0.6
7/22/2021	6:00:00 AM	29.3	31.1	31.5	31.4	32.7	32.4	35.2	35.4	35.6	45.9	47	31.2	34.5	39.5	33.9	32.1	34.3	32.5	31.9	29.7	26.4	23.8	25.2	25.8	27.8	27.8	25.6	24.4	20.5	15.9	12.6	10.6	2.1	-2.4	-2.4	-0.6
7/22/2021	7:00:00 AM	46.4	44.3	42.2	39.8	37.3	35.5	35.3	35.2	35.7	44.3	45.8	36.9	38.7	38.8	34.6	31.8	33.8	32.4	31.9	28.8	26.8	24.3	25.8	23.7	24.9	25.8	26.9	25.7	22.8	17	12.8	11.3	21.8	31.8	26.6	13.4
7/22/2021	8:00:00 AM	43.5	41.7	40.3	38.4	37.2	36.6	37.3	38	39.7	42.7	45.7	33.8	36.1	37.3	33	30.6	32	31.5	31.8	28.1	24.2	21.4	20.5	18.8	20	19.9	19.2	18.7	18.9	19.1	16.3	15.7	29.1	36	29.8	21.1
7/22/2021	9:00:00 AM	40.5	39.2	39.2	40.8	42.3	44.3	46.6	47.1	48.2	48.6	48.5	45.4	42.9	41.9	39.8	38	34.9	32.6	31.9	27.9	24.5	21.2	20.3	18.9	19.3	18.2	16.5	15.2	13.8	12.8	10.3	15.8	28	34.2	28.7	16.2
7/22/2021	10:00:00 AM	50.8	47.2	45.2	42.3	39.9	38.8	41.4	35.7	33	39.4	40.4	32.2	37.7	37	32.5	29.4	30.7	30.6	30.8	27.2	24.7	21.4	21	19.7	19.5	18.3	17.2	15.7	15	15	16.7	39.6	40.6	24.3	20.3	8.8
7/22/2021	11:00:00 AM	48.8	47	44.8	42.2	39	36.1	33.1	30.7	29.1	29	27.2	26.4	30.9	34.8	32.2	29.3	29.7	30.1	29.6	26.8	24.6	21.1	20.5	18	18.8	18.8	24.8	24.7	26	17.8	17.7	37.5	35.4	17.2	12.9	4.3
7/22/2021	12:00:00 PM	59.2	58.3	56.3	54.2	52.2	50.2	49.7	50.2	50.4	49.6	48.9	47.3	47.8	49.7	47.4	43.7	41.9	38	32.1	27.7	24.1	21	20.4	18.1	18	16.6	15.5	14.2	14.5	13.3	19.6	39.3	39.1	18.4	14	6.8
7/22/2021	1:00:00 PM	61.6	60.3	58.7	56.5	54.7	52.7	51	49.5	58.6	49.7	49.7	51.6	52.7	50.1	48.2	45.2	42.1	38.9	32.7	27.7	22.2	21.5	23.1	21	17.3	16.8	17.4	16.8	16.5	15.8	19.1	40.7	43.7	24.2	18.6	13
7/22/2021	2:00:00 PM	55.6	53.5	51.3	49.2	46.7	43.5	40.3	37.2	34.2	30.8	27.5	24.9	21.9	19.4	17.4	16.4	15.4	14.1	15.4	22.8	11.5	10.3	14.9	17.8	19.8	17.2	17.1	16.5	15	17.1	16.1	20.5	22.1	3.4	2.2	1.5
7/22/2021	3:00:00 PM	58.5	57.3	55.3	52.9	51.4	48.2	45.1	41.7	38.7	35.2	32.4	30.1	28.7	27.1	26	23.8	22	19.5	20.4	21.2	15.3	13.8	13.9	12.6	13.6	15.6	17.7	16.8	16.5	18.2	16.7	31.7	31.1	8.4	6.1	2.8
7/22/2021	4:00:00 PM	36.5	35.6	34.5	32.6	31.9	30.9	32.9	32.2	33.6	24.1	18.1	15.9	12.7	10.9	9.8	10.2	8.9	6.2	7.1	15.4	6.7	6.4	6.3	7	8.6	14.2	21.8	19.5	12.7	4.3	0.2	2.3	0	-1.7	-1.2	0

WM5: Overall Hourly Intervals – A-weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	12:23:51 PM	40.49063	9.010583	71.21021	25.20423	22.2944884	22.0456581
8/24/2021	1:00:00 PM	19.44584	7.076699	41.99707	22.81475	21.9770001	21.8701552
8/24/2021	2:00:00 PM	20.10074	6.832873	36.78316	23.53959	21.9431653	21.8571463
8/24/2021	3:00:00 PM	26.70633	6.663424	44.96305	29.82225	22.0913908	21.8612144
8/24/2021	4:00:00 PM	22.43832	6.244117	37.56573	25.86781	21.9700448	21.850319
8/24/2021	5:00:00 PM	21.19293	7.274241	40.69275	24.44003	21.9194156	21.8356064
8/24/2021	6:00:00 PM	17.89496	3.899388	34.86297	22.36492	21.8349193	21.8333263
8/24/2021	7:00:00 PM	11.87878	0	35.52761	22.0036	21.8354242	21.8333407
8/24/2021	8:00:00 PM	17.27992	0	36.98957	22.81124	21.8634472	21.8367045
8/24/2021	9:00:00 PM	18.64066	0	43.34744	22.02595	21.8469288	21.8342262
8/24/2021	10:00:00 PM	19.14155	0	43.15959	23.41862	21.8415974	21.833761
8/24/2021	11:00:00 PM	15.01201	0	37.66728	21.8533	21.8362976	21.8338822
8/25/2021	12:00:00 AM	1.089681	0	19.91606	21.84906	21.8368583	21.834131
8/25/2021	1:00:00 AM	6.925928	0	27.73062	21.90135	21.8383498	21.8339737
8/25/2021	2:00:00 AM	6.669615	0	24.4133	21.99471	21.8700371	21.8432193
8/25/2021	3:00:00 AM	15.27754	0	35.43889	22.48788	21.9516029	21.8585059
8/25/2021	4:00:00 AM	9.590771	0	24.00916	22.13616	21.9336592	21.8628746
8/25/2021	5:00:00 AM	13.04347	1.958289	33.23112	22.34413	22.0038092	21.9056865
8/25/2021	6:00:00 AM	25.07799	3.729441	44.2261	29.32502	22.4075552	21.9821021
8/25/2021	7:00:00 AM	20.37808	4.008132	37.91286	25.18576	22.511048	22.0010301
8/25/2021	8:00:00 AM	17.57868	2.699322	40.39693	23.25782	22.1263454	21.8943357
8/25/2021	9:00:00 AM	21.33015	2.085947	43.88258	24.19101	22.0286834	21.881735
8/25/2021	10:00:00 AM	14.69194	2.388705	37.36469	22.01368	21.8632568	21.8391102
8/25/2021	11:00:00 AM	16.84852	5.359591	40.35518	22.25642	21.8945963	21.843862
8/25/2021	12:00:00 PM	22.92657	7.085993	45.01709	26.11794	21.9606546	21.856776
8/25/2021	1:00:00 PM	28.98184	8.187539	44.11576	33.09154	24.8794508	21.9313304
8/25/2021	2:00:00 PM	28.42581	8.166081	46.16597	31.98567	23.2311878	21.9335841
8/25/2021	3:00:00 PM	28.92181	7.937156	49.33118	31.94278	24.1633906	21.9495103
8/25/2021	4:00:00 PM	23.9034	6.134965	49.7782	27.07445	22.0129719	21.8534936
8/25/2021	5:00:00 PM	20.13286	5.547383	41.9511	23.48761	21.8684985	21.8335503
8/25/2021	6:00:00 PM	27.8674	3.949199	52.58389	24.66584	21.8742156	21.8334778
8/25/2021	7:00:00 PM	19.25384	0	44.35742	22.50548	21.8473303	21.8352181
8/25/2021	8:00:00 PM	11.24754	0	27.33816	22.40432	21.9666967	21.8385712
8/25/2021	9:00:00 PM	17.01145	2.282556	33.16149	23.76987	22.2949672	21.9641848
8/25/2021	10:00:00 PM	19.88323	0	44.35679	23.56247	22.0833668	21.8583907
8/25/2021	11:00:00 PM	11.68755	0	33.83633	22.00245	21.8405653	21.8338624
8/26/2021	12:00:00 AM	6.578233	0	24.48215	22.014	21.8619129	21.8360429
8/26/2021	1:00:00 AM	7.311052	0	26.01147	21.99223	21.864015	21.8380604
8/26/2021	2:00:00 AM	3.705581	0	19.15356	21.89547	21.8447365	21.8355548
8/26/2021	3:00:00 AM	5.157149	0	25.60275	21.89125	21.8442187	21.8365674

8/26/2021	4:00:00 AM	5.861274	0	23.82097	21.93831	21.8579661	21.8397981
8/26/2021	5:00:00 AM	11.64427	0	34.49053	22.24417	21.9328718	21.8677001
8/26/2021	6:00:00 AM	18.38958	2.238219	36.61558	24.09857	22.0556787	21.8973561
8/26/2021	7:00:00 AM	17.58205	2.985734	37.59151	23.40298	22.1694331	21.9517615
8/26/2021	8:00:00 AM	23.76338	3.065681	53.20163	23.53278	22.0406312	21.9088457
8/26/2021	9:00:00 AM	30.9999	2.735611	53.02834	26.12119	22.1037583	21.9070212
8/26/2021	10:00:00 AM	27.40569	2.473265	51.29037	28.04127	22.0743461	21.8738008
8/26/2021	11:00:00 AM	17.62177	6.268355	40.279	22.41692	21.9179982	21.8526049
8/26/2021	12:00:00 PM	27.2829	6.864879	45.9954	22.22725	21.8962064	21.8473439
8/26/2021	1:00:00 PM	28.66398	8.166702	49.29147	31.87812	22.8903715	21.8782006
8/26/2021	2:00:00 PM	31.55497	9.115276	45.55617	35.77321	27.1497668	21.9377011
8/26/2021	3:00:00 PM	33.55248	11.77252	49.59433	37.16288	30.3148395	23.0263714
8/26/2021	4:00:00 PM	29.29393	10.23925	54.2792	32.43822	25.5613334	21.9560561
8/26/2021	5:00:00 PM	26.64942	6.335092	42.67466	30.4797	23.2038898	21.8396612
8/26/2021	6:00:00 PM	18.49534	3.973827	34.39642	22.75745	21.8334196	21.8333259
8/26/2021	7:00:00 PM	10.96551	0	34.99119	21.94897	21.8338504	21.833321
8/26/2021	8:00:00 PM	11.26502	0	30.90393	22.33706	21.8391232	21.833804
8/26/2021	9:00:00 PM	20.27479	0	46.00739	22.08373	21.8550699	21.8338523
8/26/2021	10:00:00 PM	19.29997	0	45.94174	22.38643	21.9635748	21.8684214
8/26/2021	11:00:00 PM	4.566783	0	31.74349	21.90676	21.8357685	21.8335658
8/27/2021	12:00:00 AM	4.158751	0	31.01937	21.86753	21.8364301	21.8335506
8/27/2021	1:00:00 AM	16.82886	0	43.49815	21.89216	21.8425048	21.8352405
8/27/2021	2:00:00 AM	20.57156	0	49.50735	21.89636	21.846751	21.8367681
8/27/2021	3:00:00 AM	4.411983	0	22.63372	21.88979	21.8504004	21.8395233
8/27/2021	4:00:00 AM	13.18085	0	33.75537	22.001	21.8702456	21.842385
8/27/2021	5:00:00 AM	16.49857	0	46.47327	22.18803	21.9288155	21.8671631
8/27/2021	6:00:00 AM	19.879	0	47.00734	22.58012	21.9897865	21.8686689
8/27/2021	7:00:00 AM	18.81841	0	42.92605	23.37632	21.9757004	21.8650128
8/27/2021	8:00:00 AM	30.54933	3.714073	63.13987	22.68642	22.0842096	21.9228316
8/27/2021	9:00:00 AM	17.03747	5.397083	33.85415	23.33121	22.2412276	21.986473
8/27/2021	10:00:00 AM	17.56092	4.071077	43.88641	23.47857	22.1261626	21.9102616
8/27/2021	11:00:00 AM	19.6759	7.603166	44.03502	23.17458	22.0467457	21.8868536
8/27/2021	12:00:00 PM	35.9001	7.812395	70.04146	22.80846	22.081285	21.9295239
8/27/2021	1:00:00 PM	17.39977	8.112628	35.56035	22.48471	22.0427269	21.9125771
8/27/2021	2:00:00 PM	26.1307	8.35143	48.65567	26.54567	22.1939522	21.9118758
8/27/2021	3:00:00 PM	22.99499	8.173815	41.61295	26.24902	22.1965924	21.9184706
8/27/2021	4:00:00 PM	26.90233	7.364991	49.86118	28.86107	22.4411198	21.8920096
8/27/2021	5:00:00 PM	21.32049	6.835858	42.58968	24.34204	21.9973547	21.875726
8/27/2021	6:00:00 PM	19.84936	4.86091	37.65703	23.48691	22.0827109	21.8769227
8/27/2021	7:00:00 PM	17.56241	1.287857	36.19971	23.51083	22.0513726	21.877708
8/27/2021	8:00:00 PM	22.06406	3.97115	44.22557	24.88608	22.3218145	21.9980628
8/27/2021	9:00:00 PM	22.16629	5.169433	43.82704	25.66317	22.6716329	22.0575701
8/27/2021	10:00:00 PM	14.1893	2.002351	31.95374	22.86327	22.1207732	21.945163

8/27/2021	11:00:00 PM	17.2464	2.018075	34.1716	23.93861	22.2267377	21.9595337
8/28/2021	12:00:00 AM	11.93332	0	29.10764	22.52699	22.0166797	21.8876486
8/28/2021	1:00:00 AM	10.502	0	27.06002	22.38045	21.9231929	21.8576937
8/28/2021	2:00:00 AM	6.273561	0	24.40478	21.98539	21.852704	21.8365294
8/28/2021	3:00:00 AM	16.27726	1.125778	30.95181	23.91409	22.1524463	21.9209893
8/28/2021	4:00:00 AM	8.804167	0	30.86301	22.16193	21.8975645	21.8409577
8/28/2021	5:00:00 AM	23.40644	0	53.59561	22.01137	21.8616528	21.8364981
8/28/2021	6:00:00 AM	20.06974	0	43.56602	22.94763	22.0030855	21.8647049
8/28/2021	7:00:00 AM	21.32364	4.095361	46.50868	25.15878	22.7964288	22.0231544
8/28/2021	8:00:00 AM	28.64075	4.749385	62.25443	23.20952	22.1803043	21.9716933
8/28/2021	9:00:00 AM	16.86118	3.511637	37.22775	23.34816	22.3357192	22.0002042
8/28/2021	10:00:00 AM	18.19351	4.57959	37.20821	23.61252	22.2681959	21.9651943
8/28/2021	11:00:00 AM	18.62141	6.466336	40.24623	23.02686	22.1529857	21.9391752
8/28/2021	12:00:00 PM	22.87166	9.059676	43.91434	25.04592	22.4706438	22.0485097
8/28/2021	1:00:00 PM	32.8218	8.172602	53.90702	27.76674	22.2309924	21.9560983
8/28/2021	2:00:00 PM	20.60664	8.106573	39.0422	24.07299	22.0405517	21.8996003
8/28/2021	3:00:00 PM	19.18938	7.341931	36.49855	23.19326	22.0034637	21.8903909
8/28/2021	4:00:00 PM	16.78607	6.360711	36.97123	22.61449	22.0577442	21.906011
8/28/2021	5:00:00 PM	19.54943	7.224757	39.35088	23.81403	22.4394921	22.0305841
8/28/2021	6:00:00 PM	19.52523	5.083922	39.64732	24.26562	22.4490037	21.9151865
8/28/2021	7:00:00 PM	21.17941	0	43.87123	23.68076	22.1155935	21.8757664
8/28/2021	8:00:00 PM	12.01017	0	31.74772	22.03334	21.8607332	21.8371683
8/28/2021	9:00:00 PM	5.790711	0	24.36667	21.95887	21.8494671	21.835881
8/28/2021	10:00:00 PM	3.504828	0	28.0777	21.85663	21.8371327	21.8337094
8/28/2021	11:00:00 PM	3.58254	0	20.30891	21.8781	21.8378736	21.8339005
8/29/2021	12:00:00 AM	5.752695	0	22.58368	21.94249	21.8454326	21.8357517
8/29/2021	1:00:00 AM	11.21127	0	33.56557	22.42263	21.8743061	21.8367123
8/29/2021	2:00:00 AM	3.633638	0	24.04715	21.88236	21.8418797	21.834665
8/29/2021	3:00:00 AM	13.12773	0	41.948	21.97832	21.8624265	21.8401065
8/29/2021	4:00:00 AM	7.729316	0	32.40904	21.96109	21.868559	21.8415632
8/29/2021	5:00:00 AM	21.64703	0	50.77128	22.30708	21.963194	21.8669086
8/29/2021	6:00:00 AM	19.99213	1.163637	51.17851	22.57569	22.0532084	21.9103043
8/29/2021	7:00:00 AM	19.41056	2.12996	40.56154	24.08633	22.2397101	21.9674405
8/29/2021	8:00:00 AM	21.6786	6.827214	42.75769	26.26939	22.5905065	22.1152589
8/29/2021	9:00:00 AM	21.81091	8.390291	42.08511	25.74944	22.8788128	22.2550635
8/29/2021	10:00:00 AM	19.17522	5.61781	40.70652	23.46858	22.2874462	21.9884863
8/29/2021	11:00:00 AM	21.58972	6.261034	43.46861	24.38371	22.1382703	21.9281064
8/29/2021	12:00:00 PM	19.30755	7.79002	40.17483	22.97333	21.9838516	21.8814998
8/29/2021	1:00:00 PM	17.22767	7.698618	34.32447	22.39387	21.9498268	21.8593588
8/29/2021	2:00:00 PM	17.8798	7.809816	37.41531	22.93968	22.1403094	21.9048992
8/29/2021	3:00:00 PM	22.19544	7.271428	48.66065	22.77357	21.9885607	21.8789568
8/29/2021	4:00:00 PM	17.51908	6.188989	36.39173	22.20836	21.8794526	21.8422653
8/29/2021	5:00:00 PM	19.08538	5.130072	50.21791	22.32514	21.8464314	21.8341344

8/29/2021	6:00:00 PM	16.18879	3.785597	35.41346	22.32847	21.8335866	21.8333259
8/29/2021	7:00:00 PM	13.14174	0	37.06955	21.94481	21.8335371	21.8333144
8/29/2021	8:00:00 PM	14.58397	0	37.34243	22.23239	21.8350968	21.8333772
8/29/2021	9:00:00 PM	9.223853	0	30.52375	22.0941	21.8429928	21.8344248
8/29/2021	10:00:00 PM	4.771777	0	28.10055	21.85934	21.8364202	21.8337257
8/29/2021	11:00:00 PM	9.722327	0	36.88202	21.96075	21.8528619	21.8362641
8/30/2021	12:00:00 AM	4.513798	0	24.86842	21.89671	21.8447804	21.8358325
8/30/2021	1:00:00 AM	11.3252	0	32.32347	21.97913	21.8445446	21.8362661
8/30/2021	2:00:00 AM	2.836625	0	24.083	21.85967	21.8396225	21.8348648
8/30/2021	3:00:00 AM	2.629819	0	18.82627	21.87264	21.8437734	21.8352228
8/30/2021	4:00:00 AM	4.380441	0	19.65802	21.91785	21.8589479	21.8390039
8/30/2021	5:00:00 AM	8.804033	0	31.61109	22.03864	21.9002013	21.8599197
8/30/2021	6:00:00 AM	22.56177	0.993114	43.81682	25.47883	22.0961412	21.9079946
8/30/2021	7:00:00 AM	22.93823	3.073866	48.58307	25.58928	22.3584915	21.9492723
8/30/2021	8:00:00 AM	25.36366	3.791975	45.75161	28.76493	22.2366825	21.9612223
8/30/2021	9:00:00 AM	22.24053	6.499587	55.24494	23.64134	22.5119804	22.0829333
8/30/2021	10:00:00 AM	25.28881	8.464207	42.3029	28.70146	22.5261548	21.9813553
8/30/2021	11:00:00 AM	33.93423	17.21766	47.97699	37.59237	31.5607004	25.0810756
8/30/2021	12:00:00 PM	33.11721	12.08655	48.67544	37.06117	29.436376	22.1974539
8/30/2021	1:00:00 PM	32.54777	9.870558	47.66613	36.64272	28.3036965	22.0140084
8/30/2021	2:00:00 PM	32.53098	12.37221	46.77081	36.3383	29.6726576	22.504056
8/30/2021	3:00:00 PM	33.56204	11.30466	47.83319	37.16553	29.3395749	22.3458744
8/30/2021	4:00:00 PM	29.89045	9.804003	49.72501	32.96888	26.3284626	21.9719818
8/30/2021	5:00:00 PM	24.51066	7.096957	41.21833	28.31925	21.9718613	21.8349002
8/30/2021	6:00:00 PM	14.74367	2.259842	39.10232	21.92194	21.8344702	21.8334773
8/30/2021	7:00:00 PM	12.5314	0	35.72222	22.0193	21.8395201	21.8338633
8/30/2021	8:00:00 PM	17.96612	0	41.88973	23.37917	21.8503338	21.8345469
8/30/2021	9:00:00 PM	16.21678	0	39.23498	22.09721	21.8439122	21.8356876
8/30/2021	10:00:00 PM	14.78948	0	34.64509	22.51334	21.881914	21.8426416
8/30/2021	11:00:00 PM	10.57486	0	28.5146	22.2877	21.8972276	21.8489082
8/31/2021	12:00:00 AM	8.268685	0	26.12768	22.04352	21.8757638	21.8456421
8/31/2021	1:00:00 AM	8.532644	0	33.18594	21.90912	21.8485078	21.8371731
8/31/2021	2:00:00 AM	4.871865	0	26.45936	21.85691	21.8390354	21.8344715
8/31/2021	3:00:00 AM	21.95011	0	57.30018	21.86717	21.8405065	21.8348222
8/31/2021	4:00:00 AM	6.329618	0	22.42943	21.94004	21.8579704	21.8381894
8/31/2021	5:00:00 AM	19.29124	0	51.74437	22.11609	21.9285109	21.870733
8/31/2021	6:00:00 AM	24.38478	3.401197	50.89763	24.34204	22.2062418	21.9428755
8/31/2021	7:00:00 AM	24.03106	2.614068	50.33393	25.78822	22.312838	21.9288606
8/31/2021	8:00:00 AM	24.06757	4.058572	48.72738	23.84598	22.2278598	21.9286918
8/31/2021	9:00:00 AM	30.31031	6.578609	62.25547	23.63301	22.3783676	22.0422329
8/31/2021	10:00:00 AM	22.56237	7.060527	46.53758	25.02927	22.4672213	22.0671273
8/31/2021	11:00:00 AM	19.493	8.901244	40.99049	23.49123	22.3161324	22.0487077
8/31/2021	12:00:00 PM	20.2771	8.847345	40.38261	23.09576	22.1694878	21.9747781

8/31/2021	1:00:00 PM	24.23869	8.043943	40.82482	28.19601	22.0686658	21.8744426
8/31/2021	2:00:00 PM	25.05266	8.275707	44.02572	27.61185	22.109065	21.8632404
8/31/2021	3:00:00 PM	25.57691	8.741082	44.02354	29.19141	22.1395225	21.8493948
8/31/2021	4:00:00 PM	23.96339	6.48877	50.0086	25.71313	21.9245205	21.8343905
8/31/2021	5:00:00 PM	19.09919	5.699608	38.20533	22.63009	21.8454566	21.8335195
8/31/2021	6:00:00 PM	13.26715	0.813933	36.53159	22.01816	21.8417117	21.8339509
8/31/2021	7:00:00 PM	14.33699	0	35.42044	22.44699	21.8433079	21.8335995
8/31/2021	8:00:00 PM	10.02207	0	27.99866	22.03154	21.8386719	21.8335715
8/31/2021	9:00:00 PM	22.41447	0	52.42303	21.96842	21.8423149	21.8339055
8/31/2021	10:00:00 PM	15.0721	0	37.85464	22.10415	21.8340253	21.8333607
8/31/2021	11:00:00 PM	11.79756	0	35.36962	21.96258	21.8409017	21.8343905
9/1/2021	12:00:00 AM	13.45439	0	35.45667	22.30775	21.8376815	21.8334666
9/1/2021	1:00:00 AM	7.424874	0	27.56831	21.93539	21.845828	21.8353761
9/1/2021	2:00:00 AM	8.57074	0	26.61743	22.02588	21.8779895	21.8421792
9/1/2021	3:00:00 AM	13.53121	0	29.28753	22.98948	22.1355455	21.9043202
9/1/2021	4:00:00 AM	16.47384	4.871623	31.05248	23.62029	22.4838381	22.075919
9/1/2021	5:00:00 AM	12.73866	1.040893	36.23317	22.26297	21.9652509	21.8841866
9/1/2021	6:00:00 AM	32.18082	1.238439	55.46494	23.44566	21.9985542	21.8829754
9/1/2021	7:00:00 AM	29.7345	4.279389	54.1591	24.2706	22.4888253	22.0793054
9/1/2021	8:00:00 AM	28.81612	5.615303	54.80456	23.84023	22.3213081	22.0143798
9/1/2021	9:00:00 AM	24.1736	3.011763	47.55463	24.23893	22.2673617	21.9288772
9/1/2021	10:00:00 AM	20.01221	2.429039	44.76777	23.47921	22.0317384	21.8761179
9/1/2021	11:00:00 AM	25.55978	5.982489	48.37869	25.33162	22.1182756	21.9225763
9/1/2021	12:00:00 PM	17.34489	6.734034	39.61427	22.33298	21.9099371	21.8424361
9/1/2021	1:00:00 PM	17.25025	6.901078	35.27868	22.16881	21.8593572	21.8341389
9/1/2021	2:00:00 PM	21.2526	7.112157	42.57027	23.83023	21.9616833	21.8633401
9/1/2021	3:00:00 PM	18.75769	7.700027	42.53118	22.60326	21.9144832	21.8571852
9/1/2021	4:00:00 PM	20.4787	5.563714	41.9891	22.75432	21.9156817	21.847908
9/1/2021	5:00:00 PM	18.44107	5.511474	39.36615	22.54739	21.8939386	21.8471366
9/1/2021	6:00:00 PM	16.1113	1.531724	39.69692	22.01717	21.8384183	21.833517
9/1/2021	7:00:00 PM	9.832512	0	27.09728	21.88829	21.8345261	21.8334332
9/1/2021	8:00:00 PM	5.487857	0	24.0898	21.91253	21.8443081	21.8344384
9/1/2021	9:00:00 PM	22.47568	0	50.55387	22.05882	21.850391	21.8354287
9/1/2021	10:00:00 PM	2.624178	0	21.02293	21.85349	21.8355446	21.8333881
9/1/2021	11:00:00 PM	3.184853	0	23.82706	21.85357	21.835319	21.8334788
9/2/2021	12:00:00 AM	5.794555	0	27.88072	21.89502	21.8486749	21.8346018
9/2/2021	1:00:00 AM	1.859495	0	28.23931	21.85113	21.8380272	21.8341747
9/2/2021	2:00:00 AM	5.081301	0	20.39339	21.92602	21.8570292	21.8380899
9/2/2021	3:00:00 AM	6.019088	0	20.27855	21.96152	21.8705781	21.8409212
9/2/2021	4:00:00 AM	10.10852	0	25.75999	22.29584	21.9739268	21.8743156
9/2/2021	5:00:00 AM	26.6795	0.878153	60.181	22.22034	21.9917397	21.9010942
9/2/2021	6:00:00 AM	24.13525	3.582213	55.26614	22.37916	22.0693997	21.9479299
9/2/2021	7:00:00 AM	25.24352	3.344342	53.57889	25.57193	22.2538128	21.996196

9/2/2021	8:00:00 AM	33.6405	5.523944	63.50691	24.46261	22.3059202	22.0269555
9/2/2021	9:00:00 AM	15.62414	5.356518	38.48148	22.87281	22.2382729	22.0037791
9/2/2021	10:00:00 AM	15.94756	4.635233	36.61628	22.72736	22.0920969	21.9361495
9/2/2021	11:00:00 AM	21.59242	6.85223	47.08986	23.91925	22.1811668	21.9321227
9/2/2021	12:00:00 PM	20.87176	8.441731	40.83849	23.58264	22.1618914	21.9410617
9/2/2021	1:00:00 PM	23.8034	7.786007	47.25319	24.97577	22.049863	21.9012023
9/2/2021	2:00:00 PM	24.31115	8.021004	42.41445	28.33451	22.072616	21.8818187
9/2/2021	3:00:00 PM	26.76984	7.799821	44.91603	30.74577	22.9718917	21.8687842
9/2/2021	4:00:00 PM	30.78438	6.825568	58.53864	29.7818	21.9807314	21.8443131
9/2/2021	5:00:00 PM	27.66355	7.536884	43.84148	31.31005	24.4340883	21.8610219
9/2/2021	6:00:00 PM	24.60738	8.883928	47.40708	27.86884	22.5809508	21.8616301
9/2/2021	7:00:00 PM	21.94289	0.283029	46.84911	22.98631	21.8536116	21.8360745
9/2/2021	8:00:00 PM	10.78522	0	30.89707	21.98177	21.856131	21.8392285
9/2/2021	9:00:00 PM	19.30668	0	46.83003	22.28284	21.8901551	21.846238
9/2/2021	10:00:00 PM	11.90755	0	31.103	22.26043	21.8820558	21.8407284
9/2/2021	11:00:00 PM	15.66162	0	33.30405	23.52414	22.2230034	21.883579
9/3/2021	12:00:00 AM	15.03119	0	46.04582	22.16293	21.854713	21.83582
9/3/2021	1:00:00 AM	5.093937	0	22.84686	21.95514	21.8477545	21.8354742
9/3/2021	2:00:00 AM	23.64966	0	52.24492	22.15313	21.8482134	21.8343006
9/3/2021	3:00:00 AM	4.065515	0	19.76842	21.93118	21.841005	21.8344166
9/3/2021	4:00:00 AM	14.4214	0	36.22442	21.86882	21.8405927	21.834179
9/3/2021	5:00:00 AM	19.60513	0	49.75328	21.89693	21.8442249	21.8363151
9/3/2021	6:00:00 AM	22.26013	0	47.74158	23.36142	21.9040876	21.8459092
9/3/2021	7:00:00 AM	28.16049	0	53.38733	23.76223	21.9681093	21.8527064
9/3/2021	8:00:00 AM	17.19983	0	37.33718	23.12211	22.0165823	21.852512
9/3/2021	9:00:00 AM	25.20354	0	55.9812	24.18203	22.030246	21.8638796
9/3/2021	10:00:00 AM	27.64386	0.970988	53.16566	24.48621	21.9504884	21.85064
9/3/2021	11:00:00 AM	23.71074	2.37286	46.62464	26.10756	21.88672	21.8374421
9/3/2021	12:00:00 PM	17.6729	5.427906	38.55786	22.36838	21.8818746	21.8399502
9/3/2021	1:00:00 PM	23.83655	7.762572	44.40838	25.34349	21.9580853	21.8551435
9/3/2021	2:00:00 PM	23.2533	7.910205	42.48758	25.16112	21.9526674	21.8559465
9/3/2021	3:00:00 PM	21.01261	8.244132	47.53422	23.13085	21.9301037	21.8420686
9/3/2021	4:00:00 PM	20.53937	6.076119	43.20877	22.51066	21.8729393	21.8358496
9/3/2021	5:00:00 PM	21.0799	6.002806	43.46175	23.4751	21.8859917	21.8372709
9/3/2021	6:00:00 PM	25.01567	1.26652	50.27646	23.44783	21.8364947	21.8333445
9/3/2021	7:00:00 PM	22.21373	0	45.48949	23.02356	21.8352702	21.8333275
9/3/2021	8:00:00 PM	14.99104	0	37.36841	22.20893	21.8362688	21.8333836
9/3/2021	9:00:00 PM	18.17708	0	39.11463	22.71671	21.8355398	21.8333699
9/3/2021	10:00:00 PM	12.43056	0	32.74722	22.38913	21.8354463	21.8334072
9/3/2021	11:00:00 PM	8.766236	0	35.29344	21.8471	21.8346487	21.8333727
9/4/2021	12:00:00 AM	10.09242	0	31.5498	21.95299	21.83504	21.8336449
9/4/2021	1:00:00 AM	2.701942	0	24.23332	21.84448	21.8343408	21.8333669
9/4/2021	2:00:00 AM	4.152878	0	23.66604	21.8978	21.8437695	21.8343634

9/4/2021	3:00:00 AM	15.83964	0	36.82002	22.00348	21.8597739	21.8394819
9/4/2021	4:00:00 AM	9.797741	0	26.37267	22.23133	21.9600682	21.8795759
9/4/2021	5:00:00 AM	23.94367	0.440956	55.10188	22.55249	22.0018747	21.8951648
9/4/2021	6:00:00 AM	19.80573	0	50.49978	22.22391	21.9106246	21.8563433
9/4/2021	7:00:00 AM	23.10048	0	50.45416	22.5513	22.0029617	21.8702584
9/4/2021	8:00:00 AM	16.24967	2.050772	36.06865	23.29017	22.075391	21.8971227
9/4/2021	9:00:00 AM	14.95221	3.699858	33.58828	22.72012	22.1347979	21.9377365
9/4/2021	10:00:00 AM	17.09863	5.770643	40.76487	23.03455	22.1926336	21.976794
9/4/2021	11:00:00 AM	17.62351	7.042229	39.83948	22.52722	22.0233238	21.8919397
9/4/2021	12:00:00 PM	16.54046	7.622524	35.85528	22.0829	21.8625722	21.8345941
9/4/2021	1:00:00 PM	18.5571	7.753894	39.43979	22.2015	21.8522154	21.8334661
9/4/2021	2:00:00 PM	19.66523	7.976428	40.75799	22.74351	21.8899075	21.8385937
9/4/2021	3:00:00 PM	24.40409	7.970851	49.43484	25.34786	21.9326047	21.8411053
9/4/2021	4:00:00 PM	18.4928	6.671662	38.5745	22.31073	21.8537355	21.8335434
9/4/2021	5:00:00 PM	19.81508	5.713225	45.15843	22.17835	21.8426021	21.8334159
9/4/2021	6:00:00 PM	17.45429	3.200192	40.85068	22.01634	21.8337889	21.8333325
9/4/2021	7:00:00 PM	6.791897	0	28.73828	21.84806	21.8337825	21.8333374
9/4/2021	8:00:00 PM	3.160875	0	21.6088	21.85995	21.8355479	21.833428
9/4/2021	9:00:00 PM	25.98088	0	51.25786	21.92002	21.8334461	21.8333117
9/4/2021	10:00:00 PM	2.577422	0	23.8424	21.86107	21.8339134	21.8333273
9/4/2021	11:00:00 PM	5.373022	0	24.43652	21.91403	21.8360054	21.8335664
9/5/2021	12:00:00 AM	2.454225	0	26.1901	21.86696	21.8359439	21.8336482
9/5/2021	1:00:00 AM	1.88158	0	20.20817	21.85756	21.8366828	21.8339737
9/5/2021	2:00:00 AM	0.152318	0	16.69188	21.84448	21.8359456	21.833916
9/5/2021	3:00:00 AM	3.328	0	21.0896	21.89011	21.8482807	21.8353923
9/5/2021	4:00:00 AM	5.540784	0	27.53749	21.93876	21.8617903	21.8402712
9/5/2021	5:00:00 AM	26.17903	0	59.7331	22.14074	21.9233006	21.8582862
9/5/2021	6:00:00 AM	15.8851	0.518786	37.16749	22.5255	22.0848599	21.9236508
9/5/2021	7:00:00 AM	27.98304	0	58.71738	22.35586	21.9558777	21.8737512
9/5/2021	8:00:00 AM	24.22723	2.605906	56.05174	22.37719	21.9618859	21.8870921
9/5/2021	9:00:00 AM	21.08386	3.431072	29.66249	22.12993	21.8333105	21.8333105

WM5: Overall Hourly Intervals– C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	12:23:51 PM	44.88973	27.71841	74.60618	42.96584	37.30882	33.08
8/24/2021	1:00:00 PM	36.19909	21.37002	59.64447	37.80672	32.04369	28.20141
8/24/2021	2:00:00 PM	37.60642	20.12016	60.20053	39.27216	30.8811	27.18187
8/24/2021	3:00:00 PM	45.44051	20.45262	72.33282	43.6932	33.51481	28.0489
8/24/2021	4:00:00 PM	34.8917	18.84432	59.94758	35.19886	28.16092	25.57125
8/24/2021	5:00:00 PM	35.66975	17.202	60.45956	35.59854	27.66899	24.95983
8/24/2021	6:00:00 PM	29.7784	12.6859	53.8726	30.86093	25.47692	24.14264
8/24/2021	7:00:00 PM	29.43576	11.87269	50.74156	31.72755	25.70799	24.16948
8/24/2021	8:00:00 PM	35.15865	16.23006	53.23835	37.8689	28.44438	25.36808
8/24/2021	9:00:00 PM	35.52581	14.13381	59.43659	32.00442	26.93629	24.49867
8/24/2021	10:00:00 PM	35.37317	13.16606	54.94012	38.59978	27.32148	24.40721
8/24/2021	11:00:00 PM	30.31832	14.35153	50.604	28.97064	25.84583	24.33128
8/25/2021	12:00:00 AM	25.21487	14.25418	38.04371	28.90317	26.10853	24.52707
8/25/2021	1:00:00 AM	28.24942	14.29984	46.44475	31.06753	26.50419	24.69316
8/25/2021	2:00:00 AM	31.98214	20.02871	46.2293	35.10739	30.63566	27.39007
8/25/2021	3:00:00 AM	36.29672	21.50903	54.56416	39.16714	32.53995	28.14178
8/25/2021	4:00:00 AM	34.84738	22.45002	49.49513	38.09813	32.9131	29.02293
8/25/2021	5:00:00 AM	35.945	25.01876	52.11548	38.50688	34.21755	30.95084
8/25/2021	6:00:00 AM	44.06852	26.50456	61.59202	47.02509	37.53461	32.93828
8/25/2021	7:00:00 AM	40.88508	27.34408	54.6673	44.09397	38.25223	33.82826
8/25/2021	8:00:00 AM	41.26903	24.46095	71.06854	42.39699	36.2976	31.48463
8/25/2021	9:00:00 AM	46.56554	23.96313	68.4892	46.00879	35.87205	31.61169
8/25/2021	10:00:00 AM	33.26091	18.78678	55.30318	35.64241	30.20292	27.0183
8/25/2021	11:00:00 AM	37.72532	19.63426	65.43748	38.24192	30.80657	26.94474
8/25/2021	12:00:00 PM	42.21959	20.93395	64.27846	44.63097	33.42153	27.82737
8/25/2021	1:00:00 PM	47.62495	22.37899	68.93791	49.40635	35.93806	29.26574
8/25/2021	2:00:00 PM	46.41878	22.32271	72.07182	45.82309	35.36221	29.61807
8/25/2021	3:00:00 PM	50.20164	22.322	76.09266	48.14998	36.86149	29.87154
8/25/2021	4:00:00 PM	42.42044	20.4574	66.67551	43.31219	33.75457	27.71465
8/25/2021	5:00:00 PM	33.58522	16.09074	58.93016	34.61729	27.55229	24.91834
8/25/2021	6:00:00 PM	47.68472	15.77473	73.45474	39.72756	27.60838	25.02058
8/25/2021	7:00:00 PM	37.13633	16.48988	62.89991	36.40088	27.76276	25.25257
8/25/2021	8:00:00 PM	35.881	17.67619	50.36897	39.53561	33.32442	26.18639
8/25/2021	9:00:00 PM	39.5921	25.01448	56.44498	42.84551	36.68657	32.07772
8/25/2021	10:00:00 PM	39.6286	20.11092	60.95311	41.99109	33.51817	27.69768
8/25/2021	11:00:00 PM	31.65493	14.99984	50.78645	33.58914	26.98971	24.64379
8/26/2021	12:00:00 AM	31.73536	17.66685	45.01636	35.56036	29.80802	26.19505
8/26/2021	1:00:00 AM	32.29586	18.39803	47.45795	35.2244	30.47423	26.61751
8/26/2021	2:00:00 AM	34.07305	18.29725	46.92918	37.60645	31.01999	26.85369
8/26/2021	3:00:00 AM	29.71851	17.90237	44.51619	32.64824	29.05922	26.59167

8/26/2021	4:00:00 AM	30.84408	20.12472	43.34038	33.86264	30.12972	27.44016
8/26/2021	5:00:00 AM	34.39331	22.90174	49.84059	37.08858	32.58597	29.42927
8/26/2021	6:00:00 AM	37.74553	25.71288	53.65495	41.18166	34.47292	31.26117
8/26/2021	7:00:00 AM	38.61874	26.58238	52.54554	41.43912	36.33798	32.88856
8/26/2021	8:00:00 AM	40.36359	26.05601	59.51043	42.62848	36.58312	32.79391
8/26/2021	9:00:00 AM	49.5035	25.30527	69.52637	46.14113	36.48948	32.36272
8/26/2021	10:00:00 AM	47.56892	23.72895	68.45891	50.19897	37.03746	31.57701
8/26/2021	11:00:00 AM	42.17687	22.67043	69.7788	39.13665	32.70309	29.00047
8/26/2021	12:00:00 PM	36.66658	21.00558	56.78177	38.52592	30.95538	27.62991
8/26/2021	1:00:00 PM	47.24469	21.03126	71.93206	46.5486	32.43316	27.72422
8/26/2021	2:00:00 PM	50.64257	21.54703	72.41622	52.0525	36.68513	28.96847
8/26/2021	3:00:00 PM	53.32331	22.69539	76.41258	54.82216	39.93853	31.33848
8/26/2021	4:00:00 PM	47.62256	20.96826	70.41376	49.41412	35.09362	28.34074
8/26/2021	5:00:00 PM	46.1296	16.97112	70.52058	44.40904	31.65056	26.21984
8/26/2021	6:00:00 PM	34.59304	12.22868	56.6195	37.38203	25.54364	24.31637
8/26/2021	7:00:00 PM	31.10405	10.92679	51.2141	32.45877	25.33972	24.22208
8/26/2021	8:00:00 PM	33.72036	13.53131	51.54063	37.95154	27.35949	24.65255
8/26/2021	9:00:00 PM	37.22816	13.0963	62.23583	33.50674	27.85498	24.57059
8/26/2021	10:00:00 PM	35.3125	21.10919	50.77018	39.00084	32.44684	28.0117
8/26/2021	11:00:00 PM	28.04049	14.66367	44.01091	31.27481	25.91131	24.37007
8/27/2021	12:00:00 AM	27.15838	13.27971	42.44901	30.54364	26.18629	24.29317
8/27/2021	1:00:00 AM	29.1751	16.89256	46.4922	32.0621	28.23546	25.82601
8/27/2021	2:00:00 AM	32.41472	19.91579	51.42923	35.56032	30.79073	27.37092
8/27/2021	3:00:00 AM	32.0709	20.68283	43.31474	35.1653	31.3671	28.33846
8/27/2021	4:00:00 AM	35.63104	21.61501	53.553	36.75531	32.09967	28.75322
8/27/2021	5:00:00 AM	35.44743	24.39751	50.21602	38.19237	33.89677	30.68033
8/27/2021	6:00:00 AM	36.80103	24.14299	50.52147	39.88048	34.74916	30.8383
8/27/2021	7:00:00 AM	39.12387	24.41017	62.90439	41.80975	35.57392	30.94601
8/27/2021	8:00:00 AM	39.29988	26.8346	62.83649	41.7808	37.11302	33.19561
8/27/2021	9:00:00 AM	42.26787	28.29165	56.71426	45.87091	38.91396	34.32098
8/27/2021	10:00:00 AM	39.49252	26.42424	53.20477	43.06896	37.15776	32.86116
8/27/2021	11:00:00 AM	37.1757	22.92865	53.17527	40.74555	34.0496	29.86413
8/27/2021	12:00:00 PM	43.22547	22.85934	75.1833	39.12614	33.27424	29.56227
8/27/2021	1:00:00 PM	35.73558	22.9707	54.2632	38.28695	32.39808	29.00924
8/27/2021	2:00:00 PM	40.9888	22.3358	64.22675	40.73086	32.79448	28.87517
8/27/2021	3:00:00 PM	37.40234	23.04018	56.56811	40.04357	32.43891	28.87374
8/27/2021	4:00:00 PM	41.77784	21.29564	66.90974	39.26419	31.29985	27.86746
8/27/2021	5:00:00 PM	35.7729	21.2016	56.73235	38.08344	30.54626	27.33901
8/27/2021	6:00:00 PM	35.96873	22.84092	55.36983	38.3995	33.33913	29.2494
8/27/2021	7:00:00 PM	39.02784	22.95644	54.61197	42.49249	35.15816	30.05473
8/27/2021	8:00:00 PM	43.16149	26.47745	58.69708	46.24622	39.24296	34.09555
8/27/2021	9:00:00 PM	42.48645	27.84553	60.68008	45.30186	39.39313	34.36628
8/27/2021	10:00:00 PM	36.56156	23.58343	54.741	39.55671	34.76866	30.93778

8/27/2021	11:00:00 PM	37.27308	23.32745	50.66598	40.82405	34.89116	30.63556
8/28/2021	12:00:00 AM	35.13984	22.01289	48.99214	38.38063	33.3104	29.28141
8/28/2021	1:00:00 AM	34.70064	20.53492	48.80998	38.33997	32.25608	28.0703
8/28/2021	2:00:00 AM	29.16367	17.18221	43.89935	32.64037	28.03244	25.35523
8/28/2021	3:00:00 AM	38.78563	24.01484	52.13903	42.65437	35.89667	30.93887
8/28/2021	4:00:00 AM	32.67802	18.90492	44.53088	36.40698	30.76769	26.73282
8/28/2021	5:00:00 AM	30.76555	17.41147	53.87476	33.46044	28.30717	25.5573
8/28/2021	6:00:00 AM	36.53343	21.71635	50.95189	39.89279	33.49224	29.16969
8/28/2021	7:00:00 AM	40.92776	25.53469	54.99098	44.43216	38.74591	32.74838
8/28/2021	8:00:00 AM	39.78397	26.03492	61.63509	43.18559	37.07661	32.19571
8/28/2021	9:00:00 AM	40.24704	27.07965	51.99939	43.50392	38.4984	34.07396
8/28/2021	10:00:00 AM	40.25841	25.84853	54.62839	43.76175	37.73566	32.98707
8/28/2021	11:00:00 AM	38.30323	24.55113	53.80487	41.51356	35.85939	31.4466
8/28/2021	12:00:00 PM	42.72336	27.22739	61.45057	45.07511	38.81444	33.81906
8/28/2021	1:00:00 PM	58.18285	24.81979	79.48607	48.98157	37.0717	31.77386
8/28/2021	2:00:00 PM	37.338	23.13866	56.95933	39.71783	33.80239	29.58968
8/28/2021	3:00:00 PM	36.2391	22.48959	53.94867	39.21204	33.99207	29.78385
8/28/2021	4:00:00 PM	38.38042	22.98233	52.41464	42.12717	34.84261	29.74513
8/28/2021	5:00:00 PM	43.11659	27.01258	58.59173	46.53744	40.36329	34.88761
8/28/2021	6:00:00 PM	44.12414	25.76015	58.54154	47.79235	40.80627	34.05945
8/28/2021	7:00:00 PM	39.77649	21.23823	56.94088	42.93682	35.94559	30.13191
8/28/2021	8:00:00 PM	32.48949	16.83438	48.04217	34.53917	29.28899	25.75939
8/28/2021	9:00:00 PM	28.39309	15.91756	40.86242	32.08923	27.88087	25.15209
8/28/2021	10:00:00 PM	25.1167	12.36749	39.89552	28.89055	25.81816	24.1957
8/28/2021	11:00:00 PM	26.18315	14.10761	40.56696	29.72952	26.22813	24.44548
8/29/2021	12:00:00 AM	28.95485	15.37174	43.62758	32.50742	27.4429	25.19896
8/29/2021	1:00:00 AM	34.70428	16.61236	48.82497	39.05189	30.63365	25.77598
8/29/2021	2:00:00 AM	26.66769	14.71033	40.76819	30.25768	26.60374	24.66256
8/29/2021	3:00:00 AM	30.5435	18.02301	46.97255	33.82294	28.88195	26.016
8/29/2021	4:00:00 AM	30.98675	19.15648	42.23593	34.24848	30.23019	27.1675
8/29/2021	5:00:00 AM	35.65413	22.99305	51.39354	38.98397	34.14766	29.63365
8/29/2021	6:00:00 AM	36.98266	26.32637	52.35715	39.94124	35.70282	32.23971
8/29/2021	7:00:00 AM	39.62004	26.67988	53.93228	42.97974	36.90579	32.97583
8/29/2021	8:00:00 AM	43.64273	30.22123	60.01731	46.76209	40.76109	36.29294
8/29/2021	9:00:00 AM	44.48081	31.02635	59.16393	47.44349	42.10188	37.47196
8/29/2021	10:00:00 AM	42.16839	29.02921	55.21213	45.30716	40.13583	35.41576
8/29/2021	11:00:00 AM	41.57255	25.73067	59.16124	44.29022	38.18945	33.38458
8/29/2021	12:00:00 PM	39.8778	24.3037	64.88941	41.68404	35.84547	31.28457
8/29/2021	1:00:00 PM	38.74765	21.50965	53.26784	42.1473	35.50161	29.91216
8/29/2021	2:00:00 PM	41.48552	22.81687	57.03874	44.86535	38.44242	31.59721
8/29/2021	3:00:00 PM	40.02742	21.55983	66.11087	38.16266	32.65738	28.38028
8/29/2021	4:00:00 PM	32.53956	18.41912	55.8313	34.56387	29.08775	26.04199
8/29/2021	5:00:00 PM	32.11418	14.44463	54.1074	34.99118	27.19235	24.46333

8/29/2021	6:00:00 PM	31.23652	10.68218	50.84835	34.06345	24.69438	23.80382
8/29/2021	7:00:00 PM	30.36172	9.293404	53.67415	31.56233	24.57437	23.87152
8/29/2021	8:00:00 PM	32.83513	11.75825	52.71517	34.66623	25.60548	24.06067
8/29/2021	9:00:00 PM	31.72541	15.50693	48.94976	35.3682	28.20145	25.09377
8/29/2021	10:00:00 PM	27.22276	14.60609	43.25485	30.74313	26.74544	24.69004
8/29/2021	11:00:00 PM	29.53928	16.52746	44.87874	32.61891	28.17934	25.59236
8/30/2021	12:00:00 AM	27.5481	16.46043	42.62034	30.96271	27.45773	25.33333
8/30/2021	1:00:00 AM	32.49104	17.41268	48.6773	34.95237	28.93248	26.12247
8/30/2021	2:00:00 AM	28.31815	16.53122	47.08169	31.72043	27.88837	25.55218
8/30/2021	3:00:00 AM	28.65268	17.18218	41.53299	31.93123	28.51853	25.83127
8/30/2021	4:00:00 AM	31.18743	19.88472	43.67929	34.38031	30.44623	27.33651
8/30/2021	5:00:00 AM	34.65525	23.98799	46.61735	37.59369	33.61016	30.41343
8/30/2021	6:00:00 AM	39.92837	26.27557	55.36613	43.10059	36.82718	32.78496
8/30/2021	7:00:00 AM	41.21949	27.57571	56.60997	44.2614	38.18513	33.96165
8/30/2021	8:00:00 AM	43.67028	27.66569	59.6923	47.17195	39.06434	34.33009
8/30/2021	9:00:00 AM	48.77123	29.85913	82.18606	45.87788	40.61663	36.18473
8/30/2021	10:00:00 AM	45.85636	23.09624	68.40867	47.27388	38.32458	31.12726
8/30/2021	11:00:00 AM	54.43028	25.89659	74.24417	57.26113	42.62383	32.69993
8/30/2021	12:00:00 PM	53.79398	23.10887	73.43807	55.84333	40.58185	30.93336
8/30/2021	1:00:00 PM	53.15322	23.22121	74.83997	55.05224	39.43932	30.49776
8/30/2021	2:00:00 PM	51.52147	23.78027	72.56999	53.66968	39.02837	31.11602
8/30/2021	3:00:00 PM	51.31415	22.47611	72.70851	53.03198	38.02464	29.83499
8/30/2021	4:00:00 PM	48.03854	20.15814	74.95274	46.82504	33.72116	27.81313
8/30/2021	5:00:00 PM	40.27573	17.00191	65.85396	40.40143	29.32037	25.22173
8/30/2021	6:00:00 PM	28.4103	12.13046	47.99096	30.54076	25.58446	24.19034
8/30/2021	7:00:00 PM	31.12982	13.21216	51.31858	33.38535	26.98977	24.612
8/30/2021	8:00:00 PM	37.73995	15.52778	58.60516	40.00654	28.81073	25.17841
8/30/2021	9:00:00 PM	34.62274	15.81207	54.85331	35.81927	28.16727	25.40378
8/30/2021	10:00:00 PM	35.2113	20.02503	51.08627	37.99018	31.20199	27.43657
8/30/2021	11:00:00 PM	34.60347	19.58109	47.66178	38.02541	32.66754	28.35524
8/31/2021	12:00:00 AM	33.95766	19.66052	46.64319	37.68584	31.84818	27.84819
8/31/2021	1:00:00 AM	31.22019	17.50182	55.13898	34.18618	28.88136	25.87088
8/31/2021	2:00:00 AM	27.45888	16.02866	40.08896	30.96504	27.26569	25.16713
8/31/2021	3:00:00 AM	28.03629	15.95588	56.79893	30.22198	27.12005	25.16434
8/31/2021	4:00:00 AM	30.79793	18.81537	44.80431	34.05971	29.81376	26.69833
8/31/2021	5:00:00 AM	33.99454	23.71435	51.9006	36.83027	32.96964	29.84664
8/31/2021	6:00:00 AM	39.17929	26.21844	55.19397	41.73273	36.33246	32.51958
8/31/2021	7:00:00 AM	38.96789	24.93307	59.11166	42.07921	35.78674	31.31965
8/31/2021	8:00:00 AM	41.77222	25.93664	64.38901	41.77193	36.16931	32.38183
8/31/2021	9:00:00 AM	39.7016	28.48017	61.4531	42.35353	37.75565	34.16359
8/31/2021	10:00:00 AM	41.43079	28.4681	59.12394	44.3765	38.93646	34.62075
8/31/2021	11:00:00 AM	41.42548	28.70158	55.64617	44.66661	39.26955	34.69903
8/31/2021	12:00:00 PM	40.68326	26.81566	66.36882	42.84855	37.0419	32.73251

8/31/2021	1:00:00 PM	41.21036	20.05716	66.68789	42.00569	32.22799	27.53152
8/31/2021	2:00:00 PM	41.71471	20.23692	62.21382	43.69739	31.7315	26.9353
8/31/2021	3:00:00 PM	39.73987	19.2377	65.07354	39.90578	30.23092	26.40861
8/31/2021	4:00:00 PM	37.93549	16.54578	61.33582	38.31396	28.10131	25.09937
8/31/2021	5:00:00 PM	34.78552	15.21229	56.33259	36.42708	27.11681	24.65286
8/31/2021	6:00:00 PM	31.9277	15.87168	51.81913	33.41065	27.09578	24.81023
8/31/2021	7:00:00 PM	34.06988	12.31379	53.88309	37.09394	27.01171	24.4165
8/31/2021	8:00:00 PM	31.40457	14.555	53.2422	34.53356	26.51898	24.39062
8/31/2021	9:00:00 PM	34.17399	14.2014	60.45595	32.79335	26.75749	24.43039
8/31/2021	10:00:00 PM	33.25995	11.5024	54.31896	34.10468	25.23188	24.00679
8/31/2021	11:00:00 PM	31.37059	14.18774	48.65876	31.81391	26.68966	24.65475
9/1/2021	12:00:00 AM	33.64472	11.94302	52.76229	36.18741	25.83261	24.05049
9/1/2021	1:00:00 AM	31.43466	16.15956	49.13657	34.37147	28.40242	25.50619
9/1/2021	2:00:00 AM	34.43591	18.886	50.7104	37.8129	31.75999	27.49021
9/1/2021	3:00:00 AM	40.50136	25.45531	52.36636	44.04931	38.51586	33.08212
9/1/2021	4:00:00 AM	41.19261	27.6604	54.37114	44.43175	39.21185	34.50424
9/1/2021	5:00:00 AM	35.08173	23.58866	47.74726	38.03669	33.11711	29.71116
9/1/2021	6:00:00 AM	37.65257	23.86481	55.62824	39.91477	34.3311	30.0561
9/1/2021	7:00:00 AM	40.02587	26.4679	56.34911	42.64424	37.69803	33.67241
9/1/2021	8:00:00 AM	46.13624	27.77935	70.93464	43.82402	38.18973	33.95843
9/1/2021	9:00:00 AM	43.15834	26.63022	63.6199	43.81507	37.89492	33.14227
9/1/2021	10:00:00 AM	39.18309	23.60494	56.73854	42.09354	36.30626	31.53254
9/1/2021	11:00:00 AM	43.65908	25.21705	65.10791	44.51737	37.14449	32.37128
9/1/2021	12:00:00 PM	36.7323	19.61953	58.81363	39.15986	33.07776	28.2675
9/1/2021	1:00:00 PM	33.87928	16.24575	56.77084	35.78551	28.05809	24.84283
9/1/2021	2:00:00 PM	37.87898	19.98841	59.25529	40.45502	31.10717	27.05128
9/1/2021	3:00:00 PM	33.41275	20.26979	55.68655	35.75693	29.74246	26.74242
9/1/2021	4:00:00 PM	36.79018	18.50185	57.89205	37.93154	29.3738	26.0925
9/1/2021	5:00:00 PM	33.58074	18.73487	55.10576	35.68832	29.36167	26.32886
9/1/2021	6:00:00 PM	30.79153	13.10618	51.71839	32.4209	26.83777	24.62245
9/1/2021	7:00:00 PM	26.61548	11.88651	44.18778	29.7188	25.49696	24.1864
9/1/2021	8:00:00 PM	27.44491	15.71793	42.88456	30.90165	27.07543	24.90181
9/1/2021	9:00:00 PM	38.43149	15.22995	65.97612	32.12204	27.10206	24.84109
9/1/2021	10:00:00 PM	24.07358	12.27641	45.49869	27.7627	25.27038	24.10222
9/1/2021	11:00:00 PM	24.6338	12.10973	41.60509	28.37477	25.54206	24.03441
9/2/2021	12:00:00 AM	29.15411	15.60277	46.17002	32.08869	27.94716	25.22429
9/2/2021	1:00:00 AM	28.0888	16.05454	48.26414	30.93998	27.76829	25.43429
9/2/2021	2:00:00 AM	31.58036	18.389	45.98677	34.86347	30.19255	26.96525
9/2/2021	3:00:00 AM	32.58088	19.99179	45.76646	35.92476	30.96024	27.31764
9/2/2021	4:00:00 AM	35.85095	24.09579	48.64305	38.96738	34.37364	30.61736
9/2/2021	5:00:00 AM	38.24806	25.91699	59.94136	41.43551	36.05506	31.95137
9/2/2021	6:00:00 AM	37.88423	27.00913	55.10743	40.75876	36.40729	32.89044
9/2/2021	7:00:00 AM	42.83323	28.48398	64.18467	45.00044	39.1723	35.22001

9/2/2021	8:00:00 AM	42.49285	29.41491	63.52867	45.13423	39.50312	35.48861
9/2/2021	9:00:00 AM	40.54476	28.7734	54.15749	43.22637	38.42598	34.70811
9/2/2021	10:00:00 AM	40.77377	27.1012	55.23721	44.25448	37.88432	33.75146
9/2/2021	11:00:00 AM	41.85649	26.53153	66.70252	44.38659	37.44811	32.72338
9/2/2021	12:00:00 PM	40.14354	24.27548	56.05668	43.47258	36.79245	31.35303
9/2/2021	1:00:00 PM	39.06506	21.34047	63.42704	38.44708	31.17493	27.76964
9/2/2021	2:00:00 PM	40.99981	20.82874	64.90534	41.44337	32.27274	27.76284
9/2/2021	3:00:00 PM	44.54037	20.00572	68.51934	45.11546	31.3497	26.79356
9/2/2021	4:00:00 PM	48.04533	18.23541	76.19529	40.89676	29.09212	25.64602
9/2/2021	5:00:00 PM	41.26774	18.92042	65.59217	41.98381	32.37214	26.81156
9/2/2021	6:00:00 PM	32.94348	18.23518	58.42204	34.37931	29.11531	25.9326
9/2/2021	7:00:00 PM	36.25651	16.44452	61.31066	34.57307	27.47153	25.10307
9/2/2021	8:00:00 PM	30.80586	18.27505	48.26661	33.19377	28.17256	25.87765
9/2/2021	9:00:00 PM	37.61171	18.78693	63.23634	36.66506	30.09598	26.87006
9/2/2021	10:00:00 PM	33.26601	17.80738	50.55579	36.00768	29.38886	25.93329
9/2/2021	11:00:00 PM	36.85762	18.23147	53.0987	40.28075	34.49956	27.8836
9/3/2021	12:00:00 AM	31.87424	16.16397	52.37696	34.19956	27.40199	24.97899
9/3/2021	1:00:00 AM	27.47333	16.32496	44.06495	31.12598	26.9485	24.83669
9/3/2021	2:00:00 AM	30.56964	15.67896	53.08164	32.98104	27.23479	24.967
9/3/2021	3:00:00 AM	28.38167	15.41315	41.81894	32.49308	27.0383	24.79461
9/3/2021	4:00:00 AM	32.72037	15.15624	51.67726	31.43414	27.45912	24.90158
9/3/2021	5:00:00 AM	28.53651	17.19083	50.00134	31.61413	27.76339	25.72876
9/3/2021	6:00:00 AM	36.20173	20.05249	54.91554	38.92935	30.43365	27.0158
9/3/2021	7:00:00 AM	44.63087	19.68273	70.4099	38.93908	31.78336	27.64559
9/3/2021	8:00:00 AM	36.02047	20.70469	52.2668	39.21933	32.77104	27.93642
9/3/2021	9:00:00 AM	37.90765	20.24715	59.07272	40.39703	32.9499	28.73944
9/3/2021	10:00:00 AM	39.67416	19.69732	63.08238	39.92071	31.27038	27.33997
9/3/2021	11:00:00 AM	38.16722	16.72857	57.47578	41.57075	29.66409	25.46622
9/3/2021	12:00:00 PM	33.27552	17.71644	56.96774	35.32387	28.09178	25.36123
9/3/2021	1:00:00 PM	36.70804	19.16962	60.5225	37.23822	28.92602	25.97328
9/3/2021	2:00:00 PM	39.10575	18.50681	65.19739	40.45994	29.08667	25.66332
9/3/2021	3:00:00 PM	32.5353	17.67159	54.22632	35.31149	27.82109	24.86344
9/3/2021	4:00:00 PM	36.86842	16.81259	60.66798	33.03787	26.53271	24.52539
9/3/2021	5:00:00 PM	34.58597	16.68209	54.55797	37.89566	27.48695	24.70037
9/3/2021	6:00:00 PM	36.93476	10.63671	60.54703	38.22441	25.52276	23.88554
9/3/2021	7:00:00 PM	35.54325	10.04299	53.49943	37.646	25.20624	23.84669
9/3/2021	8:00:00 PM	30.52239	11.76342	48.90362	33.32083	25.26297	23.8887
9/3/2021	9:00:00 PM	33.2942	11.33399	50.43388	37.08707	25.40949	23.88882
9/3/2021	10:00:00 PM	30.18844	11.81904	47.7031	34.1622	25.44611	23.98435
9/3/2021	11:00:00 PM	26.50913	11.13629	46.46334	28.01132	24.84487	23.82528
9/4/2021	12:00:00 AM	30.82695	12.5235	47.42816	34.51142	25.40846	24.00702
9/4/2021	1:00:00 AM	24.45792	11.11781	42.73017	28.18776	25.09948	23.84618
9/4/2021	2:00:00 AM	29.93983	15.84351	42.49636	33.96335	28.22736	24.96081

9/4/2021	3:00:00 AM	35.59267	18.67684	52.58313	35.82953	29.86311	26.68166
9/4/2021	4:00:00 AM	35.42065	23.74481	46.62994	38.7114	33.77618	29.97798
9/4/2021	5:00:00 AM	35.20514	24.35087	55.16994	37.73657	33.29094	30.15127
9/4/2021	6:00:00 AM	34.41901	23.35685	51.98623	37.5101	31.86816	28.98888
9/4/2021	7:00:00 AM	36.83126	24.68901	52.80886	39.69276	34.93768	30.94238
9/4/2021	8:00:00 AM	39.00606	24.54329	51.56302	43.80292	35.14039	30.91931
9/4/2021	9:00:00 AM	37.10832	25.5538	48.99196	40.28281	35.69365	31.81866
9/4/2021	10:00:00 AM	40.02715	27.78075	55.63132	43.29965	38.11607	34.10338
9/4/2021	11:00:00 AM	39.30219	24.21018	54.56443	42.44319	36.25238	31.47256
9/4/2021	12:00:00 PM	33.03009	15.94791	50.83483	36.07397	28.89909	24.77328
9/4/2021	1:00:00 PM	35.25882	15.51182	59.21273	36.69979	27.0402	23.94986
9/4/2021	2:00:00 PM	34.88255	16.95227	55.26197	38.06265	28.49905	24.73964
9/4/2021	3:00:00 PM	43.26804	17.27782	70.15776	36.30798	27.69251	24.75723
9/4/2021	4:00:00 PM	32.74791	15.18459	52.97858	34.8334	26.44855	24.02961
9/4/2021	5:00:00 PM	33.6484	14.42365	58.06622	34.37183	25.10864	23.85944
9/4/2021	6:00:00 PM	33.67092	11.29412	57.27653	33.01259	24.66027	23.77242
9/4/2021	7:00:00 PM	24.32709	10.58922	41.91555	28.2628	24.6146	23.79091
9/4/2021	8:00:00 PM	24.81435	12.45834	41.63458	28.99906	25.2039	23.91936
9/4/2021	9:00:00 PM	41.37012	9.790938	66.32557	30.92987	24.13588	23.68172
9/4/2021	10:00:00 PM	23.46585	10.75005	43.1854	27.48839	24.55562	23.77737
9/4/2021	11:00:00 PM	27.52888	11.48228	43.76221	31.24864	25.21798	23.93341
9/5/2021	12:00:00 AM	26.13179	11.29377	41.74094	30.12585	25.64824	24.06925
9/5/2021	1:00:00 AM	27.14933	13.23361	41.55447	31.10943	26.54413	24.61546
9/5/2021	2:00:00 AM	25.86658	14.1995	41.52415	29.58144	26.23731	24.5947
9/5/2021	3:00:00 AM	31.08147	15.83603	42.54945	35.1035	29.14845	25.73247
9/5/2021	4:00:00 AM	32.41341	18.6583	45.05258	35.99692	30.78163	26.95322
9/5/2021	5:00:00 AM	37.37885	23.18712	59.06791	40.72798	35.26124	30.45278
9/5/2021	6:00:00 AM	38.9189	26.2793	49.52692	42.1547	37.43134	32.94017
9/5/2021	7:00:00 AM	36.77746	23.64093	57.68284	39.62396	34.27778	30.48649
9/5/2021	8:00:00 AM	35.50264	24.55691	56.10221	38.16299	33.65782	30.55729
9/5/2021	9:00:00 AM	31.02511	18.96174	47.76559	35.81551	23.62753	23.62753

WM5: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	12:23:51 PM	47.97447	30.23165	75.44922	48.78992	41.26111	36.34729
8/24/2021	1:00:00 PM	46.49623	24.56955	72.62639	46.7127	37.69234	32.40856
8/24/2021	2:00:00 PM	50.62771	23.3663	73.78156	51.64844	37.49242	31.57852
8/24/2021	3:00:00 PM	58.16333	24.61172	83.76543	51.48426	39.02672	33.03903
8/24/2021	4:00:00 PM	48.60252	22.0043	74.96976	47.27361	34.21325	29.79566
8/24/2021	5:00:00 PM	49.57881	21.68402	73.70229	49.13986	34.55086	29.45021
8/24/2021	6:00:00 PM	41.91539	19.58999	67.10779	39.14147	32.36226	28.97816
8/24/2021	7:00:00 PM	35.35375	19.02136	53.81033	38.19341	32.97808	29.21165
8/24/2021	8:00:00 PM	39.86777	21.293	62.24323	42.33584	34.86722	30.62549
8/24/2021	9:00:00 PM	37.26809	17.53311	60.29397	36.80421	31.32477	27.41686
8/24/2021	10:00:00 PM	37.78739	17.88093	56.05024	41.28079	31.91472	27.54287
8/24/2021	11:00:00 PM	34.1034	18.46999	53.32943	34.96016	30.82	27.75771
8/25/2021	12:00:00 AM	32.77299	19.03252	44.04952	36.14235	31.94141	28.58049
8/25/2021	1:00:00 AM	35.56066	19.56121	57.31513	37.23541	32.25315	28.84006
8/25/2021	2:00:00 AM	38.35396	23.75206	58.30825	40.42037	35.38269	31.50383
8/25/2021	3:00:00 AM	41.89568	24.87303	66.66494	43.4351	36.76872	32.08277
8/25/2021	4:00:00 AM	41.19979	25.9164	62.96308	43.58482	37.78355	33.22726
8/25/2021	5:00:00 AM	42.98232	28.90063	63.35938	44.98033	39.88963	35.96722
8/25/2021	6:00:00 AM	48.53941	30.4147	65.71019	51.78855	42.4826	37.67351
8/25/2021	7:00:00 AM	45.51167	31.25481	59.66982	48.74879	42.77618	38.40199
8/25/2021	8:00:00 AM	49.49245	29.19007	82.34282	47.93618	41.99767	36.94771
8/25/2021	9:00:00 AM	50.11056	27.89416	72.23023	50.44659	41.27977	36.40788
8/25/2021	10:00:00 AM	43.37647	24.2494	66.87849	44.93998	37.39913	32.61944
8/25/2021	11:00:00 AM	49.57808	23.7359	80.08109	48.18593	38.10757	32.57936
8/25/2021	12:00:00 PM	56.03552	25.68705	77.54014	58.33579	44.97739	34.40256
8/25/2021	1:00:00 PM	62.23177	26.92944	84.05637	64.51632	47.95743	36.1093
8/25/2021	2:00:00 PM	60.59361	27.08042	86.71821	59.91392	43.21585	35.3489
8/25/2021	3:00:00 PM	57.52938	27.00368	82.07138	57.25372	43.09334	35.74401
8/25/2021	4:00:00 PM	55.71095	24.89184	81.16964	54.27846	39.30542	32.71599
8/25/2021	5:00:00 PM	46.87143	22.05014	72.45437	46.20719	34.95426	30.43599
8/25/2021	6:00:00 PM	50.1612	22.61986	77.48437	44.42723	35.24495	31.20754
8/25/2021	7:00:00 PM	41.59247	22.95536	67.13506	41.40469	35.25032	31.23467
8/25/2021	8:00:00 PM	41.37512	22.48982	60.33075	44.42048	38.08558	31.19468
8/25/2021	9:00:00 PM	43.17786	27.88037	60.40993	46.33164	40.5007	35.66793
8/25/2021	10:00:00 PM	42.32712	23.37133	62.27625	45.39364	37.23273	31.40144
8/25/2021	11:00:00 PM	35.16478	19.62932	54.29993	37.50616	32.07352	28.63855
8/26/2021	12:00:00 AM	36.34353	21.7048	48.83084	39.98814	34.28706	30.08951
8/26/2021	1:00:00 AM	36.53719	22.26427	51.51831	39.53536	34.85461	30.57382
8/26/2021	2:00:00 AM	38.60179	23.51906	52.22164	41.91458	36.02903	31.61027
8/26/2021	3:00:00 AM	37.23916	23.74789	52.09618	39.9615	36.0005	32.42531

8/26/2021	4:00:00 AM	37.88922	25.36575	53.16588	40.61234	36.64653	32.99369
8/26/2021	5:00:00 AM	40.75794	27.54204	57.27484	43.25805	38.87327	35.03921
8/26/2021	6:00:00 AM	43.12241	29.87443	60.4974	45.91284	40.50255	36.71839
8/26/2021	7:00:00 AM	43.44238	30.74593	56.86353	46.3422	41.80964	37.87267
8/26/2021	8:00:00 AM	44.87843	30.67666	64.15886	47.33892	41.8368	37.79638
8/26/2021	9:00:00 AM	51.46219	29.88242	71.29259	50.62438	42.24012	37.60525
8/26/2021	10:00:00 AM	50.32269	28.32908	70.31045	53.25989	42.41581	36.88629
8/26/2021	11:00:00 AM	53.28454	27.77416	80.85252	48.11549	39.52742	34.9239
8/26/2021	12:00:00 PM	49.64691	26.46295	70.51825	51.70716	39.94335	34.20656
8/26/2021	1:00:00 PM	61.60037	26.30062	84.84375	61.51081	41.87863	34.23488
8/26/2021	2:00:00 PM	65.27307	27.21127	86.32317	67.66844	49.78265	36.5368
8/26/2021	3:00:00 PM	67.63046	28.23077	87.86849	70.50196	54.76645	39.70103
8/26/2021	4:00:00 PM	62.3308	26.13379	82.77497	64.98433	47.76626	35.43902
8/26/2021	5:00:00 PM	60.78509	23.42446	85.27793	59.68504	40.65095	33.04992
8/26/2021	6:00:00 PM	44.67988	19.90722	69.29031	43.95453	33.62541	29.90243
8/26/2021	7:00:00 PM	36.40759	20.56664	55.34257	38.43531	33.41471	29.97667
8/26/2021	8:00:00 PM	38.60684	20.71426	57.65753	42.03249	34.01282	29.78175
8/26/2021	9:00:00 PM	39.04898	19.12585	62.76787	38.31885	33.08487	28.84826
8/26/2021	10:00:00 PM	38.82619	23.97435	54.49966	42.45618	36.10646	31.39461
8/26/2021	11:00:00 PM	33.1837	19.31276	51.32919	36.10286	31.09597	28.07563
8/27/2021	12:00:00 AM	32.6999	19.02898	46.17104	35.95906	31.30386	28.00322
8/27/2021	1:00:00 AM	34.91266	22.26088	50.38641	37.75647	33.91983	30.49146
8/27/2021	2:00:00 AM	39.64451	24.85205	57.74088	42.97505	37.26247	32.59709
8/27/2021	3:00:00 AM	39.28498	25.5194	53.70974	42.33982	37.92107	33.94518
8/27/2021	4:00:00 AM	40.31518	26.70819	55.96126	42.64812	38.17478	34.12101
8/27/2021	5:00:00 AM	41.41876	28.73991	57.44016	44.39793	39.73151	35.84443
8/27/2021	6:00:00 AM	41.35046	28.62737	53.44052	44.49066	39.69303	35.54649
8/27/2021	7:00:00 AM	46.99332	28.7772	75.62048	45.50928	40.24394	35.75486
8/27/2021	8:00:00 AM	43.93379	30.67017	64.28468	46.61003	42.0148	37.91883
8/27/2021	9:00:00 AM	48.70919	31.84798	66.87893	52.1046	43.91226	38.86478
8/27/2021	10:00:00 AM	44.28655	30.22107	60.01766	47.55865	41.78958	37.37749
8/27/2021	11:00:00 AM	43.7634	26.95879	62.06548	47.11725	39.21322	34.39415
8/27/2021	12:00:00 PM	48.24394	25.8138	77.05172	47.00036	38.00854	33.41844
8/27/2021	1:00:00 PM	47.20881	26.09429	68.63605	49.08906	38.51431	33.04107
8/27/2021	2:00:00 PM	45.56875	25.19956	68.98347	46.38461	37.20228	32.6682
8/27/2021	3:00:00 PM	46.36788	25.6947	69.52334	47.05798	36.97455	32.5108
8/27/2021	4:00:00 PM	50.65173	24.2233	75.38342	48.73688	36.50229	31.77185
8/27/2021	5:00:00 PM	43.55628	24.15982	66.22758	43.59404	34.99131	30.97923
8/27/2021	6:00:00 PM	42.76181	25.84576	67.48651	43.51629	37.00224	32.67725
8/27/2021	7:00:00 PM	42.04946	26.24522	57.73164	45.49895	38.67239	33.50909
8/27/2021	8:00:00 PM	46.40236	28.77386	64.7113	49.21945	42.36192	37.0842
8/27/2021	9:00:00 PM	45.22544	30.54795	61.67698	48.35307	42.60951	37.5137
8/27/2021	10:00:00 PM	40.21965	26.31494	59.05662	43.14658	38.29395	34.06982

8/27/2021	11:00:00 PM	40.50092	25.97731	56.14198	43.83849	38.23837	33.67956
8/28/2021	12:00:00 AM	38.63382	24.72356	56.74111	41.75143	36.75045	32.41939
8/28/2021	1:00:00 AM	38.22919	23.84575	51.495	41.76952	36.15588	31.58449
8/28/2021	2:00:00 AM	33.80461	20.81738	49.96895	36.81813	32.27752	28.87787
8/28/2021	3:00:00 AM	42.1519	26.7484	55.08075	46.06071	39.36716	34.28528
8/28/2021	4:00:00 AM	36.64705	22.3609	48.60746	40.23028	34.77427	30.36682
8/28/2021	5:00:00 AM	35.55982	21.60135	55.78087	38.3992	33.2848	29.56317
8/28/2021	6:00:00 AM	39.68241	24.96263	54.04002	42.97422	37.17115	32.82647
8/28/2021	7:00:00 AM	43.97053	28.47948	57.41358	47.43884	41.96868	36.04501
8/28/2021	8:00:00 AM	43.58737	28.89253	62.87618	46.9536	40.96133	36.0476
8/28/2021	9:00:00 AM	44.15863	30.1601	58.05641	47.36945	42.26881	37.69166
8/28/2021	10:00:00 AM	45.84958	29.6144	62.45146	49.29334	42.37447	37.18088
8/28/2021	11:00:00 AM	45.10282	27.99813	65.30618	47.9075	40.30942	35.35496
8/28/2021	12:00:00 PM	47.5262	29.73923	68.002	49.71079	42.46783	37.14187
8/28/2021	1:00:00 PM	62.59984	27.23144	84.30652	52.8088	40.94739	34.9383
8/28/2021	2:00:00 PM	45.80803	25.66489	71.4776	46.34131	37.62818	32.86467
8/28/2021	3:00:00 PM	43.47404	24.94107	66.73672	45.27655	37.60241	32.83857
8/28/2021	4:00:00 PM	42.6961	25.1139	60.62365	46.09045	38.10835	32.54585
8/28/2021	5:00:00 PM	49.04079	29.63216	71.60012	50.96273	43.70625	38.05609
8/28/2021	6:00:00 PM	47.32976	28.20642	63.14843	50.98383	43.68895	36.85737
8/28/2021	7:00:00 PM	42.29442	24.51252	58.4471	45.57814	38.74676	33.11606
8/28/2021	8:00:00 PM	35.79118	20.40579	50.18267	38.39246	33.39169	29.24926
8/28/2021	9:00:00 PM	32.98161	19.75467	44.33469	36.34285	32.12275	28.49906
8/28/2021	10:00:00 PM	31.90807	18.43684	48.97728	34.97348	31.03994	27.91991
8/28/2021	11:00:00 PM	32.93991	18.49734	49.10804	35.91181	31.21164	27.96779
8/29/2021	12:00:00 AM	34.64547	19.26111	53.40465	37.69207	32.39151	28.73065
8/29/2021	1:00:00 AM	38.20274	21.15436	52.5315	42.38402	34.75451	29.54716
8/29/2021	2:00:00 AM	31.98029	18.68155	49.84561	35.06956	31.12993	27.97979
8/29/2021	3:00:00 AM	35.71947	21.63446	56.05681	38.43985	33.51998	29.76268
8/29/2021	4:00:00 AM	36.7992	23.20417	51.89686	39.73013	35.0964	31.26793
8/29/2021	5:00:00 AM	40.88558	27.17609	55.32431	44.11606	39.24258	34.48219
8/29/2021	6:00:00 AM	41.1547	29.37952	54.50665	44.20736	39.89033	35.97971
8/29/2021	7:00:00 AM	42.61668	29.83746	56.1617	45.89515	40.44645	36.43654
8/29/2021	8:00:00 AM	47.84325	33.33223	65.2623	50.64108	44.71836	40.09477
8/29/2021	9:00:00 AM	48.8699	34.1377	63.82774	52.07114	46.24147	41.21222
8/29/2021	10:00:00 AM	46.18542	32.53659	59.21904	49.44244	44.11459	39.34932
8/29/2021	11:00:00 AM	45.73503	29.14986	64.68193	48.81115	42.44262	37.39118
8/29/2021	12:00:00 PM	49.53435	27.88417	78.31104	47.44558	40.32896	35.27629
8/29/2021	1:00:00 PM	45.71107	25.25777	64.44633	48.6706	40.1494	34.02764
8/29/2021	2:00:00 PM	46.89497	25.68043	67.78738	49.34586	42.15793	35.16405
8/29/2021	3:00:00 PM	44.47895	23.8136	69.15134	44.76837	36.38446	31.46727
8/29/2021	4:00:00 PM	43.61424	21.18421	71.84843	42.28537	33.11549	29.11604
8/29/2021	5:00:00 PM	37.91518	17.75254	63.92713	38.19085	30.75732	27.21774

8/29/2021	6:00:00 PM	34.16991	15.74784	53.79025	37.2537	29.58007	26.67233
8/29/2021	7:00:00 PM	34.87705	16.74257	58.34324	37.15049	30.70754	27.55972
8/29/2021	8:00:00 PM	36.86973	18.62218	56.05606	38.78448	31.85884	28.42249
8/29/2021	9:00:00 PM	35.71586	20.06095	53.77289	38.99186	33.01902	29.14063
8/29/2021	10:00:00 PM	33.74812	19.70715	52.05588	36.78499	32.14655	28.60789
8/29/2021	11:00:00 PM	35.7913	20.49913	53.92596	38.45362	33.5054	29.73493
8/30/2021	12:00:00 AM	34.68424	21.02737	52.25501	37.56918	33.39251	29.87776
8/30/2021	1:00:00 AM	36.89962	21.47338	51.90955	39.97626	34.15888	30.18135
8/30/2021	2:00:00 AM	35.68883	20.84387	61.4945	37.49718	32.77199	29.22897
8/30/2021	3:00:00 AM	35.35767	22.37739	48.22353	38.49799	34.35119	30.54514
8/30/2021	4:00:00 AM	37.67353	24.92691	48.32789	40.86868	36.57132	32.51306
8/30/2021	5:00:00 AM	40.56595	28.71596	54.54064	43.47116	39.39357	35.6888
8/30/2021	6:00:00 AM	43.92643	30.49668	58.90681	47.01774	41.63415	37.36283
8/30/2021	7:00:00 AM	45.21198	31.20063	60.24737	48.2482	42.64107	38.357
8/30/2021	8:00:00 AM	46.79522	31.33089	61.80598	50.24989	43.23591	38.54113
8/30/2021	9:00:00 AM	53.54959	33.15387	86.77036	49.72565	44.42728	39.85625
8/30/2021	10:00:00 AM	60.02496	27.61713	82.2867	61.18826	47.52674	37.3226
8/30/2021	11:00:00 AM	69.04189	29.11558	88.17881	72.54938	57.85112	41.34717
8/30/2021	12:00:00 PM	67.93796	27.09197	86.16894	71.31703	55.27928	38.33301
8/30/2021	1:00:00 PM	67.6773	27.59024	87.70555	70.72938	53.32929	37.84365
8/30/2021	2:00:00 PM	66.24925	27.85173	85.65929	69.25756	52.07887	37.98362
8/30/2021	3:00:00 PM	65.98736	27.40283	85.15253	68.89765	52.00651	36.90177
8/30/2021	4:00:00 PM	62.10137	24.9889	85.52459	62.36868	45.28685	34.36019
8/30/2021	5:00:00 PM	55.03731	23.01559	81.20716	54.88807	38.2096	31.38897
8/30/2021	6:00:00 PM	35.19261	19.06764	53.9765	37.64516	32.88097	28.90968
8/30/2021	7:00:00 PM	36.44613	19.81968	55.85805	39.04702	34.16655	30.30432
8/30/2021	8:00:00 PM	40.14832	20.42057	60.13847	42.67101	33.74024	29.36664
8/30/2021	9:00:00 PM	38.04627	19.61394	58.0564	39.97271	32.88888	28.82963
8/30/2021	10:00:00 PM	38.39974	23.90472	53.59582	41.43337	35.53912	31.41411
8/30/2021	11:00:00 PM	38.90301	23.83915	53.78388	42.29899	37.05208	32.33443
8/31/2021	12:00:00 AM	38.05996	22.76707	53.41237	41.69794	35.93659	31.37903
8/31/2021	1:00:00 AM	39.73747	22.08781	61.01934	41.99306	34.77175	30.5375
8/31/2021	2:00:00 AM	35.29175	21.40123	48.85798	38.4582	33.70753	30.05695
8/31/2021	3:00:00 AM	35.66865	21.62702	59.954	37.75622	33.87565	30.42319
8/31/2021	4:00:00 AM	37.84849	23.81505	54.56522	40.67084	36.1795	32.13682
8/31/2021	5:00:00 AM	39.93556	27.94408	55.12898	42.81385	38.79384	35.01793
8/31/2021	6:00:00 AM	42.95981	29.82008	57.10587	45.74416	40.98799	36.96811
8/31/2021	7:00:00 AM	41.95511	28.55742	60.37674	44.99978	39.79068	35.52344
8/31/2021	8:00:00 AM	43.75867	29.19027	64.86387	45.01415	40.06585	36.1169
8/31/2021	9:00:00 AM	43.85354	31.63097	62.60226	46.66329	42.14651	38.27563
8/31/2021	10:00:00 AM	46.03137	31.68362	65.05905	48.99297	43.14877	38.54615
8/31/2021	11:00:00 AM	46.01802	31.60793	61.8101	49.2353	43.2692	38.37691
8/31/2021	12:00:00 PM	49.19286	29.53287	78.58684	49.63862	41.65111	36.52028

8/31/2021	1:00:00 PM	55.93506	23.60777	80.49072	56.0112	40.44741	32.50226
8/31/2021	2:00:00 PM	50.55279	23.76968	73.37798	50.77341	37.72345	31.77888
8/31/2021	3:00:00 PM	53.76042	23.52781	78.60861	53.46692	38.13175	31.75652
8/31/2021	4:00:00 PM	45.70343	21.89159	70.36468	45.24087	35.17836	30.68263
8/31/2021	5:00:00 PM	41.13577	21.70673	65.65238	41.36451	34.19821	30.21908
8/31/2021	6:00:00 PM	37.06755	21.66423	56.03429	39.25014	33.95736	30.31641
8/31/2021	7:00:00 PM	38.64877	19.36487	61.50538	41.15421	34.1018	29.72424
8/31/2021	8:00:00 PM	39.93743	19.37926	63.28779	40.65314	33.13104	28.83394
8/31/2021	9:00:00 PM	41.39261	19.43274	70.55509	39.91964	32.51199	28.56423
8/31/2021	10:00:00 PM	36.60288	17.80829	56.38451	38.46528	30.8084	27.56646
8/31/2021	11:00:00 PM	36.13087	18.91726	52.77628	38.38447	32.90881	28.74185
9/1/2021	12:00:00 AM	37.3906	18.7806	57.7143	39.7472	31.70759	28.21653
9/1/2021	1:00:00 AM	39.24267	20.50208	58.42914	41.60383	33.89559	29.60087
9/1/2021	2:00:00 AM	42.08214	22.76868	62.2837	44.33706	36.63339	31.7563
9/1/2021	3:00:00 AM	44.25918	29.00071	55.93538	47.73567	42.39414	37.06345
9/1/2021	4:00:00 AM	44.48183	30.32114	57.67627	47.71841	42.54517	37.74123
9/1/2021	5:00:00 AM	39.64088	26.93541	51.81976	42.57526	37.95912	34.12048
9/1/2021	6:00:00 AM	41.46222	27.79026	57.61801	44.14797	39.28172	34.90695
9/1/2021	7:00:00 AM	43.85089	29.5571	63.32165	46.16507	41.54024	37.33826
9/1/2021	8:00:00 AM	47.96818	31.56747	71.33571	48.28735	42.69639	38.30889
9/1/2021	9:00:00 AM	45.75167	30.2533	64.91026	47.51104	42.05824	37.36497
9/1/2021	10:00:00 AM	43.27205	27.47414	59.73906	46.34104	40.72553	36.01376
9/1/2021	11:00:00 AM	46.63795	28.623	67.56697	48.77084	41.57877	36.48728
9/1/2021	12:00:00 PM	45.34891	24.4909	70.94827	46.16223	38.95158	33.51783
9/1/2021	1:00:00 PM	46.51677	20.39165	72.28892	47.48067	36.1829	29.40187
9/1/2021	2:00:00 PM	47.26083	23.14508	71.73499	47.92783	36.95907	31.22638
9/1/2021	3:00:00 PM	45.15116	23.03207	71.46673	45.55531	35.11693	30.54226
9/1/2021	4:00:00 PM	42.52324	21.82457	69.6391	43.40093	34.05888	29.72311
9/1/2021	5:00:00 PM	39.39152	22.52123	64.14705	40.57381	34.03456	30.06691
9/1/2021	6:00:00 PM	35.70578	20.08791	55.75002	37.97392	33.03724	29.36381
9/1/2021	7:00:00 PM	34.30125	19.94264	52.72107	37.24758	32.8091	29.30415
9/1/2021	8:00:00 PM	34.56294	20.68148	51.56982	37.40925	33.11389	29.46908
9/1/2021	9:00:00 PM	40.69235	20.25428	66.89574	39.72955	33.80803	29.62404
9/1/2021	10:00:00 PM	32.74531	18.19286	55.81356	34.74536	30.70221	27.72431
9/1/2021	11:00:00 PM	32.39578	17.9205	50.51629	35.30766	30.88768	27.69188
9/2/2021	12:00:00 AM	35.3422	20.62797	50.10415	38.59614	33.8081	29.58123
9/2/2021	1:00:00 AM	36.79937	21.776	57.97419	39.10225	34.30439	30.47646
9/2/2021	2:00:00 AM	38.94391	23.54309	55.18583	41.96449	36.57767	32.31801
9/2/2021	3:00:00 AM	39.89422	25.10416	56.87047	42.8019	37.36026	32.90438
9/2/2021	4:00:00 AM	41.14669	28.01661	54.89837	44.19717	39.53635	35.29909
9/2/2021	5:00:00 AM	43.18627	30.04381	61.5329	46.33139	41.18455	36.80699
9/2/2021	6:00:00 AM	42.91652	30.93561	59.01458	45.85672	41.35693	37.45425
9/2/2021	7:00:00 AM	46.352	32.32362	65.06002	49.17412	43.67607	39.37277

9/2/2021	8:00:00 AM	46.07955	32.99045	64.27139	49.08066	43.78996	39.58103
9/2/2021	9:00:00 AM	45.46463	32.22577	61.13075	48.2002	43.24881	39.15511
9/2/2021	10:00:00 AM	47.03523	31.22365	65.45143	49.8481	43.11398	38.55621
9/2/2021	11:00:00 AM	47.50461	30.42369	73.54144	49.13462	42.25768	37.39466
9/2/2021	12:00:00 PM	46.29746	27.50766	65.07818	49.52608	41.91328	35.90436
9/2/2021	1:00:00 PM	46.4503	24.40696	70.90424	46.62679	36.82153	31.92781
9/2/2021	2:00:00 PM	54.80863	24.72178	78.90147	54.02597	40.47901	33.15375
9/2/2021	3:00:00 PM	60.02662	24.7335	83.13812	60.71573	41.96152	32.93525
9/2/2021	4:00:00 PM	56.97457	23.34787	82.16008	55.02178	37.81259	31.67297
9/2/2021	5:00:00 PM	55.2282	24.42393	80.87002	53.21245	39.55233	33.52423
9/2/2021	6:00:00 PM	43.70155	23.7631	71.31508	42.84122	36.90861	32.70903
9/2/2021	7:00:00 PM	39.50171	22.15318	62.52841	40.34747	35.27934	31.33736
9/2/2021	8:00:00 PM	37.07949	23.02904	57.09767	39.41892	34.87465	31.13396
9/2/2021	9:00:00 PM	40.74849	24.30057	63.95007	42.09204	36.60021	32.43515
9/2/2021	10:00:00 PM	39.88087	23.23589	61.41982	41.72402	35.745	31.58639
9/2/2021	11:00:00 PM	40.19445	21.51849	56.94871	43.56182	37.97431	31.6701
9/3/2021	12:00:00 AM	36.24178	20.85912	58.89126	38.44309	32.79994	29.22592
9/3/2021	1:00:00 AM	33.27833	20.30455	55.41781	36.12515	31.56437	28.28201
9/3/2021	2:00:00 AM	34.51103	19.92862	54.40512	37.14584	32.04129	28.7672
9/3/2021	3:00:00 AM	34.66395	19.84776	50.86894	38.27813	32.23467	28.74199
9/3/2021	4:00:00 AM	36.23186	20.26412	54.15627	37.10962	32.84302	29.43138
9/3/2021	5:00:00 AM	35.2123	22.22726	52.45042	38.17014	34.11445	30.71178
9/3/2021	6:00:00 AM	40.53628	24.52551	59.35912	42.4939	35.93301	32.01081
9/3/2021	7:00:00 AM	45.65921	23.24431	70.89536	42.78612	36.39892	31.81964
9/3/2021	8:00:00 AM	40.43614	24.86822	61.014	42.96574	37.1764	32.63788
9/3/2021	9:00:00 AM	42.11548	25.19623	61.42019	45.01329	38.02166	33.49579
9/3/2021	10:00:00 AM	42.39941	24.09953	64.16212	44.13992	36.44838	31.96399
9/3/2021	11:00:00 AM	45.01839	20.73274	65.23789	48.08185	36.55246	29.77365
9/3/2021	12:00:00 PM	43.56884	21.0536	68.52079	44.84418	34.13159	29.13552
9/3/2021	1:00:00 PM	48.15863	21.93902	76.42021	46.06924	34.67241	29.42901
9/3/2021	2:00:00 PM	50.40511	21.41355	78.60275	49.37314	36.12419	29.50271
9/3/2021	3:00:00 PM	40.9231	20.40008	65.02624	42.17919	32.48168	28.23439
9/3/2021	4:00:00 PM	42.22315	19.56123	66.28091	41.45018	31.28163	27.77227
9/3/2021	5:00:00 PM	42.63765	19.6288	64.69535	44.29872	32.31683	27.90389
9/3/2021	6:00:00 PM	40.81296	16.22575	66.06299	41.43094	30.18019	26.80997
9/3/2021	7:00:00 PM	37.9374	16.62192	55.28846	40.69391	30.60972	27.15284
9/3/2021	8:00:00 PM	34.77891	16.76347	56.44006	36.78672	29.88971	26.8891
9/3/2021	9:00:00 PM	35.9813	16.43751	52.96946	39.85555	30.31731	26.74204
9/3/2021	10:00:00 PM	33.73153	16.87645	49.19568	37.57848	30.57705	27.36022
9/3/2021	11:00:00 PM	31.92296	17.35117	53.75391	33.37972	29.47524	26.95234
9/4/2021	12:00:00 AM	35.7833	17.105	52.18655	39.84741	29.94401	26.93509
9/4/2021	1:00:00 AM	32.73893	16.20458	54.16077	34.8544	30.09451	26.84866
9/4/2021	2:00:00 AM	35.0925	20.28108	50.38186	38.78213	33.0312	28.76476

9/4/2021	3:00:00 AM	39.02112	22.27718	56.11522	40.27791	34.16332	30.25045
9/4/2021	4:00:00 AM	39.61151	26.67088	51.50597	42.86692	37.6456	33.43539
9/4/2021	5:00:00 AM	39.45097	27.52042	57.86676	42.1337	37.49093	33.86482
9/4/2021	6:00:00 AM	38.69274	26.93252	54.25002	41.49486	36.49087	33.04297
9/4/2021	7:00:00 AM	41.38562	28.47643	58.63189	44.2975	39.53385	35.21693
9/4/2021	8:00:00 AM	43.42283	27.87255	59.80247	47.48287	39.45497	34.93466
9/4/2021	9:00:00 AM	41.53296	28.24094	57.51041	44.65096	39.45217	35.0694
9/4/2021	10:00:00 AM	45.37735	30.89044	62.67934	48.63963	42.2238	37.73424
9/4/2021	11:00:00 AM	44.45299	27.42829	62.02824	47.6162	40.92675	35.70839
9/4/2021	12:00:00 PM	40.40328	18.69648	60.13389	43.63457	34.45054	28.25372
9/4/2021	1:00:00 PM	45.48397	17.37893	74.33542	44.16703	32.50013	26.60163
9/4/2021	2:00:00 PM	44.90542	19.19107	66.54677	47.25727	34.70812	27.67688
9/4/2021	3:00:00 PM	49.6715	19.32578	76.2571	47.7979	33.1712	27.36288
9/4/2021	4:00:00 PM	42.39497	17.22584	65.13159	43.2825	31.21369	26.31761
9/4/2021	5:00:00 PM	43.16134	17.04298	70.56523	43.42239	29.20538	25.9761
9/4/2021	6:00:00 PM	36.80222	15.76616	60.09663	37.0936	28.44172	26.08392
9/4/2021	7:00:00 PM	31.88195	15.35247	53.0629	34.15083	29.03748	26.23721
9/4/2021	8:00:00 PM	30.42535	16.6497	48.69	33.83682	29.3323	26.56253
9/4/2021	9:00:00 PM	41.84729	14.58877	66.59924	34.89554	27.57731	25.76847
9/4/2021	10:00:00 PM	29.14926	15.83674	45.99317	32.59191	28.68651	26.38969
9/4/2021	11:00:00 PM	31.71144	16.19412	48.60337	35.26315	29.41274	26.64418
9/5/2021	12:00:00 AM	32.30845	16.37114	51.19492	35.4775	30.30525	27.049
9/5/2021	1:00:00 AM	34.77805	18.8773	51.28144	38.15807	32.24823	28.58935
9/5/2021	2:00:00 AM	33.92285	19.8358	54.2719	36.47806	31.96291	28.65016
9/5/2021	3:00:00 AM	36.4275	21.20423	48.71049	40.09194	34.46059	30.13283
9/5/2021	4:00:00 AM	37.50559	22.53566	50.92943	41.15217	35.46273	30.92833
9/5/2021	5:00:00 AM	42.13821	27.03288	60.09325	45.71323	39.87185	34.71204
9/5/2021	6:00:00 AM	43.10556	29.16981	53.9285	46.5327	41.41911	36.29071
9/5/2021	7:00:00 AM	40.9546	27.24658	59.13424	44.00821	38.88253	34.65448
9/5/2021	8:00:00 AM	40.80305	27.6098	59.68616	43.54873	38.40127	34.63032
9/5/2021	9:00:00 AM	34.71753	21.90566	53.65205	39.59683	25.46303	25.46303

WM5: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
8/24/2021	12:23:51 PM	40.4	37.5	35.2	32.9	35.3	30.1	29.4	38.3	32.5	31.7	31.8	30.7	28.5	34	32.6	34.1	33.7	33.9	31	28.6	28.2	28.8	27	24.9	28.4	28.7	31.2	27.7	29.9	28	27	25.6	22.8	21	19.3	17.1
8/24/2021	1:00:00 PM	42.7	40.1	37.1	34.7	32.5	30.1	28.8	33.1	27.6	25.3	26.9	24.5	19.7	19.4	19	14.9	12.5	10.4	10.2	8.2	6.9	6.9	6.8	5.4	4.9	4.8	5.2	6.3	7.1	7.5	7.9	8.4	6.7	6.7	6.1	4.1
8/24/2021	2:00:00 PM	47.2	44.5	42.2	39	36	33.2	30.1	30	27.9	27.7	25.1	23.8	23.3	17.5	16.4	14.6	12.9	12.5	10	8.4	6.9	6.6	6.4	5.4	5	5.4	6.4	7.7	8.5	9	9.2	9.2	8	8	7.4	5.1
8/24/2021	3:00:00 PM	53.3	53.3	50.1	47.6	44.6	41.8	38.7	36.8	35.6	34.1	32.8	30.8	30.4	24.1	21.1	19.9	17.7	16.8	15.7	14.9	13.7	13.2	13.2	11.9	11	11.2	12.6	14.3	15.4	15.9	16.5	16.3	15.6	15.6	15.1	11.9
8/24/2021	4:00:00 PM	46.1	41.7	38.5	36.3	33.8	30.1	27.7	26.6	24.1	22.9	21.4	20.7	17.8	16.9	16.8	15.8	14.6	13	12	11.1	9.4	8.3	8	7.6	7.1	7.8	9.4	10.9	11.8	12.1	12.4	11.8	11.1	10.7	9.9	7
8/24/2021	5:00:00 PM	46.3	43.8	40.2	37.9	35.8	31.9	29	26.9	23.3	21.4	19.9	18.4	16.5	15.4	15	14.6	14.2	11	10.5	11.5	7.7	7.7	8	9	7.4	7.3	8.5	9.2	9.9	10	10.3	9.7	8.9	8.4	7.7	5.2
8/24/2021	6:00:00 PM	38.8	35.6	32.1	30.1	27.9	25.1	21	20.2	18.9	18.4	17.5	17.6	17.2	16.8	15.5	14.1	12.5	9.4	8.1	8.9	6.1	4.4	5.9	7.1	6.1	4.3	3.8	4.3	4.6	4.6	4.8	4.5	4	3.6	3.3	2.1
8/24/2021	7:00:00 PM	26.5	27.6	28.1	25.6	24.1	20.1	20.4	21.8	21.8	21.8	21.1	20.5	19.7	18.2	15.7	11.6	6.4	4.8	3.6	1.8	1.6	-0.9	-1.4	-1.8	-2.3	-3.6	-4.2	-4.5	-4.4	-3.9	-3.2	-2.8	-2.1	-2.9	-1.5	6.5
8/24/2021	8:00:00 PM	32.4	30.7	29.5	28.2	28.6	26.3	26.9	28	26.8	27.2	27.1	26.6	25.6	24.8	22.4	18.9	14	11.4	12.7	9.4	0.2	-8.1	-8.5	-7.2	-7.2	-5	1.7	-6.1	-5.4	-4.6	-4.1	-3.9	-3.6	-3.5	-2.1	-0.4
8/24/2021	9:00:00 PM	25.1	24.4	23.3	23.1	24.1	19.3	19.2	25.9	19.3	19.5	19.1	22.7	30.6	32.3	22.3	11.1	12.9	5	-6.1	-9.2	-9.6	-9.6	-9.3	-8.9	-8.4	-1	-1.8	-6.7	-5.9	-5.2	-4.6	-4.4	-4.2	-4.1	-2.3	-0.6
8/24/2021	10:00:00 PM	23.1	23.6	25.2	25.1	25.4	24.9	25.7	27	26.8	26.9	27	27.1	26.4	25.2	23.4	23.6	21.6	14.8	10.3	4.9	-1.8	-8.6	-9.2	-8.7	-8	-7.8	-7.2	-6.5	-5.9	-5.2	-4.8	-4.5	-4.4	-4.4	-2.8	-0.7
8/24/2021	11:00:00 PM	24.4	24.3	23.8	21.6	22.9	20.9	20.8	22.5	22.6	23	21.1	21.3	20	17	16	19.4	18.9	12.8	5.7	-3.4	-8.2	-9.8	-9.7	-9.4	-9	-8.5	-7.9	-7.3	-6.5	-5.7	-5.2	-4.9	-4.7	-4.7	-3	-0.7
8/25/2021	12:00:00 AM	25.3	25.7	25.3	22.5	22.3	19.7	19.3	18.5	19	19.8	14.5	13.6	9.2	6.9	4.1	-1.1	-4.8	-7.7	-8.7	-9.2	-9.1	-9.1	-9.2	-9	-8.8	-8.4	-8	-7.4	-6.6	-5.8	-5.3	-5	-4.7	-4.8	-3.1	-0.8
8/25/2021	1:00:00 AM	29.6	28.3	27.1	24.5	24.3	21.6	20.4	22.2	21.1	21.2	19.1	19.1	16.2	14.6	12	8.8	3.7	0.9	-3.4	-8	-9	-9.2	-9	-8.5	-8.4	-8	-7.4	-6.6	-6	-5.3	-4.6	-4.4	-4.2	-4.5	-2.9	-0.7
8/25/2021	2:00:00 AM	31.4	30.2	28.9	26.6	27.9	22.4	22.2	31.9	22.7	22.9	20.7	19.5	15.1	14.8	13	4.2	-0.7	-3.7	-5.3	-8.7	-9.2	-9.6	-9.4	-9	-8.6	-8.1	-7.3	-6.5	-5.8	-4.9	-4.1	-4.1	-3.8	-4.3	-2.8	-0.7
8/25/2021	3:00:00 AM	34.6	33.2	31.6	29.4	32.4	27.5	28	33.7	28.2	28	27.8	26.2	23.8	22.8	20.3	14.2	8.4	7.5	8.6	5.1	-1.1	-6.2	-5.3	-6.2	-5.7	-1.9	-3	-2.3	-1.8	-1.3	-0.7	-1	0.8	-2	-1.4	-0.3
8/25/2021	4:00:00 AM	34.8	32.4	31.2	29.7	30.5	26.1	25.4	34.9	24.9	24.9	23.4	22.8	18.3	17.8	15.4	8.5	3.1	0.3	-1.7	-6.8	-9.1	-9.3	-8.8	-8.3	-7.9	-7.1	-6	-5.1	-4.7	-4.2	-3.7	-3.7	-3.6	-4.1	-2.7	-0.7
8/25/2021	5:00:00 AM	36.1	35.3	34	32.1	34.1	29.1	28.9	32.2	27.9	27.4	26.6	26.5	22.2	20.1	18.7	13.6	9.5	5	1.6	-0.7	-4.8	-8.2	-7.6	-7.4	-7	-6.1	-5	-3.9	-3.4	-2.9	-1.6	-1.4	-2.4	-3.2	-2.2	-0.5
8/25/2021	6:00:00 AM	30.1	31.1	32.6	43.8	39.6	30.5	37.4	39.1	36.2	35	34.6	36	32.1	30.2	32	26.8	23.7	21.5	19	16.5	12	6	1.6	-5.4	-8.5	-7.7	-6.5	-6.7	-6	-5.4	-4.7	-0.4	-3.7	-4.5	-3	-0.7
8/25/2021	7:00:00 AM	30.9	31.6	32.5	38.5	38	32.5	34	36.5	34	32.4	31.8	31.7	28.4	26.4	25.2	21.1	17.6	13.2	13.7	12.3	11.2	8.4	3.1	-3.6	-6.8	-5.6	-3.4	-5.3	-5.4	-4.6	-4.6	-4.1	-4.3	-4.4	-2.8	-0.7
8/25/2021	8:00:00 AM	44	37.9	42.9	40.3	39.1	35.8	36.7	34.7	33.3	31.7	30.6	31.2	31.2	25.3	19.1	17.6	11.5	7.9	5.3	2.5	1	-1.1	-2.4	-4	-4.4	-5.6	-5.7	-5.3	-4.6	-3.8	-3.8	-3.5	-3.8	-3.6	-2.2	-0.6
8/25/2021	9:00:00 AM	37.6	36.5	37.2	39.2	38.4	38.6	40.2	41	41	40.8	39.5	37.4	32.3	27.8	22.2	16.1	11.8	7.6	5.8	2.7	-0.8	-2	0.6	2.9	3.2	2.9	-3.6	-1.1	0.8	-2.6	-0.5	-2.7	-2.7	-1.6	-0.3
8/25/2021	10:00:00 AM	38.4	36.7	35	33.9	31.8	29.3	27.8	27.6	25.9	23.4	22	20.4	15.6	13.5	12.9	10.3	7.6	4.1	5.9	6.2	3.4	4	3.6	3.3	2	0.8	-0.2	-0.2	0.1	0	0.2	3	-0.5	-0.6	0.1	0.5
8/25/2021	11:00:00 AM	46.5	42.3	39.6	39.1	36.6	33.9	30.7	29.3	26.9	24.7	30.6	27.7	20	16.9	15.8	13.8	10.2	7.2	7.1	7.8	5.3	4.6	5.2	4.4	3.2	2.3	1.6	1.6	2	2.2	2.5	2.7	1.3	1.3	1.5	1.1
8/25/2021	12:00:00 PM	52.5	50.3	47.7	44.1	41.6	38.7	35.9	33.2	30.9	29.7	26.9	25.9	24.4	22.7	21	18.4	15.7	13.8	13.3	12.4	10.6	8.9	8.7	8.1	7.9	8.7	8.8	10.4	11.3	11.7	12.2	11.7	10.8	10.5	9.8	6.9
8/25/2021	1:00:00 PM	59	56.4	53.5	50.5	47.4	43.7	40.6	37.2	34.3	33.4	33.4	28.1	25.6	23.8	22.8	21.3	20.3	19.3	18.1	17.8	16.2	15.5	15.3	14.1	13.3	13.8	15.3	16.9	18	18.5	19.1	19	18.1	18	17.4	14.1
8/25/2021	2:00:00 PM	57.2	54.8	52	49.4	44.9	43.1	39.4	36.6	34.3	32.6	32.2	30.7	27.1	25.2	23	21.2	20	18.9	17.7	17	15.7	14.9	15.1	13.7	13	13.1	14.5	16.1	17.2	17.8	18.4	18.2	17.5	17.6	17	13.9
8/25/2021	3:00:00 PM	53.2	50	47.1	44.3	42.6	41.4	43.3	45.5	45.9	43.8	41.3	38.5	35.5	32.1	27.1	22.7	20.2	18.8	17.3	15.8	14.4	13.7	13.8	12.3	11.6	12.2	13.8	15.6	16.7	17.2	17.7	17.5	16.8	17.1	16.4	13.3
8/25/2021	4:00:00 PM	52	49.7	48.3	43.8	39.9	38.2	36.1	34.2	33	30.9	29	27.9	28.2	22.2	18.6	19.6	17.2	16.1	15	14.2	12.5	11.5	10.3	9.4	8.2	8.4	9.7	11	11.9	12.2	12.6	12.2	11.5	11.5	10.8	8

8/25/2021	5:00:00 PM	43.7	40.5	38.3	35.2	31.5	29.1	26.7	25.9	24.2	21.4	19.4	18	16.9	15.3	14.8	14.3	14	11.8	9.7	9.7	6.6	6.2	6.8	7.7	6.7	6.2	7.2	8	8.7	8.7	9	8.6	7.9	7.7	7.1	4.5
8/25/2021	6:00:00 PM	42.2	40.3	37	33.9	32.9	29.9	29.3	28.9	28.7	37.9	38.7	44.8	42.5	26.6	30.6	25.2	18.9	12.5	9.7	11.1	7.1	6.6	7.2	8.1	7.5	6.3	6.8	7.8	8.6	8.6	9	8.6	8	7.9	7.3	4.8
8/25/2021	7:00:00 PM	32.9	32.6	32.7	29.9	29.6	28.9	28	29	28.1	27.1	26.1	29.6	31.8	25	23.8	17.8	17.9	8.2	4.1	3	0.5	-1.1	0.1	1.1	2.4	0.3	1.6	2.6	3.4	3.4	3.8	3.5	3.1	2.6	2.4	1.4
8/25/2021	8:00:00 PM	32.7	31	30	29.2	34.3	27.2	26.8	35.2	26.2	27.1	23.8	24.3	21.7	20.3	17.6	7.9	1.4	-3.5	-6.5	-8.4	-9	-8.7	-8.2	-7.8	-7.3	-6.8	-2.4	-5.1	-4.5	-3.9	-3.2	-3	-2.7	-3.1	-1.9	-0.4
8/25/2021	9:00:00 PM	30	29.2	29	29.9	34.4	29.2	30.1	38.2	31.3	31.3	30.6	29.3	26.9	25.8	25.4	15.3	9.6	5.9	1.1	-5.5	-9	-9.6	-9.3	-8.8	-8.4	-7.8	-7.1	-6.4	-5.8	-5	-4.4	-4.1	-4	-4	-2.5	-0.5
8/25/2021	10:00:00 PM	26.7	26.4	25.7	26.4	32.8	26.5	28.1	38	27.7	28	27	27.8	31.5	32.6	26.6	14.4	12.8	5.4	-1	-5.9	-9	-9.9	-9.6	-9.3	-8.8	-8.3	-7.6	-6.7	-5.9	-5.6	-5.1	-4.8	-4.6	-4.6	-1.5	1.6
8/25/2021	11:00:00 PM	24	24.5	24.2	22.7	23.8	21.5	22.6	25.5	24.5	24.8	24.5	23	21.2	19.6	17.2	14	6.7	5.1	6.3	2.9	-5.7	-9.6	-9.7	-9.3	-8.5	-8.4	-7.9	-7.1	-6.4	-5.6	-5.1	-4.8	-4.6	-4.7	-3	-0.7
8/26/2021	12:00:00 AM	24	24.2	23.3	22.9	30.3	24	22.7	29.3	26.6	23.7	20.5	21.2	15	15	12.3	5.1	1.6	-1.8	-5.2	-9.4	-9.8	-10	-9.8	-9.5	-9	-8.6	-8	-7.3	-6.5	-5.8	-5.1	-4.8	-4.6	-4.6	-3.1	-0.7
8/26/2021	1:00:00 AM	25.3	25.1	25.5	23.6	26.4	23.5	22.9	31.6	24.1	24.3	22.3	21.2	17.7	15.7	13.8	5.9	2	-3.8	-7.4	-9.5	-10	-10	-9.9	-9.5	-9.1	-8.7	-8.1	-7.5	-6.7	-5.9	-5.4	-5.1	-4.7	-4.9	-3.2	-0.8
8/26/2021	2:00:00 AM	27.8	27.1	26.4	25.3	27	24.6	21.5	36.1	20	21	16.7	16.2	12	9.7	6.9	3	-1.8	-3.8	-6.6	-9.5	-9.8	-10	-9.8	-9.4	-9.1	-8.6	-8.1	-7.4	-6.6	-5.9	-5.3	-5	-4.8	-4.9	-3.2	-0.8
8/26/2021	3:00:00 AM	29	28.8	29.2	27.6	28.9	27	23.2	26.5	19.6	21.4	16.1	16.8	17.6	10.5	7.7	4.8	0.2	-3.3	-4.8	-8.7	-9	-9.8	-9.7	-9.4	-9.1	-8.6	-8	-7.2	-6.3	-5.2	-4.8	-4.1	-1.6	-2.9	-2.1	-0.4
8/26/2021	4:00:00 AM	29.4	29	29	28.2	30.9	25.7	24.3	27.3	21.5	22.4	20.8	20.5	15.3	13.1	9.6	6.4	2	-1.2	-4.9	-8.9	-10.1	-10.2	-9.9	-9.6	-9.1	-8.6	-8.1	-7.4	-6.6	-5.6	-5	-4.5	-3.7	-4.4	-2.9	-0.7
8/26/2021	5:00:00 AM	32.3	32.2	32.3	31.3	31.9	28.3	27	29.8	26.6	26.1	26.1	25.1	22	19.2	14.8	11.3	6.4	3.6	0	-3.7	-6.8	-7.6	-2.8	-3.1	0.6	-5	-6.8	-6.5	-6.1	-5.7	-5.2	-4.4	-4.6	-4.9	-3.2	-0.8
8/26/2021	6:00:00 AM	33.6	33.1	34.3	33.3	33.8	32.2	30.9	31.9	29.9	29.6	28.5	27.8	27.7	25.8	22.5	19.2	15.2	11.9	12.2	10.7	8.9	5.3	0.5	-2.3	-7.4	-8	-7.9	-7.1	-6.4	-5.7	-5.3	-5	-4.7	-4.9	-3.2	-0.8
8/26/2021	7:00:00 AM	30.8	32.4	33.5	32.8	35.6	32.6	31.8	34.9	30.8	30.6	29.2	28.7	26.7	24.7	21.2	18.4	14.4	9.8	9	7.3	6.5	4.4	-0.1	-5.6	-6.8	0.4	1.3	0	-3.8	-4.1	-4.5	-4.1	-4.2	-4.2	-2.7	-0.7
8/26/2021	8:00:00 AM	33.8	33.1	33.8	34.4	37.3	32.2	32.8	36.7	31.3	31	29.7	29	28.9	32.4	25.4	18.6	20.8	13.9	13.7	7.2	3.9	-1.5	-3.7	0.4	-1	9.6	11	12.7	16.2	8.8	3.8	0.2	0.7	-2.9	-2	-0.5
8/26/2021	9:00:00 AM	40	38.1	36.7	35.6	35.6	35.4	36.1	38.7	40	41.4	44.1	42.1	39.7	40.8	38	33.8	27.5	20.8	20.7	17.5	10.9	6.2	4.8	1.2	-1.4	2.6	-2	-1	0.2	0.1	0.5	4.8	0.7	-0.5	0.1	0.3
8/26/2021	10:00:00 AM	39	38.3	36.5	36.1	36.7	37.2	37.9	40	40.5	40.8	40.8	39.5	38	36.2	33.6	29.7	25.8	18.9	10.3	7.9	3.9	3.3	0.8	4.3	1.8	0.5	-1.1	-1.4	0.8	1.8	-0.6	1.4	-1.1	-1	0.1	0.4
8/26/2021	11:00:00 AM	48.8	45.7	45.2	44.2	42.2	40.3	37.3	35.3	31.7	31.5	29.5	24.9	21.5	21.7	18.6	12.4	8.9	10.9	7.9	8	7.4	7.3	6.1	4.9	3.8	2.5	1.8	1.4	1.3	1.5	1.8	2.9	0.8	0.6	1	0.9
8/26/2021	12:00:00 PM	46.1	43.7	40.6	38.4	35.9	33.1	30.2	29.5	25.5	23.5	22.4	20.2	16.7	15.5	15.1	12.1	9.8	8.2	7.6	7	5.8	5.1	5.7	4.7	4	3.6	3.5	4.3	5.2	5.9	10	26.9	22.7	6.6	4.8	2.4
8/26/2021	1:00:00 PM	58.2	55.6	53.3	50.3	47.1	44.1	40.3	37.2	34.7	31.4	31.3	27.6	24.1	22.2	21.1	20.2	19.6	18.6	17.5	16.8	15.6	15	15	13.7	13	13.3	15	17.2	19.1	18.2	18.3	18.1	17.4	17.4	16.9	13.7
8/26/2021	2:00:00 PM	61.6	59.7	57.3	53.9	50.6	46.5	43.3	40.6	37.3	34.2	31.5	31.3	26.7	24.9	23.8	22.8	22.3	21.6	20.6	20	18.9	18.3	18.4	17	16.2	16.3	17.7	19.5	20.5	21.1	21.7	21.6	21	21.1	20.6	17.5
8/26/2021	3:00:00 PM	63.9	62.2	59.3	56.3	53.1	49.9	46.6	44	41.2	38.2	35.1	32.4	30	27.8	26.1	24.7	23.8	23.1	22.3	21.8	20.8	20.3	20.5	19.2	18.4	18.3	19.7	21.3	22.4	23	23.6	23.6	23.1	23.2	22.9	19.8
8/26/2021	4:00:00 PM	59	56.6	53.9	50.7	46.9	43.4	40.3	37	34.2	31.8	29	26.9	27	31.5	29	22.3	20	19.3	18.1	17.3	16.3	15.2	15.4	14.8	14.2	14.4	16.1	17.2	17.9	18.2	18.7	18.5	18	17.8	17.3	14.1
8/26/2021	5:00:00 PM	57.4	55.2	52.2	48.7	46.1	42.7	39.4	35.9	32.9	30.6	28.5	26.2	23.7	21.6	20.1	19	18.3	17.2	15.6	14.6	12.9	12.2	12.1	11.2	10.8	11.4	13.4	15.1	16	16.3	16.8	16.6	16.2	16	15.5	12.2
8/26/2021	6:00:00 PM	40.7	38.3	36	32.8	30.8	28.7	27.1	27.1	26.8	25.9	26.2	25.4	22.3	18.6	14.5	12.6	11.2	9.3	8	6.5	5.1	3.4	5.1	5.9	5.1	4.3	4.9	6	6.5	6.7	6.8	6.5	6.2	5.8	5.5	3.4
8/26/2021	7:00:00 PM	27.2	28	28	26.1	24.9	23	24	24.3	24.6	24.7	23.5	21.9	19.6	16.4	12.8	12.6	6.7	2.1	3.7	0.3	2	3.9	1.7	1.7	2.3	3.1	4.1	4	3.8	3.8	3.2	3	3	3.1	1.9	0.4
8/26/2021	8:00:00 PM	29.7	29.6	28.7	27.2	27	26.2	27.5	28.3	27.2	27	25.7	24	22.2	20.2	16.7	10.7	3.3	0.5	1.8	3.4	5.3	7.1	8	8	7.4	6.2	6.4	5.8	5.1	4.3	3.3	3.5	3.2	3.4	1.7	0.3
8/26/2021	9:00:00 PM	27.6	26.7	25.5	24.7	26.1	22.1	20.9	24.9	22.6	23.9	19.8	21.5	32.5	34	25.5	11.4	7.2	3.5	4.7	3.1	7.9	9	8.9	8.8	8.1	7.2	6.2	6.7	5.7	5.1	4.8	4.5	4.4	4.4	2.8	0.6
8/26/2021	10:00:00 PM	26.6	25.8	25	24.2	29.2	22.7	25.1	34.5	26.1	26.2	26.6	25.4	21.7	22.1	15.3	8.5	0.3	4.3	6.8	4	6.1	11.3	14.8	11.9	7.3	2.4	6.4	6.7	6.1	5.3	4.8	4.6	4.3	4.4	2.8	0.7
8/26/2021	11:00:00 PM	23.9	23.3	23.2	22	23.7	20.3	20.3	25.9	20.8	20.2	19.1	17.3	13.9	11.8	8.8	1.3	4.2	6.9	8.6	9.8	9.3	9.4	9.3	9	8.4	8.2	7.7	7.1	6.4	5.7	5.1	4.8	4.6	4.7	2.9	6.2

8/27/2021	12:00:00 AM	23.1	23.6	23.1	21.3	24.7	20.4	20	22.8	21.1	21.4	16.5	16	12.5	10.2	8.8	0.7	-1.4	-4.9	-7.1	-7.9	-7.8	-8.5	-8.2	-7.5	-7.2	-6.4	-7.2	-6.6	-6.2	-5.7	-5.2	-4.9	-4.6	-4.7	-3	-0.7
8/27/2021	1:00:00 AM	24.9	25.3	25.4	23.8	27.8	23.4	21.9	25.2	22.4	22.6	17.6	17.1	14.6	9	5	0.2	-2.8	-6	-7.5	-1.8	9.5	11	11.2	8	6.8	0.3	-7.1	-7.4	-6.7	-5.9	-5.4	-5	-4.7	-4.9	-3.1	-0.8
8/27/2021	2:00:00 AM	30.7	31.4	29.2	28.4	34.2	27.3	26.9	28.9	23	22.2	20.7	18.2	12.4	9.1	6.4	0.9	-2.7	-5.5	-6.1	-1.9	14.8	14.7	11.3	12.8	13	6.3	-6.9	-7.1	-6.5	-5.7	-5.2	-4.9	-4.7	-4.8	-3.1	-0.7
8/27/2021	3:00:00 AM	28.9	29.8	28.9	29.1	34.5	27.5	27	28.7	22.3	22.4	20.2	17.1	11.6	9.9	8.2	3	-1.4	-4.2	-5.9	-8.5	-8.9	-9.4	-9.3	-9	-8.5	-8	-7.3	-6.6	-6.1	-5.2	-4.7	-4.5	-4.2	-4.6	-3	-0.7
8/27/2021	4:00:00 AM	28.3	28.5	28.9	28.9	33.9	28.4	28.7	30.9	27.6	28.3	26.5	26.1	24.1	23.2	19.5	14.1	5.1	2.9	2.7	-2.5	-8.6	-9.9	-9.5	-9.2	-8.9	-8.5	-8.1	-7.5	-6.7	-6	-5.5	-5.2	-4.8	-5	-3.2	-0.8
8/27/2021	5:00:00 AM	31.1	31.9	32.4	31.4	33.8	28.8	28.9	33.4	27	26.4	24.5	24.8	20.6	18.5	15.1	10.5	4.8	0.6	-1.6	-2.5	-4	-5.4	3.6	9.7	9.5	5.3	-1	1.1	-2.3	-4.2	-4.6	-1	-4.5	-4.9	-3.2	-0.8
8/27/2021	6:00:00 AM	27	28.9	30.3	30.3	34	28.6	28.9	35.7	28.2	28.2	25.5	24.7	23.1	21.7	18	13.4	9.4	7.1	8.7	6.8	5	0.2	7.5	11	10.8	6.5	10.8	9.6	1.9	-4.6	-5.4	-5.2	-4.9	-5	-3.3	-0.8
8/27/2021	7:00:00 AM	42	38.6	37.4	37.2	35.8	33	31.1	36.8	30.5	29.1	28.1	28.3	28.1	23.1	19.1	17.3	12.9	9.9	11	10.6	11.4	8.7	3.1	-3.6	-6.1	0.3	6.1	4.9	-0.2	-1.1	-3.2	2.8	-3.3	-4.4	-2.7	-0.7
8/27/2021	8:00:00 AM	33.4	32.5	32.5	32.5	34.9	31.7	30.7	38.6	29.9	29	26.6	28	21.9	20.8	18.8	14.1	11	7.4	7.7	12.1	12.3	9.2	21.6	26	23.6	17	13.9	16.7	13.1	8.1	1.1	1.9	-1.3	-2.5	-1.6	-0.4
8/27/2021	9:00:00 AM	43	40	38.2	36.2	36.4	34.3	33.3	42.6	31.8	32.4	30.6	29.8	25.9	23.5	21.3	15	9.8	6.3	2.8	-0.7	-2.3	-2.7	-1.4	-1.1	-1.1	-0.8	0.6	1.2	1.4	1.7	2.9	1.5	1.1	0.7	0.7	0.6
8/27/2021	10:00:00 AM	35.6	33.5	32.8	32.7	34.4	31.5	31.1	37.9	31.4	31	30.1	29.9	27.2	23.3	20.7	15.1	10.1	5.7	6	5.9	2.8	2.9	3.3	2.9	1.9	0.3	-0.3	0.5	0.7	2	2.2	3.4	2.1	0.3	0	0.3
8/27/2021	11:00:00 AM	38.1	35.5	33.8	32.1	33.4	29	29	33.7	29.1	28.6	28.1	28.1	24.7	23	22	16.7	12.8	8.1	12.1	12.9	8.7	8	9	7.8	6.1	4.2	2.7	2.2	2.5	2.9	3.3	2.5	1.7	1.5	1.7	1.4
8/27/2021	12:00:00 PM	43.3	40.1	37.5	34.9	33.4	30.1	32.6	32.3	29.3	28.7	28.8	29.2	32.8	36.8	37.1	28.7	25.5	22.5	26	24	22.3	21.6	23.1	24.2	24.1	24.9	24.9	25.6	25	19	21.6	19.1	17.2	15.2	13.7	9.7
8/27/2021	1:00:00 PM	43.7	40.8	38.2	35.5	33.5	30.5	28.1	30.6	26.3	25.6	25	24.6	21.1	20.6	19.5	13.2	10.3	7.7	6.6	7.7	5.9	4.7	5.4	4.6	3.7	3	2.6	3.1	3.5	3.8	4	3.9	2.5	2.5	2.4	1.6
8/27/2021	2:00:00 PM	39.6	37.6	34.6	33.2	31.2	29.1	28.7	31.3	29	29.7	29.7	29	32	37.2	29.5	22.4	25.1	19.3	19.1	12.8	10	7.8	7.2	6.6	5.8	6.2	7.4	8.9	10	10.4	10.6	10.1	9	9	8.2	5.8
8/27/2021	3:00:00 PM	42.5	39.8	36.8	34.1	31.7	29.7	28.6	31.2	28.3	28.3	28.5	28	26.7	25.7	24.3	20.8	17.6	14.9	13.5	12	9.8	8.1	8.2	7.8	7.1	7.5	8.4	9.8	10.9	11.3	11.4	11	9.9	9.7	8.9	6.2
8/27/2021	4:00:00 PM	47	44.2	41.6	37.8	34.6	31.3	28.7	31.4	28.4	26.1	31.7	34.4	35.9	34.2	24.9	23.9	20	18.1	15	14.4	12.6	11.8	11.2	10.7	9.8	10.3	11.9	13.4	14.4	14.8	15	14.5	13.6	13.3	12.4	9.3
8/27/2021	5:00:00 PM	39.2	36.7	33.4	31.8	29.8	27.2	26.9	29.7	27.3	27.2	27.4	26.9	25.4	23.8	21.8	18.6	15.4	12.2	9.1	10.2	6	5.4	5.8	7.7	6.6	6.4	7.8	8.6	9.6	9.7	9.9	9.4	8.6	8.1	7.4	5
8/27/2021	6:00:00 PM	37.8	34.9	32.5	30.9	30.5	26.5	27.3	32.5	27.2	27.1	27.6	26.7	24.2	23.4	22.2	16.4	13	9.3	8.3	8	4.8	3.9	5.6	6.3	5.5	5.1	5.9	6.9	7.6	7.6	7.8	7.3	6.5	5.9	5.1	3.2
8/27/2021	7:00:00 PM	27.1	28.1	29.2	28.1	30.4	27.7	30.8	36.1	32.5	31	31.2	28.8	28	25.7	22.8	19.1	14	7.9	2	2	2.1	3.1	0.6	-1.4	-1.7	2.2	2.2	2.1	2.1	-1.6	2.1	2.8	3.1	2	0.5
8/27/2021	8:00:00 PM	32.2	31	31	30.1	35	31.1	39.8	40.6	34	34.5	35	31.6	30.1	28.6	27	27.7	22.5	13.4	9.1	3.6	3.9	7.2	7.8	7.4	6.7	6.2	0.7	4.9	4.4	3.7	3.2	3.4	3.4	3.5	2.1	0.5
8/27/2021	9:00:00 PM	26.5	26.9	27	28.2	36.7	28.7	30.4	41.2	32.6	32.2	31.3	30.8	32.3	34.2	30.2	17.8	13.2	9.5	7.5	3.1	4.1	8.6	8.7	8.4	7.9	7.1	5.4	5.8	4.4	0.5	1.6	1.7	0.9	1.4	1.6	0.2
8/27/2021	10:00:00 PM	28.3	27.4	26.3	26.3	31.5	23.8	26.8	35.2	28.3	28.3	28.3	25.8	22.8	22.6	22.9	10.4	5.3	1.4	1.9	6.4	8.4	9	8.8	8.5	7.9	6.9	7	6.4	5.8	5.1	4.6	4.4	4.1	4	2.6	0.5
8/27/2021	11:00:00 PM	26.8	27.1	26.4	26.8	31.3	25.4	26.9	35.2	28.4	28.2	28.6	27.7	25.7	25.2	25.3	18.2	13.4	8.2	7.9	7.2	1.6	7.1	9.1	8.7	8.3	7.8	7.6	6.9	6.2	5.5	5	4.7	4.5	4.6	2.8	0.6
8/28/2021	12:00:00 AM	25.9	25.4	23.9	23.9	29.6	22.6	24	34.3	26.9	27.2	25	25.3	19.9	20.6	21.6	6.5	1.2	3.9	7.1	9.1	9.4	9.7	9.5	8.9	8.8	8.3	7.7	7	6.4	5.6	5.1	4.8	4.5	4.6	2.9	0.7
8/28/2021	1:00:00 AM	23.5	24.6	23.9	24.8	29.4	23.2	23.9	33.9	26.1	27	25.3	24.6	20.3	19.3	18.7	5.3	0.4	4.3	7.4	7.8	8.2	9.3	9	9	8.8	8.4	8	7.4	6.6	5.9	5.2	4.9	4.6	4.7	3.1	0.7
8/28/2021	2:00:00 AM	23.6	23.4	21.7	21.6	26.1	19.9	22.3	25.9	21.1	22.4	21.1	19	14.3	13.7	14.6	1.4	2.6	5.9	7.4	8	7.5	8.7	8.3	8.8	8.8	8.4	7.9	7.3	6.4	5.2	4.8	4.6	4.4	4.6	2.9	0.7
8/28/2021	3:00:00 AM	22.5	24	24.4	27.5	36.1	27.2	28.7	36.2	31.7	31.4	28.4	30.3	25.2	25.2	25.2	11	5	0.2	4.4	7.7	8.7	9.5	9.2	9.2	9.1	8.7	8.2	7.5	6.7	5.8	5.4	5.1	4.8	4.9	3.2	0.8
8/28/2021	4:00:00 AM	21.5	22.8	22.5	23.8	29.8	22.5	22	32	23.5	24	22.8	22	18.1	17.8	15.6	4.4	0.2	3.1	5.3	6.1	4.9	7.1	7.5	8.5	8.8	8.1	7	7.2	5.6	2.6	5.3	5	4.8	5	3.3	0.8
8/28/2021	5:00:00 AM	25.7	25.5	25.3	24.7	26.9	22	20.7	28.5	20.9	21.5	19.7	19.4	15.7	14.9	17.3	5.3	0.8	1.1	2.1	5.5	4.9	1.9	15.4	18.2	17	10.8	5.3	5.9	3.4	0.2	2.4	6.2	2.8	4.3	2.9	0.7
8/28/2021	6:00:00 AM	25.4	26.3	26.9	26.4	29.1	26.7	27.2	33.2	29.1	28.8	28.9	27.8	24.4	23.1	21.1	15.7	10.3	10	11.5	10.4	6.3	11.4	4.3	6.8	5.1	7.2	10.2	10.3	0.2	5.8	5.5	5.2	4.9	5.1	3.3	0.8

8/28/2021	7:00:00 AM		26	27.8	29.5	30.1	35.9	30.3	31.7	37.4	33.5	32.6	33.9	32.1	27	28.6	27.5	18.6	14.6	10.4	7.8	8.4	7.9	7.5	7.9	9.5	8	5.1	4.1	5.4	1.4	-1.8	-3.1	2.4	-2.1	-3.8	-2.5	-0.7
8/28/2021	8:00:00 AM	31.8		30.6	30.7	29.4	34.1	28.4	28.4	39.5	31.3	29.9	30	28	23.1	24.9	22.9	13.4	6.9	3.3	3	7.6	8.4	4	12.5	19.4	23.3	22.3	9.6	13.7	12.1	8.6	3.4	7.8	2.6	-3.1	-2	-0.6
8/28/2021	9:00:00 AM	32.3		31.2	30.8	30.7	35.8	30.5	31.8	38.6	33.3	32	28.8	32.3	25.4	25.1	19.3	13.1	5.3	0.8	0.5	0.5	-0.9	-0.9	2.1	3.5	4.3	-1.9	-3	-2.9	-2.9	-1.7	-1.7	-1.9	-2	-1.9	-0.7	-0.1
8/28/2021	10:00:00 AM	35.4		33.6	32.5	39.8	37.3	29.7	35.4	37.4	32.5	31.1	30.5	30.5	24.4	23.9	21.9	16.2	13.5	10.2	9.7	9.2	5.7	4	4.4	4.2	2.5	1	-0.5	-0.6	0.3	0.5	0.2	0.1	-1.2	-1.2	-0.5	0.2
8/28/2021	11:00:00 AM	39.4		36.8	35	33.5	35.5	29.5	30.1	36	29.5	29.5	28.9	28.9	23.7	23.6	21.3	14.2	12.2	7.1	9	10.3	6.4	6.2	6	5.6	4.4	3.2	2.3	2.5	3.4	3.7	3.9	3.9	2	1.6	1.5	1
8/28/2021	12:00:00 PM	40.6		38.1	36	34	36.5	31.2	31.7	40.9	32.9	32.8	33.3	33.3	33.3	31.8	27.4	20.4	15.1	12.4	11.3	9.9	9.2	7.1	7.9	7.9	6.8	6.6	4.6	4.3	4.7	4.8	5.1	5.7	3.4	3.4	3.1	1.9
8/28/2021	1:00:00 PM	42.1		40.4	37.7	34.9	49.9	60.1	54	42.4	51.5	51.5	47	43.7	43	38.5	37.9	34.2	29.1	27.1	25.5	22	17.8	12.8	9.4	8	6.8	6.8	6.2	7	7.8	8.1	8.4	8	6.8	6.8	6.1	3.9
8/28/2021	2:00:00 PM	41.8		38.9	36.1	33	31.3	28	27.5	35.1	28.8	27.8	28.6	26.6	24	22.9	21.4	18.2	15.2	12.1	10.6	9.3	7.2	6.1	6.4	5.6	4.9	5.1	6.2	7.5	8.5	8.8	9	8.6	7.4	7.5	6.6	4.3
8/28/2021	3:00:00 PM	38.8		35.4	33.3	30.7	31.2	26.5	24.9	35.8	26.5	25.5	26.9	24.6	20.8	20.5	18	14.7	12.4	10.3	8.9	8.1	6.2	5.5	5.6	5.2	4.4	4.3	5.3	6.4	7.4	7.6	7.9	7.5	6.2	6.2	5.4	3.4
8/28/2021	4:00:00 PM	33.4		31.2	28.9	28	31.7	26	26.9	39.5	27.6	26.8	26.9	26.7	21	21	19.6	9.5	8.2	6.2	5.7	6.5	4.9	4	4.1	5.4	4	2.5	2.6	0.9	1.6	1.3	1.1	2.5	-0.1	-0.2	0.3	0.6
8/28/2021	5:00:00 PM	42		39.8	37.6	34.7	41.3	31.6	32.5	43.4	33.6	31.6	31.5	31.2	25.5	25.4	23.5	13.2	10.9	7.5	6.6	8.2	4.2	3.6	4.4	6.1	5.1	4.1	4.4	4.4	4.9	5.1	5.2	5	4.3	3.5	3.3	1.9
8/28/2021	6:00:00 PM	32		28.2	27.3	28.6	38.4	29	35.2	44.4	33.9	33	36.3	32.7	28.2	26.8	23	15	10.9	4.7	5.5	6.9	3.1	2.7	4.4	5.5	4.1	2.4	1.5	1	0.7	0.6	1	3.7	0.6	-0.7	-0.2	0.3
8/28/2021	7:00:00 PM	23.6		24.6	25.3	27.8	32.7	27.2	28.8	36.2	32	30.2	34.3	29.5	25.4	25.1	27.6	27.5	20.5	15	9.9	4.8	-1	-3.3	-2	-3.7	-4.4	-4.8	-4.1	-5.4	-5	-4.5	-3.2	-1.1	-3.5	-3.4	-2.1	-0.5
8/28/2021	8:00:00 PM	23.4		23.9	23.3	22.1	24.8	21	22.5	29.7	24.7	24.6	24.1	23.1	21.6	20.8	18.5	12.7	4.9	4.4	5.6	1	-6.5	-8.7	-8.7	-8.5	-8.1	-7.1	-5.4	-6.2	-5.2	-4.9	-4	-3.8	-3.6	-3.4	-2.3	-0.5
8/28/2021	9:00:00 PM	22.4		23.8	22.5	21	24	18.2	19	24.6	21.7	23.3	19.1	18.2	14.3	13.5	12.7	2.1	-2.4	-6.5	-8.5	-8.7	-8.7	-8.3	-8.7	-8.8	-8.3	-6.2	-6.9	-6.8	-6.1	-5.4	-4.8	-4.5	-4.4	-4.4	-2.8	-0.7
8/28/2021	10:00:00 PM	23.4		24.1	23.5	22.8	23.1	17.6	16.8	21.3	16.7	17.7	17	14.9	11.1	8.4	4.5	1.3	-2.9	-3.1	-5	-5.8	-7.7	-8.2	-8.5	-8.3	-8.1	-7.8	-7.2	-6.5	-5.9	-5.2	-4.4	-4.2	-4.1	-4.5	-2.9	-0.7
8/28/2021	11:00:00 PM	25.9		25.2	24.3	22.7	23.8	17.6	16.1	21.1	17.7	20.6	16.8	16.3	15.9	10.3	6.8	1	-2.6	-6	-7.7	-8.2	-8.1	-9.3	-9.2	-9	-8.8	-8.3	-7.8	-7.1	-6.4	-5.7	-5.1	-4.9	-4.6	-4.7	-3	-0.8
8/29/2021	12:00:00 AM	26.8		26	24.9	23.2	24.6	20.8	20	27.1	20.8	21.3	19	18.3	17	13.5	11.5	4.5	1.2	2.9	-6	6.8	6.6	9.2	-9	8.8	8.4	7.9	7.2	6.5	5.8	5.3	5	4.8	4.8	3.1	0.8
8/29/2021	1:00:00 AM	23		23.4	22.7	24.7	30	24	24.7	33.9	25.1	25.1	26.3	25.6	21.7	18.4	15.4	9.6	4.8	2.4	0.9	0.9	1.7	3.9	3.9	1.7	5.8	8.6	8.2	7.5	6.7	6	5.4	5.1	4.8	4.9	3.2	0.8
8/29/2021	2:00:00 AM	23.5		23.5	22.6	20.6	22.5	15.5	14.7	22.5	21	21.9	16.9	15.9	12.9	11.1	6.9	0.4	3.5	5.7	6	6.7	5.8	9.3	9.3	9.2	8.8	8.3	7.6	7.1	6.4	5.4	5	4.6	4.4	4.6	3	0.7
8/29/2021	3:00:00 AM	27.7		26.7	26	23.1	24.5	19.8	19.1	29.4	24.1	22.2	19.7	19.8	18.9	13.7	8.9	4.5	1	3.3	4.1	6.6	6.3	3.1	1.5	9	7.2	5.5	8.1	7.4	6.7	6	5.4	5.1	4.8	5	3.2	0.8
8/29/2021	4:00:00 AM	28.3		27.3	26.5	25.5	28.9	22.9	21.4	30.5	21.2	21.3	19.4	19.5	16	14.2	12.9	4.9	0	2.7	5.2	7.1	8.1	8.2	1.3	0.2	6.4	7.3	8.1	7.5	6.7	6	5.5	5.2	4.9	5	3.2	0.8
8/29/2021	5:00:00 AM	29.1		29.2	30.4	29.9	34.9	27.5	27.4	33.3	27.8	28	24.7	24.8	21.9	18.1	14.4	6.4	1.8	0.8	0.8	2.4	1.7	3.6	10.8	15.8	16.7	7.9	4.1	4.2	1.5	2.2	5	4.9	4.8	5	3.3	0.8
8/29/2021	6:00:00 AM	27.2		28.4	28.9	29.8	33.4	29.3	30	34.1	29.9	29.6	28.4	26	23.6	20.4	18.2	12.4	8.2	3.4	3.8	5.5	2.8	1.8	10	13	11.8	8.7	6.1	4.7	1.7	0.3	3.4	5.8	0.4	4.9	3.2	0.8
8/29/2021	7:00:00 AM	27.1		27.5	28.7	28.8	32.4	29.7	30.6	36.5	32.3	31.8	32.1	30	28	26.6	24.1	20.6	17	12.2	12.3	11.1	6.3	2.5	0.9	0.1	1.4	3.9	5.4	4.9	5.9	5.4	4.9	3.1	2.3	4.6	2.9	0.8
8/29/2021	8:00:00 AM	30.7		30.8	31.4	40.5	39.9	32	34.4	43.1	33.2	34.3	32.8	32.8	30.8	28.1	27.4	22.6	18.7	16.3	14	11.7	9.5	6.1	2.9	2.7	3.1	2	5	3.3	4	0.3	4	4.1	4.1	4	2.5	0.7
8/29/2021	9:00:00 AM	32.6		32.1	32.5	41.7	41.7	32.8	37	42.8	36.7	34.6	35	34.6	30.3	27.8	28.1	23.2	19.5	15.7	14	10.4	6.4	2.5	1.6	1.2	3.2	4.1	2.3	4.3	3.5	2.4	0.9	0.8	2.7	2.7	1.6	0.4
8/29/2021	10:00:00 AM	33.7		32	31.5	32.6	38.4	31.5	31.3	42.5	32.3	32.3	30.8	29.4	25.5	28.8	22.6	17.4	17.6	9.9	9.4	8.1	3	3	4.6	4.7	2.2	0.2	1.7	2	2	1.3	1.3	0.2	1.5	1.6	0.8	0.1
8/29/2021	11:00:00 AM	35.9		33.8	32.7	33.2	37.1	32.6	31.5	40	32	31.1	30.4	32.8	33.2	24.7	24.9	20.1	17.8	16.4	13.2	11.6	8.2	5.9	7.5	8.9	7.5	3.2	0.9	0.1	0.2	0.3	1	1.3	0.6	0.2	0.3	0.4
8/29/2021	12:00:00 PM	45.2		42.7	40.2	38.8	37.1	34.9	32.1	38.3	29.4	27.8	28.5	26.5	24.1	23.2	22.3	18.3	13.8	11.6	10.8	10.6	8.8	6.9	7.2	6.2	4.8	3.3	2.4	2.5	2.9	3.3	3.6	3.8	2.7	2.9	2.9	1.9
8/29/2021	1:00:00 PM	40		37.6	35.3	34.1	34	30.2	28.6	39.8	26.4	24.8	26.3	23.7	19.6	18.5	17.3	12.9	9.4	7.9	8.9	9.6	7	5.5	6.8	5	4	3	1.9	1.7	1.8	1.8	1.8	3.1	0.4	0.6	0.9	0.8

8/29/2021	2:00:00 PM	39.9	36.9	34.5	33.6	36.5	30.1	29	42.7	30.3	29.7	30.1	27.6	23.3	23.2	21	14.3	9.9	8.1	6.1	6.2	5.1	4.2	5.7	3.9	3.2	2.6	3.1	2.2	2.5	2.7	2.9	3.2	1.4	1.7	1.7	1.2
8/29/2021	3:00:00 PM	39	35.9	32.8	30.7	30.1	26.2	25.4	33.5	25.8	24.8	24.9	31.2	36.6	33	20.1	17	13	9.6	8.6	8	5.7	4.4	4.7	3.4	2.6	2.3	3	3.4	4	4.5	4.5	4.3	2.8	2.8	2.5	1.5
8/29/2021	4:00:00 PM	40.8	36	33.9	31.4	29	26	24	28.7	22.6	22.7	23.1	21.3	18.6	17.4	15.5	12.6	10.2	7.9	6	7.4	4.5	4	4.7	5.5	4.2	3.4	4.6	4.5	5.5	5.6	5.8	5.7	4	3.7	3.4	2.1
8/29/2021	5:00:00 PM	32.5	29.3	27.1	25.9	25.1	23.3	24	27.1	24.1	24	23.8	22.9	21	19.6	17.8	15.6	12.4	7.8	8.7	8.1	4.5	4.3	5.2	6.5	4	2.6	3.7	2.5	7.6	11.7	4	10.2	1.9	1.3	1.3	0.9
8/29/2021	6:00:00 PM	20.6	22	22.6	22.3	22.8	21.1	21.4	23.3	23	24	23.8	22.9	22.1	20.7	18.3	15	11.1	8.7	5.6	5.4	3.2	2.6	3.7	4.6	4.2	2	1	-0.4	-0.7	-0.7	3.1	1	-1.1	-1.4	-0.6	0.1
8/29/2021	7:00:00 PM	25.5	26	26.1	24	24	20.7	21.1	21.5	21.7	22.2	22.1	22.3	21.6	20.5	18.4	14.8	7.8	4.5	3	-1.1	-3.1	-3.4	0	-2.5	-2.3	-2.9	-3.9	-2.2	-1.8	-3.5	1.6	-2.6	-3.4	-3.4	-2.1	-0.5
8/29/2021	8:00:00 PM	26.8	26.7	25.5	24.1	25.8	26	26.6	26.3	24.9	24.9	24.4	23.7	22.4	21.1	19.6	19	14.3	7.6	0.4	2.5	6.4	8.2	-8	-7.3	-6.3	-6	-4.6	-4.5	-3.9	-3.7	-3.4	-3.4	-3.4	-3.5	-1.9	4.9
8/29/2021	9:00:00 PM	25.3	25.2	24	22.4	23.8	21	21.3	30.7	23.2	24.6	21.8	21.2	19.4	16.9	13.4	9.7	4.2	1.8	6.8	8.6	9.2	9.3	9.1	8.7	8	7.4	6.8	6	5.1	4.1	2.3	1	0.8	0.8	0.2	0
8/29/2021	10:00:00 PM	26.4	25.5	24.6	23	23.2	20	18.5	27	17.4	17.9	14.9	14.8	11.6	8.8	4.5	0.2	5	7.7	8.5	8.7	8.8	8.7	8.5	7.9	7.3	6.9	5.7	5.1	4.3	3.7	2.7	2.9	2.9	3.2	2.1	0.5
8/29/2021	11:00:00 PM	28.6	27.8	26.7	24.5	25.6	22	21.1	26.5	21.2	22.9	19.7	19.9	16.6	14.3	11.2	6.9	1.4	2.7	5.7	6.7	1.3	2	2.6	0.1	1.8	7.3	7.5	6.8	6.1	5.4	4.7	4.4	4.4	4.5	2.9	0.7
8/30/2021	12:00:00 AM	26.9	27.5	26.8	24.5	24.8	20.9	19.2	24	18.9	20.9	17.6	17.5	13.5	11.9	8.1	5.1	0.7	2.6	5.1	7.8	9	9.1	9.3	8.9	8.5	8.2	7.7	7	6.3	5.5	5	4.8	4.7	4.7	2.9	0.8
8/30/2021	1:00:00 AM	25.1	28.1	25.5	24.2	28.2	24	24.4	28.7	24.7	25.2	23.7	23	21.2	19.9	17	13.5	9.3	6.9	1.7	5.3	8.3	9.5	9.4	9.2	8.6	8.4	7.9	7.3	6.5	5.7	5.3	5	4.8	4.8	3.1	0.8
8/30/2021	2:00:00 AM	29.1	28.6	26.2	23.7	26.1	21	21.1	27.5	19.4	20.9	15.1	14.1	9.5	8.1	4.2	0.1	3.6	6.7	8	9	9.2	9.1	8.8	8.5	8.3	7.9	7.3	6.6	5.9	5.2	4.6	4.2	4	4.2	2.6	0.6
8/30/2021	3:00:00 AM	26.8	27.1	27.3	25.2	26.4	21.9	20.6	26.8	19.9	22.2	16.8	16.6	11	9.5	5.9	1.6	3.3	6.1	7.3	8.9	9.4	9.7	9.7	9.4	9.1	8.6	8.1	7.4	6.6	5.8	5.3	5	4.8	4.8	3.1	0.8
8/30/2021	4:00:00 AM	27.1	27.8	28.3	27.9	31.9	24.7	24.1	28.6	22.2	22.4	20.7	20.5	13.8	11.2	7.5	2.3	2.1	5.7	7.5	8.9	9.5	9.5	9.7	9.5	9.2	8.7	8.2	7.5	6.8	6	5.5	5.2	4.9	5	3.2	0.8
8/30/2021	5:00:00 AM	28.2	28.9	29.6	30.4	35.6	27.9	27.4	32.7	26	25.5	23.2	23.5	16.6	15.3	10.5	4.2	0.1	3.9	5.7	4.4	6.8	7.3	3.5	2.8	4.8	7.2	6.7	4.2	4.5	5.7	5.3	0.6	4.6	4.9	3.2	0.8
8/30/2021	6:00:00 AM	30.2	31.2	32	32	35.4	33.9	33.2	36.3	31.5	31.3	30.3	29.9	29	27	25	22.3	19.3	16.1	17	15.9	15	12.5	12.8	5.3	1.8	0.7	6.6	6.7	5.8	5.7	5.2	4.5	4.5	4.7	3	0.7
8/30/2021	7:00:00 AM	29.6	30.8	32.9	33.7	36.1	36.6	33.8	38.7	33.4	32.1	30.9	30.2	29.1	27.8	25.3	23.1	20.2	16.7	16.2	14.7	11.9	7.6	5.8	6	8.5	7.8	7.3	9.8	9.1	4.8	-3.1	-1	-4	-4.5	-2.9	-0.8
8/30/2021	8:00:00 AM	30	30.3	31.7	32.9	37	36.4	36.1	40.8	35.8	35.5	34	32.6	31.7	30.1	30	30.4	24.9	20.1	17	15.5	14.5	12.1	8.7	2.5	-3.1	5.9	-6.2	-5.7	4.5	1.6	-4.2	-4	4.1	-3.7	2.2	0.6
8/30/2021	9:00:00 AM	34.4	35.9	44.6	40.2	44.6	46.8	43.5	46.2	42.1	41.2	37.9	33.7	29.4	27.5	23.4	17.2	12	8.6	6.3	4	2.3	0.1	4.6	16.6	6.2	2.8	-0.1	-1.6	2.3	2.1	-2	2.2	2.9	-2.5	1.4	0.3
8/30/2021	10:00:00 AM	56.8	54	51.4	48.3	45.3	41.4	38.4	39	33.9	32.4	31.1	29.3	26.4	24.4	22.2	19.6	17.8	15.6	14.5	14.3	11.7	10.8	10.7	9.9	9.3	9.8	11.5	13.2	14.3	14.6	15	14.7	14	13.6	12.9	9.6
8/30/2021	11:00:00 AM	65.6	63.2	60.8	57.7	54.3	50.9	47.6	44.3	41.4	38.2	35.7	33.2	31	28.8	27.1	25.6	24.4	23.8	23	22.6	21.6	21	20.9	19.5	18.5	18.5	20	21.7	22.9	23.4	24	23.8	23.2	23	22.5	19.2
8/30/2021	12:00:00 PM	64.1	62.3	59.8	57.2	54	50.6	47	44	41.2	38.1	35.4	33.3	30.2	28	26.2	24.7	23.7	22.8	22.1	21.8	20.9	20.4	20.3	18.9	17.9	17.8	19.1	20.8	21.9	22.5	23.1	22.9	22.3	22.2	21.8	18.6
8/30/2021	1:00:00 PM	64.1	62.1	59.3	56.2	53.4	49.7	46.1	43.1	39.8	37.5	34.7	32	29.6	27.4	25.8	24.3	23.1	22.4	21.5	21.1	20.1	19.6	19.6	18.2	17.3	17.2	18.6	20.3	21.4	22	22.6	22.4	21.8	21.9	21.4	18.3
8/30/2021	2:00:00 PM	63	60.2	57.9	54.9	51.2	47.5	44.4	41.4	38.3	35.7	33.7	31.5	29.6	27.5	25.8	24.3	23.2	22.5	21.7	21	19.9	19.3	19.3	17.9	17	17.1	18.6	20.3	21.5	22.2	22.7	22.5	21.8	21.9	21.5	18.3
8/30/2021	3:00:00 PM	62.7	60	57.6	54.7	50.8	47.6	44.4	41.4	38.4	35.2	32.4	30.2	28	26.2	25	24.1	23.6	23.1	22.3	21.8	21	20.7	21.1	19.7	18.8	18.6	19.7	21.3	22.4	23	23.6	23.5	22.9	23.1	22.7	19.6
8/30/2021	4:00:00 PM	58.6	56.4	53.5	50.9	47.5	43.9	41.2	38.2	35.1	32.5	32.1	32.9	34.6	27.6	24.6	24.1	21.4	20.9	20.1	17.7	16.4	16.2	16.8	14.9	14	14.1	15.9	17.5	18.7	19.1	19.5	19.3	18.7	18.7	18.2	15
8/30/2021	5:00:00 PM	52.1	49.1	45.5	43.5	39.6	35.4	32.2	30.2	27.9	25.8	24.9	23.7	22.2	20.3	18.7	17.4	16.4	15.1	13.3	12.6	10.2	9.5	9.7	9.4	9.1	9.5	11.3	12.9	13.9	14.3	14.7	14.4	13.7	13.6	12.9	9.8
8/30/2021	6:00:00 PM	27.9	27.8	27.6	25.6	24.6	19.5	18.4	20.2	19.2	20.9	20.4	20.9	17.9	15.1	11.9	9.9	8	4	2.6	6.2	6.9	2.3	3.3	4.7	4	1.7	-0.3	-1	-1.5	-1.4	-0.3	-1	-2.1	-1.9	-1	0
8/30/2021	7:00:00 PM	28.2	28.6	28.4	25.3	23.8	20.3	20.9	26.2	22.4	23.6	22.5	22.1	21.6	20.4	18.4	14.1	7	2.6	0.7	-2.2	-3	-4.5	-3.5	-2.1	-3	-2.8	-2.6	-3.9	-4	-3.2	-0.7	-2.9	-3.5	-3.7	-2.3	-0.6
8/30/2021	8:00:00 PM	25	25.5	25.1	25.1	28.1	27.1	28.6	30.9	30.7	30.8	29.4	28.6	29.8	28.2	22.9	18.5	12.7	5.5	5.4	0.5	-6.4	-8.7	-8.5	-8.2	-7.5	-7.4	-4.5	-6.3	-5.7	-5	-4	-4.3	-4.2	-4.1	-2.5	14.9

8/30/2021	9:00:00 PM	25.6	26	25.4	26	28.6	25.7	26.5	28.7	27.1	27	26.3	26	24.4	22.6	20.9	18.8	18.1	12	7.3	2	-6	-9	-8.8	-8.7	-8.2	-7.7	-6.8	-6.7	-6	-5.3	-4.6	-4.4	4.3	-4.2	-2.7	-0.7
8/30/2021	10:00:00 PM	26.3	25.8	25.5	24.8	26.8	24.2	25.1	32.5	26.8	27.1	27.3	26	24.3	23	21.5	16.4	12.5	4.8	1.8	-0.5	-5.2	-8.6	-8.9	-9	-8.7	-8	-7.7	-7	-6.3	-5.6	-5	-4.7	4.6	-4.5	-0.4	5.1
8/30/2021	11:00:00 PM	26	26.8	26.3	26.3	30.7	23.8	24.1	35.1	24.9	24.9	22.5	22	17.4	16.3	15.3	12.8	12.3	1.5	-1.3	0.1	-2.3	-6.4	-7.4	-8	-7.9	-7.4	-7.3	-6.8	-6.2	-5.5	-5.1	-4.8	4.6	-4.6	-2.9	-0.7
8/31/2021	12:00:00 AM	25.8	25.7	24.1	23.9	28.9	23.7	23.3	34.8	23.7	24.9	20.9	21.3	15.6	13.8	11	9.8	9	0.1	-3.1	-1.2	-4.6	-6.7	-8	-8.9	-8.6	-8.3	-7.8	-7.1	-6.5	-5.7	-5.2	-5	-4.8	-4.7	-3	-0.8
8/31/2021	1:00:00 AM	34.5	33.3	30.6	28.1	28.6	24.9	25.5	28.9	23.6	22.5	19.7	18.9	13.4	10.5	8.6	9.1	7.9	-1.5	-3.5	-2.6	-4.2	-6	-6.5	-6.6	-6.3	-5.5	-4.4	-3.6	-3.2	-2.6	-2.3	-2.4	-2.4	-2.8	-2	-0.4
8/31/2021	2:00:00 AM	27.6	27.9	27.3	25.3	26.6	22.9	22.6	22.4	18.6	21.5	15.4	13.7	10.2	7.9	6	4.7	6.7	-4.2	-3.3	-0.9	-6	-8.3	-8.3	-8.9	-8.5	-8.1	-7.5	-6.8	-6.2	-5.5	-5	-4.8	-4.6	-4.6	-3	-0.8
8/31/2021	3:00:00 AM	29.6	28.5	27.5	24.8	25.2	21.7	19.6	23.4	17.7	20.3	15.7	14.6	12.3	11.7	8.4	6.3	2.3	-1.5	0.7	3.6	0.1	4	16.3	12.5	15.1	11	6.1	9.5	8.3	2.8	0.3	-2.2	-3.7	-4.1	-2.7	-0.7
8/31/2021	4:00:00 AM	29.9	29.4	28.9	27.7	30.6	23.8	22.9	28.4	21.7	23.4	19.4	18.9	14.4	13.1	10	7.6	6	-2	-1.9	-3.6	-6.2	-8.6	-9.1	-9.3	-9	-8.5	-8	-7.3	-6.6	-5.9	-5.4	-5.1	-4.8	-4.8	-3.1	-0.8
8/31/2021	5:00:00 AM	29.3	29.8	30.7	30.2	33.4	26.1	26.2	31.6	25.1	25.9	23	23.7	17.9	16.9	13.3	10.2	8.5	0.3	-0.4	2	0.9	-4.2	8.9	15	12.6	4.6	0.9	-2.6	-3.7	-4.3	-4.4	-3.8	-4.2	-4.5	-3	-0.7
8/31/2021	6:00:00 AM	29.5	30.11	31.2	31.3	34.2	30.3	30.2	36.7	30.6	30.5	29.4	29.1	27.4	26.4	24.4	22	19.2	17.1	17.8	16.2	14.4	10.8	12.5	13.8	13	11.8	12.1	10.8	3	-2	-4.4	-1.6	3.6	-4.7	-3.1	-0.8
8/31/2021	7:00:00 AM	28.3	29.2	30.2	29.9	30.8	28.4	28.7	34	30.7	30.7	30.2	29.5	28.4	29.1	28	24.3	19.5	15.8	17.1	15.5	12	8.6	4.2	-0.4	-1.4	4.6	8.5	12.2	15.4	8.8	-1.6	3.3	-3.8	-4	-2.5	-0.6
8/31/2021	8:00:00 AM	28.5	28.33	30	29.7	32.5	27.5	27.6	34.9	31.9	30.6	30.5	31	34.6	37.1	30.7	19.8	16.1	11.2	8.5	5.2	2.8	2.7	0.8	-0.6	-3.5	4.1	-3.4	-3.8	3.6	0.3	-3.6	1.6	-3.1	-3.7	-2.3	-0.6
8/31/2021	9:00:00 AM	32.5	31.55	32.1	32.1	35.5	30.9	29.9	37.8	31.4	29.8	30.3	29.6	25	24.6	22.2	19.2	15.2	11.4	7.4	9.8	11.4	5.6	15.3	20	26.7	18.6	14.2	18.3	14	12	6.1	2.5	-0.8	-1.8	-0.9	0.1
8/31/2021	10:00:00 AM	37.8	35.51	35.3	33.2	36	31.6	31.7	39.9	33.1	31.2	30.4	30.7	28.9	29	29.1	26.5	21.2	13.8	12.3	12.2	6.9	5	5.7	5.3	3.8	2	0.3	-0.6	-0.6	-0.2	1.5	4.9	0	-1	-0.3	0.2
8/31/2021	11:00:00 AM	36.8	34.99	34.5	32.6	35.7	31.1	31	41.8	32.2	30.6	30.3	30.3	26.2	24.9	22.6	18.5	17.6	14.6	8.9	9.1	7.1	5.6	6.6	5.3	4.6	3	1.3	0.1	-0.2	-0.4	-0.2	-0.1	-1.2	-0.5	0.5	0.7
8/31/2021	12:00:00 PM	44.3	42.22	39.9	38.6	36.6	32.7	31.5	40	30.7	28.6	27.5	27.6	29.5	27.1	19.4	14.7	12.5	10.3	8.6	8.3	7.1	6	7.8	5.5	5.2	5.2	5	5.9	6.6	6.9	7.3	6.8	5.9	6.1	5.6	3.6
8/31/2021	1:00:00 PM	52.9	50	47.3	43.1	40.7	36.7	33.8	32.5	28.9	26.6	25.1	23.5	20.7	19.7	18.4	17.4	16.5	15.2	13.8	13.2	11.7	10.5	10.9	9.4	8.8	9.3	10.6	12.2	13.2	13.7	14.1	13.8	12.9	13	12.5	9.5
8/31/2021	2:00:00 PM	46.6	44.4	41.4	38.2	35.3	33.9	33.5	33.6	32.9	33	32.4	32.6	32.3	31.5	28.4	24.4	20.1	17.3	16.2	14	11.2	9	9.2	7.8	7.3	7.6	8.8	10.3	11.3	11.7	11.9	11.4	10.4	10.5	9.8	7.1
8/31/2021	3:00:00 PM	50.5	47.77	45.5	41.6	38.8	35.6	33	29.7	27.3	26.3	23.9	23.5	24.2	21.8	20.5	19.3	17.7	16.2	15.1	15.4	13.5	12.3	12.2	11.4	10.3	10.7	12	13.6	14.5	15	15.2	14.6	13.7	13.6	12.8	9.7
8/31/2021	4:00:00 PM	41.3	39.33	36.8	33.1	30.6	28.6	27.1	26.8	26	25.6	25.5	30.3	31.3	31.2	23.4	21.1	17.4	14.7	14.1	13.5	11.3	10.4	9.8	9.9	8.3	7.9	8.7	9.6	10.6	10.8	11.1	10.8	10	10	9.3	6.7
8/31/2021	5:00:00 PM	36.1	33.34	30.7	29.3	28	26.1	26.2	26.9	27.1	27	27	26.5	24.8	22.9	21.3	18.2	13.8	9.6	8.5	8.4	3.7	3.4	4	6.2	4.7	3.9	4.9	5.1	5.8	5.8	6.1	5.8	5	5	4.5	2.8
8/31/2021	6:00:00 PM	28	28	28.4	27.1	25.8	24.3	24.5	25.2	24.8	25	23.9	23	21.4	17.9	15.3	15.6	10.2	4.9	2.5	0.9	-0.3	-0.6	0.5	0.8	-0.3	-1.2	-2.7	-2.8	-2.5	-3.1	-1.4	-2.3	-3.1	-2.9	-1.7	-0.4
8/31/2021	7:00:00 PM	28.7	28.89	29.9	28.1	27	26.3	26.7	27.2	26.5	26.3	25.9	25.5	24.9	23.1	19.8	13.9	6.7	1.5	-1.8	-3.1	-6	-7.4	-4.1	-5.7	-4.7	2.5	-1.5	-5.7	-5.5	-4.9	-4.4	-4.2	-4	-3.8	-2.4	-0.6
8/31/2021	8:00:00 PM	33.6	33.32	32	30.6	28.8	26.3	25.3	25.2	24.2	23.6	22.1	20.3	18	15.3	11.3	6.4	1.7	-2.6	-5.2	-6.4	-7.3	-7.4	-6.4	-5.6	-4.8	-3.9	-2.3	-1.3	-1	-0.9	-0.3	-0.6	-0.7	-1.3	-0.8	0
8/31/2021	9:00:00 PM	36.5	33.44	32.9	30.8	28.8	26.4	24.9	24.7	23.5	23.9	20.1	24.8	28.9	24.9	16.4	14.1	10	0.5	-5.9	-7.1	-3.8	11.3	11	18.9	12.7	8.8	-6	-6.1	5.4	4.8	-4.3	-4	-3.8	-3.5	-2.3	-0.6
8/31/2021	10:00:00 PM	27.6	26.44	25.6	24.1	23.6	22.8	22.9	23.7	23.8	24.5	23.6	22.9	27.1	26.7	21.2	13.3	7.7	2.5	-2.9	-7.6	-8.8	-9.1	-8.9	-8.6	-7	-6.9	-7.5	-6.8	-6	-5.3	-4.8	-4.5	-4.4	-4.4	-1.5	-0.6
8/31/2021	11:00:00 PM	27.4	27.88	27.2	24.7	23.2	22.5	23	23.9	23.9	25	23.2	22.7	21.7	19.7	17.1	13.7	7.9	4.8	3.5	0.1	-2	-5.2	-8.1	-8.9	-8.8	-8.4	-7.9	-7.3	-6.5	-5.8	-5.2	-4.8	-4.7	-4.7	1.7	9.4
9/1/2021	12:00:00 AM	26.6	27.99	26.8	25.3	25	24	25.5	26.4	26.7	27	25.7	24.7	24	22.9	19.7	15.6	10.5	5.7	3.6	1.2	-6.6	-9.6	-9.6	-9.4	-9	-8.5	-7.9	-7.3	-6.5	-5.8	-5.3	-5	-4.8	-4.8	-3.1	-0.8
9/1/2021	1:00:00 AM	33.7	32	30.3	28.5	27.8	24.5	23.7	28.7	23	23.7	21.7	20.9	18.6	14.8	10.6	6.6	2.1	3.3	-5	8.4	8.4	8.6	8.8	8.2	7.9	7.4	6.6	5.9	5.3	4.8	4.3	4.1	4	4.3	2.8	0.7
9/1/2021	2:00:00 AM	36.4	34.55	32.4	31	31.6	26.7	25.9	34.5	23.2	23.7	22	21.4	16.7	15.4	11.7	6.4	4.4	2.6	2	6.8	7.8	8.7	8.2	7.7	7.2	6.4	5.3	4.3	3.7	3.3	2.9	2.9	2.9	3.4	2.3	0.6
9/1/2021	3:00:00 AM	27.3	27.88	28.8	31.6	36.1	30.2	31.6	40.6	30.8	32.1	30.9	28.3	24.4	22.7	18.1	8.9	2.6	2.5	3.4	7.6	8.5	9.5	9.4	9.1	8.9	8.6	8.1	7.5	6.7	5.9	5.3	4.1	4.7	4.9	4.7	0.3

9/1/2021	4:00:00 AM		28	28.8	29.5	31.4	35.8	29.9	31.6	39.6	31.6	33.7	34.8	30.8	27.8	24.4	21.2	13.9	8.5	2.2	-0.5	-6	-8.5	-9.8	-9.7	-9.5	-9.2	-8.7	-8.1	-7.5	-6.7	-6	-5.3	-3.7	-4.8	-5	-3.2	-0.8
9/1/2021	5:00:00 AM	28.4		29.1	30.5	28.9	29.3	25.1	25	33.4	26.1	26.5	28.6	24.8	20.8	18.1	14.6	10.9	7	1.4	-0.2	-2.4	-5.7	-6.8	-0.5	2.2	1.3	-2.4	-2.8	0.1	-2.7	-6	-5.4	-2.3	-4.5	-5	-3.3	-0.8
9/1/2021	6:00:00 AM	30.4		30.7	30.7	29.1	29.6	27.6	26.9	36.1	26.6	27.3	27.5	24.7	23.3	20.9	19.2	15	11.3	6.4	6.6	10.9	8.3	9	23.1	25.9	27.5	19.3	15.2	15.6	13.3	7.1	0.6	-3.2	-4.3	-4.8	-3.2	-0.8
9/1/2021	7:00:00 AM	32.8		32.5	32.8	31.6	33.5	30.2	30.2	37.5	31	31.1	31.4	30.2	28.5	25.7	25.1	20.9	13.1	10	9.4	9.8	6.5	7.8	19.2	22.8	25.3	15.5	13.5	15.1	9.9	5.1	-0.1	-1.9	-2.3	-2.9	-1.9	-0.5
9/1/2021	8:00:00 AM	29.1		29.9	34.3	32.4	37.1	35.2	31.9	39.3	31.6	30.8	29.5	38.9	42.9	37.5	26	28.1	23.1	17	11.6	5.9	0.4	-2.1	-1.3	3.5	5.8	10.1	15.5	19.5	14.6	-1.5	-3.6	-4	-4.2	-4.1	-2.5	-0.7
9/1/2021	9:00:00 AM	32.6		31.9	32.2	32.3	34.9	31.6	31.7	38.5	32.4	31.8	33.3	33.4	36.7	36.4	30	19.8	13.9	10.2	9.6	4.5	-1.2	-2.8	1.1	5.9	3.6	0.1	-4.6	-1.8	-2.8	-1.4	-1.7	-3.4	-4	-3.5	-2.1	-0.5
9/1/2021	10:00:00 AM	32.9		31.2	31.2	31	33.6	29.9	28.5	38	29.4	29.6	30.9	29.1	26.9	25.3	23.9	20.7	14.2	8.5	9.6	9.1	4.7	2.6	6.4	10.8	6.8	1.9	1.2	2.1	0.7	1.9	6.5	1.7	1	0.4	-0.9	0
9/1/2021	11:00:00 AM	36.4		34.2	32.9	32.8	35.9	31	30.9	39.5	32.8	31.9	37.3	35.4	33.9	34.4	32	27.6	21.7	15.5	15.3	14.8	12.3	7.8	9.2	10.3	7.2	2.8	0.8	-0.2	-0.4	-0.4	-0.2	-0.7	-1.5	-1.3	-0.4	0.2
9/1/2021	12:00:00 PM	39.3		39.2	36.4	34.7	34.8	31.9	30.9	32.7	28.5	27	26.2	25.4	24	19.8	17.1	13.5	10.8	7.7	8.3	10.4	7.4	5.8	6.4	5.7	4.4	3	1.3	0.4	0.2	0.4	0.8	0.7	-0.8	-0.5	0.1	0.5
9/1/2021	1:00:00 PM	43.2		40.3	37.3	35.3	32.2	29.5	26.5	26.1	24.3	25.2	21.5	19.3	20	14.2	13.6	12.2	10.4	10.2	8.2	8.8	6.9	5.8	6.6	6	4.6	3.5	2.7	2.7	3.2	3.3	3.6	3.3	2.3	2.3	2.3	1.5
9/1/2021	2:00:00 PM	43.3		40.7	38.3	35.4	33.1	30.7	29.7	30.9	29	28.9	28.7	27.9	27	26.2	24.7	21.8	17.2	14	15.2	14	9.4	6.6	5.5	5	4.1	3.7	4.1	4.7	5.5	5.7	6	5.5	4.5	4.5	4.1	2.5
9/1/2021	3:00:00 PM	42		38.9	35.1	33	30.6	28	25.9	27.8	23.7	23.3	22.2	21.6	20.2	18.8	17.2	15.2	12.3	10.7	9.7	9	7.2	5.8	5.1	5.1	4	3.6	4.5	5.4	6.8	7.1	7.5	7.4	5.5	4.8	4.2	2.4
9/1/2021	4:00:00 PM	36.9		34.9	31.8	30.1	29	27.8	27.7	30.5	28.9	28.6	28.3	28.7	25.9	24.5	23	24.1	20.6	15.2	8.8	9	6.4	5.1	4.5	5.5	3.5	2.4	3.3	2.7	3.5	3.4	3.4	3.1	1.8	1.8	1.9	1.3
9/1/2021	5:00:00 PM	33.6		30.8	29.2	28.4	27.2	24.9	24.2	28.2	25.8	24.8	24.2	24.4	23.2	22.6	21.6	18.5	14	10.7	9.8	9.6	4.2	3	4.1	5.8	4.1	3	3.3	3.4	3.8	3.8	4	3.5	2.5	2.2	2.2	1.5
9/1/2021	6:00:00 PM	25.6		25.9	26.6	25.8	25.9	23.3	23.3	25.9	22.9	21.9	21.4	21	19.7	18.6	17.1	15.3	10.6	7.5	11	10.1	4.8	0.8	2.4	4.8	5.9	0.8	-1.6	-1.9	-2.8	-2.7	-1.5	-2.3	-2.8	-2.5	-1.3	-0.2
9/1/2021	7:00:00 PM	26.2		27.4	27.6	25	23.9	18.3	18.6	20.4	19.1	18.9	17.2	16.4	14.9	13.1	10.5	7.9	4.2	0	-3.2	3	-1.8	-4.7	1	-1.8	-2	-2.1	-2.5	-4.4	-4.3	-4.3	-3.6	-3.6	-3.7	-3.9	-2.4	-0.6
9/1/2021	8:00:00 PM	27.3		27.2	26.4	24.6	24.7	20.7	20.2	21.3	20.1	20.9	18.2	17.6	14.9	13.3	9.5	5.8	0.6	-4.3	-8	-8.8	-8.9	-9	-8.9	-8.6	-8.2	-7.2	-6.5	-6.6	-5.8	-5.2	-4	-4.4	-4.2	-4.3	-2.7	-0.7
9/1/2021	9:00:00 PM	31.5		30.7	29	27	25.6	22	20.5	20.9	19.3	19	20	24.8	32.7	35.5	29.9	18	17.4	8.5	5	0.6	-5.8	-8.8	-8.8	-8.6	-8.1	-7.7	-7.2	-6.4	-5.7	-5.1	-4.3	-3.9	-3.7	-3.7	-2.3	-0.5
9/1/2021	10:00:00 PM	26.6		25.4	24.9	23.3	23	19.1	17.4	18.8	15.2	14.4	14.3	14.1	10.4	8.8	6.5	1.9	-3.3	-6.3	-8.2	-9.7	-9.7	-9.6	-9.3	-8.8	-8.3	-7.7	-7.2	-6.5	-5.9	-5.2	-4.7	-4.5	-4.3	-4.5	-2.9	-0.7
9/1/2021	11:00:00 PM	25.9		25.6	24.4	22	22.1	17	16	18.3	17.9	19.4	12.5	12.4	12.9	12.6	3.7	-1.4	-4.1	-6.6	-5.2	-8.7	-8.7	-9.2	-9.2	-9	-8.6	-8.2	-7.5	-6.8	-6	-5.2	-4.6	-4.3	-3.5	-4.4	-2.8	-0.7
9/2/2021	12:00:00 AM	26.2		27	26.7	25.6	26	23.8	23	23.9	22	22.4	20	18.7	15.8	14.6	8.6	4.6	-1.3	-5.5	-6	-8.4	-9.1	-9.5	-9.2	-9	-8.6	-8	-7.3	-6.6	-5.8	-5.1	-4.5	-4.1	-2.9	-4.1	-2.6	-0.4
9/2/2021	1:00:00 AM	29.9		29.2	28.7	27.1	28.6	25.1	22.9	23.3	20	19.7	14.8	12.9	8.7	8	3.8	0.4	-5.2	-7.9	-8.9	-9.7	-9.8	-9.8	-9.6	-9.3	-8.9	-8.4	-7.8	-7.2	-6.4	-5.6	-4.9	-4.6	-2.4	-4.7	-3	0.1
9/2/2021	2:00:00 AM	30.8		29.6	29.5	29.2	33	25.5	24.2	28.9	23.3	22.7	18.8	18.5	14.1	14.1	8.5	5.4	0.9	-3.8	-7.4	-9.5	-9.8	-10	-9.6	-9.3	-8.9	-8.4	-7.8	-7.1	-6.4	-5.7	-5.2	-5	-4.7	-4.9	-3.2	-0.8
9/2/2021	3:00:00 AM	32.4		31.5	30.4	29.3	33.2	25.2	24.2	30.8	23.5	23.7	21	20.5	15.2	14.4	9.2	6.1	0.4	-3	-4.8	-8.5	-9.5	-9.9	-9.7	-9.3	-8.9	-8.4	-7.8	-7.1	-6.3	-5.7	-5.2	-4.7	-4.6	-4.8	-3.2	-0.8
9/2/2021	4:00:00 AM	28.4		29.1	29.4	31.4	35.1	29.2	28.7	34	27.6	27.1	24.5	24.9	20.6	20.3	14.5	9.3	2.4	-1.9	-4.1	-8	-9.3	-9.9	-9.3	-9.1	-8.9	-8.5	-8.2	-7.6	-6.8	-6.1	-5.6	-5.1	-4.9	-4.8	-3.2	-0.7
9/2/2021	5:00:00 AM	32.3		31.8	33.1	31.5	34.3	29.8	27.7	38.9	27.5	26.6	23.7	24.6	19.8	19.2	14.9	9.2	2.4	-1.7	-0.8	9.3	8.9	5.6	16.1	22.4	19.6	13	10.8	11.7	12.4	8.3	-2.1	-3	-3.8	-4.7	-3.2	-0.8
9/2/2021	6:00:00 AM	29.9		30.8	32.8	32	36.1	29.3	28.8	37.2	29.6	29.1	25.7	25.3	21.6	21	17.4	11.4	4.9	0	-2.7	-2.8	-6.2	-4.9	-5.4	6.9	10.7	15.6	15.2	16.5	17.2	2.6	-4.2	-4.6	-4.7	-5	-3.3	-0.8
9/2/2021	7:00:00 AM	30.8		31.8	33.5	34	39	33.6	32.7	39.8	34	33.1	32.7	31.7	34.3	32.7	30.1	23.5	20.3	18.3	16.4	17.2	10.1	3.4	8.2	11.9	16	8.8	2.9	5	1.9	0.9	-3.2	-2	-3.3	-4.5	-2.9	-0.7
9/2/2021	8:00:00 AM	31.4		31.6	32.8	33.2	38.2	32.3	31.5	41	34.2	33.5	32.1	31.1	29.6	25.8	24.2	21	18.9	13	13.4	14.5	12.3	10.3	19.9	25.7	29.3	22.3	16.8	22.6	16.5	10.6	4.9	1.8	-1.5	-2.8	-1.8	-0.5
9/2/2021	9:00:00 AM	34.3		33.2	33.4	33.6	38.9	31.6	30.7	40.1	32.7	32.2	27.7	27.7	23.8	23.5	19.3	16	10	7	4.8	1.4	-1.7	-1.6	-1.2	-1.8	-3.1	-4.1	-4.2	-3.6	-2.7	-1.9	-1.2	-0.8	-0.5	-1	-0.4	0.2
9/2/2021	10:00:00 AM	40.6		37.7	36.2	35	37.7	32.7	31.3	40.9	30.5	31.6	28.4	28	23.8	21.6	19.4	14.1	9.8	6.6	5.8	4.6	1.9	0.8	0.7	0.9	-0.1	-1.6	-2.4	-2.2	-1.9	-1.5	-1	-3.3	-1.3	-1.6	-0.8	0

9/2/2021	11:00:00 PM		41	37.8	36.5	35.1	37.5	32.8	31.9	40.9	34.9	31.6	30.1	31.2	27.4	26.8	24.3	23	19.7	14.9	15	10.7	8.1	7	7.1	6.2	4.9	4.1	3.5	3.6	4.3	4.8	5.2	5.1	4.6	4.8	4.7	3.2
9/2/2021	12:00:00 PM	40.2		37.8	36.1	34.4	35.4	31.6	30.8	38.5	31.3	30.5	30.6	30	27.3	26.5	24.4	19.8	14.5	11.6	13.6	12.8	8.5	6	6.4	5	4.1	3.5	2.9	3	2.6	3.6	11	5.1	3.6	4.7	1.4	1.1
9/2/2021	1:00:00 PM	42.5		39.8	36	33.3	31.2	28.8	27.4	30.1	26.8	26.4	26.2	26	31.1	35.1	26.1	22.5	17.7	14.6	14.3	11.5	8	7	6.6	5.6	5.4	5.5	6.3	7.6	8.5	9	9.3	9	8.1	8.2	7.7	5.3
9/2/2021	2:00:00 PM	51.3		48.9	46.6	43.9	39.3	35.6	33.7	31.8	29	27.1	29.6	27.3	25.1	22	21.4	18.2	16.8	15.5	14	13.1	11.4	10.6	10.5	9.5	8.6	8.8	10.2	11.9	12.9	13.5	14	13.9	13.1	13.3	12.7	9.7
9/2/2021	3:00:00 PM	57		54.6	50.7	47.4	43.7	40	36.8	33.7	30.8	28.1	25.6	24.1	21.2	20.2	19.5	18.7	18.3	17.4	16	15	13.4	12.6	12.5	11.4	10.8	11.4	13.2	14.9	15.9	16.6	17.2	17	16.3	16.4	15.8	12.6
9/2/2021	4:00:00 PM	53.6		50.1	47.7	44.7	41.4	37.7	33.2	30.6	27.6	25.9	25	42.4	42.8	42	27.2	27.6	24.6	18.6	18.3	17.9	13.2	11.4	11.5	10.7	10	10.3	12	13.7	14.7	15.2	15.8	15.7	15.1	15.2	14.6	11.4
9/2/2021	5:00:00 PM	52.4		49.1	46	42.5	39	35.3	33.6	31.5	30.5	30.1	28.9	28	26.9	25.7	23.5	21.2	20.1	18.7	17.3	16	13.8	13.2	13.3	12.2	11.6	12.1	13.9	15.6	16.6	17.1	17.7	17.6	17.3	17.1	16.4	13.2
9/2/2021	6:00:00 PM	39.6		36.6	36.8	33.8	30.1	26.4	24.3	22.4	21.1	21.2	19.9	19.8	22.6	20.5	17.7	17.4	16.9	15.4	14.1	12.9	10.3	9.1	9.8	10.9	12.4	10.4	11.1	12.7	13.5	13.8	14.3	14.1	13.7	13.3	12.5	9.4
9/2/2021	7:00:00 PM	30.6		30.3	29.7	27.5	25.6	22	22.3	25.6	24	23.7	23.1	23	25.7	33	28	22	13.4	10.5	7.2	5.2	3.2	2.3	2.7	2	1.9	3	4.9	6.3	7.1	7.4	8	7.9	7.7	7	6.4	4.1
9/2/2021	8:00:00 PM	30.3		29.7	27.9	26.3	25.9	23.1	23	23.7	22.6	24.2	22.4	21.9	20.4	18.9	16.1	11.8	5.8	-0.7	-2.6	-5.6	-8.1	-8.1	-7.1	-7	-4.9	-4.8	-4	-3.9	-3.6	-3.1	-2.4	-2.3	-2.3	-2.5	-1.5	-0.3
9/2/2021	9:00:00 PM	29.6		30.3	30	29.1	29.2	26.8	26.9	28.8	27.8	27.7	25.7	27.5	29.4	33.7	21.8	12.6	8.6	-1.6	-8.3	-9.3	-9.7	-9.6	-9.3	-9	-8.5	-8	-7.4	-6.8	-5.9	-5	-4.1	-4	-2.7	-3.5	0.7	4.6
9/2/2021	10:00:00 PM	34.1		31.9	30.8	29	28.4	24.7	23.8	28.6	24.8	25.9	24.6	24.2	22.3	21.3	19.6	11.4	4.2	1.7	-0.7	-6.3	-9.4	-9.7	-9.2	-8.8	-8.3	-7.7	-6.9	-6.1	-5.3	-4.6	-4.1	-3.9	-3.6	-4	-2.5	-0.6
9/2/2021	11:00:00 PM	25.4		26.6	25.5	26.6	32.7	25.1	27.4	33.8	28.6	28.5	28.8	28.6	23.4	25	24.6	12.5	6.3	-0.1	-6	-8.3	-9	-9.4	-9	-8.6	-8	-7.5	-6.8	-6.1	-5.6	-4.9	-4.4	-4.1	-3.7	-4.2	-2.6	-0.6
9/3/2021	12:00:00 AM	25.9		26.1	25.7	25	26.9	22.5	23.5	24.7	23.9	24.7	24.3	23.6	21.7	20.5	18.5	13.3	7.9	1.3	-2.3	-2.9	-7	-9.4	-9.3	-9.1	-8.9	-8.4	-7.9	-7.2	-6.4	-5.6	-5	-4.8	-4.4	-4.6	-2.8	21.3
9/3/2021	1:00:00 AM	24.8		24.8	23.3	22.1	25	18.7	18	25.6	18.5	19.7	16.1	17.3	12.5	13.1	14.4	1.7	-3.6	-7.1	-8.3	-9.3	-9.3	-9.8	-9.6	-9.2	-9	-8.4	-7.9	-7.3	-6.6	-5.7	-5.3	-5	-4.5	-5	-3.3	-0.8
9/3/2021	2:00:00 AM	22.6		22.7	22.8	24.3	25.4	20.9	20.6	28.2	19.4	19.4	19.3	20	16.3	16.5	18.4	9	4.6	2.4	3.6	4.8	12.4	16.9	16	18.5	14.3	10.3	-0.7	-5.9	-6.7	-6	-5.4	-5.1	-4.7	-5.1	-3.3	-0.8
9/3/2021	3:00:00 AM	24.8		26.3	24.8	24.1	28	22.9	21.6	23.7	20.4	20.3	18.9	19.2	13.6	12.1	10.6	0.8	-3.9	-7.6	-7.2	-9.2	-9.3	-9.8	-9.8	-9.5	-9.2	-8.8	-8.3	-7.6	-6.8	-6.1	-5.5	-5.2	-4.8	-5.1	-3.3	-0.8
9/3/2021	4:00:00 AM	23.7		25.4	26.2	24.6	24.9	23.8	23.9	25.2	24.5	26.5	24.3	23.9	23.3	22.4	19.9	14.3	7.4	7.3	10.1	7.7	0.6	-6.8	-9.7	-9.6	-9.3	-8.8	-8.3	-7.6	-6.9	-6.1	-5.6	-5.2	-4.8	-5.2	-3.4	-0.8
9/3/2021	5:00:00 AM	26.3		27.3	28.1	25.7	24.9	23.2	21.5	21	19.5	23.2	18.5	17.3	13.3	11.8	7.8	4.4	-0.5	-3	4.6	8.7	5.5	1.1	9.4	13.6	14.2	6.3	2.2	1	-2.2	-2.7	0.5	-0.9	-3.1	-4.2	-2.8	-0.7
9/3/2021	6:00:00 AM	29.7		30.5	31.8	30	28.9	28.2	28.6	29.2	29	28.4	27.8	27.3	26.1	25.1	22.2	18.2	13.6	11.9	11.1	8.5	6.9	7.7	9.1	10.5	9.8	11.6	13.7	12.2	4.3	-5.2	-5.3	7.5	-2.7	-5.1	-3.3	-0.8
9/3/2021	7:00:00 AM	29.2		29.9	29.9	29.7	28.1	27.1	26.7	27.6	28	27.9	27.2	40.6	41.3	34.2	27.4	27	23.9	17.6	19.5	17.8	12.8	6.2	0.5	-1	6	12.2	17.1	14.7	7.4	-4.8	-4.6	15.6	2.2	-4.7	1.9	-0.7
9/3/2021	8:00:00 AM	31.2		31.1	30.9	29.5	29	27.7	26.9	28	28.2	28.8	30.3	27.3	25	23.3	20.7	18.8	14.6	10.7	9.7	9	7.3	5.3	1.3	-4.6	-7	-7.1	-6.7	-6.2	-4.6	-1.1	-3.9	-3.9	4.2	-4.1	-2.6	-0.7
9/3/2021	9:00:00 AM	34.5		32.6	32.1	30.1	29.6	28.4	28.2	28.9	28.7	29.8	29.7	30.2	29.1	27.8	25.2	22.2	17.9	14	16.2	16	11.3	6.3	12.7	16.2	18.7	9.7	7.5	10.4	7.8	6.3	1.6	2.1	1.2	-1.8	1.2	-0.3
9/3/2021	10:00:00 AM	32.3		31.1	30.7	29.4	29.6	28.9	28.9	29.5	29.2	29.5	29.6	29.7	29.2	28.1	29.2	32.4	28.3	22.8	23.7	22.8	16.7	7.1	6.7	9.2	6.4	2.9	2.8	0.2	-1.4	-1.2	-0.3	-0.7	-1.7	-1.3	-0.8	0
9/3/2021	11:00:00 AM	39.7		38.8	35.8	33.7	32.2	29.9	29.6	29.1	28.5	28.2	28.1	30.4	28.7	27.3	26.6	24.7	22.3	17.1	17.4	21.5	13.9	6	5.1	5	3.1	1.2	-0.3	-0.3	-0.2	0.1	0.9	0.8	-0.5	-0.6	0	0.4
9/3/2021	12:00:00 PM	39.7		37.5	34.6	31.9	28.8	26.6	25.2	24.9	24.1	23.7	24.1	23.9	23.8	19.6	18.4	14.6	12.5	9.1	7.5	7.8	6.5	5	6	4.9	4.1	3.2	2.8	3	3.6	3.9	4.1	3.8	2.6	2.4	2.3	1.5
9/3/2021	1:00:00 PM	45.5		41.1	38	34.9	33.1	30.2	29.1	28.4	27.4	26.7	26	25.5	24.2	23	23.3	24.4	19.9	17.4	14	11.5	9.6	7.9	8.5	7.3	6.7	7	7.7	9.2	10.1	10.8	17.3	12.2	9.6	9.1	8.2	5.8
9/3/2021	2:00:00 PM	46.4		44.8	41.7	38.8	36.4	33.1	31.2	30	28.9	28.4	28.2	28.1	27.7	27.2	26.2	23	19.2	15.7	17.3	16.1	11.9	8.6	8.3	7.6	6.7	6.2	6.5	7.6	8.4	9	9.3	8.8	7.7	7.4	6.9	4.6
9/3/2021	3:00:00 PM	36.8		34.4	31.4	28.7	27.1	24.4	23	24.1	22.8	22.5	22.5	22.8	22.6	21.7	20.6	18.6	16	14.5	14.8	14.5	12.7	10.8	9.7	8	6.2	4.7	4.7	4.6	5.1	5.2	5.4	4.8	3.8	3.8	3.5	2.2
9/3/2021	4:00:00 PM	37.3		34.2	32.5	29.9	26.9	24.2	23.1	23.9	21.2	20.9	20.4	29.4	34.7	24.9	17.1	18.8	14.5	11.3	8.5	8.9	6.2	4.8	5.3	6.4	4.6	3.5	4.1	4.1	4.7	5	5.5	5.6	3.8	3.4	3.1	1.8
9/3/2021	5:00:00 PM	38.8		35.5	32.6	30.1	28.5	26.4	25.6	26.5	25.3	25.7	25.6	25.4	24.4	23.2	22.1	20.3	19.8	15.2	13.4	16.3	8.9	4.1	5.5	5.4	4.4	4.1	4.5	5.6	6	6.2	6.9	6.3	5.4	4.6	4.2	2.7

9/3/2021	6:00:00 PM	33.7	31.9	29.6	27.6	27.1	26.2	26.5	27.4	27.4	27.6	27	26.6	26.4	25.3	24.5	28.4	26.4	23.2	21.4	19.4	14.5	6	3.5	2.9	1.6	0.3	-0.5	0	0.1	1.6	0.8	0.2	-0.3	-0.7	-0.2	0.2
9/3/2021	7:00:00 PM	24.4	24.5	24.9	24.3	25.3	25.4	26	26.6	26.9	27.1	26.8	26.8	26.7	26.1	23.9	21.3	18	16.5	18.4	20.1	15.9	5.1	-2.4	-5.2	-5.1	-3.7	-2.3	-4.7	-4.8	-4.6	-3.5	-4.1	-4	-4.2	-2.6	-0.6
9/3/2021	8:00:00 PM	24.9	25.4	24.9	24.1	23.8	22.3	22.3	22.4	22.1	22.2	21.8	21.5	21.1	19.9	18.9	16.2	11.5	11.5	12.3	8.7	1.7	6.2	-9.1	-8.8	-8.2	-7.6	-6.1	-6.6	-5.8	-5	-4.5	-4.2	-4	-4.2	2.3	6.4
9/3/2021	9:00:00 PM	23.1	23.5	23.9		23.8	23.3	24	24.4	24.5	25	25.1	24.9	24.4	24.1	21.9	18.8	13.7	12.7	15.7	14.2	8.2	2.8	-9.2	-9.1	-8.7	-8.2	-7.8	-7.1	-6.3	-5.6	-5.1	-4.8	-4.5	-4.7	-3	-0.7
9/3/2021	10:00:00 PM	23.3	24.4	22.8	20.6	21.7	19.8	21.7	22.3	22.2	22.6	22.2	21.6	20.1	19.5	19	16.4	13	7.9	0.8	-1.4	-5	-8.9	-9.5	-9.2	-8.7	-8.4	-7.8	-7.2	-6.4	-5.7	-5.1	-4.7	-4.6	-4.7	-3.1	-0.3
9/3/2021	11:00:00 PM	22.9	24.1	22.6	20.7	22.1	19.1	19.1	19.4	18.6	20.6	17.1	16.2	15.1	14.9	13.3	9.1	4.7	2.8	2.3	-0.1	-2.1	-3.1	-7.5	-7.1	-8.8	-8.5	-7.9	-7.3	-6.4	-5.6	-5	-4.6	-4.4	-4.7	4.6	8
9/4/2021	12:00:00 AM	20.6	22.5	23	25.6	31	22.4	25.5	25	22	22.9	21.8	20.7	19.4	17.2	14.8	12.3	8.6	6.5	3.2	-2.5	-6.4	-8.9	-9.1	-8.6	-8.5	-7.9	-7.5	-6.6	-6	-5.2	-4.6	-4.1	-3	-4.4	-2.8	-0.6
9/4/2021	1:00:00 AM	27.3	25.7	23.9	21.3	22.3	19.7	18.5	18.6	16.7	17.7	14.6	12.6	10.4	9	5.6	2.2	-1	3.9	1.5	7.1	7.7	8.9	8.9	9	8.9	8.5	8	7.3	6.6	5.8	5.3	5.5	4.6	4.9	3.2	0.5
9/4/2021	2:00:00 AM	24.4	25.1	23.2	22.5	27.7	22.8	21.5	29.5	20.8	22.2	17.2	15.8	14.4	11.3	6.5	5.9	2	3.4	5	8.4	9	9.7	9.7	9.5	9.1	8.7	8.1	7.4	6.6	5.9	5.3	4.9	4.6	5	3.3	0.8
9/4/2021	3:00:00 AM	24.4	25.5	25.6	26.3	29.8	27.8	28.7	31.1	28.6	28.7	26.8	25.6	24.4	23.5	19.6	13.8	7.9	10.2	12.3	11.3	3.1	7.2	9.9	9.7	9.3	8.8	8.3	7.7	6.9	6.1	5.6	5.3	4.9	5.2	3.4	0.8
9/4/2021	4:00:00 AM	22.8	23.8	23	26.6	33.9	25.4	26.2	35.1	27	26.3	23.5	23.5	19.1	18.7	17.8	6.6	3.1	2.6	2.9	7.1	8.6	9.7	9.8	9.6	9.3	8.8	8.3	7.7	6.9	6.1	5.6	5.3	4.9	5.3	3.4	0.8
9/4/2021	5:00:00 AM	27.5	27	28.3	27.4	31.9	26.6	26.4	32.5	26.9	27	25.1	25	22	21.1	21	14.1	9.1	9.1	10.9	11	9.2	7.1	12.7	18.1	17.4	10.1	8.6	7.2	5.4	2.6	-2.8	9.8	3.7	-4.8	3.1	0.8
9/4/2021	6:00:00 AM	24.7	26.2	31	26.4	29.1	25.5	25.9	30	29.9	26.7	25.6	24.1	21.8	18.6	17.2	11.8	6.9	1.1	0.7	1.9	2	1.6	10.4	11.5	14.2	7.9	4.6	5.2	2.5	1.7	2.5	4.4	4.8	5.2	3.4	0.8
9/4/2021	7:00:00 AM	30.1	29.8	30.6	30.5	32.8	29.6	29.6	33.8	30	27.7	26.9	27.8	25.5	20	18.5	12.8	7.5	1.9	0.2	2.2	6.2	7.7	6.1	5	0.5	11.2	13	15.3	18.1	9.5	1	0.4	2.4	4.2	2.7	0.7
9/4/2021	8:00:00 AM	35.2	32.7	31.6	31.1	33.4	27.6	26.7	35.1	36.6	28.6	27	30.1	27.4	20.4	18.5	14.3	11.4	7.1	6.3	7.2	6.1	3	0.5	2.3	4.3	4.6	4.3	4	3.4	2.4	2.6	2.5	2.6	2.9	1.8	0.4
9/4/2021	9:00:00 AM	32.1	30.5	29.7	29.2	31.9	28.5	27.9	35.2	29.7	29.5	28	27.4	24.3	20.8	19.8	13.8	8.3	5.3	3.4	3.3	2.8	0.9	0.8	1.5	2.7	4.1	4.8	4.5	3.6	1.6	3	2.8	3.2	2.7	1.4	0.3
9/4/2021	10:00:00 AM	37.8	35.5	33.8	33.3	36.2	30.4	30.7	39.4	31.8	31.1	30	29.3	23.3	21.1	22.1	14.7	9.7	5.9	7.2	8.3	4.7	2.5	3.5	3.6	1.9	0.4	-1	-1.4	0.9	0.2	0	0.4	-1	-1.2	0.5	0.1
9/4/2021	11:00:00 AM	35.6	33.6	32.8	32.5	35.8	29.6	28.7	39.9	29.3	27.3	25.7	28.8	23.4	21.9	18.3	14.1	10.3	7.4	8	8	7.6	5.6	5.6	5.4	4.3	2.5	1	0.1	1.9	4.3	0.2	0	0.8	-0.6	0	0.4
9/4/2021	12:00:00 PM	34.9	32.8	30.9	29.3	29.9	25.5	24.8	29.9	24.9	24.3	25.4	21.9	18.2	15.6	14.2	11.8	9.7	7.7	7.4	8	7.4	6.6	6.5	5.4	4.4	3.1	1.6	0.5	0.4	0.6	0.6	0.5	0.4	-0.2	0.3	0.6
9/4/2021	1:00:00 PM	41.6	39.5	35.6	33.8	31.9	29	28.2	28.1	28.1	26.8	26.3	24.6	22.4	20.1	18	15.3	11.2	9.4	9.9	8.9	7.4	7	7.2	6	4.6	3.8	3.3	3.8	4.6	5.1	5.6	5.3	4.5	4.5	4.2	2.7
9/4/2021	2:00:00 PM	41.1	38.4	35.9	33.3	30.6	28.5	27.2	27.3	26.8	26.3	25.7	24	21.5	23	19.7	20.2	16	9.8	9.3	9.4	7.4	6.6	6.6	6.1	4.9	4.4	4.7	5.5	6.3	6.7	6.9	6.3	5.4	5.2	4.8	3.2
9/4/2021	3:00:00 PM	45.4	42.5	39.9	36.5	33	30.6	27.9	27.4	25	23.6	38.4	40.9	30.3	18.8	26.9	19	16.2	12.8	11.8	12.5	9.8	8.6	8.5	8.1	7.2	6.9	8.1	9.4	10.4	10.9	11.3	10.5	9.7	9.4	8.7	6.2
9/4/2021	4:00:00 PM	38.4	35.9	33.1	31.2	28.1	26.4	25.4	26.3	25.5	24.4	23.3	22	20.3	18.4	16	13.7	11.1	8.7	8.4	8.9	6.6	5.4	5.5	6.7	4.9	4	5.2	5.1	6.5	6.9	6.5	5.8	4.9	4.7	4.2	2.7
9/4/2021	5:00:00 PM	39.5	36.4	34	31.6	28.6	26.1	24.7	24.6	23.4	23.2	22.3	20.6	23.1	28.2	17.5	13.2	14.4	7.8	5.7	6.5	4.4	3.3	4	5.8	5	9.5	9.7	6.6	5.7	5.7	6	5.3	4.6	4	3.6	2.3
9/4/2021	6:00:00 PM	27	25.7	25	24.1	23.8	23.6	23.8	25.5	25.1	23.6	24.9	26.7	27.2	24.3	18.7	14.4	9.4	8.2	8	6.1	5.9	5.8	6.2	5.8	4.4	2.5	0.6	-0.8	-1.4	-0.4	-1.4	-1.5	-1.9	-1.9	-1.1	0
9/4/2021	7:00:00 PM	25.6	24.7	23.4	21.1	21.5	17.4	17.6	19.5	17.9	17.2	15.2	12.7	10.1	7.3	3.9	-0.7	-4	-5.8	-5.7	-1.4	-5.8	-4.6	-1.3	-4	-3.6	-3.7	-3.9	-4.8	-4.5	-4	-3.7	-3.6	-3.6	-3.7	-2.4	-0.6
9/4/2021	8:00:00 PM	21.9	21.1	20.5	20.1	20.5	19.1	19.2	20.2	17.7	18.2	16.1	14.4	11.3	8.4	4.4	0.6	-4.6	-7.2	-8.6	-9	-9	-9	-8.8	-8.5	-8	-7	-6.5	-6.5	-5.8	-5	-4.4	-4.2	-3.9	-4	-2.3	-0.5
9/4/2021	9:00:00 PM	19.8	20.3	20.3	20	21.2	20.5	21.5	22.6	22.6	23.5	23.5	21.6	35.1	39.6	26.1	20.8	27.8	14.1	7.5	13.4	7.7	-3	9.3	-9	-8.6	8.2	-7.6	-7	6.2	5.4	-4.9	4.6	4.3	-4.5	2.8	0.7
9/4/2021	10:00:00 PM	20.5	21.1	19.6	17.6	20	17.4	17	17.4	15.4	16.2	13.3	12.1	16.2	9.4	2.5	1.3	4.7	6.3	4.1	7.8	7.8	9.3	9.6	9.3	8.9	8.4	7.9	7.2	6.4	5.6	5.1	4.8	4.6	4.8	3.1	0.7
9/4/2021	11:00:00 PM	20.6	22.1	21.1	19.7	21.6	19.5	20.1	20.8	20.6	22	19.8	18.8	16.4	13.1	9.6	5.4	0.9	3	3.4	6.9	7.8	9.2	9.5	9.4	9	8.6	8	7.4	6.6	5.8	5.3	5	4.7	4.9	2.7	0.3
9/5/2021	12:00:00 AM	24.6	24.4	23	21.2	22.1	20	20.1	21	18.8	20.7	17	15.5	12.3	9.9	5.3	0.5	4.8	7.4	5.9	9.3	9.4	9.9	9.7	9.4	9.1	8.6	8.1	7.4	6.6	5.9	5.4	5	4.7	5	2.6	1.9

9/5/2021	1:00:00 AM	27.3	27.8	25.2		24	26.4	22.2	23.6	23.1	18.6	20.1	14.6	13.1		8.9	7.8	3.8	1.7	-3.1	-5.6	-6.8	-8.3	-9.3	-9.6	-9.4	-9.1	-8.6	-8.3	-7.7	-7	-6.2	-5.5	-5.1	-4.8	-4.6	-4.9	-3.2	-0.8
9/5/2021	2:00:00 AM	26.9	26.5	25	23.3	26.2	21.7	20.3	20.9	17.6	19.9	13.2	11.2	6.4	6.7	3.5	-1.7	-4.2	-7.4	-6.5	-9.8	-9.8	-10.1	-9.8	-9.5	-9.1	-8.6	-8.1	-7.4	-6.7	-5.9	-5.4	-5.1	-4.8	-5	-3.4	-0.8
9/5/2021	3:00:00 AM	24.3	25.5	24.9	24.9	30.6	20.2	20.4	31.3	20	22.9	17.8	16.6	11.7	10.6	7.2	1.7	-2.4	-5	-3.8	-9.4	-9.3	-10	-9.8	-9.5	-9.2	-8.7	-8.2	-7.6	-6.7	-6	-5.4	-5.1	-4.8	-5.1	-3.4	-0.8
9/5/2021	4:00:00 AM	24.4	24.9	24.3	25.1	32.6	22.2	23.1	31.8	23.6	24	20.4	19.9	14.5	12.4	9.2	3.1	-1.4	-4.1	-2.3	-8.3	-6.9	-9.1	-9	-9	-8.8	-8.4	-7.8	-7.2	-6.7	-5.9	-5.3	-4.9	-4.5	-4.9	-1.4	-0.3
9/5/2021	5:00:00 AM	23.4	24.6	26.1	29.4	38	27	26.9	37.2	27.5	26.6	24.9	23.6	18.1	16	12.4	3.7	-1	0.8	5.5	5.5	3.2	9.6	12.1	18.2	22.3	13.1	6.2	13.2	11.6	8.7	4.4	0.2	-3.8	-4.7	-3.3	-0.7
9/5/2021	6:00:00 AM	24.1	25.6	27	29.3	37.9	28.3	28.4	38.6	31.9	29.8	26.1	25.7	21.9	21.5	18.2	10.9	7.5	5.4	6.3	5.6	3.9	1.3	-0.7	1.6	2	3.6	5.5	1.9	-1.7	-4.6	-5.3	-5	-4.6	-5.1	-3.5	-0.8
9/5/2021	7:00:00 AM	27.2	27.6	28.6	28.5	34	27.5	27	35.4	28.9	28	25.7	24.1	21.8	20.1	17.3	13.6	10.5	6.4	7.7	8.6	7	3.4	0	-2.3	5.1	12.4	14.6	20.8	23.7	18.2	4	5.2	0.7	-2.3	-1.7	-0.4
9/5/2021	8:00:00 AM	32.4	31	30.1	29.6	32.6	27.8	27.4	31.7	28.5	29	24.6	24.1	23.3	19.6	16.9	14.2	11.1	6.7	5.8	4.3	2.2	0.2	-2.2	-1.6	3.2	17.1	13.8	17.3	16.4	10.2	4.1	0.6	-0.1	-2.3	-1.5	-0.4
9/5/2021	9:00:00 AM	23.8	22.7	22.3	21.8	25.6	20	20.2	28.4	21.1	21.2	20	21.6	21.7	20.3	14.4	10.4	9.5	9.1	9	9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	9	9

WM6: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
7/8/2021	4:00:14 PM	49.10346	20.27233	78.42617	47.06429	36.41551912	24.9183564
7/8/2021	5:00:00 PM	44.38217	20.74586	61.49934	48.17562	35.94034132	26.3037916
7/8/2021	6:00:00 PM	43.2747	22.25904	63.89091	46.51123	36.04897663	28.1031902
7/8/2021	7:00:00 PM	47.07366	17.69914	66.81913	41.01359	29.15978009	21.6527326
7/8/2021	8:00:00 PM	27.06009	14.70825	48.9022	28.64499	19.82883	16.5981227
7/8/2021	9:00:00 PM	30.11516	14.76572	52.93809	28.13645	19.76313396	17.0687435
7/8/2021	10:00:00 PM	36.81327	15.48373	63.71631	28.50294	21.96193236	18.8963088
7/8/2021	11:00:00 PM	22.34706	14.37957	36.86235	25.36158	20.31128322	17.047623
7/9/2021	12:00:00 AM	28.96895	13.77429	52.20962	26.20487	17.85065249	15.1783255
7/9/2021	1:00:00 AM	22.12866	13.59148	43.74514	20.51943	16.71837239	14.6325512
7/9/2021	2:00:00 AM	18.45748	13.49053	32.66772	20.83031	16.80725872	14.5435917
7/9/2021	3:00:00 AM	23.82135	13.77953	37.95239	27.40451	20.85234881	15.9761394
7/9/2021	4:00:00 AM	24.9955	14.14427	40.12323	28.85491	21.64319602	17.1875645
7/9/2021	5:00:00 AM	28.25011	17.59263	48.79535	30.32317	25.35304245	21.7339582
7/9/2021	6:00:00 AM	29.16743	17.61513	47.71873	31.27372	25.45363522	21.2267617
7/9/2021	7:00:00 AM	27.90133	17.40602	45.77067	29.96759	24.28626708	20.7685139
7/9/2021	8:00:00 AM	37.19574	17.16114	60.07627	30.1604	24.40334839	20.0563708
7/9/2021	9:00:00 AM	24.73562	15.87054	48.94391	26.15008	21.51233552	18.7925967
7/9/2021	10:00:00 AM	59.52711	15.77334	75.28034	46.39675	21.08183974	17.9687925
7/9/2021	11:00:00 AM	39.3207	16.97506	62.89273	36.56	22.78153785	18.7311824
7/9/2021	12:00:00 PM	28.11564	17.11673	50.80465	29.9784	22.30390828	19.1356542
7/9/2021	1:00:00 PM	34.04906	16.73114	53.51398	31.51564	21.8384773	18.3967895
7/9/2021	2:00:00 PM	37.34004	16.81169	63.7223	31.56294	23.99317238	19.1333157
7/9/2021	3:00:00 PM	41.20024	17.11547	66.9426	37.40589	25.91334576	19.4319151
7/9/2021	4:00:00 PM	37.77212	16.8123	64.06159	35.27962	24.78440394	18.8836871
7/9/2021	5:00:00 PM	38.45597	17.5665	60.23638	41.11353	30.34994016	20.7875126
7/9/2021	6:00:00 PM	32.47722	16.00457	52.33617	35.15106	25.04646926	18.4506628
7/9/2021	7:00:00 PM	30.81733	15.21928	51.59952	32.16142	22.70466699	17.2358182
7/9/2021	8:00:00 PM	29.0701	14.88359	50.29684	30.94801	22.90181063	17.7180075
7/9/2021	9:00:00 PM	29.01128	15.12101	50.00157	30.26674	22.2169976	18.0127067
7/9/2021	10:00:00 PM	29.56557	15.22959	50.2398	31.87224	22.22481176	18.3490865
7/9/2021	11:00:00 PM	27.58048	14.15778	45.77611	30.24005	19.67835343	15.8943205
7/10/2021	12:00:00 AM	25.88014	14.09729	46.82055	27.35351	19.63268709	16.623631
7/10/2021	1:00:00 AM	27.24973	14.04365	49.09151	28.87397	19.18632904	15.5100362
7/10/2021	2:00:00 AM	23.50714	14.09469	42.51992	26.08457	19.49690013	15.7472462
7/10/2021	3:00:00 AM	23.66702	13.87119	45.02766	24.38996	18.60824938	15.2984161
7/10/2021	4:00:00 AM	22.5585	13.93124	43.27282	23.86017	18.67879427	15.7240643
7/10/2021	5:00:00 AM	27.61675	15.25776	48.36567	28.16782	22.26925934	18.7042481
7/10/2021	6:00:00 AM	29.03676	15.0335	48.28005	30.56534	23.88387684	18.6944639
7/10/2021	7:00:00 AM	27.28544	15.37784	46.50635	29.94281	23.17937522	18.6941754

7/10/2021	8:00:00 AM	29.26394	16.02954	52.0426	31.73045	22.81366099	19.2500797
7/10/2021	9:00:00 AM	29.22884	17.95614	51.29846	31.10286	23.57762696	20.2209673
7/10/2021	10:00:00 AM	29.9999	17.04093	50.75023	31.38823	21.33505132	18.6620194
7/10/2021	11:00:00 AM	35.3319	17.27789	58.15164	33.94356	24.17240508	19.0489439
7/10/2021	12:00:00 PM	28.73683	15.9978	49.94255	30.64321	21.7733211	18.1190466
7/10/2021	1:00:00 PM	32.72508	16.69083	58.5892	34.04423	24.94082285	19.2004997
7/10/2021	2:00:00 PM	34.27212	16.64735	55.05232	36.74873	25.6640984	18.7519543
7/10/2021	3:00:00 PM	34.93307	16.57812	55.47312	35.1322	22.03875865	18.3593623
7/10/2021	4:00:00 PM	40.93864	16.85066	61.10511	44.61886	27.46578854	18.7603854
7/10/2021	5:00:00 PM	51.57878	22.72627	68.20598	55.92416	42.77904606	29.7661294
7/10/2021	6:00:00 PM	34.33737	15.54843	54.96016	35.75004	21.80611701	17.5268623
7/10/2021	7:00:00 PM	36.25763	15.32311	57.13334	39.68687	26.22449751	18.2943805
7/10/2021	8:00:00 PM	27.65821	15.22811	52.12149	29.62482	19.41321353	17.1365844
7/10/2021	9:00:00 PM	27.83236	14.72885	47.50391	29.56851	22.88234811	17.5752263
7/10/2021	10:00:00 PM	26.27931	14.38804	42.87492	29.57738	22.56098316	17.321844
7/10/2021	11:00:00 PM	28.109	14.71541	49.07254	30.22475	21.91335109	17.7199956
7/11/2021	12:00:00 AM	25.90257	14.71266	47.92102	26.12779	19.58945702	17.0412594
7/11/2021	1:00:00 AM	25.43343	14.33548	41.56774	28.81394	22.49805034	16.8398315
7/11/2021	2:00:00 AM	23.14713	14.23792	45.90244	24.89616	18.90686508	15.8924004
7/11/2021	3:00:00 AM	22.10723	14.46828	38.39875	25.10533	18.98304899	16.5602477
7/11/2021	4:00:00 AM	28.25081	14.84853	52.1033	28.79313	21.90612556	17.8684451
7/11/2021	5:00:00 AM	30.03168	17.01133	50.0777	30.83942	24.50842583	20.6319166
7/11/2021	6:00:00 AM	28.8707	17.0318	54.0404	31.50619	24.95867216	20.2998661
7/11/2021	7:00:00 AM	29.69566	17.63383	47.3939	32.60621	26.38073057	21.8160665
7/11/2021	8:00:00 AM	30.01147	17.92969	52.74641	31.34917	25.88485947	22.0004442
7/11/2021	9:00:00 AM	30.45884	17.15687	53.73749	28.82634	23.2841437	19.6065353
7/11/2021	10:00:00 AM	39.01737	17.34643	64.37162	30.18276	21.0044026	18.8241836
7/11/2021	11:00:00 AM	32.2436	16.88833	52.30057	31.62713	22.77047066	18.7591816
7/11/2021	12:00:00 PM	30.62648	16.5206	51.10075	32.46891	22.29546194	18.3098253
7/11/2021	1:00:00 PM	30.44663	16.02379	54.91729	31.6988	22.80655522	18.679461
7/11/2021	2:00:00 PM	33.99812	16.60042	62.40882	30.89728	22.60131318	18.4721641
7/11/2021	3:00:00 PM	41.01493	18.67191	63.32588	43.93052	31.6510331	23.5255316
7/11/2021	4:00:00 PM	47.07244	18.00599	66.31085	50.87908	36.6505745	22.8769853
7/11/2021	5:00:00 PM	44.86884	20.43046	61.95474	48.74526	39.09081282	28.7597378
7/11/2021	6:00:00 PM	34.09488	16.86471	52.23537	37.91448	25.83932223	19.550027
7/11/2021	7:00:00 PM	30.99961	15.57367	53.64542	31.27342	20.39480315	17.6983728
7/11/2021	8:00:00 PM	34.04003	14.78013	54.9688	32.21414	20.50308608	16.6638163
7/11/2021	9:00:00 PM	48.92706	15.74116	64.22783	53.91057	31.0935114	20.1108377
7/11/2021	10:00:00 PM	51.35949	24.79204	66.16455	55.48888	47.12274496	36.4159869
7/11/2021	11:00:00 PM	41.40741	15.22925	59.27958	45.31302	28.11854093	18.3871927
7/12/2021	12:00:00 AM	28.11982	14.78623	49.92064	29.75436	20.70176738	16.7696107
7/12/2021	1:00:00 AM	36.13703	15.61657	61.12711	34.64931	24.37759482	18.9876172
7/12/2021	2:00:00 AM	28.13284	15.45484	52.21223	29.31737	22.31491236	18.2538862

7/12/2021	3:00:00 AM	29.77433	18.50985	49.99302	32.35031	27.06892521	22.1933346
7/12/2021	4:00:00 AM	35.927	20.67918	53.7958	39.43747	32.28428524	26.1895831
7/12/2021	5:00:00 AM	34.77394	24.64125	54.29829	36.99262	32.74900824	29.0468631
7/12/2021	6:00:00 AM	34.22777	23.13621	51.95552	37.09697	31.69163902	27.8411364
7/12/2021	7:00:00 AM	34.81426	21.03056	49.38871	37.87899	32.92941198	27.6086986
7/12/2021	8:00:00 AM	58.98407	20.93914	74.89463	54.96023	32.47086961	26.2676339
7/12/2021	9:00:00 AM	47.37312	21.82981	70.52705	48.65894	38.9589644	28.4161458
7/12/2021	10:00:00 AM	37.97347	18.69787	58.41327	40.1129	29.48449732	22.3061486
7/12/2021	11:00:00 AM	44.29379	19.09457	64.74526	47.48764	37.17557378	24.7484202
7/12/2021	12:00:00 PM	46.55558	19.18879	64.53757	50.0009	39.19580262	25.9847492
7/12/2021	1:00:00 PM	46.77731	19.87646	63.87286	50.81167	39.85542901	27.6573636
7/12/2021	2:00:00 PM	49.76305	22.25352	66.55286	53.99066	43.33128302	31.9448547
7/12/2021	3:00:00 PM	46.25782	20.95839	64.29616	49.86247	39.71526492	29.5688383
7/12/2021	4:00:00 PM	42.98349	18.84799	63.95961	45.96323	32.28300258	23.3389479
7/12/2021	5:00:00 PM	46.31208	20.78291	65.30136	49.99424	39.02280166	29.0082645
7/12/2021	6:00:00 PM	43.35442	18.22435	61.50979	47.44488	36.69144263	24.5718143
7/12/2021	7:00:00 PM	31.52687	16.04745	54.37207	31.13713	21.31853014	18.2528294
7/12/2021	8:00:00 PM	26.47482	14.64121	51.16204	24.55213	17.74875356	15.7029261
7/12/2021	9:00:00 PM	38.8363	14.83163	59.51435	41.78599	22.11420831	17.2431195
7/12/2021	10:00:00 PM	22.51735	14.85095	40.03809	24.83931	20.3658822	17.666036
7/12/2021	11:00:00 PM	29.50985	14.96376	47.07999	32.90378	24.36782405	17.9973
7/13/2021	12:00:00 AM	31.86694	17.45859	48.55261	35.47574	27.70136429	22.1542894
7/13/2021	1:00:00 AM	32.17273	18.47263	46.9155	35.63599	29.31160094	23.5771288
7/13/2021	2:00:00 AM	37.28257	18.45738	55.39453	41.08624	30.58754277	22.0698771
7/13/2021	3:00:00 AM	34.36568	17.12899	53.4222	37.76522	29.42759379	21.5420955
7/13/2021	4:00:00 AM	27.76846	15.94336	46.16033	31.01223	23.76651295	18.9563095
7/13/2021	5:00:00 AM	32.99862	17.23393	67.45624	27.06523	22.92559157	19.9935869
7/13/2021	6:00:00 AM	32.49767	18.07802	55.49384	34.0967	26.74702814	22.2975524
7/13/2021	7:00:00 AM	31.84862	20.47247	51.21924	34.79288	29.046009	24.8210649
7/13/2021	8:00:00 AM	30.38282	17.96409	48.52635	33.70849	26.23105672	19.7461629
7/13/2021	9:00:00 AM	32.35483	17.58225	55.80234	32.70718	23.78838795	19.8452644
7/13/2021	10:00:00 AM	30.90017	17.31852	51.65524	32.10938	22.37664039	19.2649557
7/13/2021	11:00:00 AM	34.29608	17.29098	55.54962	35.97264	24.9735559	19.5859711
7/13/2021	12:00:00 PM	33.01244	16.83321	51.12171	36.80405	24.90802139	19.3878544
7/13/2021	1:00:00 PM	40.60781	17.51984	64.69637	41.27266	28.39240413	20.9750809
7/13/2021	2:00:00 PM	41.53161	18.53827	58.90036	45.5503	33.33201809	23.0575164
7/13/2021	3:00:00 PM	47.04334	18.64297	61.21148	51.49155	41.50250108	27.0042509
7/13/2021	4:00:00 PM	44.97216	19.17411	59.88821	49.28862	36.29499726	23.6841745
7/13/2021	5:00:00 PM	52.94182	25.75938	66.93092	57.48277	47.18903762	35.6357364
7/13/2021	6:00:00 PM	48.63372	31.17033	61.82202	52.33665	45.95373536	39.1527302
7/13/2021	7:00:00 PM	43.34453	19.29299	63.28613	46.89775	36.35848196	26.8950134
7/13/2021	8:00:00 PM	33.87071	17.06195	52.25476	36.94993	27.52787631	21.0408124
7/13/2021	9:00:00 PM	35.90837	17.38745	56.15339	39.26388	27.79037638	20.5801845

7/13/2021	10:00:00 PM	38.57921	17.72811	56.28105	42.63717	28.39902285	21.6436887
7/13/2021	11:00:00 PM	34.73004	14.94442	60.00609	30.22924	20.95963118	17.1012636
7/14/2021	12:00:00 AM	42.77375	15.56055	69.6985	31.43272	22.99157278	18.8104351
7/14/2021	1:00:00 AM	27.32974	14.38546	47.64056	30.19573	21.65326946	16.624234
7/14/2021	2:00:00 AM	27.46704	16.51065	43.94721	30.60242	24.60280073	20.0636291
7/14/2021	3:00:00 AM	26.80815	15.10051	42.38751	30.47196	23.26355166	18.2714134
7/14/2021	4:00:00 AM	29.79294	18.34427	48.85887	31.5995	26.00063391	21.9880191
7/14/2021	5:00:00 AM	30.52957	18.7589	50.29617	33.18964	27.22627726	23.1873744
7/14/2021	6:00:00 AM	34.39	20.2231	58.16857	35.02857	29.76548175	25.039376
7/14/2021	7:00:00 AM	33.9385	23.05315	53.93584	36.0579	31.23745038	27.2914975
7/14/2021	8:00:00 AM	37.39385	19.74041	61.39047	35.52125	29.77513761	24.6710746
7/14/2021	9:00:00 AM	33.33023	18.24467	57.292	33.53964	25.81692843	21.1180965
7/14/2021	10:00:00 AM	28.70383	18.64111	48.56605	31.74784	23.88455981	20.7523237
7/14/2021	11:00:00 AM	35.37894	18.24902	55.83137	38.6151	26.95012748	21.3727141
7/14/2021	12:00:00 PM	33.67149	17.83116	55.4241	36.56205	26.25389262	20.8427845
7/14/2021	1:00:00 PM	33.2588	16.93281	53.07762	35.84149	23.78644335	19.0383273
7/14/2021	2:00:00 PM	32.67361	16.94878	53.63639	34.45426	24.10106494	19.2816882
7/14/2021	3:00:00 PM	40.05684	17.84697	62.04774	41.6182	27.24002505	20.8214367
7/14/2021	4:00:00 PM	45.18276	19.95702	62.06311	49.28926	37.87934374	25.2416597
7/14/2021	5:00:00 PM	45.39583	18.96421	63.89846	48.85931	37.75667146	27.0348809
7/14/2021	6:00:00 PM	39.08557	17.59957	57.46677	42.58302	32.48731768	23.1457733
7/14/2021	7:00:00 PM	27.52087	15.26484	46.45308	30.59673	21.08273383	17.1985738
7/14/2021	8:00:00 PM	29.33083	14.29015	54.32672	26.70835	16.84611195	15.0989697
7/14/2021	9:00:00 PM	24.93752	13.88649	44.33737	26.45082	17.12251172	14.780107
7/14/2021	10:00:00 PM	28.62596	16.86911	47.40179	31.30361	24.56429383	19.9852358
7/14/2021	11:00:00 PM	28.98868	15.60499	49.29342	31.36413	23.12386719	18.8216551
7/15/2021	12:00:00 AM	27.65967	14.00608	48.74282	27.31368	19.24438103	15.8150836
7/15/2021	1:00:00 AM	38.71682	13.70617	64.78457	29.00511	18.55760384	15.2640551
7/15/2021	2:00:00 AM	24.63655	14.16824	40.90176	27.61505	21.52846618	17.265672
7/15/2021	3:00:00 AM	23.48182	13.84744	38.66652	26.49703	20.93891768	16.7223681
7/15/2021	4:00:00 AM	27.55337	14.91996	47.86348	28.80841	23.58572836	19.7052455
7/15/2021	5:00:00 AM	27.88813	18.27819	51.42843	30.48325	25.79050004	21.9317337
7/15/2021	6:00:00 AM	31.43213	18.66665	50.35676	33.52172	27.49896821	22.6923633
7/15/2021	7:00:00 AM	35.72315	20.01082	59.63824	36.72216	28.89519468	24.1403479
7/15/2021	8:00:00 AM	31.22995	17.83408	47.95207	34.58334	27.98041491	21.9072953
7/15/2021	9:00:00 AM	37.96427	17.23236	60.19089	33.39189	24.40666698	19.7620322
7/15/2021	10:00:00 AM	29.96597	17.27438	54.32916	32.95463	22.39274066	19.3168144
7/15/2021	11:00:00 AM	30.1607	17.13794	50.58477	30.55353	22.29810838	19.0683365
7/15/2021	12:00:00 PM	32.83211	17.33047	63.53778	30.67602	22.03292081	19.2107515
7/15/2021	1:00:00 PM	39.92975	17.69249	66.23921	42.92041	28.18515664	20.8682955
7/15/2021	2:00:00 PM	38.00413	18.21713	60.42753	40.75102	29.59924674	21.9559278
7/15/2021	3:00:00 PM	42.37824	18.79081	58.17689	46.40467	35.12869965	23.6084196
7/15/2021	4:00:00 PM	41.6264	17.78408	61.49735	44.32379	29.16555896	21.2799408

7/15/2021	5:00:00 PM	42.91433	18.88888	60.33709	46.72403	35.87912614	25.4775195
7/15/2021	6:00:00 PM	44.7635	23.0662	60.77158	48.65291	39.80219294	30.9708415
7/15/2021	7:00:00 PM	41.85822	18.21719	60.18704	45.66185	34.91794436	24.8964694
7/15/2021	8:00:00 PM	29.76237	15.09219	50.19035	31.87501	21.62250097	17.6295464
7/15/2021	9:00:00 PM	29.62574	14.20521	51.95547	25.89298	18.78767641	15.6797772
7/15/2021	10:00:00 PM	27.76639	14.0741	46.63664	29.32159	20.6376297	16.54185
7/15/2021	11:00:00 PM	30.46331	13.52837	47.41423	34.31059	18.79352172	14.8091627
7/16/2021	12:00:00 AM	25.34221	13.38771	49.77271	24.21483	15.89994259	14.3146613
7/16/2021	1:00:00 AM	25.3767	13.49082	45.43102	27.60952	18.90428138	15.0475447
7/16/2021	2:00:00 AM	21.26456	13.79157	36.74011	24.14341	18.06774722	15.3126557
7/16/2021	3:00:00 AM	25.98212	14.15906	46.11878	27.32381	20.99327276	17.2970004
7/16/2021	4:00:00 AM	23.84308	14.3131	40.47015	26.9165	21.58001578	17.7110235
7/16/2021	5:00:00 AM	28.65314	18.02355	46.86588	31.24583	26.30689832	22.4538611
7/16/2021	6:00:00 AM	37.80697	19.19703	61.391	36.81017	28.99036072	23.2965826
7/16/2021	7:00:00 AM	32.85822	20.42172	49.13897	35.63026	29.92732632	25.5711088
7/16/2021	8:00:00 AM	33.32972	17.53236	53.02236	35.1908	28.01530998	21.276135
7/16/2021	9:00:00 AM	40.25124	16.65551	66.67283	33.96095	24.12545977	19.1252364
7/16/2021	10:00:00 AM	28.20554	17.13588	51.05685	29.02259	21.16531196	18.8120358
7/16/2021	11:00:00 AM	30.92081	16.86016	51.53321	28.67352	20.86789075	18.3297419
7/16/2021	12:00:00 PM	29.03775	16.55819	50.01915	29.90779	21.82914555	18.2468468
7/16/2021	1:00:00 PM	35.39694	16.99833	55.74261	38.83551	25.67465959	19.9568362
7/16/2021	2:00:00 PM	41.41752	17.61011	60.47652	44.63186	31.11568994	20.3649252
7/16/2021	3:00:00 PM	44.02607	18.67494	61.57795	47.52603	34.72026389	24.0214203
7/16/2021	4:00:00 PM	40.08519	17.28548	58.36716	43.45973	28.53983544	20.3778023
7/16/2021	5:00:00 PM	48.13991	19.87262	65.28827	52.10451	41.89738237	27.7735143
7/16/2021	6:00:00 PM	47.75811	24.32469	61.94101	52.02189	43.85770635	34.2400929
7/16/2021	7:00:00 PM	42.84788	15.65446	60.53747	47.04312	28.92794264	18.8820631
7/16/2021	8:00:00 PM	27.25795	14.13538	50.01738	28.68534	18.66480572	15.782365
7/16/2021	9:00:00 PM	32.55687	13.58704	58.33492	27.81123	18.38796956	14.8503882
7/16/2021	10:00:00 PM	23.91093	13.52493	43.20649	25.24336	17.49974462	14.627268
7/16/2021	11:00:00 PM	24.46243	13.74047	42.78779	26.42341	20.69490293	16.8254717
7/17/2021	12:00:00 AM	20.56737	13.38956	37.7918	23.00936	17.7102046	14.548071
7/17/2021	1:00:00 AM	18.90815	13.30231	43.64545	19.3853	15.482475	14.1263751
7/17/2021	2:00:00 AM	22.72774	13.33753	43.58037	23.51383	17.51991402	14.6791726
7/17/2021	3:00:00 AM	20.37438	13.54458	36.97669	22.83714	17.58157084	14.9731023
7/17/2021	4:00:00 AM	24.62898	14.02734	44.0892	27.16667	21.00784666	16.92021
7/17/2021	5:00:00 AM	25.58037	14.36511	45.89236	28.06496	21.95673183	18.1035896
7/17/2021	6:00:00 AM	32.7541	15.91118	54.63662	33.12422	24.16096662	20.0550236
7/17/2021	7:00:00 AM	31.36975	19.03206	49.8681	33.5836	27.09779623	23.0113418
7/17/2021	8:00:00 AM	28.22078	16.53179	52.1795	29.94717	23.25229665	19.5230468
7/17/2021	9:00:00 AM	31.10185	15.96992	53.2344	30.9826	22.77518976	18.407383
7/17/2021	10:00:00 AM	33.31241	17.46112	51.2291	37.17298	26.89115844	21.2453761
7/17/2021	11:00:00 AM	34.57634	16.7397	55.54764	36.69002	23.67246165	18.9152066

7/17/2021	12:00:00 PM	26.66243	16.7322	52.04619	27.84012	21.28545542	18.5359903
7/17/2021	1:00:00 PM	38.05979	17.32621	62.53394	38.31137	26.51634968	19.8543254
7/17/2021	2:00:00 PM	36.34532	17.57283	57.14557	38.3758	25.61841084	20.1805957
7/17/2021	3:00:00 PM	38.76477	16.73463	61.13881	40.14697	26.20295724	19.0132207
7/17/2021	4:00:00 PM	41.26095	16.72265	63.7552	44.50847	31.78239641	19.6294915
7/17/2021	5:00:00 PM	40.66049	18.11208	58.38414	44.5666	33.9904461	23.2611993
7/17/2021	6:00:00 PM	43.63852	20.43878	60.0726	47.72297	39.05038591	29.5805809
7/17/2021	7:00:00 PM	39.06503	17.12067	56.83294	43.13455	31.45171329	21.4224579
7/17/2021	8:00:00 PM	31.80865	14.60921	58.49856	29.69168	20.93572168	17.1728021
7/17/2021	9:00:00 PM	29.20594	14.00669	52.84335	24.91591	17.97604852	15.1892339
7/17/2021	10:00:00 PM	23.94863	14.40364	39.89954	26.8968	20.68875068	17.239065
7/17/2021	11:00:00 PM	27.93268	14.07277	51.74295	28.15537	20.90721326	16.6136761
7/18/2021	12:00:00 AM	28.77656	13.72875	49.71649	29.0113	19.98378776	15.6378462
7/18/2021	1:00:00 AM	31.55549	13.47479	55.76617	26.01602	18.2084755	14.4962227
7/18/2021	2:00:00 AM	31.95944	13.74252	51.48491	34.11737	23.7679349	15.47429
7/18/2021	3:00:00 AM	25.06961	13.91902	42.07306	28.76639	21.57716897	16.8135567
7/18/2021	4:00:00 AM	24.59185	15.06702	43.53184	27.49763	21.76357749	18.0439295
7/18/2021	5:00:00 AM	30.31231	16.60571	52.05027	28.54417	23.46780414	20.034912
7/18/2021	6:00:00 AM	25.66932	16.71669	40.79999	28.4482	23.74325894	20.3222501
7/18/2021	7:00:00 AM	32.1394	16.6281	53.7641	34.11871	26.08148972	19.8845834
7/18/2021	8:00:00 AM	29.50366	17.11027	51.5983	32.40537	24.86375009	20.4830917
7/18/2021	9:00:00 AM	30.72398	16.87767	52.58605	31.84256	24.79297806	20.0020166
7/18/2021	10:00:00 AM	30.57138	17.19036	53.07817	31.57942	22.50951663	18.9613588
7/18/2021	11:00:00 AM	29.82642	16.68275	51.35357	31.9848	23.55188012	19.0725311
7/18/2021	12:00:00 PM	27.76182	16.51527	48.53189	30.02075	22.21383752	18.4160562
7/18/2021	1:00:00 PM	28.31993	15.90857	48.43958	30.97438	22.1897973	18.1886062
7/18/2021	2:00:00 PM	31.15836	15.75404	52.95909	32.52296	21.83008351	17.8441733
7/18/2021	3:00:00 PM	35.79607	16.57839	59.40582	36.31704	24.20333172	18.7449655
7/18/2021	4:00:00 PM	35.94967	16.86327	55.91932	38.84386	29.57319836	20.8732555
7/18/2021	5:00:00 PM	49.88221	21.02272	65.24612	53.60743	45.74821903	36.2422644
7/18/2021	6:00:00 PM	41.94083	16.78319	59.69255	46.03377	37.95259111	21.4948236
7/18/2021	7:00:00 PM	44.5953	24.19365	61.377	48.37376	40.46040048	33.0507087
7/18/2021	8:00:00 PM	40.08322	15.39562	63.00111	42.94583	32.08494679	18.5746245
7/18/2021	9:00:00 PM	27.26833	14.94877	44.7518	30.19992	18.07925023	16.5923974

WM6: Overall Hourly Intervals – C-Weighted							
Date	Time	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
7/8/2021	4:00:14 PM	65.00632	34.82004	88.65608	66.00686	50.79202	41.96872
7/8/2021	5:00:00 PM	73.36913	35.09902	89.211	77.96332	61.6273	43.56788
7/8/2021	6:00:00 PM	72.70472	34.46853	90.11006	77.02148	62.84279	43.26637
7/8/2021	7:00:00 PM	63.50531	31.55125	84.48087	66.35081	48.88685	38.7809
7/8/2021	8:00:00 PM	44.36915	26.58897	62.78012	47.58788	39.2663	32.95115
7/8/2021	9:00:00 PM	45.54853	27.03718	67.15883	46.46708	37.71874	32.96659
7/8/2021	10:00:00 PM	52.91766	29.73237	79.53987	47.43403	40.27022	35.97195
7/8/2021	11:00:00 PM	39.52922	27.03004	53.59867	42.38554	37.58506	33.41379
7/9/2021	12:00:00 AM	45.29624	26.02467	64.85972	46.93791	37.5356	32.71662
7/9/2021	1:00:00 AM	41.26167	25.26059	60.80054	41.85789	35.72985	31.71456
7/9/2021	2:00:00 AM	38.55384	25.45828	55.75512	40.38653	35.19975	31.3429
7/9/2021	3:00:00 AM	43.45925	27.52839	62.92105	46.80612	40.3311	34.18833
7/9/2021	4:00:00 AM	47.62687	28.44991	67.0636	50.43616	40.54786	35.24528
7/9/2021	5:00:00 AM	45.93711	35.00901	59.7057	48.83134	44.22329	40.45991
7/9/2021	6:00:00 AM	47.28822	34.90158	61.11551	49.70643	44.65343	40.50917
7/9/2021	7:00:00 AM	45.82029	34.30558	59.17814	48.3843	43.4917	39.90989
7/9/2021	8:00:00 AM	48.43755	35.29377	63.66715	51.27263	45.98597	41.43786
7/9/2021	9:00:00 AM	50.21961	35.50892	65.12932	53.43053	47.12653	42.4511
7/9/2021	10:00:00 AM	58.4326	31.63508	74.09182	55.07145	46.71941	38.98007
7/9/2021	11:00:00 AM	60.65113	31.52116	83.55543	60.86133	46.38729	37.9911
7/9/2021	12:00:00 PM	54.32121	30.69887	72.18406	58.06204	45.84362	37.38298
7/9/2021	1:00:00 PM	52.68161	28.71476	72.18277	55.42166	42.81444	35.14984
7/9/2021	2:00:00 PM	62.41783	29.37748	88.9377	58.06889	45.29872	36.6047
7/9/2021	3:00:00 PM	65.858	29.63771	89.31184	66.26159	49.10283	37.36218
7/9/2021	4:00:00 PM	62.98153	29.24717	88.75411	63.92826	50.02768	37.4055
7/9/2021	5:00:00 PM	65.81289	29.97083	82.57371	69.85028	58.00681	41.71725
7/9/2021	6:00:00 PM	61.81916	27.07882	81.38599	65.41335	50.98154	35.34637
7/9/2021	7:00:00 PM	48.14447	26.62177	66.59567	51.11609	42.28374	34.3826
7/9/2021	8:00:00 PM	45.72258	28.15148	65.12496	48.07937	41.17041	35.06267
7/9/2021	9:00:00 PM	44.88883	26.99935	62.21077	48.13716	40.03225	33.91954
7/9/2021	10:00:00 PM	46.54831	27.69423	66.7743	49.42764	39.70483	33.75571
7/9/2021	11:00:00 PM	44.68328	24.51293	61.40313	48.53825	37.82462	31.89762
7/10/2021	12:00:00 AM	44.0448	26.66234	62.88146	47.16954	38.44859	33.11546
7/10/2021	1:00:00 AM	49.87439	28.97456	73.77302	49.04496	40.31229	35.24535
7/10/2021	2:00:00 AM	49.74215	26.62601	67.86772	53.65751	43.46349	33.81234
7/10/2021	3:00:00 AM	41.94288	26.88651	60.55113	44.3514	39.10826	33.90305
7/10/2021	4:00:00 AM	42.52656	29.22556	58.39035	45.28951	40.13933	35.76649
7/10/2021	5:00:00 AM	47.55442	33.3285	63.78494	50.98337	44.34796	39.27758
7/10/2021	6:00:00 AM	48.84237	34.53086	64.96012	51.7088	45.76614	40.78322
7/10/2021	7:00:00 AM	47.03606	34.13634	61.07878	49.97558	45.30185	41.05698

7/10/2021	8:00:00 AM	46.61927	33.11882	61.32789	49.98606	43.49262	39.38806
7/10/2021	9:00:00 AM	48.7586	33.18758	75.03544	51.03096	44.35204	39.36678
7/10/2021	10:00:00 AM	48.78455	27.6376	68.66744	52.13397	41.9817	35.18322
7/10/2021	11:00:00 AM	52.42228	30.64966	73.28699	54.38018	44.37622	36.75831
7/10/2021	12:00:00 PM	51.59535	29.22683	71.29857	53.89922	41.98137	35.3422
7/10/2021	1:00:00 PM	59.62026	30.70174	85.37166	60.90546	47.1852	38.46877
7/10/2021	2:00:00 PM	62.61828	29.30341	82.42348	65.69354	49.6154	37.14624
7/10/2021	3:00:00 PM	62.30443	27.85181	82.89608	63.59694	45.91841	34.73572
7/10/2021	4:00:00 PM	61.01785	26.39534	85.2343	58.94209	42.05777	32.64866
7/10/2021	5:00:00 PM	77.53792	37.48742	91.9388	82.54495	67.46726	47.34786
7/10/2021	6:00:00 PM	61.40201	26.40282	83.87359	59.10513	41.93689	32.24865
7/10/2021	7:00:00 PM	66.37168	30.13082	85.84124	70.03385	55.58763	42.24449
7/10/2021	8:00:00 PM	53.88914	24.66461	75.78544	55.40985	35.80226	30.61677
7/10/2021	9:00:00 PM	40.95953	24.8597	58.86582	44.31082	35.5172	30.7741
7/10/2021	10:00:00 PM	43.99378	26.38771	61.96013	47.17225	39.86757	33.71815
7/10/2021	11:00:00 PM	45.38423	28.93594	62.28249	48.41459	40.60258	35.62214
7/11/2021	12:00:00 AM	43.64997	27.00786	63.85531	45.52762	37.82089	33.12353
7/11/2021	1:00:00 AM	44.65248	26.8579	63.51243	48.09938	39.58475	33.28504
7/11/2021	2:00:00 AM	42.31322	28.96745	62.50818	44.69383	38.9392	34.67959
7/11/2021	3:00:00 AM	41.6624	29.93557	55.7735	44.62453	39.60722	35.89844
7/11/2021	4:00:00 AM	44.92545	30.53006	62.51701	48.02869	41.57019	36.62339
7/11/2021	5:00:00 AM	47.20582	33.79426	64.19875	49.77187	42.78411	39.30728
7/11/2021	6:00:00 AM	47.27563	34.34891	63.60564	50.53786	44.22744	39.77758
7/11/2021	7:00:00 AM	51.27388	37.94677	65.87118	54.48476	49.15773	44.02427
7/11/2021	8:00:00 AM	53.44724	36.82772	68.11785	56.86811	50.84218	45.04388
7/11/2021	9:00:00 AM	50.31552	29.83383	69.35578	53.21386	45.66143	38.9963
7/11/2021	10:00:00 AM	53.27793	27.77943	77.84885	50.41416	40.12836	33.84769
7/11/2021	11:00:00 AM	54.67503	28.41897	72.67779	58.58136	46.5951	36.46807
7/11/2021	12:00:00 PM	59.36722	27.89479	81.44937	60.21658	44.53115	34.5422
7/11/2021	1:00:00 PM	60.55994	28.66881	83.34639	62.68442	49.20879	36.67014
7/11/2021	2:00:00 PM	55.73724	30.13168	79.35182	56.57538	43.79113	36.53838
7/11/2021	3:00:00 PM	70.42255	32.87064	88.19308	74.42487	57.78886	41.13545
7/11/2021	4:00:00 PM	75.63726	32.96593	90.4315	80.38171	65.81676	44.01212
7/11/2021	5:00:00 PM	74.58465	35.9803	89.05177	78.89475	69.569	55.63506
7/11/2021	6:00:00 PM	65.09771	29.9152	83.40291	69.05056	55.18452	39.03395
7/11/2021	7:00:00 PM	53.73576	28.70307	76.29613	55.19216	44.32909	37.27455
7/11/2021	8:00:00 PM	54.70597	30.01117	77.18726	56.66841	47.37525	38.95498
7/11/2021	9:00:00 PM	76.61382	30.37764	90.36939	81.89335	57.23185	38.88155
7/11/2021	10:00:00 PM	78.64538	39.28027	90.97643	82.84055	75.35707	62.58498
7/11/2021	11:00:00 PM	70.88954	30.24323	88.63089	75.16788	45.54611	37.39802
7/12/2021	12:00:00 AM	53.80433	29.37387	75.03998	56.27794	41.73427	35.59509
7/12/2021	1:00:00 AM	57.46443	33.66227	76.27397	61.17112	49.40687	41.39552
7/12/2021	2:00:00 AM	52.06802	32.16375	70.85712	55.13011	48.53648	41.87042

7/12/2021	3:00:00 AM	47.51105	33.45734	67.02576	49.25836	43.5787	39.64342
7/12/2021	4:00:00 AM	52.88341	35.6721	77.83104	54.31354	47.48757	42.01755
7/12/2021	5:00:00 AM	51.46805	41.16674	70.34047	53.72774	49.65212	46.22075
7/12/2021	6:00:00 AM	50.82668	39.58377	68.2247	53.36452	48.61635	45.04725
7/12/2021	7:00:00 AM	53.44655	38.64028	72.60507	55.62003	50.23829	45.37492
7/12/2021	8:00:00 AM	65.90107	37.15351	81.70854	69.45659	58.83311	46.21839
7/12/2021	9:00:00 AM	73.64841	37.03084	90.16104	77.8569	67.62823	50.01049
7/12/2021	10:00:00 AM	65.28651	32.22409	85.76638	67.98337	50.56096	39.84188
7/12/2021	11:00:00 AM	70.4541	33.70742	89.78397	73.27929	52.2604	42.22713
7/12/2021	12:00:00 PM	73.11381	33.95092	89.58924	77.39754	57.73782	42.01477
7/12/2021	1:00:00 PM	73.45358	35.14518	90.12604	77.92726	57.60588	44.05091
7/12/2021	2:00:00 PM	77.8488	37.58477	91.25229	82.67935	70.94617	47.0237
7/12/2021	3:00:00 PM	73.85172	37.05956	89.55392	78.22066	63.61274	47.51155
7/12/2021	4:00:00 PM	70.65368	34.84077	89.51182	74.50799	56.34484	42.28454
7/12/2021	5:00:00 PM	74.82993	35.43617	90.16801	79.3148	67.20297	47.24335
7/12/2021	6:00:00 PM	73.55207	32.89474	87.79772	78.08891	67.21687	45.71966
7/12/2021	7:00:00 PM	51.71348	28.79271	80.4248	47.39602	39.14008	34.73937
7/12/2021	8:00:00 PM	45.24852	25.98491	65.47994	46.68248	37.38927	32.60989
7/12/2021	9:00:00 PM	68.50663	27.0714	87.51483	71.77536	42.40871	34.00423
7/12/2021	10:00:00 PM	47.71297	30.23824	68.79474	50.92259	41.01759	36.44964
7/12/2021	11:00:00 PM	58.1438	31.66845	78.24649	61.28645	52.05958	40.06462
7/13/2021	12:00:00 AM	62.34641	34.70974	78.06001	66.28485	56.77535	46.11957
7/13/2021	1:00:00 AM	62.49158	40.6694	76.72253	66.12629	59.47034	52.71324
7/13/2021	2:00:00 AM	67.42569	32.8103	84.47466	71.50868	60.21876	41.51627
7/13/2021	3:00:00 AM	65.12598	35.16239	84.29698	68.69279	60.12103	47.32337
7/13/2021	4:00:00 AM	56.43013	30.63432	76.11025	60.558	48.22682	37.05791
7/13/2021	5:00:00 AM	45.33524	32.22645	68.12807	47.39802	42.05423	37.74666
7/13/2021	6:00:00 AM	48.7925	34.11558	66.22537	51.67872	44.8866	40.41529
7/13/2021	7:00:00 AM	49.62397	37.1589	65.90309	52.63036	47.21411	43.21197
7/13/2021	8:00:00 AM	49.75147	33.7241	70.53381	52.71392	46.46349	40.15849
7/13/2021	9:00:00 AM	57.36188	32.22772	75.67855	61.33811	50.52376	40.75963
7/13/2021	10:00:00 AM	54.44397	32.20718	74.4295	57.99998	46.79171	39.09149
7/13/2021	11:00:00 AM	60.57243	32.08135	83.52751	63.81309	52.05726	40.53877
7/13/2021	12:00:00 PM	62.9918	30.23266	81.3603	66.94749	52.38673	38.3703
7/13/2021	1:00:00 PM	67.96506	35.9395	89.09096	70.71839	56.19547	44.60004
7/13/2021	2:00:00 PM	70.71136	36.11121	87.07037	75.07957	58.68629	44.46226
7/13/2021	3:00:00 PM	75.9693	37.61076	89.80205	80.59912	70.44447	52.79252
7/13/2021	4:00:00 PM	74.08733	34.51709	88.82319	78.78851	65.82935	46.34165
7/13/2021	5:00:00 PM	79.4501	42.11308	92.32303	84.45803	72.06996	52.13175
7/13/2021	6:00:00 PM	75.24499	44.69503	88.57119	79.62958	71.19622	55.28614
7/13/2021	7:00:00 PM	72.17737	42.63766	88.01861	76.31341	65.62121	55.88179
7/13/2021	8:00:00 PM	62.3171	36.15938	81.33467	65.51731	55.08941	44.18551
7/13/2021	9:00:00 PM	64.24821	34.09808	83.35089	67.96337	46.77642	40.12843

7/13/2021	10:00:00 PM	65.10858	34.66198	84.64203	68.01148	52.51035	42.47732
7/13/2021	11:00:00 PM	54.87381	30.51646	75.05766	57.75278	46.15693	37.30329
7/14/2021	12:00:00 AM	53.13703	34.18567	76.04025	53.79526	45.43902	40.69565
7/14/2021	1:00:00 AM	49.36422	29.48693	68.96465	52.20126	43.02731	35.48253
7/14/2021	2:00:00 AM	46.91666	33.69299	65.12886	49.55997	44.95575	40.57377
7/14/2021	3:00:00 AM	46.93878	34.43723	65.03352	49.46049	44.68486	40.59546
7/14/2021	4:00:00 AM	49.09393	37.33467	67.62436	51.69769	46.5844	42.76888
7/14/2021	5:00:00 AM	48.93578	37.59513	66.17608	51.4541	46.54002	42.91913
7/14/2021	6:00:00 AM	50.45701	39.06351	65.71923	53.12283	48.58962	44.48591
7/14/2021	7:00:00 AM	50.78352	40.45591	64.63451	53.38434	49.574	45.86201
7/14/2021	8:00:00 AM	51.47298	37.61041	68.4857	53.92634	48.60675	43.96702
7/14/2021	9:00:00 AM	49.76951	33.97461	68.77148	52.43706	45.69796	40.1221
7/14/2021	10:00:00 AM	50.58811	33.06108	71.66796	53.85813	44.68078	39.11879
7/14/2021	11:00:00 AM	62.87506	33.55377	82.78053	66.20706	52.75311	40.93605
7/14/2021	12:00:00 PM	62.18575	32.55387	81.72144	65.45614	51.9156	40.03826
7/14/2021	1:00:00 PM	60.9806	31.4826	80.98058	64.47483	50.28107	39.39195
7/14/2021	2:00:00 PM	58.10731	31.85462	79.29314	61.08997	47.32414	39.17417
7/14/2021	3:00:00 PM	69.19358	34.1397	89.87068	71.06449	50.66143	41.24197
7/14/2021	4:00:00 PM	74.55039	35.49	89.59718	79.06277	66.70716	46.62498
7/14/2021	5:00:00 PM	74.33248	35.83968	89.44114	78.83843	66.24756	45.64997
7/14/2021	6:00:00 PM	69.8301	34.79866	86.87408	73.68787	63.03039	49.7315
7/14/2021	7:00:00 PM	57.97805	30.40585	76.79039	61.27481	49.61996	40.15969
7/14/2021	8:00:00 PM	45.09166	24.30563	66.00346	47.42493	36.34285	31.04562
7/14/2021	9:00:00 PM	44.38312	23.96093	62.16095	47.31067	36.75502	30.6608
7/14/2021	10:00:00 PM	47.53341	30.73803	64.40727	50.75791	42.65615	36.62069
7/14/2021	11:00:00 PM	47.38528	30.71996	63.83061	50.4658	42.46054	37.01109
7/15/2021	12:00:00 AM	46.04764	28.66379	64.86549	48.4599	39.91144	35.19506
7/15/2021	1:00:00 AM	50.84009	25.86072	76.25187	47.13261	37.36264	32.41038
7/15/2021	2:00:00 AM	49.00497	27.64686	70.40345	52.01382	40.37448	34.8472
7/15/2021	3:00:00 AM	42.67226	27.34996	61.07923	44.16617	38.56725	33.7631
7/15/2021	4:00:00 AM	44.12437	31.55968	61.14395	46.40952	41.52423	37.60679
7/15/2021	5:00:00 AM	45.43571	35.83778	60.61983	48.03597	44.15854	40.82592
7/15/2021	6:00:00 AM	48.91639	36.58704	64.9551	51.62112	46.26249	41.99227
7/15/2021	7:00:00 AM	51.90682	36.94286	71.44591	54.95655	47.4461	42.78891
7/15/2021	8:00:00 AM	50.13689	36.78075	64.75903	53.63375	47.59466	42.65242
7/15/2021	9:00:00 AM	54.14811	33.32728	77.82309	55.11416	47.26128	40.68672
7/15/2021	10:00:00 AM	54.9879	33.59189	77.70795	59.00355	45.85445	39.84428
7/15/2021	11:00:00 AM	52.96615	31.41229	72.15844	55.55594	44.93217	37.92386
7/15/2021	12:00:00 PM	58.29549	31.16998	88.0516	56.5967	42.3251	36.83765
7/15/2021	1:00:00 PM	67.91832	33.65827	90.71159	70.17797	49.63805	40.2985
7/15/2021	2:00:00 PM	65.94969	34.48132	86.65482	69.0163	51.29646	41.79193
7/15/2021	3:00:00 PM	65.88602	33.99777	84.78142	68.41299	51.43331	42.34375
7/15/2021	4:00:00 PM	68.9422	32.97703	88.35377	70.19172	48.84023	40.1519

7/15/2021	5:00:00 PM	68.22803	33.38882	87.70664	71.007	51.30896	41.4239
7/15/2021	6:00:00 PM	74.41553	36.15102	88.53919	78.97642	67.74518	46.80526
7/15/2021	7:00:00 PM	71.93375	35.12238	87.24254	76.23182	64.43653	51.21596
7/15/2021	8:00:00 PM	55.78739	30.81156	75.42427	59.54843	47.94739	39.20827
7/15/2021	9:00:00 PM	45.68746	26.91659	65.32716	47.90908	38.78699	33.37496
7/15/2021	10:00:00 PM	44.23536	25.68518	61.71343	47.19406	38.14943	32.28644
7/15/2021	11:00:00 PM	46.94433	24.09559	61.2537	51.99431	36.93054	30.47388
7/16/2021	12:00:00 AM	42.13855	26.28127	60.19931	44.25481	37.18234	32.59628
7/16/2021	1:00:00 AM	47.2475	27.43226	65.38463	50.74051	41.03794	34.40095
7/16/2021	2:00:00 AM	48.08816	26.18637	67.34743	51.76298	39.00207	32.71209
7/16/2021	3:00:00 AM	44.39447	28.62982	61.09323	47.47957	39.88185	35.19559
7/16/2021	4:00:00 AM	43.15221	29.31993	58.56112	46.17772	40.56048	35.88984
7/16/2021	5:00:00 AM	46.68362	34.98978	62.08654	49.35435	45.09776	41.03221
7/16/2021	6:00:00 AM	51.40051	36.73659	69.94767	54.20038	47.15043	42.47014
7/16/2021	7:00:00 AM	50.53412	37.8219	63.64226	53.87065	48.2154	43.73519
7/16/2021	8:00:00 AM	50.18139	35.65858	66.23166	53.14801	47.09376	42.28951
7/16/2021	9:00:00 AM	58.83057	30.55556	82.77038	56.47753	45.97021	39.01238
7/16/2021	10:00:00 AM	47.8183	31.29259	68.21369	50.66288	42.8143	37.70503
7/16/2021	11:00:00 AM	49.0513	28.53692	68.23449	51.99915	41.26559	34.91986
7/16/2021	12:00:00 PM	54.75878	29.27437	75.21569	56.89831	43.79658	36.00132
7/16/2021	1:00:00 PM	63.74557	32.13202	85.6376	66.68659	48.82004	39.44235
7/16/2021	2:00:00 PM	67.99034	32.44989	86.98611	70.52521	49.57274	39.72883
7/16/2021	3:00:00 PM	72.66149	33.74632	89.31736	76.93518	56.44286	42.5729
7/16/2021	4:00:00 PM	69.78047	30.60161	87.1063	73.54825	51.80769	38.05311
7/16/2021	5:00:00 PM	76.59916	35.27413	91.46629	81.22936	69.26718	45.24756
7/16/2021	6:00:00 PM	77.14159	39.68612	88.99506	81.41972	73.64527	61.15912
7/16/2021	7:00:00 PM	72.37047	31.24505	88.21409	77.01475	58.2054	40.4761
7/16/2021	8:00:00 PM	45.43621	26.76479	64.39995	48.88545	38.84841	33.83329
7/16/2021	9:00:00 PM	52.39201	24.61741	77.81082	47.25364	40.08173	34.52613
7/16/2021	10:00:00 PM	42.45705	23.79991	60.41892	45.22637	35.39645	29.92243
7/16/2021	11:00:00 PM	43.16403	25.22003	58.61027	46.2116	39.02886	32.37292
7/17/2021	12:00:00 AM	40.23913	23.60355	59.56144	42.94287	35.0724	30.12494
7/17/2021	1:00:00 AM	40.12484	23.83397	60.71314	44.12619	34.95531	29.65359
7/17/2021	2:00:00 AM	42.63585	26.06782	61.96632	44.9947	36.56734	32.14958
7/17/2021	3:00:00 AM	38.09979	26.29936	53.05548	40.92711	35.74866	31.94649
7/17/2021	4:00:00 AM	45.88657	28.07652	64.74513	49.28144	39.4521	34.05705
7/17/2021	5:00:00 AM	46.3875	30.68535	61.52963	49.8774	42.27988	37.34026
7/17/2021	6:00:00 AM	48.23137	32.55985	64.85813	51.14195	44.20588	39.51286
7/17/2021	7:00:00 AM	49.40424	36.80268	65.44329	52.18541	46.91705	42.72495
7/17/2021	8:00:00 AM	48.71067	36.03985	63.62515	51.77901	46.58787	42.34615
7/17/2021	9:00:00 AM	56.9619	33.56102	78.34065	57.72107	46.85258	40.33509
7/17/2021	10:00:00 AM	61.30205	37.85747	80.36715	64.6658	54.29787	46.74427
7/17/2021	11:00:00 AM	56.10841	31.48041	74.85516	59.19755	47.79543	39.82539

7/17/2021	12:00:00 PM	51.37192	29.93079	70.33518	54.8286	42.23406	35.97913
7/17/2021	1:00:00 PM	63.19196	31.7178	87.80744	61.30615	45.86237	38.52953
7/17/2021	2:00:00 PM	66.4269	31.55374	86.50092	68.53856	49.78588	39.26385
7/17/2021	3:00:00 PM	62.93121	29.43249	82.90694	65.62676	47.77429	36.11874
7/17/2021	4:00:00 PM	69.26781	29.14678	86.35733	73.0501	60.50949	41.14386
7/17/2021	5:00:00 PM	69.64861	33.58963	86.09127	73.79883	62.86301	49.44132
7/17/2021	6:00:00 PM	73.61452	37.33761	88.18947	77.72857	69.37909	57.11492
7/17/2021	7:00:00 PM	69.64189	34.64004	85.58754	73.97103	62.30159	48.72689
7/17/2021	8:00:00 PM	50.44363	28.41231	68.39595	54.14715	43.53558	36.17229
7/17/2021	9:00:00 PM	45.80004	25.06877	65.34443	48.00654	38.64554	32.22635
7/17/2021	10:00:00 PM	43.4856	32.45366	56.36067	46.33356	41.81266	37.77394
7/17/2021	11:00:00 PM	44.06006	24.86271	62.19753	46.48309	41.39054	31.56754
7/18/2021	12:00:00 AM	44.3543	23.43135	60.62987	47.81044	34.69215	29.76939
7/18/2021	1:00:00 AM	46.1126	24.22721	66.6703	47.60132	37.75827	31.4144
7/18/2021	2:00:00 AM	49.18971	26.4356	73.78465	49.18061	40.13746	33.63582
7/18/2021	3:00:00 AM	43.74036	27.98614	61.05302	47.34017	40.41341	34.18615
7/18/2021	4:00:00 AM	42.85894	31.138	62.46657	45.50949	40.71216	36.6388
7/18/2021	5:00:00 AM	48.157	32.87485	68.69764	46.38276	42.15543	38.46852
7/18/2021	6:00:00 AM	47.2856	35.18381	59.81589	50.65623	45.1974	40.90219
7/18/2021	7:00:00 AM	49.28138	34.35903	64.78219	52.8308	46.52879	40.92341
7/18/2021	8:00:00 AM	48.79745	34.88717	66.29836	51.96798	45.06632	40.75364
7/18/2021	9:00:00 AM	53.10858	33.92353	68.55532	56.76907	49.51654	42.79441
7/18/2021	10:00:00 AM	53.51232	33.76834	70.2738	57.42463	46.40395	39.7537
7/18/2021	11:00:00 AM	56.68337	32.78563	74.57188	60.7799	49.98405	40.98785
7/18/2021	12:00:00 PM	53.35345	31.07949	70.66684	57.05415	46.13354	39.00293
7/18/2021	1:00:00 PM	56.59818	29.03932	78.44466	58.78346	44.28684	36.02739
7/18/2021	2:00:00 PM	57.71098	29.02631	83.0568	57.36594	44.49829	35.7332
7/18/2021	3:00:00 PM	64.74823	29.26983	87.32276	66.71338	48.33049	36.68126
7/18/2021	4:00:00 PM	66.60679	31.40143	85.08527	69.97056	60.54113	48.88356
7/18/2021	5:00:00 PM	73.5267	37.51554	89.94173	78.23352	62.89154	48.31899
7/18/2021	6:00:00 PM	63.01904	32.82494	82.71035	65.65621	49.87052	40.60775
7/18/2021	7:00:00 PM	71.18421	35.54907	88.24231	75.72791	56.6373	43.68477
7/18/2021	8:00:00 PM	57.99661	30.66932	81.4016	59.42875	46.77202	38.298
7/18/2021	9:00:00 PM	45.44317	28.32458	60.94934	49.84722	36.45147	32.72571

WM6: Overall Hourly Intervals – Unweighted							
Date	Time	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
7/8/2021	4:00:14 PM	77.6668	40.06706	97.43087	80.78414	64.59871	50.18184
7/8/2021	5:00:00 PM	84.98809	40.75335	99.59323	89.84821	76.64969	52.04211
7/8/2021	6:00:00 PM	84.54713	40.93479	99.30537	89.1313	77.84625	57.23156
7/8/2021	7:00:00 PM	76.96975	37.7945	95.47875	80.81778	64.50094	48.65889
7/8/2021	8:00:00 PM	50.12375	32.43955	74.58102	52.02746	45.54998	40.52643
7/8/2021	9:00:00 PM	50.2024	32.01072	70.53202	52.76512	45.44576	40.35271
7/8/2021	10:00:00 PM	54.51843	34.67483	79.86154	53.50897	47.90301	42.98585
7/8/2021	11:00:00 PM	46.72037	32.35855	60.28428	49.7813	44.81466	40.26688
7/9/2021	12:00:00 AM	52.95086	31.80114	70.64479	56.56207	44.98683	39.79468
7/9/2021	1:00:00 AM	50.27699	32.22647	70.28728	52.93033	45.4179	40.56395
7/9/2021	2:00:00 AM	49.70773	32.1308	68.14342	50.43139	44.29077	39.75998
7/9/2021	3:00:00 AM	53.69209	34.34404	76.29235	56.14611	48.41154	42.41485
7/9/2021	4:00:00 AM	59.53596	33.73423	79.08838	62.06968	47.48069	41.65325
7/9/2021	5:00:00 AM	53.47927	38.69704	69.82885	56.35575	50.84456	46.40734
7/9/2021	6:00:00 AM	51.81484	39.2553	63.94015	54.41464	50.17062	46.18389
7/9/2021	7:00:00 AM	50.7429	38.82045	63.86014	53.34112	49.21005	45.48479
7/9/2021	8:00:00 AM	54.54704	39.64129	71.18635	57.52505	51.47271	47.04206
7/9/2021	9:00:00 AM	60.37655	41.0737	75.29221	64.27503	55.85528	49.23876
7/9/2021	10:00:00 AM	65.35423	38.55954	81.97104	67.74146	58.03288	48.06937
7/9/2021	11:00:00 AM	65.74428	37.38039	86.63934	68.49494	55.35079	45.7404
7/9/2021	12:00:00 PM	67.92037	36.57696	85.44134	71.81793	55.38307	44.67771
7/9/2021	1:00:00 PM	64.9301	35.12069	85.75787	67.302	52.19002	43.81431
7/9/2021	2:00:00 PM	72.49461	35.99557	97.43753	71.39336	54.82595	44.68583
7/9/2021	3:00:00 PM	75.9634	36.47266	95.33617	79.078	60.04122	46.29631
7/9/2021	4:00:00 PM	73.261	35.73029	94.73125	76.7293	62.65343	46.02105
7/9/2021	5:00:00 PM	78.54745	36.92657	93.99017	83.01606	72.06183	54.56971
7/9/2021	6:00:00 PM	74.77897	34.77432	93.87843	78.68168	64.74198	46.16819
7/9/2021	7:00:00 PM	58.05108	34.3445	77.14841	61.39345	52.88605	44.28144
7/9/2021	8:00:00 PM	50.55457	33.73527	66.77499	53.58217	47.79896	42.06435
7/9/2021	9:00:00 PM	49.55382	32.63561	64.6345	52.96566	46.19967	40.87802
7/9/2021	10:00:00 PM	52.02801	32.68798	73.88499	54.1083	45.75625	40.18457
7/9/2021	11:00:00 PM	50.04054	30.71256	69.09499	53.14801	44.03251	38.5174
7/10/2021	12:00:00 AM	48.01728	31.89525	66.14563	51.04175	44.85803	40.17649
7/10/2021	1:00:00 AM	62.26181	34.528	87.02885	55.40898	47.43596	42.30671
7/10/2021	2:00:00 AM	63.17113	33.53722	82.00111	66.96305	56.09584	42.47805
7/10/2021	3:00:00 AM	50.49128	32.4734	71.50138	52.51046	46.57972	41.33763
7/10/2021	4:00:00 AM	52.27779	35.09008	71.43984	54.98741	48.04614	42.98699
7/10/2021	5:00:00 AM	58.06746	37.93439	77.01175	62.34648	51.7453	45.4518
7/10/2021	6:00:00 AM	57.65158	38.74754	77.40568	60.33256	51.47357	46.04044
7/10/2021	7:00:00 AM	55.03283	38.71781	73.54322	57.40137	51.19813	46.63584

7/10/2021	8:00:00 AM	51.86324	38.27241	66.75193	54.95414	49.42965	45.26368
7/10/2021	9:00:00 AM	58.18397	38.15951	87.33171	58.48469	50.60266	45.68675
7/10/2021	10:00:00 AM	60.83693	34.29532	83.43537	63.36794	50.03088	43.0171
7/10/2021	11:00:00 AM	64.01601	35.18587	86.73466	65.1452	50.65369	43.30277
7/10/2021	12:00:00 PM	64.0097	34.77518	84.16304	65.76025	50.75555	42.67966
7/10/2021	1:00:00 PM	72.05214	36.61206	97.48294	73.80704	56.7591	44.88254
7/10/2021	2:00:00 PM	75.00808	34.68262	94.11224	78.56018	61.52764	43.96041
7/10/2021	3:00:00 PM	74.70492	33.93247	94.38625	76.84616	58.25221	43.13134
7/10/2021	4:00:00 PM	74.22621	30.7581	97.13636	74.27748	51.47378	39.72816
7/10/2021	5:00:00 PM	88.40529	42.71233	101.2758	93.36569	81.44093	60.24077
7/10/2021	6:00:00 PM	74.07938	31.4641	95.84822	73.07605	54.433	39.63423
7/10/2021	7:00:00 PM	78.98308	36.10817	96.21925	83.22136	69.19602	52.72757
7/10/2021	8:00:00 PM	67.45722	30.86933	89.83231	68.9251	44.35398	38.92131
7/10/2021	9:00:00 PM	46.29235	30.46073	63.15834	49.33701	43.07735	38.44474
7/10/2021	10:00:00 PM	52.74814	33.09694	74.5837	54.2455	46.59968	41.3781
7/10/2021	11:00:00 PM	53.72934	33.5928	70.84944	57.14012	46.99672	41.38166
7/11/2021	12:00:00 AM	49.66972	32.50162	68.22369	52.55392	45.13999	40.08311
7/11/2021	1:00:00 AM	54.78457	31.43873	79.22285	55.349	45.87946	39.48787
7/11/2021	2:00:00 AM	51.58995	32.88244	69.91535	53.7016	45.92006	40.70744
7/11/2021	3:00:00 AM	50.19234	34.38676	68.02285	53.40922	46.48994	42.04063
7/11/2021	4:00:00 AM	51.85585	35.41653	68.10424	55.06281	47.75986	42.8073
7/11/2021	5:00:00 AM	52.07498	38.12583	69.49014	54.93124	48.67791	44.83154
7/11/2021	6:00:00 AM	52.83191	37.94459	70.72521	55.79908	49.48304	44.74078
7/11/2021	7:00:00 AM	56.65948	41.62002	75.35128	59.46547	53.42406	48.47269
7/11/2021	8:00:00 AM	65.4336	41.90469	81.41684	69.24345	61.78653	53.51073
7/11/2021	9:00:00 AM	61.80516	36.42393	78.41763	65.50676	54.47297	45.40453
7/11/2021	10:00:00 AM	58.83479	33.83349	80.27008	61.06528	48.44907	41.64739
7/11/2021	11:00:00 AM	67.16092	34.10272	84.66448	71.2277	57.48462	44.00567
7/11/2021	12:00:00 PM	72.72659	33.54497	94.04181	73.74845	55.84831	42.61239
7/11/2021	1:00:00 PM	73.74384	35.16621	97.22687	76.18139	62.37861	45.25655
7/11/2021	2:00:00 PM	68.4569	35.32627	90.76371	70.305	53.05004	43.405
7/11/2021	3:00:00 PM	82.41029	38.2519	98.05698	87.00994	72.30415	49.58791
7/11/2021	4:00:00 PM	86.44612	38.96252	99.4589	91.34431	79.32574	55.0322
7/11/2021	5:00:00 PM	85.91466	43.20435	98.46932	90.21738	82.24513	70.21285
7/11/2021	6:00:00 PM	77.50279	37.18713	94.63379	81.77484	69.13094	49.77419
7/11/2021	7:00:00 PM	66.69326	36.96931	88.11328	68.50625	56.54165	47.73485
7/11/2021	8:00:00 PM	67.84842	38.5745	89.10217	70.21953	60.67715	51.32803
7/11/2021	9:00:00 PM	87.39877	37.15651	99.98281	92.71168	70.27852	48.2357
7/11/2021	10:00:00 PM	89.7607	46.40461	100.8965	93.72467	87.54515	76.66226
7/11/2021	11:00:00 PM	82.31055	35.79878	98.38087	87.27698	56.16521	45.49075
7/12/2021	12:00:00 AM	67.4634	34.63303	87.62847	69.99601	51.48886	43.23501
7/12/2021	1:00:00 AM	71.27604	39.97844	88.7375	75.29354	62.20437	51.72451
7/12/2021	2:00:00 AM	66.15238	40.00442	87.58064	69.17439	61.69451	54.1472

7/12/2021	3:00:00 AM	59.92163	37.55532	81.26	60.69028	50.33139	45.53999
7/12/2021	4:00:00 AM	64.87709	39.8141	92.89965	60.89436	53.05369	47.66445
7/12/2021	5:00:00 AM	59.77306	43.57949	84.66303	59.8655	54.27698	50.24138
7/12/2021	6:00:00 AM	55.85146	42.6627	81.55319	57.56772	53.05355	49.14643
7/12/2021	7:00:00 AM	63.79147	42.17081	85.42464	64.86503	54.9911	49.7562
7/12/2021	8:00:00 AM	78.67094	41.739	94.03628	82.89013	72.84083	56.68195
7/12/2021	9:00:00 AM	85.74915	41.97538	99.15155	90.16315	81.33531	64.75473
7/12/2021	10:00:00 AM	77.71581	38.19889	96.50807	81.06901	64.70212	48.34312
7/12/2021	11:00:00 AM	82.39366	39.91829	98.84289	86.75222	67.52398	51.56853
7/12/2021	12:00:00 PM	84.93591	39.79206	99.59765	89.82048	74.60143	52.21798
7/12/2021	1:00:00 PM	84.76696	40.97861	99.66443	89.72214	73.61382	53.90474
7/12/2021	2:00:00 PM	88.65172	43.45657	100.877	93.29233	84.33715	60.92056
7/12/2021	3:00:00 PM	85.47476	42.94864	99.35293	90.15624	78.89018	61.61585
7/12/2021	4:00:00 PM	82.57808	41.35858	98.67885	87.18908	71.6292	51.34788
7/12/2021	5:00:00 PM	86.35021	41.80713	100.0924	90.92649	80.9628	62.2823
7/12/2021	6:00:00 PM	85.0469	39.69764	98.33828	89.51986	80.33227	60.28227
7/12/2021	7:00:00 PM	65.55472	35.6126	92.00117	58.72099	47.47033	42.9426
7/12/2021	8:00:00 PM	52.18933	33.8566	72.25489	54.54258	47.4975	42.74856
7/12/2021	9:00:00 PM	80.37704	33.41477	97.65138	84.47586	51.10396	42.40481
7/12/2021	10:00:00 PM	60.79179	35.9314	82.64344	63.87912	48.97364	43.11713
7/12/2021	11:00:00 PM	71.93047	36.78063	91.17344	75.3703	65.11758	47.02995
7/13/2021	12:00:00 AM	75.79072	41.95159	91.4289	79.86881	70.44907	58.44328
7/13/2021	1:00:00 AM	75.80982	53.35556	89.4469	79.60053	72.87035	65.83332
7/13/2021	2:00:00 AM	80.59796	38.94549	96.63202	84.85579	74.26959	53.95157
7/13/2021	3:00:00 AM	78.4162	43.82589	95.79924	82.24541	73.74581	60.62485
7/13/2021	4:00:00 AM	70.17593	36.75387	88.26276	74.47562	61.14548	45.6684
7/13/2021	5:00:00 AM	56.06479	37.31832	78.82908	56.51225	49.20203	44.63189
7/13/2021	6:00:00 AM	55.98029	38.7669	76.99069	57.55654	50.87928	46.45792
7/13/2021	7:00:00 AM	56.87677	40.65109	79.45699	58.1478	51.82525	47.70231
7/13/2021	8:00:00 AM	57.28566	38.90025	84.30594	58.07504	51.49291	46.2703
7/13/2021	9:00:00 AM	69.97148	38.56003	86.8157	74.29347	62.42861	49.44935
7/13/2021	10:00:00 AM	67.0418	37.55641	86.73604	70.89062	57.66297	46.63131
7/13/2021	11:00:00 AM	73.18811	38.99407	95.38029	76.68637	64.89066	50.65645
7/13/2021	12:00:00 PM	75.41868	36.5419	93.36231	79.61836	65.65445	48.29982
7/13/2021	1:00:00 PM	79.60542	43.23115	97.83175	83.41409	69.55263	55.47758
7/13/2021	2:00:00 PM	82.43462	43.32382	97.55848	87.06141	72.75357	54.85546
7/13/2021	3:00:00 PM	86.91205	46.34316	99.18642	91.39243	82.92048	66.53497
7/13/2021	4:00:00 PM	85.44714	42.0662	99.31564	90.19059	79.00076	59.67897
7/13/2021	5:00:00 PM	90.17336	49.06647	102.0668	94.78984	86.05745	67.11503
7/13/2021	6:00:00 PM	88.32891	51.13336	100.3343	92.52356	85.47564	71.60869
7/13/2021	7:00:00 PM	84.31099	50.98381	98.70295	88.65205	78.97529	68.94883
7/13/2021	8:00:00 PM	75.75525	42.1957	93.94638	79.38673	68.12212	53.6741
7/13/2021	9:00:00 PM	77.20627	38.58113	95.2248	81.56539	56.23115	46.33245

7/13/2021	10:00:00 PM	78.2012	40.21386	96.65579	81.71694	66.18909	51.89762
7/13/2021	11:00:00 PM	68.49564	36.80257	88.97474	71.42004	57.38114	46.0449
7/14/2021	12:00:00 AM	65.73604	38.42133	89.46408	66.22397	52.93107	46.41147
7/14/2021	1:00:00 AM	61.05376	34.41251	80.90365	63.56105	49.78105	42.04204
7/14/2021	2:00:00 AM	56.10363	37.69394	81.90943	57.61858	50.56554	45.59067
7/14/2021	3:00:00 AM	56.20669	38.13781	77.63435	57.78877	50.51931	45.6973
7/14/2021	4:00:00 AM	57.61921	40.84056	81.04505	60.15281	51.65261	47.1614
7/14/2021	5:00:00 AM	54.82932	40.77243	72.05443	58.2235	51.39286	47.41197
7/14/2021	6:00:00 AM	54.90048	42.41438	69.28383	57.75309	52.82774	48.77734
7/14/2021	7:00:00 AM	55.50987	43.35073	70.48791	58.16041	53.88988	49.84569
7/14/2021	8:00:00 AM	58.93078	41.19392	76.60364	62.33066	53.43032	48.44028
7/14/2021	9:00:00 AM	57.73427	38.11378	77.92439	60.72769	51.35632	45.74462
7/14/2021	10:00:00 AM	62.92274	37.47773	87.42264	65.32795	51.73186	45.2304
7/14/2021	11:00:00 AM	76.19153	38.8359	95.93253	80.06949	66.39607	48.76996
7/14/2021	12:00:00 PM	74.99832	38.29083	93.53984	78.8553	65.44202	48.83764
7/14/2021	1:00:00 PM	74.64036	38.22234	95.30015	78.26293	63.68636	49.48914
7/14/2021	2:00:00 PM	71.84261	39.54494	93.02754	74.94717	59.21387	48.79817
7/14/2021	3:00:00 PM	80.57564	41.05904	98.71082	83.708	62.98386	50.35745
7/14/2021	4:00:00 PM	85.85963	43.36134	99.41569	90.44657	80.27267	60.71458
7/14/2021	5:00:00 PM	85.66995	43.81406	99.44553	90.32769	79.74439	59.61432
7/14/2021	6:00:00 PM	81.88308	44.57186	97.8474	86.04752	76.61255	64.0993
7/14/2021	7:00:00 PM	71.08789	39.92555	89.03272	74.66712	63.07443	53.02757
7/14/2021	8:00:00 PM	53.91275	33.38488	73.34501	56.81578	47.86033	42.06997
7/14/2021	9:00:00 PM	49.67946	32.347	67.50603	52.70919	45.65378	40.71135
7/14/2021	10:00:00 PM	51.23652	34.85248	67.61072	54.13989	46.92559	41.82266
7/14/2021	11:00:00 PM	55.04512	34.98723	72.77177	58.31765	49.19083	43.2431
7/15/2021	12:00:00 AM	54.22389	34.60497	73.8437	56.98951	47.16078	42.37762
7/15/2021	1:00:00 AM	54.22223	31.98089	83.01906	53.31775	44.81551	39.74199
7/15/2021	2:00:00 AM	61.94715	34.28583	83.56975	65.12468	49.99282	42.8629
7/15/2021	3:00:00 AM	53.67643	33.52384	74.6063	53.19226	46.46217	41.63503
7/15/2021	4:00:00 AM	50.0252	36.19469	66.93549	52.11284	47.52691	43.34887
7/15/2021	5:00:00 AM	51.39816	39.35101	72.61241	53.7514	49.63055	45.79309
7/15/2021	6:00:00 AM	53.99544	40.14267	70.44226	56.77242	50.97639	46.69036
7/15/2021	7:00:00 AM	59.15788	40.64797	75.61903	63.12076	53.55019	47.50904
7/15/2021	8:00:00 AM	59.5889	41.38195	75.05061	63.38302	55.93783	49.20973
7/15/2021	9:00:00 AM	59.11635	38.83042	81.00908	61.28943	52.83386	47.03621
7/15/2021	10:00:00 AM	63.61645	38.58781	82.25154	67.6633	54.57702	46.35226
7/15/2021	11:00:00 AM	65.95966	37.30697	85.8587	68.78511	55.73551	46.05819
7/15/2021	12:00:00 PM	70.49943	37.10488	98.16051	70.3469	51.74139	44.5094
7/15/2021	1:00:00 PM	79.93012	39.51595	98.57707	83.45765	63.0333	48.74908
7/15/2021	2:00:00 PM	78.61666	41.13865	96.90142	82.45173	64.85921	51.37849
7/15/2021	3:00:00 PM	79.12057	39.52576	96.3596	82.92553	65.42196	51.44193
7/15/2021	4:00:00 PM	80.51907	40.43138	98.49886	83.93311	61.84594	49.58906

7/15/2021	5:00:00 PM	81.05934	40.02241	98.43935	85.01069	66.91048	51.21337
7/15/2021	6:00:00 PM	86.14421	43.94396	98.97468	90.65639	81.56233	61.58211
7/15/2021	7:00:00 PM	83.94929	44.07732	98.00467	88.38204	78.1571	65.24272
7/15/2021	8:00:00 PM	69.14002	38.65213	88.79324	72.95448	61.31511	50.76968
7/15/2021	9:00:00 PM	56.03392	32.97778	76.50491	59.22793	49.11813	41.9828
7/15/2021	10:00:00 PM	47.84908	31.99061	63.56121	50.96261	44.44867	39.51592
7/15/2021	11:00:00 PM	49.9657	30.53478	65.3865	54.32675	44.12755	38.85977
7/16/2021	12:00:00 AM	46.61914	32.13522	62.82433	49.24963	44.00305	39.78646
7/16/2021	1:00:00 AM	58.8045	33.64852	77.87569	62.43548	50.5105	42.23983
7/16/2021	2:00:00 AM	61.04157	31.48476	79.6694	64.79073	49.57556	40.62608
7/16/2021	3:00:00 AM	49.84923	33.08667	68.15052	52.90698	46.12556	41.18345
7/16/2021	4:00:00 AM	53.73156	34.67647	72.23376	56.45269	48.57579	43.16662
7/16/2021	5:00:00 AM	51.36968	38.52781	64.19195	54.16643	50.07748	45.92851
7/16/2021	6:00:00 AM	54.62897	39.99024	71.58664	57.62315	51.38023	46.91001
7/16/2021	7:00:00 AM	57.68653	41.6462	72.71508	61.39955	53.56955	48.4029
7/16/2021	8:00:00 AM	54.80981	39.44303	72.41898	57.64723	51.61646	47.10136
7/16/2021	9:00:00 AM	63.36465	36.78563	85.47218	65.11057	52.91925	45.79553
7/16/2021	10:00:00 AM	57.76913	36.97032	79.17304	60.23355	49.66672	44.24138
7/16/2021	11:00:00 AM	61.83484	34.29352	81.7322	64.5958	50.43971	42.8046
7/16/2021	12:00:00 PM	68.21696	35.37902	88.92228	70.6119	54.70634	44.90632
7/16/2021	1:00:00 PM	76.32565	38.58193	95.61313	80.02255	60.77517	47.90006
7/16/2021	2:00:00 PM	80.54859	39.65506	98.04592	84.40667	63.95858	49.31642
7/16/2021	3:00:00 PM	84.03228	40.41941	99.25435	88.93115	71.64391	51.68808
7/16/2021	4:00:00 PM	81.28166	37.63784	98.11258	85.66597	65.11786	46.73327
7/16/2021	5:00:00 PM	87.7697	41.46152	100.5578	92.36871	82.83304	54.64817
7/16/2021	6:00:00 PM	88.48675	49.96303	99.70265	92.59285	85.91326	75.83349
7/16/2021	7:00:00 PM	83.50963	39.01579	98.5632	88.5003	72.09483	51.25719
7/16/2021	8:00:00 PM	50.70415	32.51136	70.85716	53.51145	45.87338	41.06528
7/16/2021	9:00:00 PM	53.91909	31.4324	78.39126	52.34127	46.82883	41.52307
7/16/2021	10:00:00 PM	47.5734	30.84456	65.28378	50.70342	43.991	38.5592
7/16/2021	11:00:00 PM	48.54085	30.89007	63.052	51.81375	45.33549	39.25133
7/17/2021	12:00:00 AM	51.31226	29.48801	73.85943	52.35715	43.1544	37.5907
7/17/2021	1:00:00 AM	47.37186	29.73692	63.28269	51.55631	43.13366	37.09764
7/17/2021	2:00:00 AM	48.69177	32.46813	65.26138	51.36688	45.08869	40.07159
7/17/2021	3:00:00 AM	45.77034	31.62195	59.20711	48.81836	43.69188	39.2851
7/17/2021	4:00:00 AM	57.07752	33.12612	76.59187	60.77555	46.31508	40.95583
7/17/2021	5:00:00 AM	51.78031	35.62504	66.6211	55.24907	48.01168	43.17449
7/17/2021	6:00:00 AM	53.71479	37.19432	69.9817	56.70085	50.47931	45.45959
7/17/2021	7:00:00 AM	56.71997	40.43049	76.28441	59.52874	52.24764	47.62659
7/17/2021	8:00:00 AM	57.20076	39.71962	74.2865	60.41903	52.99617	47.92915
7/17/2021	9:00:00 AM	69.42921	38.24275	90.42968	70.24249	54.2379	46.18186
7/17/2021	10:00:00 AM	73.84922	42.74064	92.47774	77.63013	65.98348	54.67363
7/17/2021	11:00:00 AM	68.45262	36.49188	86.29579	71.62985	58.71707	46.11823

7/17/2021	12:00:00 PM	64.01198	34.76263	82.51689	67.81767	52.26616	42.83678
7/17/2021	1:00:00 PM	74.69839	36.34294	98.41176	74.75741	55.77764	45.76369
7/17/2021	2:00:00 PM	78.61585	37.21121	97.52795	81.77588	62.85173	47.02562
7/17/2021	3:00:00 PM	75.48304	35.67827	94.5998	78.88019	60.79488	44.79734
7/17/2021	4:00:00 PM	81.47538	36.49923	96.84502	85.83027	74.48803	54.36505
7/17/2021	5:00:00 PM	82.0941	43.34405	96.09611	86.45222	76.73726	63.55369
7/17/2021	6:00:00 PM	85.08107	48.94315	97.82023	89.12251	81.78171	71.09358
7/17/2021	7:00:00 PM	81.4709	45.92067	96.79787	85.92674	75.34274	61.75923
7/17/2021	8:00:00 PM	62.63133	34.78479	81.41551	66.35493	54.74208	44.60896
7/17/2021	9:00:00 PM	55.33656	32.49578	72.48527	59.01756	48.05275	41.62473
7/17/2021	10:00:00 PM	50.43064	35.74238	65.03534	53.79765	46.85705	42.30338
7/17/2021	11:00:00 PM	49.94029	30.64017	68.11609	52.69645	46.19767	38.68054
7/18/2021	12:00:00 AM	47.80641	29.26291	66.12777	51.2543	41.62233	36.88488
7/18/2021	1:00:00 AM	53.40502	30.31772	71.97683	56.39199	45.92053	39.77944
7/18/2021	2:00:00 AM	63.19924	32.93861	88.01067	60.98411	48.13669	41.68109
7/18/2021	3:00:00 AM	50.41199	33.5898	66.54668	53.82687	47.3001	41.63254
7/18/2021	4:00:00 AM	49.96704	35.75308	68.01139	52.87568	47.20487	42.62552
7/18/2021	5:00:00 AM	52.02123	37.37781	70.56852	53.30015	48.63668	44.47616
7/18/2021	6:00:00 AM	52.45846	38.97675	67.24018	55.74241	50.36916	45.94089
7/18/2021	7:00:00 AM	55.77937	39.32146	71.05376	59.38798	51.66841	46.54335
7/18/2021	8:00:00 AM	58.65655	39.88583	78.1576	62.15402	52.53807	46.87193
7/18/2021	9:00:00 AM	65.62197	39.04713	80.28796	69.73522	60.68865	49.76745
7/18/2021	10:00:00 AM	65.68963	37.33015	83.10368	69.56548	55.09844	45.20562
7/18/2021	11:00:00 AM	69.82574	37.89371	87.17694	74.00565	62.36488	48.51835
7/18/2021	12:00:00 PM	66.31363	35.65506	84.06518	70.27227	56.2355	45.15315
7/18/2021	1:00:00 PM	69.42397	35.38686	89.65298	72.04333	53.77662	44.35193
7/18/2021	2:00:00 PM	69.78385	35.73299	93.83694	70.47115	54.52982	44.71586
7/18/2021	3:00:00 PM	77.08855	36.48198	97.47581	80.14345	61.63236	45.75335
7/18/2021	4:00:00 PM	79.65787	39.39462	97.08025	83.35771	74.29964	62.43711
7/18/2021	5:00:00 PM	86.39994	42.69135	101.0899	91.17075	79.70837	61.10919
7/18/2021	6:00:00 PM	77.89634	37.73044	96.33087	81.25298	64.2838	50.16006
7/18/2021	7:00:00 PM	84.38871	41.67615	98.99475	89.29391	73.06887	54.44694
7/18/2021	8:00:00 PM	71.66477	36.6413	92.20263	73.7351	58.72493	47.80436
7/18/2021	9:00:00 PM	48.7208	33.36826	63.95417	52.69243	43.26169	39.12269

WM6: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
7/8/2021	4:00:14 PM	74.1	71.4	69	66.6	64.3	61.6	59.2	56.4	53.7	51.2	48.7	51	52.6	49.3	43.6	44.2	41.7	41.6	44	43.1	42.1	37.8	36.2	36.9	36.7	34.7	33.8	34	34.9	32	31.1	28	26.4	24.8	20.9	18.9
7/8/2021	5:00:00 PM	80	78.6	77.2	75.6	73.5	71.6	69.2	66.6	63.5	60.4	57.3	54.3	50.8	47.6	44.8	42.2	40	37.8	35.9	34.2	33.2	33	33	32.5	31	29	26.8	24.2	20.9	17.8	16.2	15.6	14.3	15.2	16.1	17.7
7/8/2021	6:00:00 PM	79.7	78.1	76.8	75.1	73	71.1	68.5	65.5	62.4	59.2	56	52.6	49.3	46.2	43.5	41	38.7	36.7	34.9	33	32	31.8	31.5	30.7	28.8	26.5	24.1	21.9	28.9	27.9	14.9	13.8	12.8	13.6	14.4	15.7
7/8/2021	7:00:00 PM	73	70.9	69.1	66.4	64.2	60.8	57.7	54.5	51.3	48.1	45.6	42.4	39.5	37.6	34.9	33.2	31.3	30	28.9	27.8	26.8	25.9	24.9	23.6	21.3	19	16.9	19.1	40.2	44.7	25.8	10.1	9.8	10.2	10.7	11.3
7/8/2021	8:00:00 PM	43.4	41.7	40.5	39.6	38.5	37	36.5	36.7	37	37.8	37.4	34.4	34.1	30.2	27.1	25.6	23.5	22.1	21.4	20.2	18.8	15.6	15.2	10.9	9	6.9	6	6.1	9.9	12.4	6.7	6.5	6.1	6.8	7.5	8.6
7/8/2021	9:00:00 PM	42.5	41.6	41	39.2	38.2	36.1	36.2	36.1	35.5	33.6	34.9	33.3	39	40	31.4	27.7	28.7	24.7	22.8	22.9	22.1	16.9	10.3	9.2	8.1	5.3	4	4.4	5	14.2	6.9	5.6	5.2	5.7	6.7	8.2
7/8/2021	10:00:00 PM	42.9	42.9	41.8	39.5	37.9	36.6	36	36.4	35.5	35.4	35.9	39.7	47.1	50.3	42	36.3	31.3	26.7	20.2	19.5	14.9	5.3	0.6	1.2	1.8	2.4	3.1	3.7	4.7	15.5	6	5.1	4.8	5.4	6.3	8.1
7/8/2021	11:00:00 PM	38.7	39	38.9	37.1	37.2	35.2	33.4	33.9	30.5	29.9	30.2	29	26.8	26.3	23.6	23.3	18.8	17.9	14	7.3	3.1	3	0.4	0.9	1.7	3	3.8	3.8	4.8	16.6	5.7	5	4.8	5.3	6.2	8.1
7/9/2021	12:00:00 AM	48	45.9	44	41.9	40.2	38.4	36.8	37.4	36.2	34.1	37.4	38.1	35.5	33.5	26.8	26.6	25.7	26.4	24.9	21.9	21	19.1	16.5	11.4	7.6	5.9	5.5	3.9	4.1	10.2	5	4.9	4.7	5.2	6.1	8.1
7/9/2021	1:00:00 AM	45	43.1	42.5	40.6	38.7	36.3	34.3	33.7	32.5	31.8	31.5	31	29.8	28.5	26.2	24.3	20.9	16.8	12.5	11.2	8.1	4.9	3.7	2.8	2.6	2.7	3	3.5	4	6.9	5	5	4.7	5.2	6.2	8.1
7/9/2021	2:00:00 AM	44.7	43.3	42.1	40.2	38	35.7	32.9	31.8	28.1	26.6	26	24.9	22.5	21.4	18.1	20.2	15.1	15.7	11.5	4.4	1.2	0.6	1.1	0.9	1.2	1.9	2.6	3.2	3.9	6.2	4.7	4.8	4.6	5.1	6	8
7/9/2021	3:00:00 AM	48.8	47.2	45.9	43.3	41.9	39.4	37.8	35.8	34.1	32.4	32.5	33.2	30.1	28.5	26.3	27.4	22.7	20.9	18.5	15.7	9.3	2.6	0.7	0.8	1.3	2	2.7	3.3	4	4.5	4.8	4.9	4.7	5.2	6.1	8.1
7/9/2021	4:00:00 AM	55.2	53.4	51.4	49.3	47.1	44.8	42.1	39.4	37	35.4	35.6	34.3	32	30.5	27.2	27.2	24	21.7	21	17.3	10.2	3.2	0.6	0.7	1.4	2.4	2.9	3.4	4.7	4.9	4.7	4.8	4.7	5.1	6	8
7/9/2021	5:00:00 AM	47	46.2	45.2	43.8	42.9	40.4	39.4	38.2	37.1	36.8	36.5	36.6	35.5	33.6	30.8	30	26.2	24.4	23.2	18.6	10.5	2.6	0.8	2	4.8	17.6	15.1	8.1	7.8	9.1	4.6	4.7	4.6	5	5.9	8
7/9/2021	6:00:00 AM	40.2	41.6	43.3	41.9	42.1	39.6	39.1	39.7	39.2	39.5	39.6	38.3	37.6	35.2	34	31	27.6	25.1	23.3	18.8	15.8	12.4	8.4	4.3	3	6.2	5.7	3.8	13.1	14	4.9	4.9	4.6	5.1	6	8
7/9/2021	7:00:00 AM	39.9	40.6	41.8	41.5	41.7	38.6	37.3	38.7	40.1	36.4	36.6	36.4	35.1	34.2	32.5	30.6	26.1	23.6	22.4	19.1	14.7	8	3.3	3.3	3.3	6.6	6.2	5	10	12.2	5.1	5	4.7	5.3	6.2	8.1
7/9/2021	8:00:00 AM	47.1	45.5	45.7	44.3	44.7	42.7	41.4	42	42.5	39.3	39.9	38.1	36	33.8	31.6	30.1	26.1	24.5	21.3	18.9	13.5	6.3	4	3.8	3.5	3.7	3.8	4.3	30.9	34.3	14.4	5.4	5.3	5.6	6.6	8.2
7/9/2021	9:00:00 AM	55.9	53.8	51.5	49.8	48.2	46.6	44.5	44.8	43.8	41.9	39.1	35.4	33.4	28.4	24.4	22.5	19.6	17.3	13.6	15.8	11.7	10.7	9.2	10.3	9.7	8.3	6.8	6.2	10.1	9.6	6.4	7	5.6	6.3	7.2	8.4
7/9/2021	10:00:00 AM	59.6	57.7	55.3	52.6	50	47.5	45.3	43.3	40.7	39.2	36.8	34.7	32.5	29.8	26.7	23.9	23	17.8	14.3	19.9	14.8	14.3	12.9	15.1	13.3	11.4	12.5	16.8	21.4	28.9	45.5	60.3	46.5	37.7	38.5	26.6
7/9/2021	11:00:00 AM	59.3	57.2	55	53.1	51.8	52.1	53.3	54	54.3	53.8	53	51.8	50.3	47.9	44.8	41.2	36	31.1	27.3	22.8	13.7	15.9	13.9	11.8	11.4	12.2	15.5	22.7	16.7	10.6	8.2	9.4	6.7	7.2	7.9	8.8
7/9/2021	12:00:00 PM	64.3	61.9	59.7	56.7	54	51.5	48.4	45.7	43.9	41.3	38.6	36	33.7	30.8	28.4	26.3	23.5	21.4	21.5	17.2	14.6	19.4	15.7	15	13.6	13.6	12.5	11.5	10.9	10.4	10	9.5	8.3	9.3	10.2	10
7/9/2021	1:00:00 PM	61.1	58.6	56.5	53.8	52.6	50.1	45.4	43.5	44.5	39.4	40.2	39.9	37.8	32.9	32.6	29	26.9	24	20.3	18.4	14.5	15.4	13.6	12.4	11.1	10.7	9.9	9.2	9.2	9.9	17.6	33.4	18.8	12	13.1	10.6
7/9/2021	2:00:00 PM	66.5	66.9	64.9	63.2	61.6	60	57.8	56.3	54	52.3	49.8	46.7	48.3	40.9	38.2	35.6	31.7	29.3	27.4	25.4	23.7	24.2	24.8	25	24.7	23.5	21.8	19.8	16.8	13.6	11.3	9.6	7.9	8.9	9.6	10.4
7/9/2021	3:00:00 PM	71	69.6	67.9	66.1	64.1	62	59.1	55.8	52.7	51	59.4	58.9	52	42.7	44.6	39.4	33.3	29.3	27.4	26.2	25.6	24.7	23.5	21.4	19	16.8	15	12	10.5	9.5	9	8.4	7.6	8.1	8.8	9.8
7/9/2021	4:00:00 PM	68.6	67.1	64.9	63.2	60.7	58.4	55.6	52.5	49.9	51.2	58	54.2	48.5	43	38.6	36.7	29.8	26.1	23.1	21	18.6	18.6	18.9	16.4	13.9	12.8	10.9	9.2	8.2	7.8	7.7	7.5	6.7	7.6	8.5	9.1
7/9/2021	5:00:00 PM	74.2	72.4	70.7	68.6	66.2	63.6	60.8	57.7	54.7	52.6	48.8	45.8	43.3	40.2	39	35.3	35.2	35.6	34.1	31.5	29.6	27.5	26.4	24.9	22.3	18.6	14.8	12.1	10.5	9.7	9.8	9.9	9.1	10	10.3	10.6
7/9/2021	6:00:00 PM	70.4	68.7	67.1	64.8	62.3	59.8	56.6	53.2	50.2	46.9	43.7	41.1	38.9	36.2	33.6	31	28.3	26.3	25.7	23.8	22.9	23.1	19.2	18.8	16.9	15.3	13.2	12.3	10.7	9.7	8.9	8.8	8.2	8.6	9.2	9.5
7/9/2021	7:00:00 PM	53.6	51.7	49.6	47.5	45	42.6	41.3	40	37.9	37.7	37.5	37.3	37.6	36.9	33.5	33.4	31	27	25.2	23.3	19.9	17.7	14.4	10.1	6.9	6.1	6	5.8	6	6.3	6.2	6.2	5.6	6.5	7.4	8.6
7/9/2021	8:00:00 PM	43.4	42.2	41.6	39	37.3	36.4	35.8	36.7	35.4	35	36.5	36.9	38.1	39.3	31.9	29.8	26.3	24.1	21.8	19.4	16.4	12.3	7	6.2	5.8	4.9	4.4	8	12.8	11.4	6.6	5.9	5.5	6.2	7	8.3

7/9/2021	9:00:00 PM		41	39.7	40.5	39	37.5	37	37.3	37.6	37.2	36.7	35.7	36.2	34.4	33.2	32.2	31.6	28.7	24.5	23.7	23.1	18.6	13.3	7.5	6.1	5.2	4.2	4.1	4.6	5.2	14.1	7	5.7	5.3	5.9	6.8	8.3
7/9/2021	10:00:00 PM	45.2		44.2	42.1	40.9	39.4	39.2	37.7	38.1	37.6	41.9	36.8	35.6	36.4	36.1	31.3	29.8	28.3	25.9	25.1	22.5	19.8	17.1	9.7	4.8	3.6	3.3	3.5	4	4.8	16	6.5	5.3	5	5.5	6.4	8.2
7/9/2021	11:00:00 PM	43.2		42.2	40.5	38.5	37.1	36.5	36	36.9	36.3	36.7	36.3	36.1	35.1	34.1	32.5	29.9	25.7	22.4	18.5	17	18	14.5	9.5	5.7	4	4.1	3.9	4	4.7	13.6	5.8	5.2	4.9	5.4	6.4	8.1
7/10/2021	12:00:00 AM	37.5		38.2	38.6	36.7	36.9	35.3	35.1	36.2	35.3	35.6	35.3	35.9	37.1	32.2	31	28.6	24.2	18.7	11.2	8.4	5.2	2.2	2.1	1.7	1.9	2.7	3.4	3.9	4.7	15.3	6	5.1	4.8	5.4	6.3	8.1
7/10/2021	1:00:00 AM	57.9		56.8	54.1	51.9	48.2	45.9	43.1	41	40	38.8	37.9	36.9	35.1	34.6	31.6	30.3	28	23	16.2	12.9	8.8	5.7	4.2	3.1	2.8	3.7	4.3	4.1	4.7	12.4	5.6	5.2	5.1	5.7	6.4	8.1
7/10/2021	2:00:00 AM	59.3	55	57.3		52.4	49.7	46.9	43.9	41.2	38.2	35.7	33.9	32	30.3	27.6	25	27.3	22.5	19.1	16.5	12.6	8	3.3	2.8	2	2.3	4.4	4.8	4.1	4.7	10.2	5.2	5.2	4.9	5.5	6.4	8.1
7/10/2021	3:00:00 AM	44.8	41	42.6	41.9	41.5	41.2	37.1	34.1	36	32.9	31.7	32.4	30.9	28.4	26.9	24.7	28.2	25.1	21.9	15	10.7	6.2	2.3	2.3	1.5	1.6	2.2	2.8	3.5	4.3	7.4	5.1	5	4.7	5.2	6.2	8.1
7/10/2021	4:00:00 AM	46.9	43.6	45.4	43.6	42.9	43.3	37.2	35.4	35.9	33.4	32.6	32	32	27.9	26.3	24.4	22.2	18.4	17.7	14.9	10.9	6.3	2.3	1.7	1.4	2.8	9.8	14.1	6.7	4.1	5.9	4.9	5.9	4.7	5.2	6.1	8.1
7/10/2021	5:00:00 AM	53.5	49.8	51.5	49.8	47.7	47.1	42.7	40.3	40.5	38.9	37.5	35.9	35.2	34.9	35.6	28.6	27.2	25.1	22.6	20.9	19.3	18.8	17.2	13.3	8.2	6.3	8.9	8.2	6.8	6	6.7	5	5	4.7	5.2	6.1	8.1
7/10/2021	6:00:00 AM	52.6	48.8	50.9	48.6	47.2	43.4	41.5	42.3	40.9	39.8	39.2	38.7	36.7	34.9	33.2	32	27.4	23.8	22.9	21.5	18.4	11.8	3.9	2.8	3.2	7	7.5	5	4.7	4.9	4.9	5	4.7	5.3	6.2	8.1
7/10/2021	7:00:00 AM	49.8	45.8	47.4	44.3	44.7	41.9	40.1	41.2	40.9	37.6	37.1	36.1	34.7	32.6	30.7	29	24.7	21.3	19.9	20.4	20.7	12	5	4.7	4	3.9	4.1	4.7	7.1	8.3	5.6	5.5	5	5.7	6.7	8.2
7/10/2021	8:00:00 AM	43.5	42.3	41.9	42.7	42.2	40	38.5	39.1	38	37.9	38.4	37.7	36.1	35.7	34.9	30.2	25.7	23	22.9	19.7	15	16.4	12.9	12.6	11.4	11	9.3	8.3	12	13.8	7	6.9	6	6.6	7.5	8.5
7/10/2021	9:00:00 AM	52.5	51	50.8	48.6	47.5	45.1	42.4	42.3	40.1	38.8	38	37.1	35.6	33.8	31.7	29.5	26.3	22.6	21.6	20.8	20.1	18.5	13.2	13.1	12.8	13.6	11.8	10.9	10.2	10.1	10.1	15.2	9.3	9.1	9.7	10.1
7/10/2021	10:00:00 AM	56.9	52.4	54.9	49.8	47.2	44.8	42.5	40.9	39.1	37.7	36.7	35.6	34.6	33.4	31.7	31	27.8	22.2	22.3	21.4	16.2	20.1	18.8	16.5	15.9	16	14.2	12.4	11.3	10	9.4	10	8.9	9.4	10.2	10.1
7/10/2021	11:00:00 AM	60.2	55.4	57.9	53.2	50.1	47.3	45	43.4	42.2	41.6	41.3	40.2	39.5	38.1	36.9	38.9	37.7	32.5	27.2	24.5	22.4	23	18.2	16.7	16.6	17.1	15.2	13.2	11.7	10.6	10.6	10.9	9.5	9.7	10.8	10.3
7/10/2021	12:00:00 PM	60.1	55.5	58	53.3	50.8	48.2	45.7	43.3	41.2	40.4	39.3	37.5	36.3	35.2	33.2	29.6	25.9	22.2	20.6	16.6	14	17.6	14.6	13.3	12.8	12.2	10.9	9.3	8.5	7.8	7.5	7.4	6.4	7.3	8.2	9
7/10/2021	1:00:00 PM	67.6	63.7	66	62.8	59.6	57.1	54.6	51.8	49.4	46.1	44.3	41.7	39.4	37.4	34.6	31.9	29.2	26.1	23.5	21.9	20.7	20.3	20.5	20.6	19.6	18.3	16.6	14.7	12.4	10.3	9.2	8.4	7.2	8	8.8	9.7
7/10/2021	2:00:00 PM	70.2	63	66.1	65.3	63	60.5	57.6	54.8	51.7	49.2	46.1	43.4	41	39	37.4	36.8	33.1	28.9	25.5	23.5	21.8	21.4	21.1	19.5	16.6	13.8	11.5	9.4	8.3	8	8.1	8	7.1	7.9	8.6	9.3
7/10/2021	3:00:00 PM	70.1	67.1	68.4	65	62.8	60.3	57.7	54.3	50.8	47.9	45.1	42.6	40.3	38.7	37.2	37.4	36.4	30.8	27.7	25.8	23	20.1	19.6	17.1	14.8	14.1	12.4	10.6	10.3	9.8	9.8	9.1	8	8.6	9.4	9.9
7/10/2021	4:00:00 PM	70.3	65.8	68.6	63.1	60.4	58.6	55.7	53	50.1	47.7	45.9	43.4	41.2	38.9	36.5	34.9	33.5	32.9	32.2	31.5	31.1	31.2	31.5	31.6	30.5	29.1	27.2	25.4	22.9	21.3	20.4	19.6	18.1	17.7	16.8	15.2
7/10/2021	5:00:00 PM	83.7	80	81.8	78.5	76.9	75.1	73.5	71.3	69.2	66.8	64.3	61.7	58.9	55.9	52.7	49.8	47.1	44.6	42.7	40.5	38.7	38.3	39	39.7	38.8	37.3	36.2	34.3	31.7	28.9	27	25.2	23.2	22.8	22.5	23.2
7/10/2021	6:00:00 PM	69.8	66.3	67.8	64.2	61.2	59.4	56.6	53.5	50.7	47.7	44.8	41.5	38.8	36.2	33.7	31.5	30.2	29.3	27.5	26.2	24.3	24	24	23.1	21	19	16.3	13.8	11.5	10	9.8	9.4	8.5	9.4	10	10.7
7/10/2021	7:00:00 PM	74.4	71.2	73	69.1	66.9	64.2	61.5	58.4	55.3	52.4	49.2	46.2	43.3	40.7	37.6	35.1	33.1	31.6	29.6	26.9	24.5	23.9	23.7	22.4	19.5	17	14.5	13.7	13.6	9.2	8.5	8.6	8.2	9	9.7	10
7/10/2021	8:00:00 PM	63.5	60	61.4	56.5	53.9	51	47.6	45	42.3	40.1	37.7	35.3	33.2	31.1	29	26.5	23.7	21.5	19.7	19.3	19.1	16.5	13.7	11.5	9.4	11.1	14.9	6.5	9.6	12.9	8	8.6	9	10.4	11.2	11
7/10/2021	9:00:00 PM	38.1	37.9	37.9	36.3	35.1	32.1	31.8	32.7	32.8	32.6	32.3	32.2	32.1	29.6	27.4	23.9	23.2	23.2	19.6	19.7	19.9	18.6	17	12.6	9.2	8	7	7.2	5.5	7.2	22.5	11.9	6.2	5.8	6.4	7.2	8.4
7/10/2021	10:00:00 PM	48.4	43.8	45.8	41.9	39.5	37.5	36.5	35.6	34.8	35.7	35.5	34.3	33.1	32.3	30.4	27.2	23.5	21.2	20.4	16.3	12.4	7.4	3.2	1.8	2.3	3	3.7	4.5	5.2	17.9	7.3	5.7	5.4	5.8	6.7	8.3
7/10/2021	11:00:00 PM	48.8	45.3	46.9	42.9	41.2	39.2	37.5	36.2	35.2	35.8	35.7	39.4	33	33.5	29	27.4	25.9	27.2	23	20.1	17.6	13.2	9.3	5.6	4	3.5	3.7	4.2	5.8	16	6.1	5.4	5	5.6	6.5	8.2
7/11/2021	12:00:00 AM	42.9	40.8	41.6	39.8	37.6	36.1	35.5	35.6	35.4	35.8	35.4	34.8	33.5	32.6	30.7	28.1	23.5	18.5	17.5	16.9	14.5	9.5	2.2	1.5	2.2	2.9	3.6	4.5	5.6	14.8	5.8	5.6	5.3	5.9	6.8	8.3
7/11/2021	1:00:00 AM	50.9	45.3	48.2	42.8	43.4	38.3	38.4	36.8	36.6	36.1	35.1	33	33.5	29.5	26.6	26.7	22.4	22	20.5	17.7	14.6	11.6	8.2	5.9	4.1	3.3	3.6	4.1	4.8	12.9	5.7	5.5	5.3	5.8	6.7	8.2
7/11/2021	2:00:00 AM	46	43.7	45.5	41.1	40.3	37.3	34.7	34.4	31.6	32.6	34.9	31.3	31.8	29.5	23.2	23.4	18.6	17.8	14.9	11.4	8.7	8.1	6	7.1	8.7	9.9	7.2	5	4.6	10.8	5.4	5.2	5	5.5	6.4	8.1
7/11/2021	3:00:00 AM	44.1	41.9	42.5	40.3	42.2	36	34.5	34.5	32	33.2	32.2	30.8	28	29	23	23.4	18.5	17.2	15.5	13.9	9.8	4.9	2.4	1.5	2.1	4.5	5.8	4.9	6.3	8.2	5	5.1	4.9	5.4	6.3	8.1

7/11/2021	4:00:00 AM	45.4	43.9	43.1	41.7	41.9	38.4	37.8	38.6	37.1	36.5	36.6	35.1	32.1	30.7	28.9	29.8	27.2	23.4	20.7	20.9	19.4	19.1	16.3	11.1	10.4	11.6	8	6.7	7.1	7.8	4.9	5.1	4.9	5.4	6.3	8.1
7/11/2021	5:00:00 AM	40.7	40.1	41.2	41.3	43.2	43.3	42.7	42.3	40.3	38.8	35.8	35.9	35.7	31.9	29.4	28.6	27.5	26	23.9	22.3	21.4	19.9	19.2	14.2	13.6	15.9	14.2	11.6	8.7	11	5	4.9	4.7	5.2	6.1	8.1
7/11/2021	6:00:00 AM	45.5	44.1	43.7	42	42.4	38.9	38.3	40.8	41	39.9	38.1	37.7	37.5	35.4	32.3	30.2	25.1	23.1	21.9	20.8	17.1	12.6	7.2	3.7	4.1	10.9	10.5	9.2	10.7	17.4	7.7	5.3	5	5.5	6.5	8.2
7/11/2021	7:00:00 AM	49.1	47.9	46.7	45.2	45.4	44.2	43.4	44.9	47.9	44.1	40.9	40.1	38.2	37.1	34	31.3	26.9	26.2	22.7	19.7	16.6	11.9	7.6	7	5.4	6.5	6.6	5.1	6.7	7.6	5.5	5.5	5.1	5.7	6.7	8.2
7/11/2021	8:00:00 AM	61.5	59.4	57	54.4	51.9	49.6	47.3	45.3	46.2	42.3	41.7	40.7	38.7	35.7	32.6	30.3	26.7	23.2	20.7	23.1	16.2	15.8	15.6	15.7	13.7	11	9.5	9	9	9.8	9.7	14.3	7.3	7.6	8.2	9
7/11/2021	9:00:00 AM	58	55.7	53.1	50.4	48.3	45.8	43.7	41.8	40.1	39.2	37.7	40.6	39.4	38.6	30.6	28	25.1	19	22.8	22	15.9	19.6	17.3	17.8	16.4	15.8	14.1	11.9	10.6	10	9.4	9.4	7.9	8.2	8.7	9.3
7/11/2021	10:00:00 AM	53.7	51.6	49	46.8	44.3	42.1	39.9	38.6	37.5	36.4	35.9	35.9	34.8	51.5	43.1	34.5	38.8	34.3	28	27.6	28	27	21.7	16.3	15.8	15.5	13.9	12.4	10.8	9.8	9.2	8.8	7.6	8.2	8.7	9.3
7/11/2021	11:00:00 AM	62.9	61.2	59.1	56.8	54.4	52	49.3	46.6	44.5	42.3	40	38.9	38.5	34.7	30.9	27.9	24.3	20.1	26	23.3	14.5	24.6	21.4	20.3	20.1	20.3	17.9	16	13.8	11.8	10.6	10.4	9.3	9.7	10.2	10.1
7/11/2021	12:00:00 PM	68.8	66.7	64.6	62.2	59.8	56.9	53.6	50.8	47.6	44.9	43	41.5	37.2	34.1	31.5	29.4	27.4	25.9	23.8	21.9	19.6	18.4	17.8	16.6	14.7	12.8	11.5	10.2	9.6	9.3	9.4	9.6	9.1	10.2	11	10.7
7/11/2021	1:00:00 PM	69.8	67.7	65.5	63.1	61	58.5	55.6	52.1	49	45.9	43	39.8	37.4	34.3	31.4	29.5	26.4	24.5	23.8	20.8	19	18.3	18.1	17.4	15.5	13.1	11.4	9.8	8.4	7.8	7.7	7.6	6.8	7.6	8.4	9.4
7/11/2021	2:00:00 PM	64.4	62.3	60.6	58.2	55.4	52.3	48.9	46.5	43.5	41.5	39.4	38.3	42.8	44.8	36.1	30.3	30.4	26.9	25.6	24.5	23.1	22.5	21.1	18.8	16.1	14.1	12.7	11.9	10.8	10.2	9.6	9.1	8.2	8.8	9.4	9.7
7/11/2021	3:00:00 PM	77.6	76.1	74.6	72.8	71	68.8	66	63	59.9	56.5	53.4	50.1	47.2	44.3	41.4	39.1	37.1	35.4	34	32.6	31.1	30.4	29.4	28.1	25.6	23.1	20.9	18.6	16.5	15.2	14.1	13.7	12.3	13.1	13.4	14
7/11/2021	4:00:00 PM	81.1	79.8	78.5	77.2	75.5	74	71.9	69.3	66.5	63.6	60.5	57.3	53.9	51.5	49.1	45.3	42.9	40.5	38	35.9	34.5	34.4	34.9	34.8	33.4	31.5	29.7	27.3	24	20.7	18.5	17.1	15.6	16.2	16.9	18.2
7/11/2021	5:00:00 PM	80.5	79.5	78.3	76.8	74.9	72.9	70.6	67.8	64.6	61.6	58.3	54.9	51.8	49.2	46.2	43.7	41.6	38.9	36.5	34.4	32.9	32.7	32.8	32.1	30.1	27.7	25.3	22.4	19	16.3	15.3	15	14	14.7	15.4	16.4
7/11/2021	6:00:00 PM	72.6	71.5	69.9	67.9	65.8	63.3	60.5	57	53.5	50.4	47.4	44.1	41.5	39.1	36.4	33.8	30.9	28.2	26.1	24.1	22.6	22.5	20.8	18.5	16.3	14.4	12.3	10.6	9.7	9.8	9.6	9.6	8.5	9.2	9.7	9.9
7/11/2021	7:00:00 PM	62.3	60.9	58.9	56.5	54.1	51	47.6	44.8	42.2	40.1	38.3	36.6	35.5	33.2	30.8	29.2	27.7	24.2	22.9	26.7	23.5	20.4	18	18.8	15.7	13.9	12.5	10.9	10	9.9	9.7	9.2	8.5	9	9.2	9.4
7/11/2021	8:00:00 PM	64	62	59.6	56.7	54.5	51.7	48.7	45.8	43.5	41.6	39.1	37.8	39.6	36.9	35.4	32.2	30	28.2	29.4	28.7	28.4	25.8	19.9	15.9	13.4	10.4	7.6	6.6	8.6	11.3	7.8	7.4	7.2	8.1	8.9	9.3
7/11/2021	9:00:00 PM	81.9	80.8	79.6	78.3	76.5	74.7	72.7	70.2	67.6	65	62.1	59.2	56	52.9	49.6	46.8	44.3	42.5	40.8	38.5	36.5	36.4	37.1	36.9	35.3	34.3	32.4	30.1	26.7	24.8	20.8	18.2	16.5	16.9	17.6	19.6
7/11/2021	10:00:00 PM	84.5	83.3	82	80.4	78.6	76.8	74.5	72	69.4	66.7	63.9	60.8	57.7	54.4	51.3	48.6	46.3	44.6	42.9	40.8	39.2	39.4	40.2	40.1	38.7	37.8	36	33.9	30.6	27	24	21.8	19.9	19.9	20.4	22.2
7/11/2021	11:00:00 PM	76.9	75.8	74.9	73.3	71.3	68.9	66.9	63.9	60.7	57.8	54.7	51.5	48	45.1	42.1	39.6	37.6	36.2	34.7	32	29.7	29.3	29.4	28.6	26.3	24.3	21.8	18.8	15.4	12.9	11.1	10.8	10.1	10.5	10.9	12.3
7/12/2021	12:00:00 AM	63.9	61.5	58.9	56.4	53.7	50.9	47.7	45.3	42.4	40	37.8	36.1	34.7	33.3	31.4	29.6	27.2	23.7	20.6	18.6	16.8	15.6	14.3	12.4	9.3	8	6.2	5.8	5.7	9	6.4	6.2	5.7	6.1	6.9	8.4
7/12/2021	1:00:00 AM	67.7	65.6	62.8	59.7	57	53.7	50.8	48.5	45.9	43.6	41.6	40.1	39.2	37.9	37.6	41	39.2	31.8	27.2	26.7	25.6	21.8	17.4	15.2	12.2	9	6.9	5.9	5.7	8.6	6.3	6.4	7.6	10.2	7.5	8.5
7/12/2021	2:00:00 AM	62.9	60.2	57.3	54.4	51.7	48.6	46	43.8	40.5	38.1	36.4	34.3	31.8	30.7	27.2	26.8	22.9	21.7	21.1	18.9	15.8	14	12.9	12.9	14.8	9.3	5.1	4.6	4.9	6.9	5.8	8.8	19.3	25.5	17.7	10.6
7/12/2021	3:00:00 AM	56.7	53.6	50.7	48.1	45.8	42.7	40.5	40.1	37.3	35.9	35.8	35.8	33.5	32.7	30.3	30.1	27.2	26.3	26.1	23.4	20.1	16.6	13.7	10.9	7.9	5.7	4.7	4.7	5.2	8.2	6.1	8	19.6	21.7	16.2	9.4
7/12/2021	4:00:00 AM	61.9	58.5	54.2	53.1	50.7	48	45.5	44.6	43.6	42	41.8	42.2	39.7	38.7	36.8	36.2	34	32.8	32.9	29.8	26.6	23.5	20.4	17.9	14.6	10.7	8.3	6.8	6.8	8.5	7.5	10.3	22.3	26.7	18.4	11.9
7/12/2021	5:00:00 AM	55.9	52.2	50.2	47.9	46.9	44.4	43.8	43.8	43	42.2	42.5	42.8	41.6	39.3	37.3	35.4	31.6	30.2	29.9	28	25.4	22.4	18.7	15.5	12.1	9	7	6.5	14.4	12.4	7.1	8.8	20.7	27	16.2	10.8
7/12/2021	6:00:00 AM	49.4	47.7	45.3	44	44.5	42.8	41.9	42.2	41.4	41.5	42.2	42.6	43.6	40	36.9	36.2	31.9	30.1	29.2	27.3	24.6	20.4	16.1	11.9	8.5	6.2	5.4	5.4	14.1	11.8	6.3	6.4	5.9	6.4	7.1	8.4
7/12/2021	7:00:00 AM	60.3	57.3	54.4	51.6	49.2	46.9	46.7	45.2	44.7	44.5	45.2	43.3	41	41.4	37.7	35.9	32.5	30.6	29.8	27.6	24.6	22.2	20.3	18.3	15.2	11.9	9.3	8.1	8.9	9.5	8.4	8.6	7.3	7.8	8.3	8.9
7/12/2021	8:00:00 AM	74.8	72.7	70.4	67.7	64.9	61.9	59.3	55.8	54.4	53.1	52.2	50	47.5	46.1	42.9	39.5	36.1	33.2	31.4	28.7	26.9	25.5	24.1	23.2	20.7	17.5	16.1	15.7	22.2	26.9	40	58.8	53.4	52.2	46.8	40
7/12/2021	9:00:00 AM	81.2	79.6	77.8	75.9	73.6	71.5	68.5	65.4	64.2	60.2	60	57.4	55.9	52	49.9	47.2	43.8	41.1	38.3	38	38.7	38.3	34.6	32	30	26.8	24.4	21.3	18.3	15.7	14	13.6	12.7	13.4	13.6	15
7/12/2021	10:00:00 AM	73.2	71.7	69.7	67.8	65.6	63.2	60.5	57.9	54.9	51.6	48.2	45.2	42.6	40	37.4	35.2	33.1	31.2	30.2	28.7	27.8	28.6	27.5	27	25.4	23.7	21.3	18.7	15.8	13.4	12.4	12	11	11.6	11.8	12

7/12/2021	11:00:00 AM	77.9	76.2	74.3	72.2	70.3	68.5	66.1	63.4	60.9	58.3	55.2	52.1	49.6	47.3	43.2	40.8	39.5	37.2	36	34.7	33.9	33.9	34	33.5	32.2	30.4	28.3	25.9	22.7	19.6	17.9	17.2	16.2	16.9	17.3	18.4
7/12/2021	12:00:00 PM	80.4	78.6	76.9	74.9	73	71.2	68.9	66.3	63.4	60.5	57.5	54.3	51.4	48.4	45.4	43.1	41	39.2	37.7	36.4	35.8	35.8	36	35.9	35	33.6	31.8	29.7	26.6	23.2	20.8	19.4	18	18.6	19.3	20.3
7/12/2021	1:00:00 PM	79.9	78.3	76.6	75.2	73.5	71.5	69.4	67	64.3	61.3	58	55	51.6	48.4	45.7	43.3	41.3	39.5	37.9	36.7	36	36	36.3	36.1	35.2	33.6	31.6	29.2	26	22.4	20	18.8	17	17.8	18.6	19.5
7/12/2021	2:00:00 PM	83.4	82	80.8	79.2	77.5	76	74	71.7	69	66.3	63.4	60.3	57	53.7	50.6	48	45.5	43.1	40.9	38.8	37.5	37.3	37.6	37.5	36.2	34.5	32.7	30.3	27	23.6	21.6	20.5	19.3	20.1	20.9	22
7/12/2021	3:00:00 PM	80.7	79	77.7	75.7	73.9	71.9	69.7	67	64.3	61.4	58.3	55.1	51.9	48.9	45.9	43.5	41.2	39.3	37.6	36.1	35.2	35.2	35.5	35.2	33.9	32.2	30.2	27.7	24.5	21.2	19.2	18.4	17.3	18.2	19.1	19.9
7/12/2021	4:00:00 PM	77.9	76.3	74.7	72.7	70.8	68.8	66.2	63.9	60.6	57.8	54.8	51.7	48.8	45.9	43.1	40.4	38.1	36.2	34.5	33.1	32.3	32.1	32.1	31.7	30.3	28.5	26.7	24.3	21.3	18.2	16.5	15.7	14.2	14.9	15.8	16.4
7/12/2021	5:00:00 PM	81.4	80	78.4	76.8	75	73	70.8	67.9	65.3	62.1	59.2	56.3	53.1	49.7	46.7	44.3	41.9	39.7	37.6	35.8	34.7	34.6	34.8	34.5	33.1	31.3	29.3	26.7	23.6	20.5	18.8	18.1	16.8	17.5	18.6	19.1
7/12/2021	6:00:00 PM	79.8	78.7	77.3	75.8	73.9	72.1	69.5	66.6	63.3	60	56.8	53.4	50.1	47.1	44.4	42.1	39.8	37.4	35.2	32.8	31.3	31.5	31.5	30.7	28.6	26.2	23.8	20.8	17.6	15.3	14.4	14.1	13.2	13.7	14.8	15.5
7/12/2021	7:00:00 PM	62.3	59.2	56.6	54.7	51.8	49.3	45.1	42.2	37.9	36.8	35.4	33.8	34	34.3	27.9	26.9	27.3	23.1	25.1	26.3	20.5	22.6	20.4	21.2	18.6	17.1	14.8	13.2	12.9	12.2	11.8	11.8	10.1	10.5	10.9	16.7
7/12/2021	8:00:00 PM	46.3	45.2	43.8	41.5	39.3	37.1	36.5	36	36.7	37.3	37	36.9	36	34.5	32.2	28.6	23.7	17.7	13.4	11.8	8.7	5.7	5.2	5.3	5.2	5	5.1	5.8	6.7	14.1	7.2	7.1	6.8	7.6	8.5	12.5
7/12/2021	9:00:00 PM	75.5	74	72.6	71	68.9	66.6	64.4	61.2	57.9	55.1	52.3	49.1	45.9	43.2	40.2	37.5	35.3	33.7	31.9	28.9	26.5	26	26.2	25.8	23.6	21.2	19.4	16.4	13.3	12.1	9.8	9.2	8.4	8.9	9.4	10.8
7/12/2021	10:00:00 PM	57.3	54.4	52.3	49.7	47.3	44.7	42.3	39.8	37.1	35	33.4	31.5	29.7	30.3	25.1	22.5	19.1	16.9	15.4	12.4	9.3	6.5	3.8	2.9	3.1	3.5	4	4.6	5.1	8.1	5.9	5.8	5.4	5.9	6.8	8.3
7/12/2021	11:00:00 PM	68.2	66	63.9	60.9	58.1	55	52.3	49.5	46.5	44	41.7	39.1	36.5	34.1	31.5	29.5	26.7	24.7	22.8	20.7	18.9	18	17	14.8	11.3	8.9	6.7	5.8	5.5	7.9	6	6.1	5.6	6	6.9	8.3
7/13/2021	12:00:00 AM	71.6	70.1	67.8	65.5	62.6	59.7	56.5	53.6	50.7	47.8	45.1	42.3	39.6	37.2	34.2	31.9	29.6	27.7	25.8	22.4	19.5	18.4	16.5	14.9	12.7	8.5	5.9	5.5	5.5	6.4	6.2	6.3	5.8	6.1	7.1	8.4
7/13/2021	1:00:00 AM	71.5	70.1	68	65.6	62.7	59.8	56.7	53.9	51.1	48.2	45.5	43.1	40.3	38.2	35.3	33.1	30.3	28.2	26.7	22.4	18.3	15	13.1	10.7	7.4	5.2	4.6	4.7	5	5.8	5.8	5.8	5.4	5.9	6.7	8.2
7/13/2021	2:00:00 AM	76.5	74.5	72.7	70.3	67.9	65.1	62	59	56	52.9	49.9	46.6	43.8	41	38.3	36.1	34.2	32.8	30.9	28.1	25.9	25.3	25.2	24.3	21.8	18.6	16.1	13	10.2	9.2	8.4	8.3	7.6	8	8.7	10.5
7/13/2021	3:00:00 AM	74.2	72.5	70.6	68.2	65.6	62.6	59.6	56.5	53.6	50.6	47.4	44.4	41.5	38.7	36	33.8	31.7	30.2	28.1	25.2	22.7	22	21.4	19.4	15.8	13.4	10.2	7.9	6.6	7.5	6.6	6.6	6.1	6.5	7.3	8.7
7/13/2021	4:00:00 AM	66.4	64.5	61.9	59	56.2	53.4	50.6	47.7	45.1	42.5	40.3	38.4	36	34.2	31.6	28.3	25.4	23.2	21.8	18.6	14.7	11.2	8.9	7.1	4.9	3.8	3.9	4.2	4.8	7.7	5.7	5.7	5.2	5.6	6.5	8.2
7/13/2021	5:00:00 AM	52.1	49.4	47.4	45.9	43.6	40.7	38.7	39.6	35.9	35.2	34	32.8	30.7	30	28	24.6	21.2	21.7	19.9	17.7	14.4	9.2	3.9	3.5	4	2.9	3.3	4.5	15.4	18.8	15.9	33.1	8.8	5.6	12.8	8.3
7/13/2021	6:00:00 AM	51	48.6	46.5	44.7	43.2	42.8	40.1	40.4	39.9	39.5	39.6	39.8	39.2	38.8	38.8	35.9	34	30.1	27.6	27.4	25.7	23.4	18.7	12.8	7.7	5.1	4.8	7	13.2	18.4	12.4	5.6	5.5	5	5.6	6.6	8.2
7/13/2021	7:00:00 AM	52.2	49.5	46.8	45.2	44.3	42.5	41.7	41.7	41.3	41.2	41.3	41	39.8	37.9	35.3	33.5	29.6	28.5	27.7	24.5	20.4	15.1	10.2	7.6	5.6	5	4.9	5.8	12	14.1	6.8	5.9	5.4	6	6.9	8.3
7/13/2021	8:00:00 AM	51.6	50.7	47.9	46.7	45.2	43.4	42.5	42.1	42.3	42.4	40.5	40.3	38.8	37.4	35.1	32.3	28	24.8	23.7	21.1	17.8	14	11.4	11.3	11.2	9.9	8.5	7.8	8.6	8.5	7.4	6.9	6.1	6.8	7.6	8.7
7/13/2021	9:00:00 AM	65.7	64	61.8	59.8	57.6	54.8	52	49.6	46.5	43.9	41.2	39.3	37	35.2	38.7	35.3	26.2	22.5	25.3	19.3	15.4	23.6	16.7	17.4	17.2	16.7	14.4	12.6	11.3	10.2	9.4	9.1	8	8	8.4	9.1
7/13/2021	10:00:00 AM	63	61	58.8	56.5	54.2	51.4	49	46.8	44.1	42	40.3	38.6	36.9	35.1	33.5	30.7	26	21	24.5	20.8	12.9	21.8	19.6	17.2	16.4	17.3	15.5	13.6	12.5	11.7	9.6	9.4	7.9	8	8.7	9.2
7/13/2021	11:00:00 AM	69	66.8	65.4	63.1	60.7	58	55.6	52.9	50.2	47.9	44.8	42	39.5	36.8	33.8	31	28	26.4	28.2	25.6	20	26.9	23	21.3	20.8	20.6	18.5	16.3	13.8	12	11.6	10.9	9.4	9.6	9.9	12.4
7/13/2021	12:00:00 PM	70.8	69.4	67.6	65.6	63.3	60.8	58.3	55.3	52.4	49.5	46.4	43.1	39.9	38.2	34.6	32.1	29.3	27.9	25.8	23.5	21.6	21.5	20.1	18	15.3	12.7	10.6	9	10.4	11.2	8.1	8	7.2	7.9	8.6	9.2
7/13/2021	1:00:00 PM	74.8	73.4	71.5	69.9	68	66.1	63.6	61.1	58.2	55.2	52.6	49.5	46.1	43.6	43.9	41.3	36.1	33.2	31.3	29.8	28.5	28.8	29.4	28.8	27.1	25.3	23.2	20.9	17.7	15.1	13.2	12.2	11.2	11.7	12	12.6
7/13/2021	2:00:00 PM	77.3	76.2	74.9	72.8	71.1	69.1	66.3	63.7	60.5	57.5	54.1	50.9	47.7	45.5	42	39.6	37.6	35.5	33.5	31.7	30.6	30.5	30.5	29.5	27.4	25	22.2	19.4	16.3	14.1	13.4	13.2	12	12.7	13.3	14.1
7/13/2021	3:00:00 PM	81.5	80.3	79.1	77.7	76.1	74.4	72.2	69.5	66.6	63.3	60.3	56.9	53.6	50.6	47.9	45.8	43.6	40.9	38.5	36.5	35	35	35.5	35.1	33.1	30.8	28.4	25.4	21.8	18.8	17.4	17.1	15.8	16.4	17.3	18.7
7/13/2021	4:00:00 PM	80.3	79	77.7	76.1	74.2	72.3	70	67.4	64.4	61.4	58.6	55.2	52.1	48.9	46.2	43.5	41.2	39	36.7	34.3	32.6	32.5	33	32.7	30.8	28.5	26.2	23.3	19.8	16.9	15.7	15.1	13.9	14.5	15.3	16.5
7/13/2021	5:00:00 PM	85.2	83.6	82	80.3	78.9	77.2	75.4	73.3	71.1	68.7	66.1	63.3	60.4	57.1	53.9	50.9	48.2	46	44.1	41.9	40.1	39.8	40.6	41.2	40.2	38.5	37.3	35	31.9	28.4	25.5	23.2	21.1	21.2	21.6	23.6

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7/15/2021	1:00:00 AM	46.6	44.7	43.3	41.5	40.3	39.4	40	39.8	39.3	38.9	38.6	38.2	37.7	37.2	40.2	46.2	42.7	32.9	26.1	21.8	17.5	11.7	9	7	4.8	3.6	3.4	3.8	4.4	7.5	5.2	5.4	5.2	5.4	6.3	8.2
7/15/2021	2:00:00 AM	57.8	56.1	53.7	51.6	49.2	46.5	43.3	40.9	37.3	34.7	33.3	32	29.3	29.5	25.8	26.8	23.5	22.7	21	16.6	11.4	6.9	5.2	3.1	2.4	2.4	2.9	3.5	4.1	4.6	5	5.1	4.9	5.2	6.2	8.1
7/15/2021	3:00:00 AM	48.8	47.3	45.9	43.9	42.1	39.6	36.6	34.7	31.6	30.1	30.7	30	28.8	28.3	24.9	25.7	21.9	23.1	19.4	14.7	9	2.8	1.8	1.2	1.2	1.8	2.5	3.2	3.7	4.2	4.6	4.8	4.7	4.9	5.9	8.1
7/15/2021	4:00:00 AM	42.8	42	40.7	39.8	40.2	36.7	35.8	36.3	34.2	34.5	35.5	35.6	35	32.7	29.5	30.1	29.7	26.1	21.9	17.1	10.5	2.7	0	0.5	1	1.8	2.5	3.5	4.8	4.5	4.6	4.8	4.7	4.9	5.8	8
7/15/2021	5:00:00 AM	43.4	42.4	42.9	41.7	42	38.9	37.5	39.2	37	36.2	35.9	36.6	35.2	34.3	30.8	29.3	26.8	24.7	23	20	14.2	6.5	2.8	4	3.8	2.2	2.8	3.9	11.3	14.9	6	4.7	4.7	4.8	5.8	8
7/15/2021	6:00:00 AM	46.6	45.1	44.6	42.9	43.5	40.3	39.4	40.6	40.7	40.3	40.2	40.1	41	38.4	35.6	34.1	30.6	27	25.5	22.9	18.6	11.7	7.2	7.9	7.4	4	3.8	5.2	8.3	7.5	5.2	5.1	4.9	5.3	6.2	8.1
7/15/2021	7:00:00 AM	53.7	52	50.2	48.8	46.9	44.6	43.7	44	42.9	42.1	41.9	41.4	42.1	41.9	41.9	37.8	33	30	29.7	30	26.5	21.7	15.4	9.9	5.5	3.8	3.8	4.5	10.3	14.5	6.7	5.9	5.4	5.6	6.5	8.2
7/15/2021	8:00:00 AM	54.8	53.1	51.1	49	47.5	45.4	43.8	43	43	40.3	39.4	39.2	37.4	36.3	33.6	33.5	31.3	28.5	27.5	24.5	19.5	12.7	7.2	5.3	4.9	5	5	5.6	6	6.2	6.5	6.6	6.2	6.9	7.5	8.6
7/15/2021	9:00:00 AM	52	50.1	48.5	47.5	47.7	45.9	44.7	46.5	46.5	49.7	46.1	45.5	43.7	38.2	34.9	32.8	28.5	24.9	20.2	17.2	14.2	12.2	12.3	17.8	11.1	9.2	9.9	10.7	11.3	16.6	34.2	33.8	21.6	20.9	18.5	17.6
7/15/2021	10:00:00 AM	59	57	54.8	52.6	50.4	47.8	45.3	43.7	45.4	52.9	45.2	41.6	39.7	35.5	31.5	27.9	24	20	19.4	17	14.8	17.8	14.1	12.9	11.8	10.8	9.6	9	8.2	7.9	7.7	7.5	6.6	7.2	8	8.9
7/15/2021	11:00:00 AM	61.9	60	58	55.4	52.8	50.1	47	44.5	42.1	40	38	36.7	36.6	33.1	29.3	27.6	24.3	21.4	23.8	19.5	13.7	23.2	18.6	17.1	17.2	17.4	15.5	13.9	12.1	10.5	9.5	9	7.9	8.3	8.9	9.6
7/15/2021	12:00:00 PM	66.4	64	61.9	61.2	57.6	55.9	53.2	51.1	48.7	47.3	42.6	40.7	37.8	35.3	32.6	30.1	27.1	24.9	24.5	22.4	19.8	22.9	21.8	21	20.3	20.2	19.2	17.3	15	12.5	11	10.1	8.8	9.7	10.5	10.4
7/15/2021	1:00:00 PM	75.1	73.9	72.1	70.2	68	65.9	63.3	60.5	57.9	55.8	52.1	49.6	46.5	43.4	40.6	38.6	35.5	33.5	32.4	30.3	29	29	28.8	27.8	25.9	23.9	21.5	18.7	15.9	14	13.3	13.1	12	12.7	13	13.5
7/15/2021	2:00:00 PM	74.1	72.7	70.7	68.7	66.3	63.8	61	58.3	54.9	51.9	49.2	45.7	43.3	40.5	37.9	35.6	33.5	31.9	30.6	29	27.9	27.7	27.4	26.4	24.6	23	21.1	19	16.5	14.3	12.9	11.9	10.6	11.1	11.4	13
7/15/2021	3:00:00 PM	75.2	73.2	70.7	68.4	66.4	63.7	60.5	57.4	54.6	51.6	48.6	45.9	43.2	40.9	38.8	37.2	36.2	35.3	34.4	33.4	33.1	33.2	33.3	32.8	31.5	29.7	27.5	25	21.6	18.2	16.3	15.9	14.2	14.8	15.3	15.8
7/15/2021	4:00:00 PM	75.5	74.2	72.8	70.8	69.3	67	64.7	62.4	59.1	56.1	53	49.7	46.5	43.8	41.2	39.1	36.9	35	33.2	31.8	31	30.9	31.1	30.7	29.3	27.7	25.8	23.2	20.1	17	15.1	14.8	13	13.7	14.5	15.7
7/15/2021	5:00:00 PM	77	74.8	73.1	70.6	68.5	65.9	63.3	60.5	57.6	54.7	51.5	48.5	45.3	42.5	40.1	38.1	36.7	35.7	34.7	33.9	33.5	33.4	33.5	33.1	31.7	30	27.7	25.1	21.7	18.7	16.7	15.9	14.6	15.3	16	16.8
7/15/2021	6:00:00 PM	81.2	79.6	78.5	76.8	74.8	72.7	70.3	67.2	64.2	61	57.9	54.5	51.3	48.2	45.4	42.9	40.6	38.5	36.5	34.7	33.5	33.4	33.4	32.7	30.7	28.3	26	23	19.8	17.4	16.7	16.5	15.3	15.8	16.9	17.7
7/15/2021	7:00:00 PM	78.9	77.9	76.2	74.5	72.5	70.2	67.4	64.5	61.1	58.2	54.8	51.4	48.5	45.5	43.4	40.6	38.3	36.6	35.3	32.9	31.1	29.8	29.3	28.3	26.1	23.6	21.1	18.2	15.5	13.6	13.2	13.3	12.3	12.7	13.9	15
7/15/2021	8:00:00 PM	65	63.5	61.1	58.5	56	52.9	49.7	46.8	44	41.5	40.1	38.4	37.2	36.4	34.4	32.4	29.2	25	22.2	20.5	18.1	14	9.4	6.9	5.2	4.4	4.2	4.8	6.6	7	6	6.2	5.8	6.4	7.3	8.5
7/15/2021	9:00:00 PM	51.8	49.7	47.4	45.5	43.2	40.7	38.2	37.1	34.5	33.3	34.5	35.5	35	35.3	31.4	28.9	26.7	24.3	24.4	24.8	24.1	18.6	10	7.5	6	4	3.6	4.1	4.7	7.2	5.4	5.5	5.1	5.5	6.5	8.2
7/15/2021	10:00:00 PM	38.1	37.7	37.8	36.3	35.7	34.7	35	35.4	34.5	35.1	35.4	35	35.7	36.3	33.2	31.1	27.7	22.8	19.5	15.4	10.9	6.9	4.2	2.2	1.8	2.2	2.9	3.5	4.3	8.7	5	5.1	4.8	5.2	6.2	8.1
7/15/2021	11:00:00 PM	40.2	39.3	38.5	37.1	36.3	36.3	36.9	37.3	37.8	38.4	38.5	38.4	38.3	37.7	36.9	34.7	30.8	25.4	19.9	18.4	13.5	5.8	1.8	1.4	1.5	2	2.7	3.4	4.1	7.3	4.9	5	4.8	5.1	6.1	8.1
7/16/2021	12:00:00 AM	36.2	36.3	37.1	35.5	36	35.9	34.3	37.1	34.1	33.8	33.2	32	31.1	31	29.6	27	22.8	20.3	16.2	14.1	12.6	11.9	17	7.9	6.8	7.2	5.8	3.3	3.9	4.8	4.7	4.9	4.7	5	6.4	10.4
7/16/2021	1:00:00 AM	54.8	52.7	50.3	47.6	45.8	43.3	41.2	39.9	38.3	36.9	36.1	34.1	32.5	32.1	30.3	28.7	24.6	22.8	17.3	12.5	6.5	2.8	2.5	1.4	1.3	1.9	2.6	3.3	3.9	4.4	4.7	4.9	4.7	5	6	8
7/16/2021	2:00:00 AM	57.1	54.9	52.8	50.7	48	45.5	42.7	40.7	37	34.7	32.5	29.9	25.7	26.6	22.6	22.7	19	18.6	15.1	12.1	7	2.2	1.7	1	1.2	1.9	2.6	3.3	3.9	4.4	4.7	4.9	4.7	5	6	8
7/16/2021	3:00:00 AM	40.2	39.9	40.9	39	40.6	40.7	37.6	38.6	36.4	36.7	35.7	33.2	31.1	32	28.8	28.3	25	21.9	19.9	14.1	11.6	15.5	13.6	9.2	7.6	2.8	2.6	3.1	3.7	4.2	4.6	4.8	4.7	4.8	5.8	8
7/16/2021	4:00:00 AM	49.2	47.4	45.5	43.2	42	38.3	36.4	36.1	33.6	32.6	32.8	32.1	29.6	28.1	25.7	26.5	23.9	22.1	18.8	15.6	8.2	3	2.1	1.4	1.2	1.7	2.4	3.1	4.2	4.8	4.5	4.7	4.6	4.8	5.8	8
7/16/2021	5:00:00 AM	39.7	41	42.7	41.3	42.8	38.6	38.6	41.1	37.3	36.9	37.8	37.6	37.9	35.5	32.9	32.1	27.9	25.5	22.8	18.4	11.8	4	0.2	0.9	1.5	3.8	2.9	3.2	4.3	4.7	4.5	4.7	4.6	4.8	5.7	8
7/16/2021	6:00:00 AM	42.9	42.6	42.9	42.5	43.6	40	41.4	46.8	43.8	43.4	41.7	42.2	41.9	39.4	36.2	35.7	33.2	32.4	32.6	33.3	33.5	30.2	24.1	16.9	10.9	8.9	5.4	4.1	7	11.7	6.2	4.9	4.7	5	6	8
7/16/2021	7:00:00 AM	51.7	50.2	48.9	47.2	46.5	43.4	44.7	44.3	41.5	41.5	41.9	40.3	38.7	38.6	36.7	35.7	31.7	29.2	29.5	26.2	20.6	14.4	7.4	4.3	3.3	3.2	3.6	4.2	5.3	6.5	5.5	5.6	5.3	5.9	6.9	8.3

7/16/2021	8:00:00 AM	46.6	45	44.8	44	43.6	42.4	42.3	42.6	41.3	41.3	45.1	41.2	38.4	37.6	34.7	33.8	31.4	28.9	28	28.3	19.9	19.6	17.8	20.1	17.7	14.4	11.4	10.3	12.1	13.1	10.5	10.3	8.7	9	9.4	9.6
7/16/2021	9:00:00 AM	56.5	54.7	52.5	51	49.8	49.2	49.3	50	51.8	51.7	51.3	50.5	48.6	47.7	46.1	43.9	40.6	37	29.7	20.4	13.4	11.8	13	14.2	16.8	10.6	8.5	8.9	7.6	7.2	6.9	6.7	6.1	6.6	7.5	8.6
7/16/2021	10:00:00 AM	53.2	51.5	49.4	46.8	44.8	42.9	40.9	41.2	40.4	39.9	37.9	35.8	34.7	32.5	30	26.8	26.5	19.1	18.2	22.9	14.9	16.1	15.8	15.5	13.7	12.2	10.8	9.6	9.2	8.9	8.7	8.6	7.4	7.9	8.6	9.1
7/16/2021	11:00:00 AM	58.1	55.8	53.6	50.7	47.9	45.1	42.7	40.9	38.9	37.6	36.2	35.4	33.7	31.9	30.3	27.9	24.3	19.9	26.2	17.4	12.3	25.9	16	19.2	18.8	18.2	16.4	14.6	12.3	10.8	9.4	9	7.7	8	8.5	9.1
7/16/2021	12:00:00 PM	64.2	62.7	59.8	57.5	54.6	52	49.1	46.1	43.5	41.2	38.8	36.2	34.1	32	29.4	28	25.4	22.2	23.4	19.2	14.7	20.7	16.4	15.9	14.9	15.3	13.2	11.3	10	8.7	8.1	7.8	6.9	7.5	8.2	9
7/16/2021	1:00:00 PM	71.9	70.3	68.5	66.2	63.8	61.6	58.8	55.9	53.5	50.7	47.8	45.2	41.8	38.6	35.7	33	30.6	29	27.6	26.2	25	25.2	24.7	23.4	21.2	18.9	16.2	13.7	11.4	10.2	10	9.9	8.9	9.4	10.1	10.4
7/16/2021	2:00:00 PM	76.3	74.4	72.4	70.5	68	66	63.3	60.3	57.6	54.6	51.7	48.2	45.4	42.7	40.1	37.9	35.9	34.3	33.1	32	31.4	31.4	31.5	31.1	29.7	27.9	25.8	23.4	20.2	17.2	15.6	15	13.7	14.4	15.3	16.1
7/16/2021	3:00:00 PM	78.9	77.7	76.2	74.6	72.6	71	68.6	65.9	63.2	60.3	56.8	53.7	50.3	47.1	44.1	42	39.7	37.6	35.6	33.7	32.7	32.6	32.8	32.4	30.7	28.6	26.5	23.8	20.5	17.6	16.2	15.7	14.5	15.2	16.2	17
7/16/2021	4:00:00 PM	76	75	73.6	72	70	68.3	65.7	62.7	59.7	56.5	53.3	50	46.8	43.8	41	38.7	36.2	34	31.8	29.9	28.6	28.5	28.6	27.6	25.5	23.2	21	17.9	15	12.8	12.1	11.8	10.7	11.3	12.1	13
7/16/2021	5:00:00 PM	82.7	81.3	79.8	78.3	76.5	74.7	72.6	70.2	67.4	64.7	61.7	58.4	55.3	52	48.9	46.1	43.6	41.6	39.4	37.4	36.2	36	36.2	35.9	34.5	32.7	30.9	28.2	25	21.8	20	19.3	18	18.7	19.9	21
7/16/2021	6:00:00 PM	83.3	82	80.7	79.2	77.4	75.5	73.2	70.4	67.4	64.1	61	57.9	54.5	51.1	48.6	46.2	44.2	42.2	40	37.5	35.8	35.6	35.8	35.4	33.6	31.3	29	26	22.8	20	18.9	18.8	17.7	18.2	19.5	21.5
7/16/2021	7:00:00 PM	78.1	77.7	75.8	74.3	72.7	70.7	68.5	65.8	62.7	59.3	56.1	52.7	49.4	46.3	43.7	41.4	39.4	37.3	35.2	32.7	30.6	30.6	30.9	30.4	28.3	25.9	23.6	21.4	21.3	15.7	14	14.1	13	13.3	14.1	15.2
7/16/2021	8:00:00 PM	43.6	42.3	41.2	39.4	38.3	37.2	37.1	39.1	37.7	37.1	37.1	36.2	36.1	34.2	31.9	30.8	26.4	21	18.4	17.2	15.5	8.7	3	2.5	3.2	4.3	4.8	4.8	5.2	6.9	6.1	6.4	6.2	6.6	7.2	10.5
7/16/2021	9:00:00 PM	41.4	41.2	40.1	37.8	36	33.9	33.3	40.8	32.2	33.4	46.2	48.1	47.7	38.9	35.3	33.1	26.1	18.2	11.7	4.7	0.5	-0.1	0.1	0.7	1.5	2.2	2.9	3.6	4.2	6.8	5.1	5.2	5	5.3	6.3	8.2
7/16/2021	10:00:00 PM	39.4	39.4	39.2	36.8	35.2	33.4	33.5	34.1	34.3	35	34.4	33.8	32.7	32.2	30.3	26.9	22.2	17.1	10.6	4	0.5	-0.5	0	0.6	1.3	2	2.7	3.4	4	5.4	4.9	5	4.8	5.1	6.1	8.1
7/16/2021	11:00:00 PM	39.3	38.4	39.5	39.5	38.8	37.6	36.5	36.7	34.5	34.3	33.7	33.6	32.3	32.7	30.4	27.3	23.4	18.7	15.6	11.4	4.4	0.7	0.3	0.8	1.5	2.2	2.9	3.6	4.3	4.8	5.1	5.2	5	5.1	6.1	8.1
7/17/2021	12:00:00 AM	46.9	45.5	42.9	40.4	38.3	36.1	34.3	32.2	29.7	30.2	28.8	27.6	27.1	28.7	23.2	23.5	17.4	17.8	9.6	5.1	3.3	1.1	0.8	0.6	1.3	2	2.7	3.3	3.9	4.4	4.7	4.9	4.8	5	6	8.1
7/17/2021	1:00:00 AM	38	39.8	38.1	38.6	38.3	37.2	37.6	34.6	30.5	29	27.9	28	26.5	25.3	24	20.1	15.1	11.8	2.2	0.4	-0.5	-0.6	-0.1	0.5	1.2	1.9	2.6	3.3	3.9	4.4	4.7	4.9	4.7	5	5.9	8
7/17/2021	2:00:00 AM	41.6	40.8	40.4	38.4	36.6	34.9	35.1	34.4	34.5	35	34.4	33.8	34.1	31.2	27	24.5	18.5	17.6	6.6	3	1.2	0.8	1.1	0.7	1.2	1.8	2.5	3.2	3.8	4.2	4.6	4.8	4.7	4.9	5.9	8
7/17/2021	3:00:00 AM	39.4	38.6	38	35.7	34.7	32.9	31	29.9	27.2	29.5	29.4	29	25.8	27	24.8	23	19.2	16.1	12.2	3.5	-0.9	-0.9	-0.3	0.3	0.9	1.7	2.4	3.1	3.7	4.2	4.6	4.8	4.7	4.8	5.8	8
7/17/2021	4:00:00 AM	52.6	51	48.8	46.8	44.9	42	39.4	37	35.1	35.1	35.6	35.3	31.5	31.5	29.2	27.4	23.1	21	17.7	13	10.2	5.9	2.1	0.7	1.1	1.8	2.5	3.1	3.8	4.4	4.6	4.8	4.7	4.8	5.8	8
7/17/2021	5:00:00 AM	39.9	40.5	43	42.1	43	41.3	42.8	41.9	37.9	36.4	36.3	35.7	34	33.8	30.4	27.5	23.1	19.3	18	13.5	9.1	2.2	0	0.3	0.9	1.8	2.5	3.5	7.5	13	5.1	4.8	4.7	4.8	5.7	8
7/17/2021	6:00:00 AM	47.1	45.4	44.3	42.5	42.6	39.9	38.8	39.2	40.3	37.7	40.3	40.7	38.5	37.2	34.9	34.5	30.3	27.8	26.8	27.1	26.8	22.2	14.9	8.9	5.1	3.3	2.9	3.3	4.4	5	4.8	5.1	5	5.4	6.3	8.1
7/17/2021	7:00:00 AM	51.2	49.6	47.8	45.8	45	42.7	41.4	41.4	42.1	39.7	40.2	39.7	39.9	38.4	35.9	34	30.4	27.2	24.6	21.9	20.4	17.4	11.6	6.8	3.9	3	3.3	4	6.5	6.7	5.2	5.2	4.9	5.4	6.4	8.1
7/17/2021	8:00:00 AM	51.7	49.5	47.8	46.8	49.2	42.9	40.7	42.9	42.7	38.4	38.3	36.5	34.5	33.8	32.4	30.3	27	22.7	17.6	20.2	12.5	12.7	12.9	13.9	12.3	10.6	8.4	8.1	8.6	9.4	8.2	8.3	7.3	8	8.7	9.2
7/17/2021	9:00:00 AM	64.9	63.4	61.7	59.5	57.1	54.3	51.3	49.9	46.4	44.1	41.7	39.2	36.7	34.7	33.1	30.9	28.9	25.1	22.4	23.7	18.9	19.6	18	18.6	17.6	15	12.6	10.7	9.9	9.9	10.8	8.9	7.8	8	8.7	9.2
7/17/2021	10:00:00 AM	69.4	67.8	66	63.8	61.7	58.8	56	54.1	50.5	47.6	45	42.9	40.7	39.3	37.4	35.6	32.8	28.9	25.2	23	20.2	18.2	16.5	14.1	11.7	10.5	9.3	7.9	7.5	7.2	7.3	7.1	6.4	6.8	7.7	8.9
7/17/2021	11:00:00 AM	64.4	62.3	60.4	57.8	55.6	52.7	50.3	48.3	45.6	43.5	41.9	40.8	40.9	39.8	38	37.1	37	31.2	28.8	22.6	17.2	19.5	15.2	14.1	13.5	13.6	12.1	10.5	9.1	7.9	7.5	7.6	6.9	7.7	8.5	9
7/17/2021	12:00:00 PM	60	57.9	55.7	53.7	51.2	48.4	45.7	43.8	40.4	38.2	38	37	33.3	30.7	28.6	26.6	24.4	21.3	19.4	17.4	15	15.2	12.5	11.6	10.4	10.3	8.8	7.6	7.2	7.2	7.2	7.2	6.6	7.6	8.6	9.1
7/17/2021	1:00:00 PM	69.7	68.4	67.1	64.8	63.1	61.4	58.9	55.8	53.2	51.3	48.9	46.3	43.6	41.7	39.2	36.6	34.1	31.5	29.6	28	27	26.4	26.1	26	25.4	24.5	23.3	21.7	19.2	16.2	14	12.1	10.1	10.6	11.2	11.6
7/17/2021	2:00:00 PM	73.9	72.4	70.7	69.1	67.1	64.4	61.8	58.9	55.6	52.7	49.6	46.5	43.3	40.4	37.9	35.6	33.3	31.5	29.3	26.6	24.4	23.7	23.5	22.6	20.3	17.8	15.6	13.1	11.1	10.1	9.8	9.9	9.5	10.7	11.5	11.4

7/17/2021	3:00:00 PM	71.2	69.2	67.7	65.4	63.1	60.7	57.6	54.8	51.5	48.6	45.8	43.5	45.7	45.7	43	40.4	39	33.4	29.4	28.6	27.4	25.7	25	23.9	21.8	19.8	17	14.3	11.6	10	9.5	9.3	8.6	9.6	10.5	11
7/17/2021	4:00:00 PM	76.8	75.2	73.8	71.8	69.5	67.4	64.6	61.9	58.8	55.7	52.7	49.5	46.5	43.8	41.5	39	36.9	35.1	33.3	32	30.9	31.1	31.1	30.4	28	25.4	23	19.7	16.7	14.3	13.4	13.1	12.2	12.5	13.5	14.4
7/17/2021	5:00:00 PM	77.7	75.8	74.1	72.3	70.1	67.7	65	62.2	58.6	55.6	52.2	48.9	46	43.4	40.9	38.6	36.3	34.3	32.5	31.1	30.3	30.2	30.4	29.8	27.4	24.6	22	19.2	17.2	13.9	12.8	12.7	11.7	12.1	13.5	14.4
7/17/2021	6:00:00 PM	79.8	78.7	77.4	75.8	74	72.1	69.7	66.7	63.5	60.2	56.9	53.5	50.2	47.3	44.8	42.5	40.2	37.8	35.5	33.4	32.1	31.9	32	31.1	28.7	25.9	23.3	20.1	16.8	14.5	13.8	13.9	12.6	13	14.1	14.7
7/17/2021	7:00:00 PM	76.2	75.3	73.9	72.2	70.3	68	65.4	62.2	58.8	55.5	52.2	48.8	45.7	43.2	41.1	38.7	35.8	34.1	31.8	29.1	27	26.7	26.6	25.4	22.6	19.6	16.9	14.1	12.6	11.8	10.6	10.5	9.3	9.5	10.2	10.5
7/17/2021	8:00:00 PM	58.6	56.6	54.3	51.9	49.5	47.2	44.7	42.5	40.2	38.2	37	36.2	36.1	34.7	32.4	30.6	27.4	25.8	24.5	23.8	23.7	19.2	10.2	6.6	5.6	4.9	9.1	22.2	23.7	12.5	6.3	5.9	5.4	5.8	6.8	8.3
7/17/2021	9:00:00 PM	50.6	48.9	47	44.8	43.1	40.3	38.7	38.5	34.6	34.4	37.7	30.2	33.5	36.8	29.6	29.3	30.2	24.6	22.6	22	22.1	17.9	11.2	7.4	6.1	4.3	3.4	3.9	4.5	7.6	5.3	5.3	5	5.4	6.4	8.2
7/17/2021	10:00:00 PM	44.5	43	41.6	39.3	37.4	35.3	34.1	41.8	32.3	32.7	35.5	32.8	30.4	31	27.7	25.3	22.1	19.9	19.9	14.5	8.4	2.3	0.8	1.2	2	2.5	3.2	3.8	4.4	5.6	5.2	5.3	4.9	5.3	6.3	8.1
7/17/2021	11:00:00 PM	43.6	41.9	40.6	38.4	36.5	34.8	33.8	42	33	33.1	34.7	32.8	31.9	32.3	30.2	30.6	29.9	26.5	22.8	17.8	14.3	11.9	3.7	2.9	3.6	3.2	4.3	5.1	5.7	6.1	6.6	6.2	5.7	5.8	6.6	8.4
7/18/2021	12:00:00 AM	38.8	37	36.7	35.4	35.7	34.2	34.8	36.1	35.5	35.9	35.9	35.7	35.1	34.5	33.2	31.7	28.3	26.1	21.6	20.9	18.7	12.7	5.5	3.2	2.3	2.5	3.7	4.3	4.8	8	7	7.5	5.3	5.4	6.3	8.5
7/18/2021	1:00:00 AM	48.3	45.9	44.5	42.3	41.1	39.3	38.3	38.2	37.5	36.6	36.6	35.4	34.1	33	31.5	34.6	35.6	31.7	21.9	19.5	18.3	12.5	4.8	2.4	2.3	2.7	3.5	5.7	6.1	5.7	8	7.7	6.4	6.5	6.6	8.2
7/18/2021	2:00:00 AM	60.2	57	54.5	50.7	47.8	44.6	42.5	40	37.5	35.5	35.3	35.2	32.4	32.4	30.4	30	27.6	28.2	28.1	24.2	22.8	21.9	21.7	20.9	19	16.1	13.3	10.7	8.4	7.5	7.7	7.6	7.4	7.3	7.7	8.7
7/18/2021	3:00:00 AM	43.3	41.8	41.7	39.8	41.2	38.4	38.7	38	34.9	33.8	34.1	34.5	31.6	31.3	26.6	27.1	22.7	22.7	21.7	17.2	11.6	5.1	2.8	1.6	1.5	3.1	2.6	3.3	3.9	4.4	4.7	4.9	4.8	5	6	8
7/18/2021	4:00:00 AM	43	42.6	41.7	40	39.9	37	35.9	35.3	33.9	33.3	35.4	33.5	29.9	31.9	26.6	25.9	23.2	21.6	20.5	16.9	11.4	3.7	0.7	0.8	1.3	2	2.6	3.4	4.8	5.6	4.7	5	4.8	4.9	5.9	8
7/18/2021	5:00:00 AM	42.3	42.5	42.3	41.1	42.5	37.6	36.6	36.1	33.9	33.7	36.7	45.5	38.4	31.8	37.9	31.6	28.6	26.1	22.9	18.1	12.9	5.4	1.1	1.1	1.2	1.8	2.5	3.1	4.8	6.5	4.6	4.8	4.7	4.8	5.8	8
7/18/2021	6:00:00 AM	42.3	43.2	43.1	41.8	42.2	42	41.9	40.9	41.1	39.4	37.7	38.1	36.8	33.4	28.3	26.2	23	20.9	18.3	14.2	9.4	4	1.9	1.8	1.8	2.1	2.7	3.5	5	4.9	4.8	5	4.8	5.1	6.1	8
7/18/2021	7:00:00 AM	49.5	47.7	46.6	45.2	44.8	43.1	42.3	41.9	42.5	40.3	40.1	39.4	38.8	37.9	34.3	32.4	29	26.8	27.5	26.4	24.9	21.9	16.6	12.2	8.5	6.4	5.6	4.6	4.8	5.1	5.3	5.3	5	5.6	6.5	8.2
7/18/2021	8:00:00 AM	54.4	51.9	50.1	47.8	46.1	43.9	42	41.5	38.7	38.9	38.4	40.3	35.5	36.5	33.2	31.1	27.9	26	24.6	21	17.7	11.4	9.3	9.9	9.5	7.6	6.4	6.1	6.5	6.5	6.5	6.2	5.5	6	6.9	8.3
7/18/2021	9:00:00 AM	61.7	59.8	57.2	54.6	52	49.3	47	44.9	45.1	40.8	39.4	37.9	38.2	38.3	32.2	30.6	28.9	23.2	24	23.9	17.4	16.6	16.6	18	15.6	12.8	10.5	10	9.7	9.4	8.7	8.5	7.5	7.8	8.5	9.1
7/18/2021	10:00:00 AM	61.5	59.7	57.3	55.4	52.9	50.3	47.9	46.2	43.9	42.3	41.2	37.7	36.7	34.1	31.2	28.8	26.7	19.9	20.9	24.8	18.2	19.5	18.7	19.6	16.9	15.8	14.6	13.2	10.7	11	10.2	9.4	8.4	8.8	9.2	9.5
7/18/2021	11:00:00 AM	65.8	64	61.7	59.2	56.5	53.8	50.9	48.7	45.6	43.1	41.4	38.7	38.2	39.2	35.4	29.2	27.9	23.5	19.1	17.2	15.6	14.3	12	10.1	8.7	7.9	7.3	6.9	6.9	7.2	7.7	9.3	7.8	8.7	9.5	9.5
7/18/2021	12:00:00 PM	62.4	60.4	58	55.6	52.9	50.3	47.6	45.7	42.9	40.7	40	36.9	35.3	33.3	30.3	27.3	24.7	20.3	19.1	17.6	15	17	13.9	11.9	11.7	12	10.9	10.1	9.5	9	8.7	8.3	7.3	7.9	8.6	9.1
7/18/2021	1:00:00 PM	65	63.7	61.4	59.2	56.9	54.1	51.5	48.5	45.2	42.7	40.3	39.5	35.6	34.6	30.4	27.2	24.5	21.4	19.7	18.3	16.7	15.9	15.5	12.6	11.3	11	10.5	9.5	9.1	8.6	8.4	8.1	7.2	7.9	8.8	9.3
7/18/2021	2:00:00 PM	65.2	63.5	62	60.4	57.4	56	53.1	50.3	46.4	44.6	42.3	40.2	38.6	37.7	35.3	31.6	28.1	24.7	23.4	20.8	19	19.1	16.7	15.7	14.2	13.5	11.8	10.5	9.9	9.3	9	8.6	7.5	8.1	8.7	9.3
7/18/2021	3:00:00 PM	72.4	70.9	69.6	67.4	64.8	62.4	59.9	57.2	55	51.6	48	45.1	42.2	40.2	36.7	33.8	31.4	29.6	27.6	25.7	24.3	23.8	24	23.5	22.1	20.6	18.7	16.5	13.6	11.2	10.1	9.6	8.5	9.4	10.3	10.6
7/18/2021	4:00:00 PM	75.4	73.7	71.8	69.4	67	64.4	61.3	58.1	55.4	52.5	49.4	46.4	43.3	40.5	37.7	35.1	33.1	31.2	29	26	23.6	22.9	22.7	21.8	19.3	16.1	14.1	11.3	11.5	11.2	8.2	8.2	7.7	8.5	9.3	10.3
7/18/2021	5:00:00 PM	82.6	80.3	77.8	75.5	73.5	71.2	68.8	66.1	63.2	60.4	57.6	54.5	51.4	48.2	45.7	43.6	42	41.1	40	39	38.5	39.1	40.3	41.2	40.4	38.4	36.8	34.4	31.1	27.3	24.4	22.4	20.6	20.4	20.5	20.7
7/18/2021	6:00:00 PM	74.9	71.9	69.1	65.5	62.3	59.5	56.6	53.6	50.5	47.3	44.6	42.5	40.6	39	37.6	36.4	35.4	34.7	33.9	33.3	32.7	32.9	33.3	33.1	31.5	28.9	26.2	23.2	21.4	21.6	16.6	15.6	15	14.8	14.8	13.7
7/18/2021	7:00:00 PM	80.6	78.3	76	73.6	71.3	68.8	66.2	63.2	60.3	57.5	54.5	51.5	48.3	45.5	43	40.9	39.2	37.9	36.6	35.2	34.2	34.3	35	35	33.4	30.6	28.3	25.2	21.6	18.5	16.8	16.1	15.3	15.5	15.9	16.9
7/18/2021	8:00:00 PM	68.6	65.5	62.6	59.7	56.9	54	50.8	48.3	45.6	43.4	41.8	40	42.7	46.2	45.9	34.9	33.7	32.6	31.2	30.5	29.9	29.7	29.9	29.5	27.8	25	22.1	19.1	15.7	14	13	12.8	12.3	12.3	12.1	11
7/18/2021	9:00:00 PM	39	36.9	36.3	35.7	36.1	36.1	37.8	38.5	37.2	37	37.2	37.3	36.4	35.2	33.3	30.6	25.4	18.9	14.7	15.2	13.3	8.8	4.5	3.2	4.1	4.6	4.9	5.5	5.9	7.2	6.5	6.5	5.9	6.2	7.1	8.4

WM8: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	11:57:23 AM	48.75741	17.08386	68.84187	45.29965	26.02271	20.24172
8/23/2021	12:00:00 PM	29.09941	7.656579	46.92552	32.81033	23.83786	14.40339
8/23/2021	1:00:00 PM	28.29249	5.899004	49.75239	31.02544	22.25052	13.94068
8/23/2021	2:00:00 PM	41.96557	7.15441	66.89545	34.02372	24.49621	17.19495
8/23/2021	3:00:00 PM	32.05184	7.726571	54.56244	34.73244	25.70367	16.58274
8/23/2021	4:00:00 PM	34.76927	9.693065	52.02424	38.44844	30.06002	20.65353
8/23/2021	5:00:00 PM	36.16203	15.04858	53.39115	39.70742	31.24665	23.07643
8/23/2021	6:00:00 PM	33.72494	15.71951	51.9747	37.16173	29.20918	22.46784
8/23/2021	7:00:00 PM	34.16648	6.711143	59.86988	34.50888	24.97096	18.67039
8/23/2021	8:00:00 PM	31.99068	1.093368	52.35359	35.4489	25.13425	13.04419
8/23/2021	9:00:00 PM	41.02379	3.872585	62.56724	42.62447	23.79948	13.18209
8/23/2021	10:00:00 PM	36.51464	1.188713	61.82727	39.24785	25.51547	12.40533
8/23/2021	11:00:00 PM	32.10173	2.18543	51.52716	35.62301	22.16387	10.76407
8/24/2021	12:00:00 AM	38.86934	1.033788	63.88534	40.56311	24.08593	10.26829
8/24/2021	1:00:00 AM	37.57532	0	64.67638	35.19532	17.53767	6.322126
8/24/2021	2:00:00 AM	37.2077	0	61.87763	37.79954	22.89347	6.788375
8/24/2021	3:00:00 AM	43.34874	14.13015	61.70684	47.88178	34.52891	23.84856
8/24/2021	4:00:00 AM	38.4741	12.39718	53.97139	42.37863	33.23264	22.46997
8/24/2021	5:00:00 AM	40.50487	16.69187	59.12255	42.16894	32.34343	25.50127
8/24/2021	6:00:00 AM	42.69806	18.19052	60.67057	43.93885	33.31502	25.68664
8/24/2021	7:00:00 AM	39.06344	19.32339	57.20429	42.38756	34.6014	27.07393
8/24/2021	8:00:00 AM	31.64444	11.95247	52.49133	33.65967	25.64367	19.04192
8/24/2021	9:00:00 AM	40.16681	8.135138	64.63691	33.60219	24.23927	17.2624
8/24/2021	10:00:00 AM	30.8611	6.090503	52.2021	33.41902	23.12352	13.02867
8/24/2021	11:00:00 AM	29.45166	5.907645	49.30653	33.23353	23.37456	13.94112
8/24/2021	12:00:00 PM	29.53442	4.598901	49.7337	32.99833	20.97035	11.8981
8/24/2021	1:00:00 PM	35.4986	6.301962	68.31727	29.76293	20.29146	13.18261
8/24/2021	2:00:00 PM	28.47272	6.331353	45.9406	32.3953	23.68554	14.85814
8/24/2021	3:00:00 PM	29.91596	7.067502	50.14965	33.46926	23.66338	14.53071
8/24/2021	4:00:00 PM	26.17085	6.412687	42.97975	29.87412	21.50315	13.84052
8/24/2021	5:00:00 PM	27.70966	8.628591	45.40651	31.72041	22.80667	15.34354
8/24/2021	6:00:00 PM	32.37183	13.24093	48.04858	36.21533	28.21476	21.47761
8/24/2021	7:00:00 PM	26.35453	7.000795	43.62533	30.01529	22.58862	15.37577
8/24/2021	8:00:00 PM	38.15897	3.471911	59.99417	40.31297	34.2365	17.48494
8/24/2021	9:00:00 PM	35.38419	2.490048	57.97525	37.87752	24.16457	15.90167
8/24/2021	10:00:00 PM	39.6506	3.795467	64.37043	39.98795	23.70904	11.47735
8/24/2021	11:00:00 PM	32.21128	0	53.12575	37.70565	14.43607	4.78872
8/25/2021	12:00:00 AM	42.97709	5.710261	60.90513	44.12368	38.0623	18.7115
8/25/2021	1:00:00 AM	30.18254	4.426469	48.49704	33.43876	20.55245	11.36231
8/25/2021	2:00:00 AM	26.55386	0	43.44529	30.82725	17.87753	8.692688

8/25/2021	3:00:00 AM	39.37537	0	63.03466	41.03639	24.97979	11.73007
8/25/2021	4:00:00 AM	34.08725	15.17774	54.62721	37.33094	29.5498	22.79093
8/25/2021	5:00:00 AM	39.76914	18.84862	57.59149	42.66801	34.05061	27.38302
8/25/2021	6:00:00 AM	41.78418	20.12055	65.90056	43.27236	33.67398	26.65051
8/25/2021	7:00:00 AM	40.91647	18.51134	60.57687	43.38946	34.00852	26.36184
8/25/2021	8:00:00 AM	35.75027	15.30104	52.68903	39.70955	28.369	20.95125
8/25/2021	9:00:00 AM	37.35576	10.77489	63.51855	32.44153	24.56731	18.34681
8/25/2021	10:00:00 AM	28.53945	5.631877	44.91228	32.37466	24.17191	13.81702
8/25/2021	11:00:00 AM	32.42176	4.748236	55.00132	32.46008	22.02632	11.58476
8/25/2021	12:00:00 PM	27.86464	5.716802	46.43193	31.69203	21.59437	12.24299
8/25/2021	1:00:00 PM	27.3831	5.960115	47.85126	30.68157	20.47644	12.07436
8/25/2021	2:00:00 PM	29.61132	7.442705	48.94797	32.89422	25.52865	15.58099
8/25/2021	3:00:00 PM	28.34512	7.249049	50.57559	31.29515	21.65943	13.52808
8/25/2021	4:00:00 PM	31.31058	9.147593	52.80836	34.39594	25.73326	17.95423
8/25/2021	5:00:00 PM	32.21147	11.97913	50.10741	35.89438	27.11766	19.88285
8/25/2021	6:00:00 PM	32.42635	10.76173	48.35046	36.07967	27.81724	20.38865
8/25/2021	7:00:00 PM	26.32784	0	48.41382	28.94062	21.22782	10.91356
8/25/2021	8:00:00 PM	28.48907	0	51.02712	31.23826	20.54592	7.472104
8/25/2021	9:00:00 PM	35.94205	0	61.77461	36.22879	21.91454	7.363135
8/25/2021	10:00:00 PM	38.53739	4.493183	59.94453	41.61921	26.90335	14.08601
8/25/2021	11:00:00 PM	34.7772	4.666632	54.97819	37.73614	25.39058	13.67258
8/26/2021	12:00:00 AM	34.15252	0	52.2777	35.65206	16.92798	3.836245
8/26/2021	1:00:00 AM	30.62029	0	51.7483	33.38816	20.36613	1.939278
8/26/2021	2:00:00 AM	31.68607	0	52.48268	33.82882	19.93953	5.813248
8/26/2021	3:00:00 AM	37.28095	7.464248	58.46889	38.75943	27.55503	17.45174
8/26/2021	4:00:00 AM	36.29373	7.693949	57.63625	39.71232	32.04404	20.53285
8/26/2021	5:00:00 AM	37.93336	17.7644	60.61602	40.67751	31.98254	25.25013
8/26/2021	6:00:00 AM	35.66393	17.37591	55.68746	38.54231	31.12391	24.29981
8/26/2021	7:00:00 AM	39.93314	14.23515	61.69515	42.52638	31.14415	23.07931
8/26/2021	8:00:00 AM	38.29116	11.24051	56.80995	41.07457	27.06566	18.49449
8/26/2021	9:00:00 AM	28.59999	9.114458	48.92124	31.27501	21.81089	15.01553
8/26/2021	10:00:00 AM	27.19951	4.93505	45.59695	30.45321	22.66455	14.87126
8/26/2021	11:00:00 AM	31.75183	5.434069	52.12188	33.79876	26.27876	14.73878
8/26/2021	12:00:00 PM	29.67615	6.016557	51.50588	32.92338	24.89732	16.5266
8/26/2021	1:00:00 PM	28.75063	5.226733	46.18947	32.18037	23.69146	14.41998
8/26/2021	2:00:00 PM	29.98261	4.074373	49.97759	34.32511	23.51713	11.48011
8/26/2021	3:00:00 PM	33.9845	10.33638	51.0837	37.73125	27.99227	19.17168
8/26/2021	4:00:00 PM	32.30025	10.36938	51.95648	35.84521	27.03552	18.92651
8/26/2021	5:00:00 PM	25.94069	6.357121	43.55894	29.10271	22.45871	15.82711
8/26/2021	6:00:00 PM	24.83181	4.619611	46.34638	27.27222	19.34586	11.8813
8/26/2021	7:00:00 PM	25.01065	6.351983	51.73	26.9749	21.40138	15.4257
8/26/2021	8:00:00 PM	29.73069	5.131749	55.47767	29.09422	21.26455	13.57467
8/26/2021	9:00:00 PM	31.77284	0.401298	52.99977	34.03984	20.78593	8.174583

8/26/2021	10:00:00 PM	35.58305	10.33546	56.52626	39.18403	25.10389	16.94905
8/26/2021	11:00:00 PM	37.17733	1.664352	56.8429	39.16707	18.53427	8.861681
8/27/2021	12:00:00 AM	35.25346	1.802439	55.25333	38.2711	20.26371	9.308809
8/27/2021	1:00:00 AM	33.67825	0	53.95713	34.50843	20.4976	8.299618
8/27/2021	2:00:00 AM	37.85834	2.322362	60.25123	40.41292	20.42171	9.530935
8/27/2021	3:00:00 AM	39.21711	0	64.84216	36.59124	22.36888	8.647179
8/27/2021	4:00:00 AM	38.80481	14.76547	61.73096	41.5712	33.60056	24.74354
8/27/2021	5:00:00 AM	41.46402	15.55753	61.97923	45.19595	34.99788	26.92315
8/27/2021	6:00:00 AM	39.62181	6.6304	58.36526	42.58449	31.08696	18.60226
8/27/2021	7:00:00 AM	35.50195	9.594406	63.10335	35.83505	27.44986	17.20393
8/27/2021	8:00:00 AM	35.12761	8.845501	55.85013	33.88864	22.9489	14.19244
8/27/2021	9:00:00 AM	35.96885	8.806124	53.47569	37.53129	21.18837	14.10922
8/27/2021	10:00:00 AM	33.31865	5.10708	56.58883	32.88111	22.07303	12.80172
8/27/2021	11:00:00 AM	37.44458	5.499274	70.26895	31.81855	21.8889	12.19665
8/27/2021	12:00:00 PM	25.29909	4.666918	49.39341	27.23524	18.2672	10.66062
8/27/2021	1:00:00 PM	30.26688	6.532161	47.96463	34.059	23.76094	14.91426
8/27/2021	2:00:00 PM	27.99712	4.404148	48.34613	31.89191	21.53623	11.73212
8/27/2021	3:00:00 PM	28.88432	3.269599	46.3841	32.47256	22.8736	10.98702
8/27/2021	4:00:00 PM	26.61913	4.624696	45.04215	29.98527	21.40005	12.34048
8/27/2021	5:00:00 PM	29.29562	4.03289	46.9483	32.91564	23.968	12.95217
8/27/2021	6:00:00 PM	31.83615	9.29468	51.64742	35.46288	24.3438	17.63849
8/27/2021	7:00:00 PM	31.33516	3.968715	55.61456	32.1487	22.90823	14.83525
8/27/2021	8:00:00 PM	30.18992	0	49.31669	33.89619	21.15624	9.494524
8/27/2021	9:00:00 PM	31.3102	0.238322	54.73998	33.02593	19.26869	9.178055
8/27/2021	10:00:00 PM	35.81547	1.069664	58.48246	37.94534	23.46186	11.63322
8/27/2021	11:00:00 PM	26.41818	0.657341	45.96157	29.83088	18.38405	8.310912
8/28/2021	12:00:00 AM	38.2155	2.662703	64.35335	37.26927	18.79034	9.051469
8/28/2021	1:00:00 AM	38.8492	0	55.83919	41.01735	21.83989	7.051237
8/28/2021	2:00:00 AM	29.62975	0.816817	51.10006	32.02712	16.63611	7.932999
8/28/2021	3:00:00 AM	34.44898	3.523853	58.95048	35.87833	21.14778	10.86781
8/28/2021	4:00:00 AM	28.9706	4.969524	49.77824	32.46406	22.06129	13.35758
8/28/2021	5:00:00 AM	32.70679	8.724759	52.93754	36.09078	25.47265	16.50044
8/28/2021	6:00:00 AM	33.86697	8.216147	50.65753	37.44876	26.93101	15.32289
8/28/2021	7:00:00 AM	34.07236	10.05556	51.89846	34.09441	23.70377	16.51741
8/28/2021	8:00:00 AM	25.35194	9.826523	44.13179	27.95436	19.46022	14.45217
8/28/2021	9:00:00 AM	27.50113	8.974198	47.11639	30.26842	19.79953	14.74436
8/28/2021	10:00:00 AM	29.06023	2.763936	48.30197	32.78436	18.44272	8.611446
8/28/2021	11:00:00 AM	22.58959	3.194716	42.35286	26.2259	17.92978	9.171719
8/28/2021	12:00:00 PM	28.17138	4.90459	53.23108	28.99196	18.583	10.33349
8/28/2021	1:00:00 PM	21.06835	3.966736	38.94416	24.74522	15.44096	8.806163
8/28/2021	2:00:00 PM	24.97697	2.691493	48.93393	26.80044	14.8679	7.178786
8/28/2021	3:00:00 PM	22.84371	3.085205	43.6405	25.79065	15.86171	8.253011
8/28/2021	4:00:00 PM	21.88368	1.109	41.37436	24.69734	13.61215	5.648213

8/28/2021	5:00:00 PM	25.50595	1.161406	47.33084	27.84997	17.78773	8.987413
8/28/2021	6:00:00 PM	22.27995	0.113914	40.75838	25.35258	15.32121	7.466017
8/28/2021	7:00:00 PM	32.66256	0	55.30566	31.00462	20.59165	9.204436
8/28/2021	8:00:00 PM	27.82509	0	46.2624	31.23848	19.97071	7.858941
8/28/2021	9:00:00 PM	39.88785	5.107878	59.41378	41.48662	21.85599	12.15646
8/28/2021	10:00:00 PM	29.92595	0	48.22738	33.75915	19.02601	6.566189
8/28/2021	11:00:00 PM	27.0233	0	48.14434	29.5311	12.92632	2.999536
8/29/2021	12:00:00 AM	25.2629	0	44.89043	29.09356	14.16869	5.49874
8/29/2021	1:00:00 AM	33.3845	0	51.12766	34.40987	12.48369	3.071687
8/29/2021	2:00:00 AM	26.88764	1.591764	46.57617	30.49922	15.86349	8.736188
8/29/2021	3:00:00 AM	27.93723	0	47.86991	31.92279	17.85786	7.280724
8/29/2021	4:00:00 AM	28.93177	4.453225	46.92851	32.59769	21.93828	12.61029
8/29/2021	5:00:00 AM	40.53465	7.53388	59.55939	43.73494	29.35923	18.19674
8/29/2021	6:00:00 AM	40.35323	13.75256	59.12568	44.69618	32.61917	22.34218
8/29/2021	7:00:00 AM	34.13246	12.81877	54.21674	36.70834	27.93886	19.80042
8/29/2021	8:00:00 AM	38.11558	11.13003	59.00884	41.44259	25.93997	18.22266
8/29/2021	9:00:00 AM	24.05522	8.708044	45.05039	27.24488	19.72553	13.99641
8/29/2021	10:00:00 AM	25.36603	4.658756	43.03732	29.02398	17.50436	10.4893
8/29/2021	11:00:00 AM	23.6928	3.522531	46.16711	27.47585	16.55005	8.936009
8/29/2021	12:00:00 PM	24.35745	1.988033	44.49676	27.52424	15.18299	6.905536
8/29/2021	1:00:00 PM	25.04765	1.923225	43.95547	27.06354	12.57393	6.166339
8/29/2021	2:00:00 PM	23.61003	3.216541	40.94053	27.77305	15.87805	7.923538
8/29/2021	3:00:00 PM	27.85327	2.13122	47.60671	31.34047	18.3467	8.890478
8/29/2021	4:00:00 PM	30.59014	5.325185	52.7858	34.679	22.93202	13.16907
8/29/2021	5:00:00 PM	25.8563	3.661327	42.88018	29.23754	19.26204	9.743244
8/29/2021	6:00:00 PM	22.81137	2.439858	40.35248	26.1563	17.84603	9.177999
8/29/2021	7:00:00 PM	26.85074	0	46.49743	30.89096	19.15813	5.403653
8/29/2021	8:00:00 PM	27.03926	1.565829	45.9506	30.16358	19.84113	11.85338
8/29/2021	9:00:00 PM	33.09465	0	53.95717	34.8257	19.95784	9.533233
8/29/2021	10:00:00 PM	32.09708	0	52.17897	33.24643	10.59861	1.92298
8/29/2021	11:00:00 PM	32.787	0	51.5364	36.50936	21.60729	9.232657
8/30/2021	12:00:00 AM	37.56971	0	56.21074	40.77214	23.8403	9.078452
8/30/2021	1:00:00 AM	42.53634	0	65.97197	39.00554	24.60429	5.885711
8/30/2021	2:00:00 AM	36.97027	2.641584	54.8671	38.60822	22.13908	10.16791
8/30/2021	3:00:00 AM	35.02294	3.328999	53.03296	39.61332	25.42228	12.05324
8/30/2021	4:00:00 AM	39.58798	10.94983	59.848	42.1735	33.39023	22.95596
8/30/2021	5:00:00 AM	40.86543	18.14789	58.18961	44.27557	37.63857	30.02535
8/30/2021	6:00:00 AM	40.27267	18.30852	62.25109	43.29196	35.40605	27.94931
8/30/2021	7:00:00 AM	42.28874	15.14241	60.2933	47.33986	33.40859	24.92815
8/30/2021	8:00:00 AM	40.6094	11.70992	66.37019	41.44747	28.06901	19.94135
8/30/2021	9:00:00 AM	29.74582	6.785928	50.90372	31.76035	23.145	15.18384
8/30/2021	10:00:00 AM	28.61413	6.048722	48.84269	30.90011	20.75917	11.83818

WM8: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	11:57:23 AM	53.70352	36.37334	72.02793	54.70937	45.98652	40.35457
8/23/2021	12:00:00 PM	50.90647	27.30425	72.20546	53.30644	44.5768	36.3347
8/23/2021	1:00:00 PM	54.45406	25.07135	74.0053	57.82544	46.57018	36.75525
8/23/2021	2:00:00 PM	57.48172	27.15232	79.57117	58.66201	48.45391	40.03693
8/23/2021	3:00:00 PM	58.18138	27.40796	77.01652	61.32173	48.8947	39.08839
8/23/2021	4:00:00 PM	63.63559	31.07164	79.57327	67.8715	57.30332	44.53159
8/23/2021	5:00:00 PM	64.82003	34.15284	78.74135	69.17375	59.90983	48.91616
8/23/2021	6:00:00 PM	63.33865	32.54005	80.00896	67.47525	57.88316	46.76147
8/23/2021	7:00:00 PM	56.3742	27.73667	74.61589	58.71787	48.23313	39.33449
8/23/2021	8:00:00 PM	46.82531	26.58722	67.71616	49.78027	41.67892	33.7483
8/23/2021	9:00:00 PM	57.80833	27.7481	75.29665	59.91057	42.5941	35.21546
8/23/2021	10:00:00 PM	53.50163	24.54425	71.70456	55.71396	43.47789	33.27902
8/23/2021	11:00:00 PM	45.02513	27.58867	61.13473	48.9455	40.36082	34.47687
8/24/2021	12:00:00 AM	53.17675	25.90355	73.35224	52.89427	40.92549	33.47481
8/24/2021	1:00:00 AM	54.23663	24.27607	74.2868	51.30358	37.61687	30.93272
8/24/2021	2:00:00 AM	56.35917	24.91587	75.36732	57.77832	42.70326	31.64507
8/24/2021	3:00:00 AM	62.32604	33.3649	77.03913	67.00793	52.89124	42.64279
8/24/2021	4:00:00 AM	49.58131	30.98141	65.75065	53.04867	46.22158	38.62963
8/24/2021	5:00:00 AM	56.67485	35.42606	75.28759	57.85411	47.49341	41.9889
8/24/2021	6:00:00 AM	58.79315	36.54745	76.28676	60.76621	49.26332	43.75127
8/24/2021	7:00:00 AM	52.06343	37.15963	72.60722	54.42098	49.2024	44.24347
8/24/2021	8:00:00 AM	50.28091	32.85754	69.21024	51.48679	44.9312	39.5147
8/24/2021	9:00:00 AM	53.42077	31.35366	76.85369	51.71839	45.46456	39.98372
8/24/2021	10:00:00 AM	48.22893	29.62916	66.93763	51.5595	44.25278	37.35994
8/24/2021	11:00:00 AM	49.68931	26.33218	67.56055	52.98448	45.19964	37.0739
8/24/2021	12:00:00 PM	51.29385	23.8743	71.58372	54.43952	44.19817	35.21572
8/24/2021	1:00:00 PM	51.89023	25.22716	74.6155	54.53995	42.93898	34.29759
8/24/2021	2:00:00 PM	53.057	27.26626	72.03707	56.44094	46.06693	37.54993
8/24/2021	3:00:00 PM	56.34972	27.77924	75.86462	59.80521	47.97629	38.02139
8/24/2021	4:00:00 PM	53.57948	26.4834	74.06666	56.46915	44.86651	36.87639
8/24/2021	5:00:00 PM	55.75874	28.17318	73.7834	59.93707	47.01727	38.92411
8/24/2021	6:00:00 PM	62.42909	32.99621	77.31498	66.66617	57.15242	46.84099
8/24/2021	7:00:00 PM	51.94119	27.5988	70.27615	55.3283	45.90008	37.93556
8/24/2021	8:00:00 PM	51.87624	23.97966	69.35207	55.30323	43.584	33.1579
8/24/2021	9:00:00 PM	53.79577	27.73201	71.99226	53.49404	40.86585	34.28821
8/24/2021	10:00:00 PM	56.07925	28.69815	74.50547	57.8248	43.10381	35.63499
8/24/2021	11:00:00 PM	41.35624	24.05484	63.87274	44.47837	34.63091	30.25218
8/25/2021	12:00:00 AM	59.20908	25.63757	78.81651	56.57241	44.65713	35.62828
8/25/2021	1:00:00 AM	43.83501	26.36763	61.49141	47.08113	39.05211	33.24868
8/25/2021	2:00:00 AM	40.14282	24.53814	56.91679	43.71566	36.34956	31.33474

8/25/2021	3:00:00 AM	56.79785	25.38423	75.12181	58.2111	42.56338	33.15532
8/25/2021	4:00:00 AM	46.78803	32.35012	65.69176	49.73655	43.76714	38.68835
8/25/2021	5:00:00 AM	57.12358	37.77066	73.88175	59.76574	49.97052	44.32726
8/25/2021	6:00:00 AM	58.74222	37.8736	77.49608	58.93561	49.37949	44.29382
8/25/2021	7:00:00 AM	57.38315	38.77451	74.18924	58.9132	49.80253	44.82478
8/25/2021	8:00:00 AM	54.75546	36.23764	70.81693	58.07209	48.02388	42.37908
8/25/2021	9:00:00 AM	51.69305	34.17882	75.31947	52.08248	46.20472	41.41271
8/25/2021	10:00:00 AM	50.35457	27.13029	67.50112	51.76882	44.97667	37.64446
8/25/2021	11:00:00 AM	50.67639	27.09694	71.02494	52.87102	44.28945	36.67887
8/25/2021	12:00:00 PM	49.59107	26.53234	69.56938	52.62901	43.96786	35.86748
8/25/2021	1:00:00 PM	48.71623	25.58992	70.22805	51.33366	42.51339	34.27451
8/25/2021	2:00:00 PM	49.90446	28.34859	74.8074	52.01391	44.49841	37.31926
8/25/2021	3:00:00 PM	50.27635	25.90699	71.6279	53.06316	44.181	35.73761
8/25/2021	4:00:00 PM	60.14702	29.26292	79.04712	63.72477	51.83347	40.64534
8/25/2021	5:00:00 PM	61.73616	32.36729	78.11841	65.89956	55.64351	45.65563
8/25/2021	6:00:00 PM	62.12487	33.54046	77.10633	66.2185	56.78773	46.63947
8/25/2021	7:00:00 PM	52.42654	23.9701	73.81015	55.47367	43.95872	32.56074
8/25/2021	8:00:00 PM	46.3907	25.68856	65.21441	49.11512	41.02848	32.89105
8/25/2021	9:00:00 PM	51.73208	22.86856	72.04017	50.94094	39.93984	31.09706
8/25/2021	10:00:00 PM	55.21041	27.72036	71.77145	59.55784	45.61714	36.91811
8/25/2021	11:00:00 PM	49.85154	27.42021	66.83508	52.24172	43.76415	35.35012
8/26/2021	12:00:00 AM	55.82762	21.51901	75.46779	51.5854	37.91282	29.36355
8/26/2021	1:00:00 AM	44.57778	21.18073	66.15154	46.53561	36.55369	28.475
8/26/2021	2:00:00 AM	43.41424	23.11467	62.9607	46.87009	36.7057	29.64054
8/26/2021	3:00:00 AM	55.46731	30.3613	77.9926	53.01942	43.28148	37.29448
8/26/2021	4:00:00 AM	48.95698	28.5068	70.17511	51.84214	45.00366	36.91355
8/26/2021	5:00:00 AM	51.17595	34.6316	71.87011	54.19382	47.21319	41.48558
8/26/2021	6:00:00 AM	49.69672	36.2718	66.24884	52.32715	46.98571	42.39607
8/26/2021	7:00:00 AM	56.91385	35.84599	74.10576	58.99505	48.02676	42.36009
8/26/2021	8:00:00 AM	56.87433	34.2839	76.07777	58.45414	46.33467	40.29256
8/26/2021	9:00:00 AM	50.43235	33.76838	70.66517	52.87929	45.43257	40.09754
8/26/2021	10:00:00 AM	50.99171	29.49161	68.76895	54.35974	47.02665	40.43148
8/26/2021	11:00:00 AM	52.93218	28.8963	73.8898	54.21881	45.19898	37.6539
8/26/2021	12:00:00 PM	53.19168	27.93041	77.38251	54.48485	43.55257	35.3137
8/26/2021	1:00:00 PM	49.70139	24.48321	69.9772	52.11346	41.8666	32.63508
8/26/2021	2:00:00 PM	53.00026	23.67032	74.85239	53.32175	42.94114	33.2391
8/26/2021	3:00:00 PM	63.48424	29.35786	78.9028	67.86545	56.70219	44.23678
8/26/2021	4:00:00 PM	62.09291	31.19833	79.53945	66.15042	55.33188	44.63521
8/26/2021	5:00:00 PM	54.6196	29.12076	72.80355	57.89255	48.15203	40.33552
8/26/2021	6:00:00 PM	52.27601	28.61365	71.34622	55.6164	45.73236	37.78835
8/26/2021	7:00:00 PM	49.7438	29.29491	71.01138	52.57055	44.46541	37.76116
8/26/2021	8:00:00 PM	49.38069	28.50721	71.47901	51.66388	43.16255	36.48435
8/26/2021	9:00:00 PM	45.81715	24.33157	63.48981	48.99975	38.82342	31.47937

8/26/2021	10:00:00 PM	53.56853	32.47056	70.36045	57.35143	45.67502	39.35317
8/26/2021	11:00:00 PM	54.72303	27.37984	72.19573	57.24464	40.06305	33.52277
8/27/2021	12:00:00 AM	45.61327	27.01043	64.03259	49.16295	39.45923	33.34257
8/27/2021	1:00:00 AM	51.44144	25.14515	71.18015	52.94333	41.74556	33.12858
8/27/2021	2:00:00 AM	55.04778	27.35147	73.14834	55.59389	40.50142	34.36564
8/27/2021	3:00:00 AM	53.84378	25.66228	73.15192	50.72786	38.61869	31.99295
8/27/2021	4:00:00 AM	50.41791	31.47504	71.33644	53.17825	46.29791	39.31819
8/27/2021	5:00:00 AM	59.40557	34.70198	76.4989	62.38538	49.71346	42.25511
8/27/2021	6:00:00 AM	57.50858	30.8615	74.24824	57.269	46.14078	38.55678
8/27/2021	7:00:00 AM	50.18869	31.96978	73.35203	50.27873	43.79484	38.37356
8/27/2021	8:00:00 AM	52.78445	31.90163	72.81221	50.87178	43.78441	38.27545
8/27/2021	9:00:00 AM	54.60766	32.85584	71.30907	56.74171	43.85343	38.71239
8/27/2021	10:00:00 AM	52.40603	26.55024	72.91899	53.41666	44.13174	36.9563
8/27/2021	11:00:00 AM	52.70134	27.12045	75.12917	54.92406	44.8176	36.19773
8/27/2021	12:00:00 PM	49.90861	26.15151	69.55828	52.83678	41.82332	33.34263
8/27/2021	1:00:00 PM	55.53964	27.81555	75.04241	58.38905	46.00955	36.78324
8/27/2021	2:00:00 PM	53.46271	24.9069	73.39062	55.58919	43.64758	34.48387
8/27/2021	3:00:00 PM	55.54037	23.98911	73.11633	59.24508	46.95084	34.66927
8/27/2021	4:00:00 PM	53.39684	24.99653	71.71042	56.774	45.99635	36.85
8/27/2021	5:00:00 PM	57.03039	25.32453	74.26928	60.73056	47.82745	37.75042
8/27/2021	6:00:00 PM	57.47485	29.66889	73.39349	61.30761	50.09561	40.95039
8/27/2021	7:00:00 PM	49.63172	27.53675	70.08319	50.41463	42.27196	35.67171
8/27/2021	8:00:00 PM	44.52664	23.39572	67.02606	47.35951	38.23759	31.22893
8/27/2021	9:00:00 PM	48.1342	24.1203	70.74854	49.50847	38.70428	31.90881
8/27/2021	10:00:00 PM	49.47703	25.5409	68.02944	50.76829	40.72647	33.30597
8/27/2021	11:00:00 PM	43.89437	24.25078	62.53476	47.36477	38.18066	31.23975
8/28/2021	12:00:00 AM	53.06106	25.84564	72.8868	55.18098	40.71564	32.46841
8/28/2021	1:00:00 AM	56.16056	25.20296	73.84597	57.58381	40.70509	32.145
8/28/2021	2:00:00 AM	43.57501	25.745	65.647	45.71331	36.44128	31.61282
8/28/2021	3:00:00 AM	51.03672	27.60723	70.20128	51.66829	39.171	33.81653
8/28/2021	4:00:00 AM	42.503	27.36627	64.98427	45.21583	38.35869	33.65615
8/28/2021	5:00:00 AM	45.96579	29.48318	62.64154	49.34159	41.61036	35.92242
8/28/2021	6:00:00 AM	45.45146	30.27416	59.88415	49.03855	42.11069	36.8164
8/28/2021	7:00:00 AM	52.11116	32.0601	69.32111	52.97975	43.48689	38.33213
8/28/2021	8:00:00 AM	46.24612	33.09678	63.71843	49.1195	42.90295	38.34472
8/28/2021	9:00:00 AM	50.23313	31.10693	67.26225	50.54211	42.49273	38.17824
8/28/2021	10:00:00 AM	54.97795	23.71087	72.12882	56.44105	41.76563	32.39765
8/28/2021	11:00:00 AM	47.45595	22.68233	65.73336	50.94145	41.19944	32.42139
8/28/2021	12:00:00 PM	51.24293	24.59974	72.48755	54.06772	43.17613	33.39427
8/28/2021	1:00:00 PM	45.4495	22.77804	62.81043	49.22244	39.55746	30.60705
8/28/2021	2:00:00 PM	50.35075	21.85878	70.98767	53.00457	40.83175	29.41057
8/28/2021	3:00:00 PM	47.05779	22.65787	68.63533	49.82318	40.04066	31.10009
8/28/2021	4:00:00 PM	45.03549	20.02457	68.60188	47.18314	38.16128	28.12314

8/28/2021	5:00:00 PM	51.53739	23.34342	68.03096	52.99451	42.40729	33.65626
8/28/2021	6:00:00 PM	44.58716	21.60023	62.4379	47.84557	39.33751	31.13348
8/28/2021	7:00:00 PM	50.97656	21.47117	72.10902	49.19767	39.59172	31.3782
8/28/2021	8:00:00 PM	42.24108	20.85136	59.0097	45.952	37.50506	29.71188
8/28/2021	9:00:00 PM	57.37971	27.56728	76.08445	58.25249	41.07841	34.57255
8/28/2021	10:00:00 PM	42.62812	23.05061	59.6441	46.66027	36.80933	30.18837
8/28/2021	11:00:00 PM	41.0534	20.8649	61.26842	44.42034	34.02279	28.0459
8/29/2021	12:00:00 AM	41.75811	24.39529	59.90211	45.16227	36.12391	30.80589
8/29/2021	1:00:00 AM	51.89436	23.50818	70.11994	51.0367	36.7348	30.42519
8/29/2021	2:00:00 AM	42.33375	26.40112	66.22349	45.29534	37.6177	33.02989
8/29/2021	3:00:00 AM	42.78822	25.34468	63.45967	45.79074	37.82565	32.13271
8/29/2021	4:00:00 AM	43.81542	27.56272	63.02556	46.72614	39.05907	34.01715
8/29/2021	5:00:00 AM	58.56596	31.04576	77.31896	62.08536	47.72372	38.79575
8/29/2021	6:00:00 AM	58.36104	34.21905	74.84805	62.08906	47.88483	40.86547
8/29/2021	7:00:00 AM	48.02928	34.65044	67.17684	50.90496	45.22415	40.49643
8/29/2021	8:00:00 AM	58.7645	34.40511	76.70722	61.27207	46.38112	41.09425
8/29/2021	9:00:00 AM	46.0861	33.03738	64.22075	48.5214	43.21126	38.93729
8/29/2021	10:00:00 AM	48.9769	28.90086	65.55365	49.91439	41.64119	36.10895
8/29/2021	11:00:00 AM	44.02826	25.11626	61.48522	47.72689	39.90349	32.96798
8/29/2021	12:00:00 PM	44.82638	21.94449	65.29793	48.27334	38.22502	29.33012
8/29/2021	1:00:00 PM	50.11564	20.03886	67.99392	49.09261	37.04571	27.67189
8/29/2021	2:00:00 PM	43.22889	21.8534	61.06459	47.18105	38.2383	29.55972
8/29/2021	3:00:00 PM	51.80855	20.0703	71.78885	54.67132	42.2183	30.74717
8/29/2021	4:00:00 PM	56.95617	25.58191	73.68937	61.58757	47.06132	35.81583
8/29/2021	5:00:00 PM	48.33899	22.62227	68.03286	49.02647	41.32194	32.51521
8/29/2021	6:00:00 PM	49.4245	20.82766	70.09955	52.5584	42.64926	33.30501
8/29/2021	7:00:00 PM	45.55208	20.29059	62.85958	49.09797	41.04399	31.8672
8/29/2021	8:00:00 PM	51.94125	25.03447	68.3548	55.77115	47.33609	38.69349
8/29/2021	9:00:00 PM	49.30998	22.32159	69.53226	52.63587	40.14894	31.29057
8/29/2021	10:00:00 PM	43.74082	17.89821	62.79835	47.17254	33.97888	26.49471
8/29/2021	11:00:00 PM	45.28611	25.06367	61.3602	49.4697	40.27881	32.41291
8/30/2021	12:00:00 AM	52.95612	25.66204	71.57762	53.9392	41.15702	32.39434
8/30/2021	1:00:00 AM	56.35302	21.39036	76.23529	53.58277	41.17042	30.34961
8/30/2021	2:00:00 AM	53.75493	25.5925	72.53743	52.76295	40.29623	33.20614
8/30/2021	3:00:00 AM	46.27154	27.35509	63.67201	50.41182	40.67529	34.55392
8/30/2021	4:00:00 AM	55.93819	32.33347	75.58466	55.04923	47.34187	41.04443
8/30/2021	5:00:00 AM	52.24944	34.56568	69.53848	55.38291	49.2424	43.32163
8/30/2021	6:00:00 AM	54.55232	37.01896	72.3149	56.59479	49.65568	43.79648
8/30/2021	7:00:00 AM	62.94696	34.31367	79.52612	66.39208	49.15974	41.91928
8/30/2021	8:00:00 AM	56.72248	32.626	78.61769	54.98527	45.17226	39.50568
8/30/2021	9:00:00 AM	46.93861	29.71064	66.60818	49.38293	43.40485	37.41834
8/30/2021	10:00:00 AM	48.77564	27.56412	67.05684	51.41692	42.87409	35.40681

WM8: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	11:57:23 AM	60.57497	41.39557	74.87949	63.99821	54.21856	45.95374
8/23/2021	12:00:00 PM	61.22927	31.96249	83.2092	63.43592	51.03067	42.27099
8/23/2021	1:00:00 PM	66.55485	31.05396	84.95668	70.38229	57.96791	44.93375
8/23/2021	2:00:00 PM	67.47209	32.83556	84.86948	71.27429	60.20644	47.39745
8/23/2021	3:00:00 PM	69.98997	32.58266	87.54599	73.63463	60.83291	46.98097
8/23/2021	4:00:00 PM	75.32777	37.06449	89.73952	79.70134	70.11881	55.91847
8/23/2021	5:00:00 PM	76.54095	42.93626	89.43683	80.93267	72.63054	61.98808
8/23/2021	6:00:00 PM	75.1465	39.16351	88.99886	79.43738	70.79859	59.44889
8/23/2021	7:00:00 PM	66.24724	34.42277	85.52322	69.92673	59.47386	47.24703
8/23/2021	8:00:00 PM	50.13746	31.26988	69.3671	53.32723	45.71052	38.78795
8/23/2021	9:00:00 PM	61.4525	32.31258	78.96534	64.00466	47.65276	40.66184
8/23/2021	10:00:00 PM	59.33197	30.0896	77.96966	61.35318	49.35565	39.70528
8/23/2021	11:00:00 PM	50.0807	32.51968	66.17872	53.69145	46.02191	40.18395
8/24/2021	12:00:00 AM	58.59462	30.83574	78.13675	56.94458	45.8305	39.06807
8/24/2021	1:00:00 AM	58.67141	28.57786	77.71255	55.62004	43.72692	36.63184
8/24/2021	2:00:00 AM	58.5672	28.96566	78.02148	60.3134	46.47888	37.20543
8/24/2021	3:00:00 AM	65.15194	36.98087	80.59731	69.63201	56.08191	46.6284
8/24/2021	4:00:00 AM	52.72855	34.80474	68.09776	56.12053	50.17898	43.73238
8/24/2021	5:00:00 AM	60.87376	39.17948	78.75922	61.76103	51.72386	46.31764
8/24/2021	6:00:00 AM	62.24223	39.82934	79.82626	64.72519	53.29416	47.69127
8/24/2021	7:00:00 AM	54.52177	39.83573	73.40865	57.18669	52.28167	47.50612
8/24/2021	8:00:00 AM	53.77288	36.39396	73.37729	54.40909	48.41953	43.4758
8/24/2021	9:00:00 AM	55.27432	35.89193	77.21784	55.77972	49.83798	44.75432
8/24/2021	10:00:00 AM	55.94484	34.17915	74.72177	59.33354	49.7254	42.55998
8/24/2021	11:00:00 AM	58.68423	31.62385	79.58701	62.20885	51.93732	43.13474
8/24/2021	12:00:00 PM	62.43299	29.95882	81.46651	65.80993	53.18839	42.69746
8/24/2021	1:00:00 PM	63.58897	30.3764	83.6568	66.74907	52.11617	41.27126
8/24/2021	2:00:00 PM	64.96046	31.88796	84.27997	68.59834	56.01185	43.90366
8/24/2021	3:00:00 PM	67.77028	32.83095	87.9501	71.53717	59.52348	46.22491
8/24/2021	4:00:00 PM	65.95314	30.99102	85.45401	69.2833	53.01716	42.4091
8/24/2021	5:00:00 PM	66.63258	32.92894	85.57049	70.31048	56.32535	45.69268
8/24/2021	6:00:00 PM	74.46238	41.06769	88.23089	78.78868	70.12377	59.76633
8/24/2021	7:00:00 PM	64.30194	33.47367	82.77467	67.93048	56.16344	44.20898
8/24/2021	8:00:00 PM	56.61794	28.57021	75.38451	60.23757	49.1698	39.78146
8/24/2021	9:00:00 PM	59.15616	32.16318	77.516	58.77079	46.09349	39.67574
8/24/2021	10:00:00 PM	60.87296	32.72779	78.9862	63.02278	47.90357	41.17282
8/24/2021	11:00:00 PM	45.33328	28.26758	65.07532	48.7535	40.54475	35.98573
8/25/2021	12:00:00 AM	63.07992	30.11662	82.68987	61.21633	48.99243	40.6755
8/25/2021	1:00:00 AM	51.08576	30.32424	70.66264	53.9954	45.04562	39.15867
8/25/2021	2:00:00 AM	46.19031	29.01087	64.92714	49.44074	42.25818	37.00375

8/25/2021	3:00:00 AM	60.74586	30.42318	79.013	62.06473	48.16397	39.13251
8/25/2021	4:00:00 AM	50.30167	35.96245	67.08444	53.35691	48.00565	43.08194
8/25/2021	5:00:00 AM	60.53339	41.45531	77.34743	63.30022	54.26402	48.68376
8/25/2021	6:00:00 AM	63.0018	41.43283	82.88786	64.77843	54.43759	48.83891
8/25/2021	7:00:00 AM	61.90764	41.56593	78.82926	63.59089	54.13133	48.86785
8/25/2021	8:00:00 AM	59.29867	40.26	76.54434	62.63381	53.27226	47.21871
8/25/2021	9:00:00 AM	57.5386	37.88517	78.05972	60.3489	51.97663	46.16947
8/25/2021	10:00:00 AM	55.94548	31.92905	74.54513	57.87469	49.63213	42.66274
8/25/2021	11:00:00 AM	60.02284	31.45251	79.41118	62.655	50.18111	41.73937
8/25/2021	12:00:00 PM	60.80688	30.92434	81.56794	63.78116	52.03694	42.10058
8/25/2021	1:00:00 PM	59.63893	29.73639	80.75576	62.54753	50.34694	40.68539
8/25/2021	2:00:00 PM	60.25077	32.99235	84.51851	62.21361	51.9572	43.31995
8/25/2021	3:00:00 PM	60.38494	31.03756	81.62226	63.08615	51.45625	41.54287
8/25/2021	4:00:00 PM	72.10384	34.56026	89.37106	76.12911	64.32488	48.3294
8/25/2021	5:00:00 PM	73.73678	41.36015	88.70581	78.14295	68.51166	57.82403
8/25/2021	6:00:00 PM	74.08626	40.89415	88.25447	78.31797	69.45725	58.96985
8/25/2021	7:00:00 PM	64.8589	29.36521	85.93408	68.17291	51.78457	39.01724
8/25/2021	8:00:00 PM	54.44688	29.81727	74.68965	57.3256	46.15152	38.40525
8/25/2021	9:00:00 PM	55.94087	27.3504	75.17916	56.02171	45.26436	37.04461
8/25/2021	10:00:00 PM	60.21399	32.19264	76.63854	64.33553	51.26199	42.97115
8/25/2021	11:00:00 PM	55.84128	31.9762	73.02529	59.04383	49.71376	41.28145
8/26/2021	12:00:00 AM	61.45591	26.88477	81.4703	57.25785	44.34122	36.3152
8/26/2021	1:00:00 AM	47.67695	25.48526	67.23554	50.64396	41.80473	34.40134
8/26/2021	2:00:00 AM	47.9187	26.84126	66.54374	51.3851	42.59639	35.38466
8/26/2021	3:00:00 AM	57.61749	34.48079	79.37729	56.70397	48.197	42.35275
8/26/2021	4:00:00 AM	51.80034	32.10572	71.19039	54.96803	48.55962	41.14112
8/26/2021	5:00:00 AM	54.00467	37.72589	73.06551	57.12271	50.85013	45.16104
8/26/2021	6:00:00 AM	54.33201	39.46959	71.0762	56.9918	51.46912	46.82521
8/26/2021	7:00:00 AM	60.63434	39.2955	77.66466	62.71126	51.98267	46.50086
8/26/2021	8:00:00 AM	59.50073	38.36981	78.80287	60.49358	50.69493	45.25494
8/26/2021	9:00:00 AM	59.17337	38.16478	78.02383	62.5289	53.57472	46.57234
8/26/2021	10:00:00 AM	62.37227	35.73048	80.10751	66.13148	56.46447	47.33558
8/26/2021	11:00:00 AM	60.18644	33.79682	85.66655	61.00483	50.76292	43.07849
8/26/2021	12:00:00 PM	63.92324	32.42174	86.67602	65.70368	52.08475	41.83774
8/26/2021	1:00:00 PM	60.59581	30.91539	81.50859	63.59929	51.37077	40.96773
8/26/2021	2:00:00 PM	64.97684	29.5459	86.00439	65.38005	50.88765	40.6259
8/26/2021	3:00:00 PM	75.22369	36.65965	89.41014	79.69874	69.63329	56.79018
8/26/2021	4:00:00 PM	74.08173	39.66861	90.0572	78.36093	68.35069	56.71979
8/26/2021	5:00:00 PM	67.24526	35.90313	85.45051	70.85481	59.57986	48.64154
8/26/2021	6:00:00 PM	64.72174	33.70295	83.17498	68.39187	57.45766	46.85698
8/26/2021	7:00:00 PM	61.73235	34.50489	82.6224	64.86272	54.1988	44.83639
8/26/2021	8:00:00 PM	59.65856	32.93019	80.52366	62.9915	51.47437	42.73525
8/26/2021	9:00:00 PM	50.5297	28.23788	67.76851	53.24892	43.50402	37.09024

8/26/2021	10:00:00 PM	58.66314	35.45534	74.96451	62.36942	49.88323	43.6035
8/26/2021	11:00:00 PM	58.60417	31.82429	75.92017	61.60963	45.88907	39.17144
8/27/2021	12:00:00 AM	48.84531	31.40888	65.54801	52.60492	44.55073	38.88208
8/27/2021	1:00:00 AM	53.87227	30.07165	73.68401	55.90096	45.74938	38.50887
8/27/2021	2:00:00 AM	60.0113	31.95219	77.8869	60.10464	46.0889	39.80337
8/27/2021	3:00:00 AM	58.46141	30.05527	77.08498	55.48189	43.97776	37.66937
8/27/2021	4:00:00 AM	53.72149	35.62441	72.91958	56.75812	50.10071	43.77374
8/27/2021	5:00:00 AM	62.54817	37.76649	79.39227	66.02689	53.29153	46.02431
8/27/2021	6:00:00 AM	60.9374	35.6668	77.69549	61.10334	50.02852	43.42666
8/27/2021	7:00:00 AM	54.15217	35.73383	80.38824	54.26404	47.9992	42.93005
8/27/2021	8:00:00 AM	54.4872	35.7118	73.61819	54.18237	48.1874	43.26088
8/27/2021	9:00:00 AM	56.08995	36.61922	72.55777	58.62316	48.24575	43.50068
8/27/2021	10:00:00 AM	56.00417	31.59385	76.28312	57.7392	49.24656	42.53913
8/27/2021	11:00:00 AM	60.50238	31.55304	80.44056	63.74365	52.02106	42.09618
8/27/2021	12:00:00 PM	61.46241	30.58294	81.49389	64.92076	51.52862	40.21329
8/27/2021	1:00:00 PM	66.3108	32.21143	85.58083	69.47377	55.89985	43.17485
8/27/2021	2:00:00 PM	65.49182	29.06673	85.38617	67.8755	52.19398	40.62271
8/27/2021	3:00:00 PM	67.86237	29.5863	84.69263	71.81335	58.77931	42.94769
8/27/2021	4:00:00 PM	65.87373	31.14878	83.92365	69.52037	57.17343	45.69202
8/27/2021	5:00:00 PM	68.07896	31.67737	85.24114	72.26182	58.10437	45.21176
8/27/2021	6:00:00 PM	68.41003	37.97352	84.95242	72.25597	61.92703	51.87469
8/27/2021	7:00:00 PM	55.51638	31.35203	75.69552	57.24734	47.05011	40.21784
8/27/2021	8:00:00 PM	47.87054	27.46886	68.51548	50.91252	42.55489	36.28526
8/27/2021	9:00:00 PM	53.29139	29.74654	74.47421	55.57976	44.67679	38.12326
8/27/2021	10:00:00 PM	53.96263	29.3409	72.13618	55.16236	45.19612	37.79258
8/27/2021	11:00:00 PM	53.67369	28.29818	72.02853	56.74416	43.63991	36.76649
8/28/2021	12:00:00 AM	58.90599	29.67654	77.48015	62.00598	49.23204	37.73759
8/28/2021	1:00:00 AM	59.83185	29.45605	77.8059	60.65321	45.11332	37.27897
8/28/2021	2:00:00 AM	47.38754	29.65147	67.9863	50.22077	41.94176	36.9054
8/28/2021	3:00:00 AM	56.53736	32.18833	75.15526	56.35348	45.09489	39.43712
8/28/2021	4:00:00 AM	46.87035	31.40883	66.4175	49.99535	43.75887	38.85655
8/28/2021	5:00:00 AM	52.76181	33.65606	71.05474	55.48001	47.07447	41.28027
8/28/2021	6:00:00 AM	49.82192	34.35549	64.43452	53.2626	46.7482	41.49346
8/28/2021	7:00:00 AM	56.85306	35.8123	74.05882	58.10447	48.67546	43.20128
8/28/2021	8:00:00 AM	52.04417	36.97182	74.31871	54.63007	48.13479	43.43457
8/28/2021	9:00:00 AM	55.67434	35.80228	74.42029	56.96481	48.50895	43.42634
8/28/2021	10:00:00 AM	60.60896	28.51158	78.20609	62.99288	49.63497	39.74881
8/28/2021	11:00:00 AM	59.50628	28.32608	79.22637	63.04542	50.39486	40.17691
8/28/2021	12:00:00 PM	62.56335	29.3814	83.22545	65.72578	53.59945	41.73294
8/28/2021	1:00:00 PM	57.18309	27.13309	74.78572	60.94016	48.94856	37.87764
8/28/2021	2:00:00 PM	62.13168	26.76535	81.6133	65.46577	52.28284	37.73071
8/28/2021	3:00:00 PM	58.20054	27.85974	79.79265	61.02178	48.74898	38.57931
8/28/2021	4:00:00 PM	54.9929	25.46744	79.88454	57.11442	46.21028	36.07803

8/28/2021	5:00:00 PM	59.43244	30.1039	76.80973	62.446	51.18213	41.79528
8/28/2021	6:00:00 PM	54.72403	28.97489	72.52078	58.45812	48.1511	39.09423
8/28/2021	7:00:00 PM	56.01311	27.60365	75.87686	55.10869	45.87648	38.33834
8/28/2021	8:00:00 PM	46.76434	26.09088	63.99141	50.35972	42.88615	36.08678
8/28/2021	9:00:00 PM	61.11053	31.9868	79.50826	61.73142	45.90688	39.87851
8/28/2021	10:00:00 PM	46.38568	26.98256	63.70874	50.25191	41.65872	35.49755
8/28/2021	11:00:00 PM	46.12723	25.27968	64.92304	49.53115	40.23184	33.49324
8/29/2021	12:00:00 AM	50.98844	29.17276	71.11586	53.97524	43.29379	37.03869
8/29/2021	1:00:00 AM	55.95003	27.85238	74.71298	57.66337	44.61496	36.06391
8/29/2021	2:00:00 AM	52.58868	30.73637	78.29072	54.52188	44.57313	38.79015
8/29/2021	3:00:00 AM	50.41859	30.0548	69.69599	53.80408	45.01136	38.32275
8/29/2021	4:00:00 AM	48.20277	31.36131	68.77089	51.08899	44.20457	39.19129
8/29/2021	5:00:00 AM	62.57372	35.14323	79.84312	66.88598	52.17401	44.07022
8/29/2021	6:00:00 AM	62.93175	37.8236	80.05593	66.30855	52.45007	45.2672
8/29/2021	7:00:00 AM	52.39855	37.9594	71.11694	55.37858	49.53146	44.66783
8/29/2021	8:00:00 AM	62.72597	38.1537	80.65574	65.34429	51.03623	45.90574
8/29/2021	9:00:00 AM	54.47404	37.12907	72.37436	57.57711	49.30936	44.42725
8/29/2021	10:00:00 AM	55.3978	33.76317	75.23475	57.59701	48.43732	42.31971
8/29/2021	11:00:00 AM	52.98762	29.51261	72.64148	55.99115	46.61638	39.12909
8/29/2021	12:00:00 PM	55.40347	27.60747	77.88632	57.89057	46.16111	37.23313
8/29/2021	1:00:00 PM	56.01118	26.03254	76.45796	57.95364	46.79732	37.04993
8/29/2021	2:00:00 PM	51.99521	26.90496	72.89355	54.96267	45.26527	36.37221
8/29/2021	3:00:00 PM	62.14537	25.185	82.24898	65.04983	52.45392	39.75446
8/29/2021	4:00:00 PM	66.19337	29.74058	84.07674	70.41653	56.87935	42.97606
8/29/2021	5:00:00 PM	53.67059	27.24222	73.27384	55.41352	46.2227	38.16963
8/29/2021	6:00:00 PM	61.75655	27.21921	80.89788	65.26714	53.47277	40.84953
8/29/2021	7:00:00 PM	55.27921	28.70151	74.13986	58.2444	49.01146	40.90211
8/29/2021	8:00:00 PM	63.9608	34.634	81.19343	67.89752	59.28812	50.05859
8/29/2021	9:00:00 PM	60.89069	27.22849	79.82241	64.8021	46.34354	37.0617
8/29/2021	10:00:00 PM	47.91367	22.69924	68.18922	51.13709	39.99986	32.50553
8/29/2021	11:00:00 PM	48.38658	29.48204	63.33664	52.45813	44.57741	38.00378
8/30/2021	12:00:00 AM	57.19918	30.03575	75.69803	58.42712	46.82028	37.82843
8/30/2021	1:00:00 AM	59.82338	25.48783	79.27755	58.22057	45.47919	36.23707
8/30/2021	2:00:00 AM	58.31751	30.31935	77.15097	58.08545	46.81271	39.24308
8/30/2021	3:00:00 AM	51.26695	31.81231	70.05957	54.87142	46.61497	40.49006
8/30/2021	4:00:00 AM	59.71787	36.90242	79.10304	58.67874	51.45319	45.70006
8/30/2021	5:00:00 AM	54.988	37.70607	71.38804	58.22212	52.12542	46.34188
8/30/2021	6:00:00 AM	58.72053	39.88629	75.95161	60.62116	53.25543	47.3932
8/30/2021	7:00:00 AM	67.36055	37.64548	83.76461	70.6201	53.0161	45.71035
8/30/2021	8:00:00 AM	59.9429	35.88526	80.45798	58.40003	49.41995	43.8755
8/30/2021	9:00:00 AM	50.48097	34.04462	69.85707	53.1372	47.60038	42.2466
8/30/2021	10:00:00 AM	55.97165	32.44498	76.27267	58.89607	48.67169	41.09846

WM8: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
8/23/2021	11:57:23 AM	54.9	53.8	52	49.8	47.6	45.3	43.1	44	40.4	39.7	45.7	39.5	38.5	37.2	37	41.5	43.8	37.1	36.5	40.1	38.8	35.5	38.4	35.8	34.6	38.3	38.2	36.9	35.1	37.4	34	32.1	31.4	30.5	30.3	27.8
8/23/2021	12:00:00 PM	56.6	54.8	53.1	50.7	49	46.6	45	43.2	42.2	43.2	40.1	40.2	35.6	33.8	32.9	30.6	27.8	24.9	24	21.5	18.4	15.2	12.1	9.3	4.3	0.5	-0.6	-0.7	-0.5	0	0.8	0.7	-0.1	0.1	0.7	1.1
8/23/2021	1:00:00 PM	61.9	60.5	58.8	56.5	54.5	52.1	49.4	46.8	44.5	41.3	39	37.8	37.4	36	31.1	29.4	28.7	23.5	21.2	18.4	15	11.2	8.9	8.3	6.6	2.7	1.3	3	1.5	3.2	3	2.4	1.8	2	3.1	10.5
8/23/2021	2:00:00 PM	62.7	61.3	59.4	57.5	54.9	52.3	49.4	46.7	44.4	41.6	40.3	38.7	36.8	43	52	49.2	32.6	29.4	27.4	24.9	21.2	15.3	9.3	6.5	4	2	0.9	0.7	1	1.8	2.9	3.1	2.4	2.4	5	15.8
8/23/2021	3:00:00 PM	65.1	63.8	62.2	60.5	58.4	55.8	53.5	50.5	47.7	45.4	42.1	39.9	39.9	42	34.9	32.6	30.9	26.2	24.2	23.8	20.5	15.4	12.9	11.6	9.7	7.4	5.2	3.7	3.2	3.8	5	5.2	4.4	4.4	5.3	12.1
8/23/2021	4:00:00 PM	70.4	69	67.6	65.7	63.8	61.8	59.3	56.8	53.8	50.8	47.6	44.4	41.9	39.3	36.9	34.7	32.8	30.2	28.2	26.3	23.6	20.6	19.4	18.9	17.6	15.4	12.8	10.3	8.9	9.3	10.7	10.7	9.9	9.9	10.1	10
8/23/2021	5:00:00 PM	71.6	70.2	68.8	67	65.1	63	60.5	57.8	54.8	51.7	48.4	45.5	42.6	41.8	41.8	36.3	32.9	30.9	28.7	26	23.1	21.2	20.6	20.4	19.2	17.1	14.5	12	10.3	10.3	11.6	11.8	11.1	11	11.1	11
8/23/2021	6:00:00 PM	70.3	68.8	67.4	65.5	63.6	61.5	59	56.4	53.4	50.3	47.1	43.8	40.9	38.1	35.5	33.1	30.8	29.1	27.2	24.5	21.6	19.8	19.1	18.8	17.4	15	12.3	10	8.5	8.8	10	10.4	9.7	9.6	9.8	9.8
8/23/2021	7:00:00 PM	61.2	59.7	57.6	56	54.6	52.3	53.6	51.6	48.3	45.2	41.5	40.2	41.3	38.9	35.5	33.2	32	31.4	28.7	27.5	25.8	24.9	20.1	18.7	11.9	3.5	-0.6	1.4	0.2	0.3	1.6	1.3	0.7	0.4	0.7	1
8/23/2021	8:00:00 PM	37	38.1	38.8	39.1	39.8	39	38.6	38.9	38.3	36.5	37.4	38.2	38.2	38.1	33.6	32.2	29.4	29.8	27.7	24.9	23	20.9	19.1	15.8	11.2	3.3	-3.3	-3.8	-3.7	-3.2	3	-1.7	-3.1	-2.9	-0.4	2.8
8/23/2021	9:00:00 PM	39.8	47.1	49.1	49.9	55.2	51.3	51.5	47	46.4	47.6	48.3	49.4	49.7	49.8	43.8	40.4	38.2	37.5	34.5	33.3	32	28.6	25.9	24.9	16.5	7.4	-3	-3	-4	-3.6	-3.3	-3.1	-3.4	-3	0.8	4.8
8/23/2021	10:00:00 PM	47.3	48.5	49.1	49.3	52.5	50.9	50.8	45.3	41.3	40.8	41.7	43.3	43.5	39.3	36.8	36.3	34.9	34.1	31.7	31.5	27.8	26.1	24.4	18.3	12.5	3.4	-4.1	-4.4	-4	-3.6	-3.2	-3	-3.3	-3.1	-0.7	3.4
8/23/2021	11:00:00 PM	41.7	40.5	40.4	39.5	40.1	39	38.1	38.2	36.1	34	35.6	34.9	33.6	33.5	32.2	32.6	29.2	28.7	29	25.9	24.2	23.3	21.1	16.9	11	2.7	-4	-4.8	-4.2	-3.8	-3.4	-3.2	-3.4	-3.3	-0.4	2.6
8/24/2021	12:00:00 AM	40.2	45.8	47.3	49.1	52.5	51	49.6	45.9	42.4	41.2	41	42.1	40.9	38.5	36	36.7	36.9	37.1	34.3	34.3	32.4	29.6	27	22.9	17.7	9.3	-0.2	-4.5	-4.3	-3.9	-3.3	-3.3	-3.4	-3.5	-2.3	-0.2
8/24/2021	1:00:00 AM	39.7	47.7	48.7	49	51.5	49	46.4	43.2	44.7	48.2	45	46.2	44.8	39.4	36.3	35.6	36.1	36.1	34.4	31.2	27.6	27.4	23.7	21	13.9	3.4	-4.9	-5	-4.4	-3.9	-3.6	-3.3	-3.5	-3.5	-1.9	0.8
8/24/2021	2:00:00 AM	36.6	39.5	44.6	44.9	48.2	46.6	47.5	47.1	47.3	46.7	45.2	52.7	48.9	41.1	37.6	35.2	33.6	33.1	30.6	27.4	26.8	25.2	21.2	19.9	10.8	2.1	-5.2	-5	-4.4	-3.9	-3.6	-3.3	-3.5	-3.5	-2.5	-0.3
8/24/2021	3:00:00 AM	45	47.7	51.7	52.2	56	55.9	54.8	53.5	54.2	52.9	51.5	54.2	56.5	52.5	44.2	42.9	40.3	37.9	35.2	33.5	30.2	28.7	26.4	21.9	16.6	8.2	-1.5	-4.9	-4.5	-4	-3.6	-3.4	-3.5	-3.6	-2.6	-0.3
8/24/2021	4:00:00 AM	39.6	39.8	42	42.5	42	41.1	40.7	41	39.9	38.6	38.2	42	38.6	39.1	38.4	37.9	35.5	34.6	33.9	32	30.8	30.7	29.2	25.3	19.8	11.7	2	-4.3	-4.5	-4.1	-3.6	-3.4	-3.6	-3.6	-2.6	-0.3
8/24/2021	5:00:00 AM	44.4	51.3	49.4	50.2	52.8	49.7	50.6	49.9	48.1	47.9	46.6	48.4	47.8	43.8	40.6	40.3	38.7	37.8	36.5	35.6	32.5	28.5	26	22.2	16.4	8.3	-0.7	-3.2	-4	-4.1	-3	-3.3	-3.6	-3.7	-2.6	-0.3
8/24/2021	6:00:00 AM	44.9	51.1	48.8	49	52.7	53.5	51.9	51.2	51.3	51.6	49.6	50	49.3	44.1	43.2	42.7	41.6	40.2	39	37	34.2	30.8	29.2	25.4	20.3	12.7	2.1	-1.5	-4	-3.7	-2.7	-3.2	-3.6	-3.6	-2.6	-0.3
8/24/2021	7:00:00 AM	37.1	39.8	42.4	42.2	42.4	42.5	42.9	44.6	43.4	41.7	42.9	43.6	43.5	42	41.2	38.1	34.9	33.9	34.5	32.8	31.4	31.1	29.1	24.6	18.7	11.7	11.1	6.7	4.1	3.5	-2.1	2.8	3.5	-3.6	2.4	0.2
8/24/2021	8:00:00 AM	36.9	37	38.8	38.7	45	48.3	39	38.9	44.9	41	42.5	41.3	41.4	34.7	33.3	33.4	28.9	29	27.9	24.2	20.8	18.1	15.8	11.4	6.3	2	-3.4	-4.4	-2.5	-2.8	-3.2	-3.1	-3.3	-3	-0.4	2.4
8/24/2021	9:00:00 AM	41.1	43.3	41.3	41.8	42.1	41.6	42.2	42	40.9	40.4	40.2	39.1	36	39.8	49.4	48.2	30.3	27.3	25.2	22.7	19.1	15.1	12.7	9.1	5.5	1.7	-3	-2.8	-3.3	-3	-2.7	-2.6	-3	-2.6	0.1	2.8
8/24/2021	10:00:00 AM	50.8	48.9	47.2	45.3	43.5	41.3	39.8	40.2	39.4	39	39.8	38.6	36.3	36.1	37.8	34.9	30.8	25.7	24	21.9	17.3	11.4	7.5	4.7	1.2	1.1	-2.3	-2.5	-2.2	-1.9	-1.4	-1.4	-1.9	-1.7	-0.7	1.1
8/24/2021	11:00:00 AM	53.6	52.3	50.3	48.2	46.1	44	42.2	42.6	42.5	40.7	40.4	39.9	38.2	35.4	34	32	28.1	24.7	22.5	21.4	17.9	14	11	5.7	2.2	1.1	-1.6	-1.6	-1.3	-1.1	-0.8	-0.8	-1.3	0.8	6.8	14.3
8/24/2021	12:00:00 PM	57.5	56.2	54.8	52.5	50.6	48.1	45.5	43.9	41.8	39.8	39	37.8	36.6	34.8	33.6	33.3	30.5	24.9	23.2	20.5	16.2	10.8	7.4	4.4	1.3	0.5	-1.1	-1	0.5	0.3	0.7	0.6	0.2	4.2	11.5	19.8
8/24/2021	1:00:00 PM	59.3	57	55.6	53.8	51.2	48.9	46.2	43.8	41.4	40	39.5	39.4	34.5	32.6	32.6	32.9	31.2	25.9	24.9	26.7	22.5	18.8	20.4	22	21.2	21.2	25.9	24.3	25.7	22.3	20.3	17.1	15.4	13.8	14.7	19.9
8/24/2021	2:00:00 PM	60.3	58.9	57.1	55	52.8	50.6	47.8	45.4	42.6	40.7	39.3	38.3	36	34.7	32.8	30.5	27.2	23.7	21.5	18.8	15.3	11.5	8.6	6	3.4	2.7	3.9	6.9	8.2	3.7	1.8	1.6	1.5	6.4	18.1	22.2
8/24/2021	3:00:00 PM	63.1	61.5	59.7	57.8	55.9	53.6	51.7	49.5	47.8	45.6	41.5	41.9	37	35.3	32.6	30.5	28.3	26.2	23.5	20.8	18.4	16.1	12.9	10.8	6.8	3.9	2.3	2.8	2.7	2.6	3.6	3.4	2.8	4.2	13	20.1

8/24/2021	4:00:00 PM	61.5	59.7	58.2	56.1	53.8	51.1	48.4	45.6	42.9	40.6	38.9	37.2	34.1	31.9	29.9	27.6	24.2	21.2	19.6	17.7	14.6	11.2	8.4	5.5	2.6	0.5	-0.5	-0.6	-0.1	0.9	2.1	1.9	1.2	1.5	4.9	10.1
8/24/2021	5:00:00 PM	61.7	60.2	58.5	56.9	55	53	51.7	49.4	48	45.8	41.7	38.4	35	32.7	30.4	28.7	26.1	23.3	20.8	18.3	15.8	12.5	9.7	7.1	3.6	1.3	0.1	-0.1	0.3	1.4	3	2.4	1.5	1.4	1.7	2.1
8/24/2021	6:00:00 PM	69.7	68.3	66.5	64.8	62.9	60.6	57.9	55.2	52.1	48.9	45.7	42.4	39.5	36.9	34.2	31.8	29.7	28	26.1	23.2	20.1	18.1	17.3	16.7	15.1	12.7	10.3	8	7.2	8.2	9.9	9.6	8.9	8.7	8.8	8.5
8/24/2021	7:00:00 PM	60	58.2	56.4	54.1	51.6	49.1	46.3	44.3	41.6	40	39.1	36.2	34.3	31.6	29.4	27.9	24.4	22.7	20.5	17.2	15.2	12.7	10.2	7.4	3.1	-0.9	1.4	-0.8	5.2	3.5	1.2	0.9	0.2	0	0.7	2.2
8/24/2021	8:00:00 PM	47.9	48.2	46.6	45.8	46	43.3	44.4	41.7	42	45.1	45	44.9	39.6	37	35.7	35.4	34.2	34.6	33.6	29.2	28.2	27.6	23	18.4	13.7	4.4	-3.8	-3.2	31.9	23.6	-0.1	-1.8	-2.9	-2.7	-1.8	0.4
8/24/2021	9:00:00 PM	43.3	47.3	47.5	50	53.4	50.6	48.3	45.5	44.3	44.6	45.1	44.7	42.9	38.3	35.6	33.1	31.3	32	30.5	27.5	25.2	21.8	18.4	14.5	9.3	-0.3	-4.1	-2.9	27.8	15.6	-2.4	-2.7	-3.3	-3.1	-0.3	2.5
8/24/2021	10:00:00 PM	43.7	47.6	52.6	51.4	53.3	52.4	49.8	46.2	44.6	45	45.2	47.5	47.6	47.2	41.7	37.1	36.7	37	34.2	33.5	30.6	29.7	25.1	20	14.9	5	-3.3	-4.1	12.1	2.3	-2.7	-2.6	-3	-3	-0.2	2.1
8/24/2021	11:00:00 PM	30.9	32.3	35.9	35.2	36.4	35.9	33.8	33.5	31.1	30.5	32.6	30.1	28.5	30.9	27.8	29.8	27.9	25.2	24	21.9	18.9	17.9	15.7	11.3	5.9	-0.5	-2.1	0.1	29.1	3.2	2.1	0.8	0.2	-0.2	0.8	1.7
8/25/2021	12:00:00 AM	42.8	47.7	48.1	51.9	55.2	57	51.6	49.1	51.3	51.4	49.1	50.4	50.3	46.7	42.1	41.1	39.3	37.3	36.2	33.5	33.7	32.1	27.9	23.6	20	9.6	-2.6	1.5	36.7	4.1	-3.1	1	-3.2	-2.2	-2.3	4.8
8/25/2021	1:00:00 AM	45.1	43.6	42.6	40.6	39.5	38.7	37.2	36.8	34.8	33.3	32.5	32.8	34.4	31.6	30.2	30.1	26.5	26.2	25.7	23.7	22.3	22.2	20.7	16.3	10.3	1.5	-4.5	-4.7	3.7	3.3	-1.1	-3.2	-3.4	-3.5	-1.8	0.3
8/25/2021	2:00:00 AM	38.1	37.2	37.8	36.6	36.1	34.8	33.5	34.1	31.6	29.9	30.8	29.2	27.8	26.7	26.1	27.2	24.1	22.5	21.8	20.7	19.9	18.7	15.4	10.8	5.1	-2	-5.4	-5.2	4.3	4.1	-3.7	3.4	-3.6	-3.6	-2.1	0
8/25/2021	3:00:00 AM	43.6	49	51.7	51.7	52.6	48.1	48.8	46.2	45.6	46.6	46	51	49.8	47	40.3	38.4	37.4	36.2	31.8	30.1	28.5	25.1	27	25.9	13.7	5.1	-3.7	-5	4.3	-4	-3.6	3.3	-3.5	-3.6	-2.1	0.1
8/25/2021	4:00:00 AM	34.4	36.9	40.2	39.6	40.9	39.6	39.6	39.9	37.6	36.2	36.7	37.9	35.6	37.5	33.4	33.3	31.4	31.3	28.9	27.1	26.3	26	24.4	20.8	15.6	8.5	2.1	-4.1	4.7	4.2	-3.8	3.5	-3.6	-3.7	-2.5	0.1
8/25/2021	5:00:00 AM	48.4	49.4	49.8	48.9	50.9	47.6	48.8	46.7	48.7	48.9	48	48.2	51	47.1	41.9	40.1	37	35.6	33.5	31.1	29.3	28.1	26	21.4	15.4	6.8	-0.6	-1.2	3.5	0.5	5.1	2.5	-3	-3	2.3	0.1
8/25/2021	6:00:00 AM	54.4	53.7	53.5	51.8	51.8	48.9	48.8	46.5	50.2	53	50.1	50.4	49.9	49.5	42.8	41.5	39.1	37.8	36.1	34.6	32.8	30.2	28	25.8	17.3	12.4	15	18.5	9.7	2.3	-2.7	2.5	-2.7	-3	-2.2	0.2
8/25/2021	7:00:00 AM	47.9	47.3	47.6	48.9	56.2	51.3	53.7	52.1	50.4	48.5	47.1	44.5	44.5	41.8	41.5	41	38.1	36.8	35.9	33.5	31.2	30.5	28.9	24.9	22	24.3	28.8	25.9	21.4	17.5	13.3	7	1.6	-1.8	2.1	0.2
8/25/2021	8:00:00 AM	48.4	48.6	47	47.2	50.8	49	50.1	47.9	48.7	48.5	45.6	43.2	40	40.5	38.8	36.8	34.2	31.4	31.5	29.5	26.4	25.4	21.7	14.6	6.7	-1	-4.1	-3.8	3.8	3.6	-3.2	2.9	-3.2	-3.2	2.1	0.2
8/25/2021	9:00:00 AM	52	50	48	45.9	44.3	42.9	41.8	41.4	41.3	40.2	41.6	42.8	37.2	37.9	41.5	46.4	36	25.7	24.8	20	17.1	14.1	11.3	7.3	1.7	2.6	-2.9	-3.8	3.4	2.8	-2.3	2.6	-2.2	-2.4	1.4	0.1
8/25/2021	10:00:00 AM	47.8	46.7	45	44.5	44.7	45.1	47.6	46	43.2	42.1	40.1	39.3	36.5	34.9	31.8	30	26.5	24.1	23.4	20.8	17.6	13.7	10.7	7.6	2.9	0.3	-1.2	-1.9	1.4	1.4	-1.5	1.5	1.9	-1.7	1	2.4
8/25/2021	11:00:00 AM	55.5	53.7	51.5	49.4	46.7	44.2	42.3	41.5	40.4	39.9	40.9	40.9	37.5	40	42.9	33.1	26.2	23.2	20.9	17.3	14	11.2	8.7	5.2	1.3	0.4	2	2.6	3.2	1.6	-0.1	0.3	0.8	2.8	15	20
8/25/2021	12:00:00 PM	56.7	54.7	52.5	50	47.2	44.6	42.8	41.2	40.4	39.2	39.3	40.5	37.3	33.1	31.5	29.9	25.9	21.9	20.4	17.2	14.4	12.2	10.4	6.5	2.1	0.7	-1.8	-1.7	1.3	0.8	-0.3	0.2	1.4	7.1	19.1	24
8/25/2021	1:00:00 PM	55	53.5	51.7	49.3	46.9	45.1	42.5	40.4	38.9	38.1	38.4	37.4	34.4	36.1	32.9	27.4	24.1	20.5	19	15.7	12.4	10.5	8.6	4.7	1	0.5	-0.4	-1	1.1	0.9	-0.4	0.3	1.7	7.9	20.6	26
8/25/2021	2:00:00 PM	55.5	54	51.9	50.3	47.6	45.6	43.8	42.9	41.3	40.8	40.5	38.4	35.3	33	31.2	29.4	26.7	25.8	23.6	20.7	17.6	15.3	13.3	10.3	6.7	3.1	0.7	-0.4	0.6	0.5	0	0.8	2.2	9.5	25.5	30.6
8/25/2021	3:00:00 PM	55.6	53.9	52.3	50.3	48.1	45.6	43.9	42.9	41.6	42.4	40.7	38.3	36.1	35	33.9	29.5	26.7	22.5	21.2	17.1	13.5	11.7	9.4	5.6	1.8	0.9	-2.1	-1.5	1.4	0.6	0.2	0.2	0.1	5.2	20.3	25
8/25/2021	4:00:00 PM	67.5	65.7	64.3	62.4	60.1	58.1	55.8	52.9	50	47.3	44.6	42.4	39.6	37.1	34.4	31.7	28.7	26.3	24.2	21.3	17.9	15.9	15	14.5	13.3	11.4	8.9	6.5	5.3	5.6	6.8	7	6.4	6.3	7.5	8.2
8/25/2021	5:00:00 PM	69	67.5	65.9	64	62.1	59.8	57.3	54.4	51.4	48.5	45.3	42.8	39.5	37	35.6	32	29.7	27.8	25.8	22.8	19.6	17.6	16.3	15.7	14.1	11.6	8.9	7	6.2	7	8.5	8.7	8.1	8.1	9.8	11
8/25/2021	6:00:00 PM	69.3	67.7	66.4	64.5	62.5	60.2	57.7	54.9	52	48.9	45.7	42.8	40.6	37.4	34.3	31.9	30.1	27.9	25.7	23	19.8	18	17.1	16.6	15	12.6	9.8	7.7	6.8	7.4	8.9	9.1	8.5	8.4	10.3	11.2
8/25/2021	7:00:00 PM	60.5	58.8	57	54.6	52.4	49.6	47.2	44.7	43	39.6	37.7	35.5	33.6	31.1	28.9	27.2	23.7	21.3	19	16	13.4	10.6	8.6	6	3.9	4.2	5	12.6	13.9	11.5	4.2	3	0.9	1.4	9.6	13.5
8/25/2021	8:00:00 PM	49.1	47.7	45.8	43.9	42.3	40.3	38.9	38.7	38.5	36.1	37.3	36.5	37.3	34.8	31.4	29	25	25.4	22.6	21.6	20	15.3	13.3	9.1	3.6	2.1	-2.3	-2.5	0.4	2.4	-0.6	1.8	2.3	0.6	13.5	18.2
8/25/2021	9:00:00 PM	43.1	44.8	46.7	45	47.8	44	44.8	42.4	43.4	43.6	40.9	41.9	44	42.1	36.7	35.2	34.4	34.6	30.7	30.4	27.1	23.9	21	15.6	7.5	1.3	-4.8	-4.8	2.6	3.6	-3.3	3.1	3.4	-2.8	5.7	10.7
8/25/2021	10:00:00 PM	46.9	51.3	50.1	49.4	52.5	49.4	50.5	47.6	46.4	45.2	46.3	46.9	44.4	40.4	39.7	39.3	38.3	37	33.9	32.7	29.5	27.4	22.2	16.5	9.7	0.1	-4.9	-4.8	2.6	3.7	-3.3	3.1	3.3	-2.3	8.4	13.6

8/25/2021	11:00:00 PM	48.6	47.3	47.8	44.1	42.9	44.2	45.4	43.3	41.3	39.7	38.3	38.5	41.6	37.2	35	35.2	33.5	31.9	32.2	28.3	25.7	24.6	21.5	16.5	9.8	0.7	-4.6	-4.6	-2.9	-3.5	-3.1	-2.8	-3.1	-1.8	8.9	14.7
8/26/2021	12:00:00 AM	43.7	45.2	47.2	49.4	54.7	57.4	50.8	50.4	46.6	42.4	41	40.1	41.3	41.3	37.5	36.2	33.3	30.5	29	26	23.2	21.8	18.3	13.5	7.6	2.7	-4.3	-5	-3.4	-2.6	1	-3.1	-3.4	-3.3	1.9	5.7
8/26/2021	1:00:00 AM	35.3	35.2	36	36.4	37.7	36.6	35.6	35.3	33	33.3	35.2	35.9	36.3	36.4	34.3	31.2	28	26.7	25.6	23.6	21.8	20.8	18.5	14.2	8.3	0.2	-5	-5	-4.4	-4	-3.7	-3.4	-3.5	-3.6	-1.7	1.1
8/26/2021	2:00:00 AM	39.1	38.1	38.2	37	37.3	36.4	35.7	36.1	34	32.8	33.5	33.7	31.9	31.5	31.1	32.1	29.8	29	27.6	25.2	23.8	23.6	21.5	16.3	10	1.2	-4.8	-5.1	-4.4	-4	-3.6	-3.4	-3.5	-3.6	-1	1.8
8/26/2021	3:00:00 AM	42.9	44.4	44.6	45.1	46.7	45.1	43.1	42.3	41.6	40.8	41.8	52.1	51.2	37.2	36.1	35.7	33.4	32.7	30.6	27.9	25.8	24.9	22.4	17.6	11.4	2.3	-4.4	-5.1	-4.6	-4	-3.6	-3.2	-3.5	-3.6	-1.3	1.4
8/26/2021	4:00:00 AM	35.4	37.3	39.4	40.2	41.4	41.2	41.2	41.6	39.1	38.3	39.1	40.6	39.1	38.9	37	36.2	33.8	33.8	32.1	29.9	28	28	25.4	20.7	14	4.4	-3.9	-5.2	-4.7	-4.2	-3.5	-3.5	-3.6	-3.7	-2.3	0.3
8/26/2021	5:00:00 AM	38.1	39.2	42.9	42.7	43.3	42.1	42.6	43.5	41.8	40.8	43.5	42.1	41.4	41.1	38.9	37.9	35.5	36.6	34	30.6	29.6	28.2	26.3	22.4	16.3	7.2	-1.7	-3	-2.9	-4.1	-3.2	-3.2	-3.5	-3.7	-2.7	-0.3
8/26/2021	6:00:00 AM	43.4	42.8	44.9	47	43.6	42.2	41.9	42.2	41.7	38.2	38.3	40.3	42.2	38.7	35.9	35.9	32.9	31.7	31.4	28.4	26.4	25.8	23.5	19.1	15	15.5	21.8	18.5	7	10.6	6.5	1.4	-2.1	-2.8	-0.9	1.5
8/26/2021	7:00:00 AM	41.8	48.6	50.2	48.5	52	50.6	49.9	51	48.8	47.2	47.2	49.5	47.9	43.1	41.5	40.3	38.6	37.4	33.8	33.6	32	29.3	25.9	20.3	13.8	4	2.4	-3	-2.6	-1	-3.5	-3.3	-3.5	-3.4	2.1	4.1
8/26/2021	8:00:00 AM	44.3	43.3	43.2	42.4	44.7	44.7	54.1	50.2	45.7	48.1	49.2	47.9	46	46.2	45.1	42	38.2	31.2	27.9	25.6	21.6	20.1	16.4	9.9	3	3.2	-5.1	-4.7	-4	-3.4	-3.2	-3	-3.1	-2	7.6	8.6
8/26/2021	9:00:00 AM	54.5	52.5	50.7	48.1	46	44.5	42.5	42	40.3	40.6	43.9	43.9	36.6	36	33.1	28.7	24.7	22	20.3	17.2	13.7	11.5	9.6	5.7	3.8	4.9	7.1	4.5	1.3	-1	-1.6	1.7	-1.9	-0.1	10.1	11.6
8/26/2021	10:00:00 AM	58	56.4	54.2	51.7	49.4	47.2	44.6	43.3	41.7	40.6	41.3	38.6	37.1	35.7	31.4	28	25.5	21	19	15.7	12.6	10.8	8.9	4.9	0.4	-2	-2.3	-2.2	1.9	1.4	-0.7	0.6	0.7	0	8.7	11.8
8/26/2021	11:00:00 AM	53.8	51.6	51.7	50.1	49.8	48.7	48.1	46	46.2	44.4	43.7	40.3	39.7	41	37.7	29.9	27.5	24.6	22.1	19.4	16.1	14.2	10.7	7.3	2.7	0.1	-1.1	-0.9	0	1.1	1.5	1.6	3.7	9.6	26	31.5
8/26/2021	12:00:00 PM	59.2	57.4	55.8	53.9	51.8	50.3	48.3	46.7	45.1	44.1	40.5	39.2	35.3	33.7	30.1	28.4	25.4	23.7	23	19.7	16.8	15	13	9.9	6.7	6.9	8.6	1	0.8	1.1	1.9	2.5	5.4	12.6	27	31.6
8/26/2021	1:00:00 PM	56.7	54	52	50	47.2	44.4	42.5	41.6	41.1	40.1	38.5	43.3	31.2	28.7	27.6	25.8	22.8	20.8	19.8	17.4	14.8	13.1	10.8	6.9	2.7	0.1	-1	-1.1	0.7	0.1	0.7	1.4	4.7	12.5	27.8	32.1
8/26/2021	2:00:00 PM	60.4	58.7	57.1	55.1	53.2	50.5	47.9	45.2	42.8	40.8	39.5	37.3	34.4	32.3	29.7	27.6	25	24.3	22.4	19.8	17.2	14.8	12.8	11	9.5	7.7	5.8	4.4	3.2	3.1	3.5	3.9	4.9	13.4	28.3	33.6
8/26/2021	3:00:00 PM	70.3	68.9	67.4	65.7	63.8	61.7	59.3	56.4	53.5	50.4	47.1	44	41.2	38.4	35.8	33.2	30.8	28.9	27	24.3	21.4	19.6	19	18.6	17.2	15	12.2	9.8	8.3	8.5	9.8	10.2	9.7	12.1	23.8	28.7
8/26/2021	4:00:00 PM	69.4	67.7	66.3	64.4	62.4	60.2	57.6	54.9	51.8	48.8	45.8	43	40.6	37.2	34.4	31.8	29.5	27.5	25.7	22.9	19.8	17.9	16.9	16.3	14.7	12.3	9.7	7.6	6.5	7	8.3	8.7	8.1	8.1	8.6	8.4
8/26/2021	5:00:00 PM	62.9	61.3	59.3	57	54.7	52.1	49.2	46.6	44.6	41.2	39.4	38.2	37	32.4	29.1	25.8	22.7	20.4	18.2	15.1	11.7	9.3	7.9	6	3.5	1.4	0.2	0.1	0.3	1.2	2.2	2.4	1.8	1.7	2.1	1.9
8/26/2021	6:00:00 PM	60.4	58.6	57	54.5	51.9	49.3	46.9	44.3	41.8	39.8	39.3	38.1	35.7	31.9	28.2	24.6	21.1	19.5	17.6	13.1	9.5	7	4.7	2.3	0.2	1.3	-1.8	-1.5	1.1	0.3	0.6	0.8	0.2	0.1	0.6	0.8
8/26/2021	7:00:00 PM	57.6	55.5	53.5	51.4	48.8	46.5	44.4	42.7	40.1	38.9	37.3	35.5	33.1	30.7	27.1	24.7	20.8	19.2	16.8	13.6	12.4	10.4	7.9	4.6	1.6	3.1	7.9	11	14	10.4	1.8	0.2	0.9	-1.2	0.6	0.4
8/26/2021	8:00:00 PM	55.4	53.1	51.2	49.1	46.8	44.5	42.5	40.7	42	38.9	39	40.4	39	31.7	28.7	26.8	24.4	26.4	24.6	24.4	22.6	19.9	17.1	11.6	5.7	1.5	-3.7	-3	2.9	2.3	-1.7	1.5	1.9	-2.1	1.4	0
8/26/2021	9:00:00 PM	36	41.6	40.8	39.8	41.6	41.8	39.4	37.7	35.3	34.6	37.2	37.6	34.3	32.7	31.4	33.6	30	28.5	28.2	25.5	23.5	22.4	19.7	16.4	10.4	2.3	-3.7	-4.3	4.1	3.6	-3.3	3.1	3.4	-3.3	2.3	0.3
8/26/2021	10:00:00 AM	42.6	47.1	47.9	48.2	53.5	47.7	48.1	45.8	43.3	41.9	43.8	44.9	43.8	42.4	38.7	38	32.7	32.3	28.6	27.6	25.4	23.1	21.8	17.5	12.5	3.9	-3.6	-4.6	4.1	3.6	-3.2	3.1	3.3	-3.2	2.4	0.3
8/26/2021	11:00:00 AM	42.8	45.2	45.4	46.1	50.9	50	50.5	47.6	45.4	44.8	42.4	41.3	44.4	47.8	41.1	38.7	35.3	32.9	31.3	26.3	24.1	23.2	20.7	16.1	10	1.7	-4.1	-4.4	3.9	3.5	-3.1	2.9	3.2	-3.4	1.6	1.3
8/27/2021	12:00:00 AM	33.8	35.5	39.2	38.3	39.1	37.7	36.9	36.9	35.1	33.1	35	36.1	34.9	35	34	35.5	32.3	31.2	31.8	28.7	27.9	27.6	25.4	21.3	15.4	6.6	-2.2	-4.9	4.5	4	-3.6	3.3	3.5	-3.6	2.6	0.3
8/27/2021	1:00:00 AM	42	41.2	42.7	40.1	40.4	39.5	38.3	38.1	45	41.3	41.2	46.3	45.8	36.5	34.8	34.4	31.8	29.8	26.9	24.5	22.8	21.5	19.7	15.3	10	2	-4.3	-5	4.4	3.9	-3.5	3.2	3.4	-3.4	2.5	0.3
8/27/2021	2:00:00 AM	39.8	50.6	48.1	49.5	54.7	47.7	49.1	46.8	45.7	47.7	46.7	45.8	43.1	40.5	39.6	38.3	35.9	35.9	33.6	30.3	29.5	27.3	24.7	21.1	16.2	8	-2.4	-5	4.6	4.1	-3.7	3	3.6	-3.7	2.7	0.3
8/27/2021	3:00:00 AM	39.9	47.9	49.4	48.5	51.1	48.1	47.5	45.2	44.8	43.6	44	46.8	44.6	38.8	36	36	36.7	37.7	32.7	35.1	31.6	30.6	28	23	16.6	7.1	-2.5	-5.1	4.6	4.1	-3.7	3.4	3.6	-3.7	2.7	0.3
8/27/2021	4:00:00 AM	43.8	42.1	42.2	41.6	42.5	41.5	42.3	41.6	40.9	39.4	41.2	42.8	40.4	39.9	37.2	37.4	34.7	35.8	36.2	32.7	31.7	30.1	28	24	18.4	10.3	0.7	-4.6	4.6	4.1	-3.7	3.4	3.5	-3.7	2.7	0.3
8/27/2021	5:00:00 AM	46	50.4	50.8	52.2	49.4	52.3	52.7	50.4	51	51.5	50.6	52.1	51	49	43.7	42	38.8	37	35	32.9	30.6	30.4	28.2	23.7	18.3	10	0.4	-4.6	4.6	3.9	-2.5	3	3.5	-3.7	2.7	0.3

8/27/2021	6:00:00 AM	41.1	49.1	50.8	50.1	51	48.1	49.2	49.1	52.1	51.8	49	47.3	47.5	43.4	42	40.3	38.4	36.5	33.8	31.6	30.4	28.9	27.3	23	17	10.3	11.5	5.5	-1.2	-1.6	-2.5	-3.3	-3.6	-3.7	-2.7	-0.3
8/27/2021	7:00:00 AM	47.2	43.6	42.6	41.5	41.5	39.6	39.2	42.3	44.5	39.9	38.3	43	40.9	40.2	36.3	37.3	34	32.3	30	26.1	25.2	25	23.2	18.6	13.2	16.4	18.9	19.5	14.1	3.2	-2.2	-2.4	-3.2	-3.3	-2.5	-0.3
8/27/2021	8:00:00 AM	37.4	37.6	39.9	39.9	40.6	40.4	40.7	42.7	42.6	43.9	45.5	45.6	45.1	44.3	41.9	37.2	31.4	27.5	26.4	23.9	20.6	18.3	14.8	9.3	3.7	-2	-4.7	-4.7	-2.7	-2.6	-3.3	-3.1	-3.4	-3.3	-2.3	-0.3
8/27/2021	9:00:00 AM	39.1	38	39.6	38.8	40.6	42.5	42.3	43.7	44.5	46.1	47.5	47.8	47.3	45.9	42.7	38.3	31.9	25.9	21.9	17.9	13.5	10.3	7.9	4.6	1.1	-2.2	-3.6	-3.7	-3.2	-2.9	-2.5	-2.4	-2.8	-2.7	-1.7	-0.1
8/27/2021	10:00:00 AM	46.7	44.9	45.9	44.1	43.6	42.9	44.1	43.2	43.3	44.6	43.7	45	45.2	42.1	38.1	35.2	33.5	24.8	21.4	17.6	15	13.2	10.6	7.1	2.9	0.1	-1	-1.2	-1	-0.9	-0.8	-0.8	-1.2	-1	-0.4	0.3
8/27/2021	11:00:00 AM	54.6	53.3	51.7	49.9	49.5	48.2	47.9	45.5	45.1	43.5	41.8	43.8	38.7	37.6	37.4	34.4	30.2	28.5	29.3	29.1	30.1	25.5	25.9	27.1	25.3	25.1	21.6	23	19.9	16.7	22.4	17.7	16.2	14.3	11.4	10.3
8/27/2021	12:00:00 PM	56.7	55.5	53.4	51.6	49.1	46.8	45.4	41.8	42	38.9	37	35	31.6	29.5	27.1	24.7	22	22.8	20	17.4	16.8	14.3	10.4	6.3	3.9	1	-0.5	-0.4	-0.5	0.3	1.3	2	1	1.3	0.6	1
8/27/2021	1:00:00 PM	61.4	59.8	58.3	56.3	54.8	52.8	51.6	48.5	47	45.3	42.3	40.7	38.5	36.9	34.1	31.8	29.1	26.4	23.3	20	16.8	14.3	13	13.1	7.8	4.6	2.6	1.6	1.5	2.2	2.7	2.9	2.5	2.7	2.5	2.2
8/27/2021	2:00:00 PM	61	59.2	57.6	55.7	53.5	50.7	48.3	45.6	42.8	40.7	39.2	38.6	36.7	35.8	32.9	29.9	25.5	21.8	19.7	16.5	13.6	11.3	10.4	13.7	10	4.7	0.7	0.3	0.1	0.6	1.5	1.7	1	1.2	1.6	1.8
8/27/2021	3:00:00 PM	63.3	61.7	60.2	58	55.7	53.1	50.3	47.5	44.8	42.1	39.9	39.6	37.8	34.5	32.5	30.6	28.6	25.9	21.7	18.3	15	12.4	10.8	8.2	5.7	3.4	1.8	1.1	1.1	1.8	2.9	3.2	2.4	2.4	2.5	2.1
8/27/2021	4:00:00 PM	61.5	59.9	57.9	55.7	53.4	50.8	48	45.3	43	40.3	38.9	38.2	35	33.4	31.3	28.7	24.9	21.4	19	16.5	13	9.3	8	5.4	3	1.4	0.2	-0.4	-0.1	0.5	1.5	1.6	0.9	1	1.3	1.2
8/27/2021	5:00:00 PM	63.1	61.7	60.1	58.2	56.8	54.3	53.1	50.6	48.8	45.8	42.4	39.2	37.9	35.7	32.9	30.4	27.5	25	22.5	19	15.5	12.6	10.8	9.4	7.2	4.9	2.7	1.5	1.5	2.1	3.1	3.2	2.5	2.4	2.6	2.4
8/27/2021	6:00:00 PM	63.5	61.9	60.4	58.7	56.7	54.9	53.2	51.6	49.2	46.4	42.5	40.2	40.4	37.3	34.2	32.9	30.6	28.1	26.5	23.5	19.7	19.2	16.7	13.7	10.2	4.5	1.2	0.7	0.8	1.4	2.6	2.7	2.1	1.9	2	1.7
8/27/2021	7:00:00 PM	47.8	46.3	45.8	45.5	46	43.5	44.6	43.8	41.8	40.4	37.9	38.9	39.8	39.7	33.5	31.3	29	27.7	24.5	22.9	21.7	18.9	16.9	16.4	10.3	3.7	-3	2.9	7.7	9.9	1	0.8	2.6	-2.8	1.9	0.1
8/27/2021	8:00:00 PM	31.3	34.3	36.5	36.8	38	37.9	38	36.6	36.5	34.8	35.4	35.3	35.4	32.8	31.4	31.6	27.5	27	26.2	22.9	20.8	20.1	19.4	16.3	11.9	4.7	-2.3	-4.3	-4.1	-3.6	-3.3	-3.1	-3.4	-3.3	-2.3	1.5
8/27/2021	9:00:00 PM	45.1	44.4	43.5	42.8	44.4	41.1	40.3	38.1	36.8	36.3	37.3	38.9	42.4	40	32.7	30.4	28	26.7	24.8	22.3	20.2	20	18.4	15.2	10.7	3.8	-1.1	-0.4	0.8	1.7	3.4	3.7	6.3	4.9	2.8	2.4
8/27/2021	10:00:00 PM	36.3	43.5	47.8	41	42	42.6	44.8	40.7	41.8	40.2	38.5	39.8	40.1	37.3	36.2	35.4	32.4	33.7	31.8	29.3	28	26.8	25.1	21	16.3	8.5	-0.5	-4.3	-4.2	-3.6	-3.3	-3	-3.3	-3.3	-0.3	8.8
8/27/2021	11:00:00 PM	48.8	47.3	45.5	43.5	41.3	39.1	37.3	36.5	34.2	33.3	33.1	32.5	32.9	30.6	29	28.7	25.1	23.7	22.1	18.4	16.3	14.5	12.3	9.5	5.3	0.9	-4.5	-4.7	-4.2	-3.4	-0.3	-2.6	-3.2	-3.2	-2.2	7.6
8/28/2021	12:00:00 AM	50.4	50.5	49.3	48.1	50.6	46.3	48.4	43.9	43.8	44.9	45.2	43.6	40.3	38.7	37.8	36.4	36	36.1	34.1	32.7	30	29.2	26.9	23.3	20.1	13.2	1	-4.3	-4	-3.4	-2.9	-2.7	-3	-3.1	-2.2	4.2
8/28/2021	1:00:00 AM	41.7	47	50.6	51.3	49.8	47.7	47.3	48.4	47.3	47.3	45.8	48.1	48.3	47.9	41	37.9	36.3	34.9	33.3	30.6	27.6	25.8	25.1	21.2	17	9.2	-0.4	-4.2	-4.2	-3.3	-1.6	-2.3	-2.7	-2.5	-1.9	-0.2
8/28/2021	2:00:00 AM	35.5	36.1	37	36.9	37.6	36.6	35.6	35.4	32.6	31.5	36.1	38.5	31	29.9	27.5	28.9	26	27.1	25.5	22.4	22	21.4	19.2	16.1	11.4	4.4	-2.5	-4.9	-4.6	-4.1	-3.7	-3.4	-3.6	-3.7	-2.7	-0.3
8/28/2021	3:00:00 AM	41.6	46.3	47.7	47.9	49.6	46.8	45.1	40.3	40	40.9	42.2	43	42	37.2	32.9	33.6	32.5	34.5	27.8	26.6	25.9	23.3	22.2	19.7	14.6	8.1	-0.3	-4.5	-4.5	-4.1	-3.7	-3.4	-3.5	-3.6	-2.6	-0.3
8/28/2021	4:00:00 AM	35.2	34.8	36.5	36.8	37.9	36.8	35.8	36.1	35.6	32.2	30.1	34.6	30.1	30.8	27.1	28.5	25.8	25.7	25	21.6	20	20.3	19.3	17	13.3	7.9	1.1	-3.7	-4.5	-3.9	-2.6	-3.3	-3.5	-3.6	-2.6	-0.3
8/28/2021	5:00:00 AM	45.3	43.6	44.1	45.6	41.5	39.9	40	39.9	37.4	34.3	36.6	34.6	32	34.7	32.1	30.6	28.5	28.1	28.7	24.8	24.4	25	24.2	21.3	17.1	10.2	2.6	-2.8	-2.9	-3	-2.8	-2.7	-3.4	-3.6	-2.6	-0.3
8/28/2021	6:00:00 AM	39.4	38.3	39.6	39.2	40	39.2	39.3	39.8	36.9	35.5	35.7	34.5	34.1	32.8	30.7	32.3	29.8	29.1	27.9	26.4	26.2	26.1	25.7	22.7	18.4	14.1	16	12.4	6.3	3.8	1.3	0.7	-3.3	-3.6	-2.7	-0.3
8/28/2021	7:00:00 AM	42.8	48.5	46.5	45.8	48.7	44.9	45.9	45	44.9	45.5	43.9	42.7	40.8	35.9	33.3	34.3	34.3	31.4	29.5	26.8	24.3	22	20.8	18	13.1	11.5	13.8	6.2	0.3	1.7	-2	2.9	-3.3	-3.3	-2.4	-0.3
8/28/2021	8:00:00 AM	45.2	43.6	42.7	40.9	40.6	39.8	38.8	39.1	38.6	38.5	40.3	38.9	32.1	28.6	26.9	24.5	21.2	20.9	20.2	17.1	14.7	13.3	12.2	9.8	6.3	1.7	-2.8	-4	-3.5	-3.1	-3	-2.8	3.1	-3.1	-2.1	-0.2
8/28/2021	9:00:00 AM	46	45.5	45.2	45.3	46.6	45.4	47	43.5	43.2	44.3	39.2	39	36.2	36.1	27.5	26.9	25	22.7	21.7	17.4	15.3	13.3	12.4	11.7	6.2	1.4	-2.4	-3.2	-2.3	0.3	-1.8	-2.2	2.6	-2.4	-1.6	-0.1
8/28/2021	10:00:00 AM	51.4	50.4	49.5	48.4	52.9	49.1	51.5	51.1	49.7	48.2	43	39.4	36.3	34.6	30.2	28.5	26.8	25	22.4	20.1	17.9	15.4	14.1	11.7	8.1	2.4	-2	-2.4	-2.1	-1.7	-1.3	-1.4	1.9	-1.8	-1.1	0.1
8/28/2021	11:00:00 AM	55.2	53.1	51.7	49.5	47	44.4	42	39.8	37.3	35.7	35.1	33.3	30.5	28.6	25.4	23.2	19.9	18.2	17.2	13.3	10.6	9.2	7.8	5.1	1.8	-0.6	-1.1	0.2	0.7	0.1	0.5	0.1	-1	-1	0.5	0.6
8/28/2021	12:00:00 PM	58	56.5	54.5	52.2	50	48.1	45.4	43.7	41.7	41.8	39.2	37.8	36.3	37.5	28.4	26.5	25.8	23.1	21.5	20.8	17	16.7	13.9	9.1	6.2	0.8	-1	-1	0.8	0.4	0.4	0.9	-0.2	-0.2	0.3	0.8

8/28/2021	1:00:00 PM		53	51	48.9	46.4	44.4	42.3	41.4	37.2	35.5	35.3	33.5	32.1	28.6	26.1	23.8	21.2	17.9	17.1	15	11.7	10.2	8.8	7.2	4.5	1.4	-1.3	-2.2	-2.1	-1.7	-1.4	-1	-0.9	-1.5	-1.1	-0.5	0.4
8/28/2021	2:00:00 PM	57.9		55.8	54.1	51.8	49.2	46.4	46	45.3	38.5	37.9	38.1	34.6	33.8	30.8	28.9	26.7	24.2	21.6	18.4	15.4	11.4	8.1	5.5	2.9	-0.2	-1.4	-1.8	-1.7	-1.3	-0.7	0	0.1	-0.6	-0.4	0.2	0.7
8/28/2021	3:00:00 PM	53.2		52.2	50.4	48.6	45.9	43.4	41.1	39.2	37.5	37	36.4	34.4	34.1	28	25.8	23.6	19.8	18.2	15.7	12.8	9.8	7.3	6.3	2.3	-0.2	-0.3	-0.4	-1.4	-1.2	-1.2	-1.1	-1.8	-1.5	-0.7	0.5	
8/28/2021	4:00:00 PM	50.3		48.2	46.6	45.3	43	40.9	38.4	37.2	36.1	34.8	36.9	36.2	29.5	28.6	25.3	22.5	18.9	16.1	14.2	11.1	8.3	6.7	4.9	2.2	-0.9	-2	-2.2	-2.3	-2	-1.8	-1.5	-1.4	-2	-1.7	-0.9	0.3	
8/28/2021	5:00:00 PM	53		51.9	50.1	49	50.5	46	48.3	46.1	45.9	44	40.3	34.7	30.3	28.5	26.6	25.6	24.2	23.2	19.3	17.4	14.3	12.4	8.9	4.9	0.5	-2.7	-3.2	-2.8	-2.4	-1.9	-1.5	-1.4	-2	-1.7	-0.9	0.2	
8/28/2021	6:00:00 PM	49.8		48.5	46.7	44.2	42.3	40	39.4	38.7	35.3	34	34.8	35.9	26.7	25.1	23	22	19.6	20.5	17.1	14.7	12.2	9.3	6.4	3.3	-0.7	-3.5	-4	-3.6	-3	-2.6	-2.3	-2.2	-2.8	-2.5	-1.6	0	
8/28/2021	7:00:00 PM	42		41.7	46.3	47.5	47.3	48	47.6	43.6	39.2	38.8	37	38.7	42.8	42.6	33.5	32.7	30.7	28.7	25.7	23.1	20.8	21	15	10.5	6.3	3.3	8.5	12.3	12.3	11	2.3	-0.3	-2.6	-2.8	-2	-0.2	
8/28/2021	8:00:00 PM	37.1		36.1	36.3	36.8	36.6	35.8	35.1	35.5	34.8	34.5	32.1	31.6	30.3	30.4	28.6	29.3	26.7	25.9	23.7	20.8	19.1	17.7	15.4	11.6	6	-1.1	-4.6	-2.5	-4	-3.5	-3.1	-2.9	-3.3	-3.1	-2.2	1	
8/28/2021	9:00:00 PM	38.5		47.3	49.1	48.7	54.9	47.9	52.5	49.3	48.9	48.1	47.2	48	49.4	46.3	43.5	41.3	38.6	36.9	34.9	31.7	28.8	25.4	23.2	20.3	11.4	1.4	-4.8	-4.8	-4.3	-3.8	-3.4	-3.2	-3.4	-3.4	-2.4	-0.3	
8/28/2021	10:00:00 PM	32.3		33.8	36.2	36.3	37.1	36.4	35.2	35	32.2	31	33.6	33.7	32.3	31.9	30.8	30	27.2	26.7	25.3	23.5	22.6	21.4	19.3	15	9.1	0.6	-4.7	-5	-4.4	-3.9	-3.5	-3.3	-3.5	-3.5	-2.5	-0.2	
8/28/2021	11:00:00 PM	38.1		37.8	36.8	35.3	35.2	34.4	33.5	34.2	32.6	30.6	30.7	30.3	31.3	32.6	28.6	25.6	24.6	23.1	21	19.5	18.8	19	17.2	13.1	6.9	-1.3	-5.2	-5	-4.4	-3.9	-3.5	-3.3	-3.5	-3.5	-2.5	-0.3	
8/29/2021	12:00:00 AM	46.1		44.6	42.2	40.2	38.8	37.2	35.6	35.3	33	32.3	31.7	31	28.1	27.4	26	25.3	22.7	23.1	20	17.6	16.7	16.4	14.3	10.5	5.4	-0.1	-0.5	0.3	0.1	1.6	2.7	2.4	2.1	2.9	2.2	1.4	
8/29/2021	1:00:00 AM	47.6		46.5	45.2	44.3	42.9	41.6	43.1	44.8	43.2	43.9	45.6	45.5	41.5	38	34.7	33.4	30.9	30.3	28.9	26	23.8	20.5	18	15.2	9	1.8	-3.9	-4.7	-4.2	-3.7	-3.3	-3.1	-3.4	-3.4	-2.4	-0.3	
8/29/2021	2:00:00 AM	48		45.7	44.6	42.2	40.9	38	36.3	37	33.6	31.8	30.3	28.2	26.1	24.8	24.1	25	22.9	25.3	23.8	19.8	18.8	18.2	16.7	14.3	10	3.1	-3.2	-4.6	-4.2	-3.7	-3.3	-3.1	-3.3	-3.4	-2.4	-0.3	
8/29/2021	3:00:00 AM	45.1		43.1	41.5	39.4	38.6	36.8	35.8	37.7	34	33.1	32.4	32.8	32.2	28.6	26.7	27.2	24.2	24.6	23.5	21	20.3	19.5	18	15.1	10.6	3.9	-2.6	-4.7	-4.3	-3.8	-3.4	-3.2	-3.4	-3.5	-2.5	-0.3	
8/29/2021	4:00:00 AM	37.8		37.2	37.9	38	38.7	37.4	36.9	36.8	35.2	32.9	36.1	35.6	34.4	31.3	28.5	27.7	24.9	24.3	24.2	22.4	21.2	20.8	19.1	15.7	10.6	3.4	-3.1	-4.9	-4.5	-4	-3.6	-3.3	-3.5	-3.6	-2.5	-0.3	
8/29/2021	5:00:00 AM	43.5		50.7	53.4	52.7	54.8	52	50.9	47.6	48.5	49.9	48.4	50.9	51.6	49.2	40.5	39.7	39.2	37.1	33.7	31	29.5	27.3	25.7	22.7	16.6	8.6	-0.4	-4.5	-4.5	-3.9	-2.6	-2.8	-3.5	-3.7	-2.7	-0.3	
8/29/2021	6:00:00 AM	46.2		51.7	50.4	52.1	56.4	52.7	54.1	51.1	49.7	51	48.7	49.1	47.4	42.9	40.3	40.3	39.3	37.4	35.9	33.6	31.6	30	27.9	24	19.9	12.1	1.2	-3.5	-4.4	-4.1	-3.7	-3.4	-3.5	-3.7	-2.7	-0.3	
8/29/2021	7:00:00 AM	43.2		42.1	42.3	41.3	43	40.9	39.3	40.1	38.5	38.8	39.2	39.2	39.8	37.2	34.5	33.2	30	28.1	28.1	27.6	25.4	25	23.3	19.3	15	15.8	22.2	16.2	10.5	9.8	4.5	0.5	1.8	-3.4	-2.6	-0.3	
8/29/2021	8:00:00 AM	43.5		46.8	47.8	51.1	53.3	54.6	55	54.5	53.3	51.1	48.1	45.8	43.7	41.5	39.6	38.4	37.9	36.3	32	30.6	28.3	27	25.1	21.3	15.6	6.4	-3.4	-4.7	-4.3	-3.8	-3.4	-3.2	-3.4	-3.4	-2.4	-0.3	
8/29/2021	9:00:00 AM	49.1		47.5	45.8	43.6	42.6	41.2	42	39.7	37.6	38.5	37.3	36	30.7	28.3	26.4	24.3	19.9	20.6	20.3	15.4	13.3	11.6	9.8	5.9	1.2	-3.2	-4.6	-4.3	-3.7	-3.2	-2.8	-2.6	-3	-2.8	-1.9	-0.1	
8/29/2021	10:00:00 AM	48.7		47.2	46.4	44.1	43.7	43.5	43.9	42.2	42.5	44.2	38.9	37.9	33.6	32.9	27.6	25.8	22.3	19.5	18.3	15	12.9	10.7	8.9	6.5	1.9	-0.7	-2.4	-2.4	-1.7	-1.7	-1.5	-1.5	-2.2	-2	-1.2	0.1	
8/29/2021	11:00:00 AM	48.5		46.2	44.1	42	40	38.4	37.1	37.1	35.9	35.4	35.2	34.8	32.4	30.2	27.7	25.7	21.4	17	17.1	14.2	12.1	10.1	8.5	4.7	2.5	1	-0.5	-1	-0.9	-0.7	-0.5	-0.6	-1.4	-1.2	-0.6	0.4	
8/29/2021	12:00:00 PM	51.5		49.8	46.8	44.1	41.8	39.9	38	37	36.1	35.3	35.3	33.9	32.3	32.2	28.4	27.3	24.3	18.2	17	14.5	10.3	7.9	6.6	2.8	-0.2	-1.5	-1.5	-1	-0.7	-0.4	-0.1	-0.3	-1.1	-1	-0.4	0.5	
8/29/2021	1:00:00 PM	48.9		47.6	45.9	43.6	44.6	44.8	45.6	44.8	45.4	44.3	40.6	36.5	32.7	29.8	27.1	25.4	22.9	21.2	18.5	15.3	11.9	8.9	7.5	3.2	-0.5	-2	-2.4	-2.3	-1.1	-1.5	-1.4	-1.4	-2.1	-1.7	-0.8	0.3	
8/29/2021	2:00:00 PM	47.3		45.3	43.3	41.1	39.2	37.1	35.7	35.6	34.6	35.1	35.4	34.4	30.9	29.6	27.1	24.8	20.6	20.6	18.1	15.3	12.4	9.5	7.3	6.7	0.9	-1.4	-1.9	-2.1	-1.8	-1.6	-1.2	-1.2	-2.1	-1.7	-0.8	0.4	
8/29/2021	3:00:00 PM	56.9		55.9	54.3	52.6	50.3	47.9	45.8	43.7	42.3	44.3	40.5	41	37.7	34.2	29.8	27.9	24.7	23.4	21.7	18.5	16	12.3	10.3	8.8	7.4	0.6	-1.3	-1.3	-0.9	-0.5	0.3	0.3	-0.5	-0.3	0.4	0.8	
8/29/2021	4:00:00 PM	60.7		59.3	57.7	56.2	54.7	53.9	53	51.8	50.7	49.1	43.1	38.4	37	34.5	32.1	30.8	29.9	28.5	24.8	22.5	19.1	17.2	13.6	8.8	4.3	0.6	-0.5	-0.5	-0.1	0.4	1.2	1.3	0.5	0.6	1.1	1.2	
8/29/2021	5:00:00 PM	45.1		44.2	43	43.4	40.5	42.9	43.8	45.1	41.8	41.8	38.1	35.2	32.8	31	29	27.6	24.9	22.8	19.6	17.5	15.1	10.6	7.9	4.9	1.4	-1.2	-2.1	-2.7	-2.4	-2.1	-1.8	-2	-2.7	-2.2	-1.2	0.2	
8/29/2021	6:00:00 PM	57.2		55.7	54	51.9	49.4	46.9	44	41.2	38.7	36.8	36.1	33.8	30.6	28.9	26.9	25.2	21.3	18.2	16.8	12	8.7	6	3.1	1.1	-1.4	-2.4	-2.7	-2.4	-1.8	-1.3	-0.6	0.5	-1.1	-0.9	0.3	0.5	
8/29/2021	7:00:00 PM	50.3		48.9	47	45	43.1	41.1	39.4	39	37.6	37.5	34.9	33	30.5	29.8	27.7	27.4	24.9	24.4	23.8	20.7	17.6	15.3	12.4	7.6	1.2	-1.7	1.6	3.9	8	4.6	-0.8	-1.1	-2.2	-2.3	-1.5	0.1	

8/29/2021	8:00:00 PM	59.5	58	55.9	53.8	51.3	48.9	46.9	44	43.2	41.8	37.7	35.5	33.7	31.3	28.6	28	25	24.7	24.3	19.6	16	12.7	8.2	2.2	-2.6	-3.4	-3	-2.3	-1.5	-0.8	0.1	0.4	-0.2	-0.2	0.4	1.2
8/29/2021	9:00:00 PM	56.5	54.7	52.8	50.8	48.5	46	43.1	40.8	37.9	35.8	35.2	35.3	34.7	35.2	32.8	34.1	30.8	30.3	30.5	26.8	25.5	23.3	20.3	15.9	9.1	0.1	-3.7	-3.2	-2.5	-1.5	-0.7	0.7	-0.3	-1.4	-0.7	0.4
8/29/2021	10:00:00 PM	39.5	38.3	37.9	36.4	36.4	36.1	35	35	33.3	32.3	33.3	35.7	33.9	33.7	31.9	31.8	28.8	28.5	27.9	26.8	25.8	23.1	20.7	17.1	11.3	2.4	-4	-4.7	-4.2	-3.6	-3.3	-3.1	-3.4	-3.3	-2.3	-0.2
8/29/2021	11:00:00 PM	33.6	35.3	37.5	37.2	38.4	37.7	36.8	36.6	34.8	34.2	37	37	35	34.9	33.6	32.8	28.8	31.4	28.9	26.4	25.4	23.7	20.8	16.9	10.8	1.9	-4.5	-4.9	-4.3	-3.8	-3.5	-3.2	-3.4	-3.4	9.7	5.7
8/30/2021	12:00:00 AM	45.1	46.5	49.2	45.5	46.8	46.5	47	42.7	42.4	44.1	42.1	44.4	43.2	45.3	39.5	38.3	35.1	34.6	31.9	30.6	28.7	26.8	24.6	20.1	13.4	4.5	-3.8	-4.9	-4.3	-3.8	-2.9	-3.1	-3.4	-3.4	-2.4	4.4
8/30/2021	1:00:00 AM	40.4	50.2	47	46.9	51.9	46.8	49.8	48.7	46.6	48.5	47.5	46.5	45.2	44.1	44.2	43.7	42.4	40.9	39.3	36.9	33.1	30.6	27.6	21.1	14.4	3.4	-3.7	-5	-4.4	-3.9	-3.5	-3.3	-3.5	-3.5	11.1	1.8
8/30/2021	2:00:00 AM	44.6	48.1	47.6	46.7	50.8	46.2	49.5	47	46.2	46.6	44.1	42.4	41.1	40.3	38.7	38.3	36.2	35.2	32.8	29.9	28.1	25.7	23	19	12.6	3.1	-4.2	-4.9	-4.4	-3.9	-3.4	-3.2	-3.4	-3.5	-2.5	-0.3
8/30/2021	3:00:00 AM	44.2	42.3	41.4	40.2	40	38.6	38	38.7	35.8	34.6	36.2	37.2	34.8	35.6	34.7	34.2	31.5	33.3	30.8	28.6	27.7	26.8	24.8	20.9	15.1	6.5	-2.3	-4.7	-4.3	-3.8	-3.4	-3.2	-3.4	-3.5	-2.5	-0.3
8/30/2021	4:00:00 AM	43.2	46.6	49.7	49.3	50.8	48.4	51.2	46.9	46.5	46.2	46	47.9	47.5	46	40.5	39.8	37.8	36.2	34.1	32.2	30.7	29.4	26.9	22.9	16.2	7	-2.2	-4.4	-4.2	-3.8	-3.5	-3.3	-3.5	-3.5	-2.5	-0.3
8/30/2021	5:00:00 AM	42.6	42	43.2	43	43.8	42.8	42.9	43.5	40.9	40	43.5	44.1	43.2	43.1	40.5	39.6	36.7	36.8	36.9	34.2	33.4	33.5	31.5	27.2	20.6	11.6	1.3	-4.5	-4.5	-3.9	-3.1	-3.2	-3.5	-3.6	-2.6	-0.3
8/30/2021	6:00:00 AM	42.4	50.2	47.9	47.3	50.3	47.5	46.9	46.8	47	45.2	46	46.4	43.5	41.3	40.3	40.2	37.7	37.4	36.8	34.9	32.9	30.8	28.2	23.8	17.2	8.1	2.3	6.9	-1.1	0	0	-2	-3.1	-3.4	-2.4	-0.3
8/30/2021	7:00:00 AM	43.7	50.6	53.5	56.2	59.2	61.5	57.5	58	56.4	54.8	52	49.6	48.9	49.2	44.3	43.3	41.2	38.9	36	34.3	32.5	31	28.7	24	19	12.1	16.3	13.3	3.2	4	-1.6	-2.5	-3.2	-3.4	-2.4	-0.3
8/30/2021	8:00:00 AM	42.1	46.3	47.8	48.5	50.8	49.4	50.2	49.6	47.5	45	46	49.3	50.2	45.1	40.3	39.9	38.5	38.1	35.6	34.3	33.4	28.9	26.1	22.2	14.6	5.7	-3.2	-4.5	-4	-3.5	-3.2	-3	-3.3	-3.2	-2.2	-0.3
8/30/2021	9:00:00 AM	40.6	38.9	39.2	39.2	39.2	38.2	38.2	39.2	38.8	38.1	37.5	37.5	39.4	38.6	31.9	30.5	31.2	25.4	23.6	19.6	16.1	12.7	10.3	7.2	2.9	-2.1	-3.9	-3.7	-3.2	-2.7	-2.4	-2.3	-2.8	-2.5	-1.6	-0.1
8/30/2021	10:00:00 AM	50.6	48.8	46.6	44.4	44.4	41.8	40.8	41.5	41.6	41.1	41.2	39.5	37.2	35.6	33.4	31.2	26.3	22.9	22.2	18.5	15.8	13.8	11.2	7.4	2.9	0.2	1.6	-2	-1.8	-1.3	-1.3	-1.1	-1.9	-1.7	-0.9	0.2

WM10: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	12:46:29 PM	43.25197	9.597076	71.42562	32.69144	23.17073	21.5191
8/23/2021	1:00:00 PM	30.36554	7.38291	52.73042	30.10416	22.30747	21.32686
8/23/2021	2:00:00 PM	39.54553	10.55931	64.85386	36.22969	26.20946	21.87281
8/23/2021	3:00:00 PM	37.88363	7.610312	62.60125	34.46079	25.52434	21.69492
8/23/2021	4:00:00 PM	43.10703	9.334221	63.03672	39.51274	27.59731	22.37839
8/23/2021	5:00:00 PM	33.98943	13.59468	54.56388	35.75001	28.00674	23.41413
8/23/2021	6:00:00 PM	28.97363	8.641796	47.73241	31.79381	25.17905	21.95193
8/23/2021	7:00:00 PM	49.73689	7.727663	70.30139	39.11907	25.14578	21.54321
8/23/2021	8:00:00 PM	33.21817	2.667974	57.85056	32.29003	23.56947	21.39435
8/23/2021	9:00:00 PM	48.04649	0.59818	66.28904	43.05373	22.30716	21.35365
8/23/2021	10:00:00 PM	49.07716	4.493314	69.94448	41.02709	25.11769	21.63397
8/23/2021	11:00:00 PM	25.75864	2.950653	43.27107	29.60651	22.39294	21.36497
8/24/2021	12:00:00 AM	45.59879	3.013617	65.05795	34.35037	22.8919	21.39167
8/24/2021	1:00:00 AM	47.57832	0	67.52233	35.84695	21.96854	21.26255
8/24/2021	2:00:00 AM	38.84969	0	59.75322	39.30022	25.74409	21.27001
8/24/2021	3:00:00 AM	52.92588	13.61281	72.91738	56.98467	35.76337	25.36938
8/24/2021	4:00:00 AM	37.06007	15.14648	58.98173	37.62535	29.93341	23.94638
8/24/2021	5:00:00 AM	52.14553	17.81466	72.19172	43.12263	30.61624	24.98074
8/24/2021	6:00:00 AM	55.04624	16.6203	77.59458	45.51287	29.57381	24.33263
8/24/2021	7:00:00 AM	34.82316	19.55679	56.86539	36.6684	30.60084	26.05691
8/24/2021	8:00:00 AM	28.90798	11.0992	47.14837	32.29299	25.95327	22.61547
8/24/2021	9:00:00 AM	37.68118	8.670401	60.41396	35.72179	23.59963	21.73968
8/24/2021	10:00:00 AM	32.16916	6.105373	53.82291	34.42222	23.54551	21.38125
8/24/2021	11:00:00 AM	34.5958	6.256783	56.80924	34.42109	24.02435	21.37053
8/24/2021	12:00:00 PM	30.51712	5.86633	51.08615	33.28963	22.08091	21.34114
8/24/2021	1:00:00 PM	37.82388	6.967655	70.67338	29.18547	21.84918	21.33005
8/24/2021	2:00:00 PM	28.07917	6.170093	47.63425	31.73246	23.28183	21.31179
8/24/2021	3:00:00 PM	43.14402	8.320455	65.50548	33.71149	23.22334	21.48547
8/24/2021	4:00:00 PM	28.84919	8.069167	49.09626	30.51969	22.99572	21.37435
8/24/2021	5:00:00 PM	44.86444	7.239925	63.76063	45.52094	23.37242	21.42973
8/24/2021	6:00:00 PM	27.50652	9.65803	47.63134	30.2882	24.19109	21.78793
8/24/2021	7:00:00 PM	28.88421	4.125243	48.47384	31.96336	24.37866	21.59736
8/24/2021	8:00:00 PM	45.62794	1.872646	64.79067	39.33493	23.86352	21.39098
8/24/2021	9:00:00 PM	44.23113	0	62.59699	36.15682	22.49477	21.30229
8/24/2021	10:00:00 PM	51.67761	2.531596	73.49829	43.70388	23.39003	21.35265
8/24/2021	11:00:00 PM	24.47644	0	48.3445	24.1542	21.34496	21.24555
8/25/2021	12:00:00 AM	53.04734	2.237183	73.5547	39.47929	25.3792	21.56812
8/25/2021	1:00:00 AM	27.90808	0	51.11654	28.3803	22.1105	21.29802
8/25/2021	2:00:00 AM	19.13575	0	38.77065	24.14892	21.52574	21.28595
8/25/2021	3:00:00 AM	47.22742	0.814412	68.7042	39.91729	23.65568	21.47912

8/25/2021	4:00:00 AM	37.07271	12.72036	59.00873	34.20546	28.02777	23.9947
8/25/2021	5:00:00 AM	47.78192	19.71436	65.90803	43.5245	31.57882	27.03124
8/25/2021	6:00:00 AM	50.49319	21.99877	73.06584	43.90814	33.45419	28.47479
8/25/2021	7:00:00 AM	39.08859	20.91418	56.35554	40.5255	32.74004	27.98394
8/25/2021	8:00:00 AM	42.79998	13.13579	65.17173	39.51433	27.70431	23.19316
8/25/2021	9:00:00 AM	36.31396	7.997335	62.08368	33.01349	24.48722	21.93331
8/25/2021	10:00:00 AM	34.07782	5.983125	54.49963	33.88269	23.53052	21.42543
8/25/2021	11:00:00 AM	35.58672	5.372306	59.2175	33.5464	23.8359	21.31231
8/25/2021	12:00:00 PM	39.33324	5.822984	64.39341	31.82191	22.64446	21.35471
8/25/2021	1:00:00 PM	29.69537	7.351481	52.14708	30.03541	22.4937	21.44128
8/25/2021	2:00:00 PM	26.26019	6.30658	44.13901	30.01622	23.03606	21.40082
8/25/2021	3:00:00 PM	29.01658	5.830848	50.63203	31.03314	22.63445	21.37239
8/25/2021	4:00:00 PM	27.93884	7.049128	48.52219	30.96234	24.28103	21.61284
8/25/2021	5:00:00 PM	37.68043	9.53759	60.02794	35.31749	25.0506	21.97493
8/25/2021	6:00:00 PM	41.30441	10.69339	65.20637	33.00476	25.13771	22.23761
8/25/2021	7:00:00 PM	27.77238	1.035888	46.89451	30.20444	23.70536	21.38988
8/25/2021	8:00:00 PM	36.50382	0	60.65821	31.91089	22.5617	21.27768
8/25/2021	9:00:00 PM	46.37589	0	67.87826	33.6015	22.31659	21.27069
8/25/2021	10:00:00 PM	54.59287	1.477861	72.55762	55.12187	27.22575	21.59173
8/25/2021	11:00:00 PM	43.3174	0.388748	63.68424	32.15508	22.76473	21.34716
8/26/2021	12:00:00 AM	49.67481	0	70.08582	31.36255	21.76437	21.27045
8/26/2021	1:00:00 AM	29.0039	0	49.83433	31.80991	23.06173	21.25058
8/26/2021	2:00:00 AM	26.52733	0	44.93019	30.81043	22.1562	21.25883
8/26/2021	3:00:00 AM	43.99942	7.679922	66.81898	36.8792	26.52366	21.83785
8/26/2021	4:00:00 AM	38.38424	7.999452	61.60378	34.72589	27.57319	22.68046
8/26/2021	5:00:00 AM	41.08552	16.77384	67.37605	39.07029	31.02491	25.18174
8/26/2021	6:00:00 AM	46.34375	17.85173	66.58538	50.25993	33.91996	27.13599
8/26/2021	7:00:00 AM	45.60613	17.47792	66.33833	45.11058	32.77256	26.00366
8/26/2021	8:00:00 AM	39.01974	8.313197	56.90971	41.80785	26.98568	22.24141
8/26/2021	9:00:00 AM	28.6013	7.535449	49.20447	30.72571	22.66481	21.58032
8/26/2021	10:00:00 AM	32.28815	4.655127	51.55221	30.99678	22.76029	21.38629
8/26/2021	11:00:00 AM	38.78564	7.68585	59.76031	34.74377	23.07331	21.41728
8/26/2021	12:00:00 PM	34.15198	6.507297	59.21143	30.43621	22.36963	21.37309
8/26/2021	1:00:00 PM	32.79157	4.805309	56.70159	26.96505	21.83001	21.29787
8/26/2021	2:00:00 PM	25.03142	6.218682	46.10089	28.41122	22.25434	21.33535
8/26/2021	3:00:00 PM	29.85322	7.859014	49.72938	32.73136	24.0712	21.52419
8/26/2021	4:00:00 PM	36.92486	9.487899	63.04166	33.81071	25.5391	21.83575
8/26/2021	5:00:00 PM	30.25353	7.029084	54.16829	30.87023	24.27601	21.72008
8/26/2021	6:00:00 PM	25.21179	3.30448	47.08047	27.12994	21.86987	21.27661
8/26/2021	7:00:00 PM	30.42769	4.241555	53.65847	29.89338	23.46288	21.4234
8/26/2021	8:00:00 PM	41.14894	0.54815	63.76281	34.58524	24.99005	21.37972
8/26/2021	9:00:00 PM	38.64084	0.984569	61.52689	31.417	22.26896	21.31873
8/26/2021	10:00:00 PM	48.54982	4.511703	67.67195	43.62948	23.04356	21.46684

8/26/2021	11:00:00 PM	40.22091	0	58.84929	41.0369	21.91804	21.26883
8/27/2021	12:00:00 AM	26.91709	0.641811	42.95703	31.55323	22.53229	21.31188
8/27/2021	1:00:00 AM	32.75062	1.813358	54.09706	35.87996	23.588	21.37077
8/27/2021	2:00:00 AM	55.85004	0.951564	73.45936	48.01642	24.33948	21.34977
8/27/2021	3:00:00 AM	48.59318	0	69.86778	35.02207	23.17108	21.31687
8/27/2021	4:00:00 AM	39.3439	11.72429	63.45065	34.37697	27.74778	23.11147
8/27/2021	5:00:00 AM	49.7706	17.20576	67.26854	50.83517	32.70719	25.18772
8/27/2021	6:00:00 AM	50.94933	4.037331	69.94881	45.41069	29.2389	21.84076
8/27/2021	7:00:00 AM	45.70702	10.53551	70.66321	34.51554	25.69679	22.17928
8/27/2021	8:00:00 AM	34.24442	8.480998	54.5849	34.49912	24.58314	21.76064
8/27/2021	9:00:00 AM	35.85459	7.07151	55.17024	37.78507	23.18132	21.57116
8/27/2021	10:00:00 AM	37.5271	6.765234	58.45959	33.90513	22.68823	21.48645
8/27/2021	11:00:00 AM	39.07475	6.607847	61.47065	33.45616	23.04383	21.38526
8/27/2021	12:00:00 PM	27.85144	5.892983	52.17829	25.76807	21.61195	21.30055
8/27/2021	1:00:00 PM	40.20946	6.718193	71.30957	33.58671	22.99605	21.36899
8/27/2021	2:00:00 PM	29.09756	7.049923	49.63247	32.38278	23.35678	21.40689
8/27/2021	3:00:00 PM	39.81178	5.945326	64.28249	32.90979	23.03931	21.32689
8/27/2021	4:00:00 PM	27.22323	5.281282	46.45497	30.27485	22.52335	21.31415
8/27/2021	5:00:00 PM	35.66259	5.043738	55.34854	31.39243	22.43778	21.3443
8/27/2021	6:00:00 PM	46.86722	5.652187	65.88675	37.65561	23.28392	21.3986
8/27/2021	7:00:00 PM	46.02927	6.278686	67.01302	36.16634	25.26688	21.63889
8/27/2021	8:00:00 PM	37.33689	1.306202	61.69233	31.93777	23.36775	21.31261
8/27/2021	9:00:00 PM	44.81053	6.092792	66.1188	33.95569	23.49282	21.48932
8/27/2021	10:00:00 PM	51.73325	1.223164	71.96749	38.4975	24.21345	21.43342
8/27/2021	11:00:00 PM	23.77067	0	44.59493	27.65871	21.64198	21.26718
8/28/2021	12:00:00 AM	53.96422	0	73.49235	40.93734	22.28217	21.29877
8/28/2021	1:00:00 AM	54.67242	0	74.71508	39.92908	22.273	21.30755
8/28/2021	2:00:00 AM	36.38823	0	63.34221	27.90567	21.68096	21.29475
8/28/2021	3:00:00 AM	49.22832	3.219366	71.62672	30.9771	22.11402	21.3288
8/28/2021	4:00:00 AM	21.54315	4.662309	38.5892	26.17709	21.85372	21.33482
8/28/2021	5:00:00 AM	25.55019	7.488256	44.21317	28.29375	23.31957	21.55333
8/28/2021	6:00:00 AM	31.89517	6.300309	56.22	30.60427	23.51789	21.4474
8/28/2021	7:00:00 AM	38.06287	7.602203	55.89479	33.37305	23.40087	21.56208
8/28/2021	8:00:00 AM	27.84812	6.654659	50.76583	26.06032	22.06399	21.52386
8/28/2021	9:00:00 AM	38.24847	7.849552	59.82432	29.7605	22.38174	21.64462
8/28/2021	10:00:00 AM	40.67767	3.882834	59.89513	38.85439	21.59754	21.25031
8/28/2021	11:00:00 AM	27.98765	4.985562	52.85449	24.48912	21.46664	21.26259
8/28/2021	12:00:00 PM	34.45326	6.080008	54.30892	27.71122	21.5969	21.27316
8/28/2021	1:00:00 PM	20.47463	5.376258	41.97785	23.71897	21.50357	21.27096
8/28/2021	2:00:00 PM	43.85335	4.515726	70.1532	26.5992	21.38884	21.24758
8/28/2021	3:00:00 PM	19.56554	4.565028	49.48091	22.3765	21.31137	21.24665
8/28/2021	4:00:00 PM	22.21073	3.577061	52.97349	24.05618	21.30726	21.23966
8/28/2021	5:00:00 PM	41.17301	3.350383	60.50231	33.22697	21.31616	21.24235

8/28/2021	6:00:00 PM	16.69661	2.484197	39.3383	22.08046	21.25789	21.23759
8/28/2021	7:00:00 PM	45.93159	0	67.8625	32.81355	22.05975	21.24068
8/28/2021	8:00:00 PM	25.7371	0	48.79683	28.75578	22.3213	21.27768
8/28/2021	9:00:00 PM	49.57476	5.460422	68.95069	42.03686	24.35565	21.60007
8/28/2021	10:00:00 PM	24.21577	0	43.8129	28.05663	22.06123	21.27571
8/28/2021	11:00:00 PM	19.65921	0	42.03269	23.9106	21.34225	21.2515
8/29/2021	12:00:00 AM	40.86049	0	70.08542	23.43772	21.33577	21.2544
8/29/2021	1:00:00 AM	45.47421	0	66.52082	25.38809	21.32501	21.25955
8/29/2021	2:00:00 AM	12.49621	0	37.3716	21.57715	21.32406	21.26613
8/29/2021	3:00:00 AM	28.0254	0	52.96121	22.66637	21.33039	21.26419
8/29/2021	4:00:00 AM	19.90575	0.781045	37.66067	24.5269	21.60344	21.29838
8/29/2021	5:00:00 AM	49.9405	4.573479	69.59203	52.63379	25.69793	21.68094
8/29/2021	6:00:00 AM	54.72296	10.04192	72.83351	48.06108	27.35625	22.28787
8/29/2021	7:00:00 AM	28.74631	9.597839	48.04028	31.97787	24.9627	21.92208
8/29/2021	8:00:00 AM	37.64393	10.73852	57.05464	35.39508	24.55722	22.16868
8/29/2021	9:00:00 AM	21.77315	7.744063	41.01957	25.69065	22.091	21.58667
8/29/2021	10:00:00 AM	36.50633	5.066717	56.36754	28.36264	21.86597	21.36871
8/29/2021	11:00:00 AM	23.91944	4.892884	43.90469	27.23388	21.73745	21.31438
8/29/2021	12:00:00 PM	23.86402	4.753232	47.46841	26.90112	21.41061	21.24379
8/29/2021	1:00:00 PM	39.012	5.301024	61.86064	28.20935	21.34881	21.24224
8/29/2021	2:00:00 PM	26.28905	4.993587	52.34158	26.3053	21.44407	21.25158
8/29/2021	3:00:00 PM	38.6159	4.954585	57.13191	30.75793	21.72335	21.26648
8/29/2021	4:00:00 PM	42.09762	4.924898	62.14093	35.10193	21.69386	21.25602
8/29/2021	5:00:00 PM	38.69196	4.428076	57.71399	29.93608	21.4607	21.24046
8/29/2021	6:00:00 PM	29.97714	2.907014	54.92382	27.51434	21.74418	21.24243
8/29/2021	7:00:00 PM	27.40865	0	48.96114	28.00136	22.0141	21.24798
8/29/2021	8:00:00 PM	48.49845	0	68.96112	38.30991	22.13446	21.24917
8/29/2021	9:00:00 PM	26.17604	0	44.70094	30.35698	22.58841	21.28659
8/29/2021	10:00:00 PM	23.19338	0	42.11934	27.31429	21.47251	21.25107
8/29/2021	11:00:00 PM	25.17002	2.271655	43.61145	29.66614	22.36531	21.35892
8/30/2021	12:00:00 AM	44.05294	1.847452	64.62431	37.61543	22.7603	21.34214
8/30/2021	1:00:00 AM	53.25018	0	72.23606	37.74112	23.98805	21.26484
8/30/2021	2:00:00 AM	53.7482	0.926121	74.57202	34.78076	23.00974	21.34224
8/30/2021	3:00:00 AM	26.57431	3.000804	47.88234	30.14323	23.07584	21.39471
8/30/2021	4:00:00 AM	40.60263	7.89616	61.78279	38.14005	28.81613	22.29661
8/30/2021	5:00:00 AM	32.30051	16.60442	52.12675	34.73408	28.65148	24.55155
8/30/2021	6:00:00 AM	48.20655	15.51765	69.16964	42.68098	31.6398	25.71615
8/30/2021	7:00:00 AM	53.18107	18.51944	69.46662	57.45584	34.53124	26.76219
8/30/2021	8:00:00 AM	43.54123	12.37912	63.99508	46.93377	33.10395	23.91041
8/30/2021	9:00:00 AM	40.70593	9.15209	56.01875	45.2406	30.24213	22.61609
8/30/2021	10:00:00 AM	36.05487	8.197107	52.09468	39.57233	26.08283	21.682
8/30/2021	11:00:00 AM	31.76155	9.403469	49.19795	35.007	26.80308	21.98454
8/30/2021	12:00:00 PM	33.3091	7.411391	51.4844	36.8014	26.03559	21.62324

8/30/2021	1:00:00 PM	44.20907	10.70648	63.72389	47.99494	30.66357	22.65581
8/30/2021	2:00:00 PM	43.66768	14.59983	64.28581	45.0661	34.64885	25.71384
8/30/2021	3:00:00 PM	40.27971	18.57503	63.48865	42.36096	33.34147	26.28081
8/30/2021	4:00:00 PM	36.05812	18.82709	53.90119	39.68912	31.89843	25.6771
8/30/2021	5:00:00 PM	42.15589	13.94011	64.21657	36.8852	27.71923	23.26003
8/30/2021	6:00:00 PM	26.86063	7.068578	46.94277	28.77137	23.46687	21.57506
8/30/2021	7:00:00 PM	28.84145	7.111865	49.42933	32.33373	24.61357	21.61093
8/30/2021	8:00:00 PM	43.29524	1.699272	63.81348	36.52636	25.03064	21.38282
8/30/2021	9:00:00 PM	22.73767	0	43.19066	26.32835	21.57206	21.25666
8/30/2021	10:00:00 PM	43.29031	0	64.84409	34.70074	23.38437	21.36442
8/30/2021	11:00:00 PM	50.53092	0	70.73821	38.26882	24.97505	21.25669
8/31/2021	12:00:00 AM	28.49923	0	54.43915	30.86309	22.75908	21.25846
8/31/2021	1:00:00 AM	54.18638	3.908874	72.98443	53.55003	25.95093	21.49032
8/31/2021	2:00:00 AM	45.68976	1.87174	66.01223	37.30388	24.18251	21.44167
8/31/2021	3:00:00 AM	50.52622	6.42409	70.88622	36.2623	26.51952	21.61987
8/31/2021	4:00:00 AM	35.67254	11.61916	58.49158	35.37132	29.0857	23.344
8/31/2021	5:00:00 AM	37.9397	15.17863	63.15689	38.40379	31.8239	26.52161
8/31/2021	6:00:00 AM	38.96626	15.49833	64.51025	37.13011	29.84785	24.82567
8/31/2021	7:00:00 AM	49.01084	18.99318	67.10956	43.80955	32.04361	26.71601
8/31/2021	8:00:00 AM	36.23388	14.63165	55.28901	38.32463	29.46749	23.98442
8/31/2021	9:00:00 AM	39.40723	12.06109	57.54162	39.34329	27.98777	22.72789
8/31/2021	10:00:00 AM	34.42032	6.59571	53.27561	35.59586	25.88143	21.53577
8/31/2021	11:00:00 AM	38.57492	7.211406	56.64535	40.77424	27.92686	21.76007
8/31/2021	12:00:00 PM	41.20985	6.781699	65.53836	32.57751	23.61892	21.47574
8/31/2021	1:00:00 PM	30.67629	6.11336	52.24362	31.9302	22.33017	21.34596
8/31/2021	2:00:00 PM	30.78781	5.828617	52.51457	31.90639	23.689	21.47087
8/31/2021	3:00:00 PM	37.7659	6.481519	58.5977	32.39447	23.35254	21.48452
8/31/2021	4:00:00 PM	30.91885	10.61614	49.54131	33.85766	25.54181	22.05379
8/31/2021	5:00:00 PM	29.02839	8.00907	52.12103	30.82813	23.70375	21.6055
8/31/2021	6:00:00 PM	27.32226	3.884863	49.16453	28.76684	21.98583	21.27611
8/31/2021	7:00:00 PM	41.3086	3.2017	61.6541	31.63244	23.18769	21.43277
8/31/2021	8:00:00 PM	46.01033	3.907912	65.15578	36.41361	23.33043	21.46232
8/31/2021	9:00:00 PM	42.45214	2.981598	63.323	35.75891	24.26648	21.4939
8/31/2021	10:00:00 PM	26.23592	0	46.27528	29.75159	22.03106	21.3026
8/31/2021	11:00:00 PM	24.76176	0	44.46394	28.08768	23.12424	21.33399
9/1/2021	12:00:00 AM	52.11684	4.337281	71.86771	35.44209	24.26119	21.46609
9/1/2021	1:00:00 AM	52.17427	0	73.68834	36.05061	22.60115	21.24392
9/1/2021	2:00:00 AM	48.0644	0	68.65608	31.87316	22.2817	21.25722
9/1/2021	3:00:00 AM	53.07896	2.713003	72.7898	53.47927	26.02034	21.65467
9/1/2021	4:00:00 AM	36.83535	4.290722	59.15344	33.98409	26.16192	21.6528
9/1/2021	5:00:00 AM	36.8642	18.80552	56.67944	38.82944	32.15665	27.1966
9/1/2021	6:00:00 AM	41.31579	13.42137	63.06947	39.17169	30.08831	23.9984
9/1/2021	7:00:00 AM	37.4817	17.22209	59.51113	37.87595	29.40276	24.99753

9/1/2021	8:00:00 AM	40.16849	13.41953	58.74841	40.1197	26.62752	22.85723
9/1/2021	9:00:00 AM	24.03083	6.257907	40.06274	28.64374	22.26297	21.49295
9/1/2021	10:00:00 AM	36.45812	6.267404	57.99386	35.02065	22.57078	21.38702
9/1/2021	11:00:00 AM	39.21978	5.359124	61.17146	33.03306	22.0166	21.3193
9/1/2021	12:00:00 PM	35.51262	6.275231	57.63209	34.83863	22.47887	21.3164
9/1/2021	1:00:00 PM	34.09288	6.832518	56.42494	36.48454	25.33316	21.44663
9/1/2021	2:00:00 PM	35.08205	10.17198	55.51454	38.11983	26.86612	22.15748
9/1/2021	3:00:00 PM	36.67089	6.073725	59.35351	33.77921	22.68179	21.3141
9/1/2021	4:00:00 PM	31.40233	5.844229	60.13221	27.68022	21.96917	21.28762
9/1/2021	5:00:00 PM	44.25769	5.170131	66.46175	30.80477	22.3992	21.33284
9/1/2021	6:00:00 PM	45.49504	4.059219	65.15136	33.06551	22.47652	21.30628
9/1/2021	7:00:00 PM	52.4774	7.42563	71.42047	50.79026	24.69768	21.57432
9/1/2021	8:00:00 PM	34.77876	2.592164	58.3402	29.32606	22.68479	21.36923
9/1/2021	9:00:00 PM	22.32143	0	39.80117	26.79691	21.99069	21.30871
9/1/2021	10:00:00 PM	38.70361	0	62.92585	32.17879	24.33479	21.70119
9/1/2021	11:00:00 PM	25.08344	7.07756	42.04695	29.23262	23.91489	21.6992
9/2/2021	12:00:00 AM	52.88786	7.952916	70.77272	46.72145	27.2903	22.02883
9/2/2021	1:00:00 AM	27.34393	0.411301	51.5668	28.66485	22.41959	21.37648
9/2/2021	2:00:00 AM	28.36809	3.146776	47.86489	31.29804	24.40915	21.55298
9/2/2021	3:00:00 AM	42.38878	0	64.55782	32.80794	24.31928	21.48612
9/2/2021	4:00:00 AM	48.7579	10.0336	69.98584	39.91924	29.52721	23.47742
9/2/2021	5:00:00 AM	44.5731	18.29016	65.77884	40.0454	29.68342	25.34591
9/2/2021	6:00:00 AM	50.2085	14.8984	78.83848	38.44115	29.03595	24.35502
9/2/2021	7:00:00 AM	48.68177	18.37093	71.0359	44.51785	31.65513	26.19735
9/2/2021	8:00:00 AM	37.63219	11.54147	56.40332	38.81218	28.6658	22.96938
9/2/2021	9:00:00 AM	32.79821	8.519863	57.25754	34.93052	24.22467	21.93735
9/2/2021	10:00:00 AM	31.91652	3.932271	52.85861	33.0566	23.30609	21.35418
9/2/2021	11:00:00 AM	30.53243	5.843601	51.4261	30.22021	22.45122	21.30867
9/2/2021	12:00:00 PM	37.85333	6.063373	57.82004	36.65737	23.12895	21.34664
9/2/2021	1:00:00 PM	28.78243	6.463516	53.37472	28.51222	21.86289	21.32867
9/2/2021	2:00:00 PM	29.15245	6.366419	53.38708	30.96675	23.7536	21.44206
9/2/2021	3:00:00 PM	40.55274	6.109484	58.24634	43.11681	24.14252	21.39265
9/2/2021	4:00:00 PM	41.43589	7.386938	63.07179	40.778	28.64646	22.31265
9/2/2021	5:00:00 PM	43.80413	15.04091	66.62189	42.73081	31.93564	24.3617
9/2/2021	6:00:00 PM	28.03199	7.937293	46.69452	30.8858	23.44875	21.61123
9/2/2021	7:00:00 PM	43.29528	7.219972	66.00954	30.78996	23.391	21.641
9/2/2021	8:00:00 PM	32.74173	0.556053	57.82638	30.47646	23.51356	21.41054
9/2/2021	9:00:00 PM	21.56096	3.247692	37.18035	24.53511	21.23333	21.23333
9/2/2021	10:00:00 PM	24.83922	6.128386	50.02157	26.72625	22.54496	21.52833
9/2/2021	11:00:00 PM	23.46026	0	44.23149	26.58278	21.65836	21.27346
9/3/2021	12:00:00 AM	54.71287	6.397996	70.63642	58.92748	27.25003	21.66139
9/3/2021	1:00:00 AM	29.59891	0	58.30572	23.45811	21.45855	21.23333

WM10: Overall Hourly Intervals – C-Weighted							
Date	Time	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
8/23/2021	12:46:29 PM	52.88796	28.30803	75.08404	53.00363	42.64061	34.73105
8/23/2021	1:00:00 PM	50.38782	23.14024	74.41432	50.61748	37.37321	30.01749
8/23/2021	2:00:00 PM	57.33035	27.35295	80.02456	58.01201	45.51752	35.85968
8/23/2021	3:00:00 PM	58.3362	25.94124	82.4351	57.18784	43.541	34.96417
8/23/2021	4:00:00 PM	64.38737	27.35649	81.96398	64.87523	50.16595	37.90238
8/23/2021	5:00:00 PM	58.66141	29.29219	75.58659	62.39177	50.84345	39.9645
8/23/2021	6:00:00 PM	56.6624	26.14138	76.54983	59.93482	47.78689	37.30873
8/23/2021	7:00:00 PM	65.68065	25.13562	85.21209	58.30144	40.32228	33.48377
8/23/2021	8:00:00 PM	50.13298	24.62595	74.8204	46.99909	37.27808	31.30437
8/23/2021	9:00:00 PM	66.10188	23.78904	83.8315	61.07746	38.17267	31.35911
8/23/2021	10:00:00 PM	63.55802	23.26072	82.23585	58.47665	39.39413	31.70611
8/23/2021	11:00:00 PM	40.26711	25.23424	55.1385	43.96591	36.10405	31.37193
8/24/2021	12:00:00 AM	61.66278	24.33431	81.07067	51.93439	36.49032	31.25226
8/24/2021	1:00:00 AM	62.94073	20.6469	86.41504	52.35773	33.81888	28.17001
8/24/2021	2:00:00 AM	58.6575	21.39814	79.26425	60.11445	41.36979	29.20513
8/24/2021	3:00:00 AM	71.20401	32.11098	87.51491	76.06951	53.72626	41.90881
8/24/2021	4:00:00 AM	52.79536	30.25336	77.20345	50.10299	42.632	36.83867
8/24/2021	5:00:00 AM	65.31772	32.54047	84.66657	60.10177	44.76551	39.21072
8/24/2021	6:00:00 AM	67.26772	31.95968	87.54364	63.70864	47.03934	38.51166
8/24/2021	7:00:00 AM	53.51478	35.36485	75.77965	54.3636	47.55474	41.51109
8/24/2021	8:00:00 AM	48.39315	29.95979	67.60865	50.33924	43.23422	37.01207
8/24/2021	9:00:00 AM	56.7489	30.35375	77.91564	53.74217	42.17871	36.56251
8/24/2021	10:00:00 AM	49.51659	27.79548	72.66401	50.67148	40.57723	34.01183
8/24/2021	11:00:00 AM	56.7951	24.64982	79.66828	53.149	41.92721	32.93551
8/24/2021	12:00:00 PM	49.81274	22.39257	70.66407	51.52177	38.89109	31.06454
8/24/2021	1:00:00 PM	49.79938	23.0241	75.37541	49.56033	37.02159	30.25513
8/24/2021	2:00:00 PM	49.77088	22.85183	68.71731	52.47714	40.93244	30.77101
8/24/2021	3:00:00 PM	63.41948	25.75994	85.91939	57.4796	41.40068	33.15722
8/24/2021	4:00:00 PM	51.26075	25.22004	70.82543	53.45709	41.75669	33.64764
8/24/2021	5:00:00 PM	65.88588	25.05248	83.46699	68.09848	41.7961	33.53973
8/24/2021	6:00:00 PM	55.08684	26.04157	74.76862	58.02099	46.16899	36.24483
8/24/2021	7:00:00 PM	50.41373	22.24627	72.4409	51.90326	40.13739	33.05148
8/24/2021	8:00:00 PM	62.28268	20.98038	82.43845	57.25989	39.73024	31.59139
8/24/2021	9:00:00 PM	64.40813	22.2426	84.12936	54.05058	36.36977	29.93461
8/24/2021	10:00:00 PM	65.86545	25.15693	86.27098	60.27972	40.3274	32.39553
8/24/2021	11:00:00 PM	37.57817	20.23522	58.51283	38.61516	31.11586	27.33313
8/25/2021	12:00:00 AM	67.3259	23.64404	87.67381	58.37048	40.17306	32.13989
8/25/2021	1:00:00 AM	40.84231	22.15201	64.082	41.56321	34.36405	29.53639
8/25/2021	2:00:00 AM	34.9611	23.48269	48.50923	37.8801	33.52889	29.92595
8/25/2021	3:00:00 AM	62.96225	23.88203	82.14959	57.72579	39.41593	32.29129

8/25/2021	4:00:00 AM	51.62855	29.65837	74.36682	47.06306	40.18946	35.94296
8/25/2021	5:00:00 AM	65.07948	34.8446	84.5491	60.56173	45.6585	40.79254
8/25/2021	6:00:00 AM	64.29414	35.86913	84.37987	59.42083	46.70592	41.86356
8/25/2021	7:00:00 AM	62.1379	37.85622	81.13689	60.74422	49.12314	44.25931
8/25/2021	8:00:00 AM	64.71911	34.13436	86.39867	60.52182	47.24239	41.16813
8/25/2021	9:00:00 AM	52.85405	30.216	75.49836	53.31848	43.465	37.24224
8/25/2021	10:00:00 AM	57.70712	26.21407	77.2226	53.89582	42.37632	34.52589
8/25/2021	11:00:00 AM	53.63406	23.0259	76.84766	53.35138	42.48588	32.23593
8/25/2021	12:00:00 PM	58.59468	22.16297	83.49634	51.05144	40.26881	31.62345
8/25/2021	1:00:00 PM	51.31601	24.80636	72.81939	52.08013	40.11126	32.55882
8/25/2021	2:00:00 PM	48.8423	24.96913	67.42028	51.85457	40.71031	32.17301
8/25/2021	3:00:00 PM	51.86029	22.71073	75.72177	51.99134	40.78214	32.41673
8/25/2021	4:00:00 PM	53.16432	24.54553	73.82546	56.0816	43.19492	34.8403
8/25/2021	5:00:00 PM	60.95953	27.84656	84.18613	61.22353	48.25265	37.77845
8/25/2021	6:00:00 PM	60.81063	28.50068	83.68223	60.16385	48.23369	38.28527
8/25/2021	7:00:00 PM	47.04163	21.59695	69.78744	48.76337	38.41276	31.03319
8/25/2021	8:00:00 PM	51.57555	21.55266	74.76159	47.37343	37.18771	29.70443
8/25/2021	9:00:00 PM	61.73336	20.98374	82.40146	50.54344	36.23292	29.30706
8/25/2021	10:00:00 PM	67.75353	23.0053	85.88978	70.38546	43.64133	33.20085
8/25/2021	11:00:00 PM	59.8736	24.14308	78.94128	49.2481	38.10611	31.45039
8/26/2021	12:00:00 AM	66.66855	20.77262	87.07736	51.32548	35.55578	29.16894
8/26/2021	1:00:00 AM	42.48721	20.01134	63.20581	43.21947	34.27097	27.79901
8/26/2021	2:00:00 AM	38.99453	19.33292	58.83739	42.74643	33.27819	27.41923
8/26/2021	3:00:00 AM	57.93068	28.00088	80.18557	52.61379	40.04289	34.49427
8/26/2021	4:00:00 AM	54.19947	26.80828	78.22562	48.20957	40.01276	34.1706
8/26/2021	5:00:00 AM	53.18271	31.66205	74.87779	54.00066	44.45633	38.08715
8/26/2021	6:00:00 AM	61.21109	34.0328	77.36488	67.06789	49.392	41.10342
8/26/2021	7:00:00 AM	63.41365	35.71719	82.50266	63.86995	49.26006	42.77323
8/26/2021	8:00:00 AM	58.31707	30.92781	76.43685	60.04612	44.66424	37.52298
8/26/2021	9:00:00 AM	49.70937	29.70066	73.16277	50.59304	40.75244	35.83673
8/26/2021	10:00:00 AM	54.82972	26.67753	75.24316	51.14928	41.90586	35.19732
8/26/2021	11:00:00 AM	62.40013	27.11943	84.31283	56.08411	41.44871	34.05492
8/26/2021	12:00:00 PM	57.6013	24.74656	80.27304	53.15939	40.64871	32.40584
8/26/2021	1:00:00 PM	56.92867	21.59274	81.06769	49.47338	37.73707	29.70214
8/26/2021	2:00:00 PM	50.5202	22.89843	72.49903	53.18888	40.1839	30.56037
8/26/2021	3:00:00 PM	56.97143	25.7221	76.74827	59.64316	45.8954	35.08585
8/26/2021	4:00:00 PM	60.13764	28.13582	83.59802	62.02352	49.70746	38.07703
8/26/2021	5:00:00 PM	55.02487	27.40621	76.7558	57.40104	45.42304	36.81765
8/26/2021	6:00:00 PM	45.72645	19.98152	66.56929	47.82172	37.05285	30.19379
8/26/2021	7:00:00 PM	45.42152	20.6811	71.75999	44.0685	37.20878	30.59431
8/26/2021	8:00:00 PM	57.86182	23.27234	80.50402	49.36446	38.64851	31.60303
8/26/2021	9:00:00 PM	52.96211	23.35944	76.12742	45.39686	35.55214	30.118
8/26/2021	10:00:00 PM	64.68203	28.25448	83.81727	60.20853	41.57333	35.58204

8/26/2021	11:00:00 PM	62.98721	22.41301	81.78744	58.2853	36.73297	29.26421
8/27/2021	12:00:00 AM	39.64559	23.21521	55.92765	43.09524	36.16183	30.22329
8/27/2021	1:00:00 AM	54.84092	25.47242	72.6807	60.87502	41.37658	32.34108
8/27/2021	2:00:00 AM	67.58464	25.60881	86.43757	67.19142	40.77511	32.49725
8/27/2021	3:00:00 AM	62.287	24.38781	82.06855	50.95228	36.90175	31.06505
8/27/2021	4:00:00 AM	50.66513	27.99137	73.70439	46.98039	40.35675	35.15798
8/27/2021	5:00:00 AM	66.06063	31.53974	84.80437	66.49289	45.85682	37.90909
8/27/2021	6:00:00 AM	67.0451	28.25287	85.89224	60.55805	43.24378	35.83709
8/27/2021	7:00:00 AM	50.948	30.9698	80.92491	49.98023	41.8926	36.69731
8/27/2021	8:00:00 AM	51.35444	30.71275	70.22685	50.5397	41.89514	36.39039
8/27/2021	9:00:00 AM	54.20526	29.60698	73.3493	57.36503	41.23957	35.79796
8/27/2021	10:00:00 AM	58.58035	27.1163	79.50508	53.53406	40.56604	34.74381
8/27/2021	11:00:00 AM	61.25667	24.83453	82.27793	54.41095	41.36822	32.89579
8/27/2021	12:00:00 PM	51.87383	24.10645	76.34241	47.47157	35.62867	30.19076
8/27/2021	1:00:00 PM	59.23958	23.84294	82.08269	53.5189	39.59949	30.83949
8/27/2021	2:00:00 PM	50.26028	24.33032	71.59919	52.32811	39.99997	31.7924
8/27/2021	3:00:00 PM	59.31426	22.68104	83.95517	54.57279	41.22654	31.19691
8/27/2021	4:00:00 PM	49.48674	23.12279	70.47464	51.9247	39.45283	31.32041
8/27/2021	5:00:00 PM	62.28698	22.81798	82.63197	53.46544	40.58861	32.92401
8/27/2021	6:00:00 PM	64.47113	25.30248	83.26475	55.97715	39.9915	32.95932
8/27/2021	7:00:00 PM	60.98404	25.34484	83.37965	50.77183	39.79861	33.92574
8/27/2021	8:00:00 PM	48.2538	21.82221	72.17146	44.62646	35.94049	29.26991
8/27/2021	9:00:00 PM	59.8559	23.50852	82.59879	50.00456	35.74103	30.42549
8/27/2021	10:00:00 PM	62.02565	22.73985	81.15289	53.45997	38.24294	31.70757
8/27/2021	11:00:00 PM	38.44363	20.80872	59.04105	42.14338	33.24042	28.25752
8/28/2021	12:00:00 AM	65.20356	22.95611	84.59337	59.12172	38.05077	29.9282
8/28/2021	1:00:00 AM	66.42327	23.93988	87.23521	56.8369	37.0214	31.04994
8/28/2021	2:00:00 AM	55.75659	23.28109	82.82113	43.02198	33.80307	29.86225
8/28/2021	3:00:00 AM	62.31838	25.18495	84.35573	45.92936	34.53446	31.05705
8/28/2021	4:00:00 AM	35.27502	24.52334	51.06146	38.11612	33.70091	30.41448
8/28/2021	5:00:00 AM	39.97172	26.97033	57.98286	42.09018	36.4898	32.631
8/28/2021	6:00:00 AM	42.4668	26.87967	64.04984	43.47976	37.08643	32.94588
8/28/2021	7:00:00 AM	59.99763	28.9651	78.88417	53.79367	40.14707	34.95965
8/28/2021	8:00:00 AM	50.93947	27.29015	74.1453	45.9608	38.05371	34.0844
8/28/2021	9:00:00 AM	59.90009	26.91911	80.90346	49.68198	39.43459	34.80917
8/28/2021	10:00:00 AM	64.51646	21.60965	83.11065	62.32866	36.66692	29.10104
8/28/2021	11:00:00 AM	48.24277	21.28525	73.18125	45.26408	34.63092	28.33776
8/28/2021	12:00:00 PM	57.41356	22.29132	77.838	49.73898	36.34315	29.03729
8/28/2021	1:00:00 PM	42.95018	21.10975	64.63146	45.30973	34.4176	28.45258
8/28/2021	2:00:00 PM	58.93976	20.1308	85.34314	47.36798	32.82496	26.93638
8/28/2021	3:00:00 PM	40.53284	20.11916	64.93957	42.69421	32.39651	27.67081
8/28/2021	4:00:00 PM	41.09418	19.10535	63.36179	43.72243	32.38442	26.86687
8/28/2021	5:00:00 PM	62.69547	19.30289	80.82482	53.48274	34.12194	28.06131

8/28/2021	6:00:00 PM	34.39865	18.58779	56.07475	36.42756	30.90661	26.80367
8/28/2021	7:00:00 PM	61.13058	19.25462	84.15139	48.52841	34.57953	27.53974
8/28/2021	8:00:00 PM	39.03938	17.53808	60.4953	42.1098	34.16038	27.46965
8/28/2021	9:00:00 PM	65.55589	25.28807	84.20046	58.37128	38.84995	32.5817
8/28/2021	10:00:00 PM	37.29391	20.97011	55.10838	40.85105	33.57525	28.40521
8/28/2021	11:00:00 PM	36.34339	21.01116	57.07992	38.84935	31.98541	27.97244
8/29/2021	12:00:00 AM	52.63554	21.0212	78.32133	40.37947	31.36364	28.01154
8/29/2021	1:00:00 AM	61.93842	23.13963	82.75387	42.35261	33.52583	29.83925
8/29/2021	2:00:00 AM	34.63301	24.22081	48.17684	37.41788	33.70069	30.46739
8/29/2021	3:00:00 AM	49.70006	22.8658	73.65659	39.84052	32.83657	29.1463
8/29/2021	4:00:00 AM	36.98701	24.1897	52.8099	39.02671	34.1192	30.50743
8/29/2021	5:00:00 AM	66.62557	28.826	84.08141	70.28305	44.39583	35.82355
8/29/2021	6:00:00 AM	68.96631	30.61631	88.23384	65.03542	44.49374	37.16705
8/29/2021	7:00:00 AM	43.84832	30.4811	62.02744	46.90645	40.63687	36.30549
8/29/2021	8:00:00 AM	61.46031	33.0716	81.71173	56.15217	44.20475	39.2464
8/29/2021	9:00:00 AM	41.6354	31.07575	56.23119	44.30344	40.12612	36.65826
8/29/2021	10:00:00 AM	59.57499	27.36168	78.92702	48.55361	39.62227	34.00235
8/29/2021	11:00:00 AM	44.2614	25.84843	64.47799	46.11365	37.43037	32.32193
8/29/2021	12:00:00 PM	42.87474	20.09915	65.66746	45.72873	34.72863	27.79716
8/29/2021	1:00:00 PM	61.57431	19.17671	83.12946	49.28579	32.18178	26.70528
8/29/2021	2:00:00 PM	47.29846	20.17196	72.6248	44.93255	33.86233	27.77196
8/29/2021	3:00:00 PM	60.83129	20.80772	81.62585	55.38699	38.7562	28.94551
8/29/2021	4:00:00 PM	64.30063	19.28308	83.93768	56.80652	35.63457	27.83065
8/29/2021	5:00:00 PM	62.10828	18.683	81.21746	47.5183	33.92235	26.84651
8/29/2021	6:00:00 PM	48.89749	16.26376	75.17789	44.55107	33.73503	26.64339
8/29/2021	7:00:00 PM	42.07283	17.27448	62.04193	44.27721	34.28347	26.99141
8/29/2021	8:00:00 PM	64.12479	16.58222	84.09156	57.68303	35.71008	26.31098
8/29/2021	9:00:00 PM	39.96073	19.82721	62.41043	43.39664	34.2044	27.71948
8/29/2021	10:00:00 PM	38.54463	18.97071	55.92604	42.45246	33.25669	27.54686
8/29/2021	11:00:00 PM	40.84587	24.04982	55.22571	44.91036	36.3692	31.16123
8/30/2021	12:00:00 AM	61.3844	23.54825	80.55562	53.90355	36.85162	30.92052
8/30/2021	1:00:00 AM	64.58373	20.68667	84.73481	54.32524	37.53591	28.69573
8/30/2021	2:00:00 AM	64.74083	22.57471	84.8068	50.91144	35.96874	30.12138
8/30/2021	3:00:00 AM	40.00383	25.82393	60.80505	42.26433	36.77655	32.28415
8/30/2021	4:00:00 AM	59.62468	29.98126	80.22404	53.3947	42.64162	36.97079
8/30/2021	5:00:00 AM	45.30197	31.35552	64.46518	47.45147	41.88303	37.55179
8/30/2021	6:00:00 AM	62.14834	32.90961	81.31754	60.45847	46.39419	39.73163
8/30/2021	7:00:00 AM	70.22977	35.82044	87.37077	74.72214	53.41425	44.96919
8/30/2021	8:00:00 AM	64.2594	32.01955	83.28078	67.92243	53.05131	40.98111
8/30/2021	9:00:00 AM	62.71166	29.99538	79.37544	66.87443	50.60035	39.73928
8/30/2021	10:00:00 AM	58.87445	28.77369	76.95999	61.77342	45.27866	35.518
8/30/2021	11:00:00 AM	53.56709	29.47676	72.9668	55.48598	45.518	37.78607
8/30/2021	12:00:00 PM	54.89891	26.39698	75.27096	57.15431	44.1334	34.85781

8/30/2021	1:00:00 PM	66.70252	28.71754	84.26675	71.76008	52.36101	40.0945
8/30/2021	2:00:00 PM	67.01714	32.37042	84.38102	70.90212	59.03752	44.25343
8/30/2021	3:00:00 PM	65.53991	33.23466	84.74941	69.34289	58.79384	46.20311
8/30/2021	4:00:00 PM	64.03214	33.25227	79.67131	68.41124	57.86071	45.86381
8/30/2021	5:00:00 PM	62.79844	31.19227	80.83553	64.97413	53.1501	41.6981
8/30/2021	6:00:00 PM	49.55006	23.20097	70.92128	51.39608	39.0623	32.18381
8/30/2021	7:00:00 PM	43.16372	23.86478	62.21124	45.60159	38.24693	32.05904
8/30/2021	8:00:00 PM	59.01444	23.589	80.69126	51.24025	38.61039	30.84523
8/30/2021	9:00:00 PM	40.55153	20.31637	61.87713	42.56815	32.78589	28.09555
8/30/2021	10:00:00 PM	62.76805	23.03846	82.76251	50.4851	37.87061	30.52834
8/30/2021	11:00:00 PM	64.84083	18.5024	84.32346	53.34188	37.6889	28.03395
8/31/2021	12:00:00 AM	38.08691	19.46596	57.43696	41.54075	33.46416	27.18007
8/31/2021	1:00:00 AM	65.78089	24.02455	85.26858	66.2656	42.11492	32.947
8/31/2021	2:00:00 AM	63.09358	24.19	83.49136	54.54234	38.25003	32.23949
8/31/2021	3:00:00 AM	61.13052	27.21399	81.74406	50.68956	39.78289	33.87632
8/31/2021	4:00:00 AM	51.48829	29.42885	74.87564	46.96821	40.9314	35.97265
8/31/2021	5:00:00 AM	51.80844	31.60538	75.27113	50.94074	43.85534	39.34211
8/31/2021	6:00:00 AM	53.15803	31.48756	75.70751	50.36268	42.58613	37.94869
8/31/2021	7:00:00 AM	65.7105	36.47649	83.42766	64.17658	48.79425	42.72569
8/31/2021	8:00:00 AM	57.63827	33.9287	77.94937	58.90234	47.29728	41.03747
8/31/2021	9:00:00 AM	61.22691	34.14099	79.58841	59.11223	46.38906	40.4498
8/31/2021	10:00:00 AM	60.49059	28.07609	80.52222	57.19483	44.77172	35.64068
8/31/2021	11:00:00 AM	61.9441	27.04457	79.74708	62.73934	46.8421	37.10928
8/31/2021	12:00:00 PM	60.54241	25.12534	84.8554	50.96728	39.87792	32.86629
8/31/2021	1:00:00 PM	51.45573	23.35294	73.0589	53.12612	40.08705	31.42465
8/31/2021	2:00:00 PM	53.18815	23.33795	75.11246	54.00108	42.87337	34.24591
8/31/2021	3:00:00 PM	58.34567	24.34885	78.41048	56.51825	43.09752	33.7008
8/31/2021	4:00:00 PM	59.1314	27.15545	77.91441	62.39229	50.15435	37.7605
8/31/2021	5:00:00 PM	51.84405	24.75588	72.90992	54.15173	41.58345	33.37091
8/31/2021	6:00:00 PM	42.57372	20.94821	60.59619	45.38829	35.42047	28.68418
8/31/2021	7:00:00 PM	60.01284	22.20226	81.05062	48.3078	36.7892	31.37817
8/31/2021	8:00:00 PM	64.02324	23.8844	84.53201	54.69303	38.82725	31.83838
8/31/2021	9:00:00 PM	57.67529	23.82589	79.63504	53.57234	38.61933	31.16961
8/31/2021	10:00:00 PM	41.06438	21.13395	60.65002	43.52932	34.73719	29.30616
8/31/2021	11:00:00 PM	39.0326	22.57468	54.97989	42.19217	35.91969	30.07034
9/1/2021	12:00:00 AM	63.26583	23.08913	83.2541	50.74116	38.07517	30.7607
9/1/2021	1:00:00 AM	64.5304	18.33925	84.84439	53.20348	35.28327	26.93939
9/1/2021	2:00:00 AM	62.93629	19.30054	82.85167	51.50724	34.66586	27.56018
9/1/2021	3:00:00 AM	67.69471	25.52471	86.62797	68.95478	43.04862	33.94106
9/1/2021	4:00:00 AM	53.97345	25.73729	77.64239	49.14595	38.82751	32.58701
9/1/2021	5:00:00 AM	51.63745	32.90438	74.74227	50.60013	43.60575	39.14729
9/1/2021	6:00:00 AM	58.18363	32.29691	79.61927	56.37025	44.77109	38.92799
9/1/2021	7:00:00 AM	56.5866	34.32309	79.5184	54.79846	46.19267	41.34499

9/1/2021	8:00:00 AM	64.71254	34.9741	82.70814	60.72395	46.75726	41.47573
9/1/2021	9:00:00 AM	44.31446	30.29327	59.5204	47.8086	41.08344	36.76626
9/1/2021	10:00:00 AM	59.6022	27.92737	79.87551	56.30831	40.33675	34.22733
9/1/2021	11:00:00 AM	61.87394	25.24766	82.20196	53.45481	38.92211	32.82134
9/1/2021	12:00:00 PM	55.41922	24.37382	76.89435	54.74045	39.99887	31.78313
9/1/2021	1:00:00 PM	54.67924	23.39525	76.90223	57.01186	43.69993	33.16489
9/1/2021	2:00:00 PM	54.61469	27.2551	73.37478	58.1587	44.99854	36.17899
9/1/2021	3:00:00 PM	54.9964	23.9707	74.73241	54.25235	40.12357	31.50052
9/1/2021	4:00:00 PM	50.19523	22.36447	77.88141	47.87736	36.90028	29.90155
9/1/2021	5:00:00 PM	62.01291	22.8146	82.66661	51.73674	39.12057	31.68284
9/1/2021	6:00:00 PM	62.71469	22.19719	82.85618	50.30921	36.38884	30.26853
9/1/2021	7:00:00 PM	68.05156	24.3902	86.60802	66.12012	38.93355	31.96681
9/1/2021	8:00:00 PM	50.28671	24.63938	73.86381	45.10894	36.41322	31.12622
9/1/2021	9:00:00 PM	38.09493	22.13131	53.19468	41.6548	34.82168	29.88872
9/1/2021	10:00:00 PM	55.44569	23.74736	79.71816	45.93003	37.66847	31.93106
9/1/2021	11:00:00 PM	39.04822	26.03963	53.15816	42.28721	36.95467	32.45981
9/2/2021	12:00:00 AM	66.12707	27.77002	82.83483	63.35777	42.7251	35.25666
9/2/2021	1:00:00 AM	39.87025	24.38199	62.32622	41.23388	35.35891	31.12393
9/2/2021	2:00:00 AM	41.98342	24.06578	62.13656	43.55553	37.59785	32.26642
9/2/2021	3:00:00 AM	61.33432	25.42319	85.17675	49.43576	38.19793	32.51192
9/2/2021	4:00:00 AM	64.10899	26.69187	84.14284	56.55995	42.28369	35.05164
9/2/2021	5:00:00 AM	60.32077	33.62033	80.75623	57.52758	44.49647	39.58047
9/2/2021	6:00:00 AM	60.30713	32.17616	84.906	53.39963	43.91611	38.67059
9/2/2021	7:00:00 AM	67.03288	36.07222	84.99504	65.61699	49.86937	43.97587
9/2/2021	8:00:00 AM	59.40523	32.51384	78.07008	58.39956	46.50344	39.81242
9/2/2021	9:00:00 AM	52.86171	31.42862	74.98664	54.92828	44.31904	38.92936
9/2/2021	10:00:00 AM	50.94676	24.70773	72.69316	51.28539	41.16364	33.46637
9/2/2021	11:00:00 AM	54.35852	23.43715	75.85712	48.78733	38.49763	30.80664
9/2/2021	12:00:00 PM	60.25207	23.77414	81.82804	56.10203	40.82585	31.32919
9/2/2021	1:00:00 PM	49.13733	24.02097	72.56481	48.92465	36.85514	30.89253
9/2/2021	2:00:00 PM	52.78577	24.42303	78.55475	52.6981	41.7612	33.4202
9/2/2021	3:00:00 PM	63.65442	24.25963	80.60225	66.47475	44.35235	32.84202
9/2/2021	4:00:00 PM	65.18991	25.16102	83.78325	67.76626	53.21622	37.56791
9/2/2021	5:00:00 PM	66.52865	32.28663	85.67885	69.51351	57.76019	44.55933
9/2/2021	6:00:00 PM	56.64151	25.12612	75.75879	59.42032	47.10086	36.13656
9/2/2021	7:00:00 PM	60.51298	26.72422	84.63159	51.95707	39.60563	33.76644
9/2/2021	8:00:00 PM	50.92572	23.75288	75.32473	46.17195	37.5072	31.12836
9/2/2021	9:00:00 PM	36.38284	18.76105	53.20729	40.88635	23.02966	23.02966
9/2/2021	10:00:00 PM	40.48453	25.53404	60.4554	43.28083	36.79784	32.17472
9/2/2021	11:00:00 PM	39.35737	22.61441	57.32903	42.16095	34.22638	29.568
9/3/2021	12:00:00 AM	70.06496	27.32991	86.84353	73.44804	44.48733	33.97056
9/3/2021	1:00:00 AM	39.35877	18.23983	64.63554	38.80595	34.06829	23.02966

WM10: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	12:46:29 PM	60.52727	33.45512	80.09499	63.57147	51.12133	40.61901
8/23/2021	1:00:00 PM	59.54166	27.47507	84.04119	61.83113	45.67818	36.18987
8/23/2021	2:00:00 PM	66.93224	31.43081	86.79019	69.90729	56.19849	42.49435
8/23/2021	3:00:00 PM	66.67476	30.71234	87.3479	69.79265	53.90305	40.70803
8/23/2021	4:00:00 PM	72.3141	32.53482	89.10912	75.86379	63.73828	48.38258
8/23/2021	5:00:00 PM	71.54807	35.3047	87.1669	75.58032	65.05372	52.26641
8/23/2021	6:00:00 PM	69.62303	33.20547	88.01817	73.4038	61.97162	49.57497
8/23/2021	7:00:00 PM	68.44986	29.43708	88.0735	63.86692	45.28084	38.96666
8/23/2021	8:00:00 PM	52.2912	28.83195	76.68802	49.71423	41.43896	35.99373
8/23/2021	9:00:00 PM	68.85846	28.29217	86.66843	66.18052	44.33947	36.81716
8/23/2021	10:00:00 PM	66.58965	27.91372	85.83138	63.40034	43.85357	36.63086
8/23/2021	11:00:00 PM	44.24606	29.20205	58.3192	47.77652	41.40091	36.7107
8/24/2021	12:00:00 AM	64.77857	28.80645	84.49793	57.36582	42.17117	36.7295
8/24/2021	1:00:00 AM	65.69556	24.49554	88.22312	57.26524	38.94064	32.96627
8/24/2021	2:00:00 AM	60.13751	25.8507	80.51591	61.91581	44.4744	34.27409
8/24/2021	3:00:00 AM	73.55268	36.33169	89.83371	78.33009	57.2344	46.62592
8/24/2021	4:00:00 AM	54.24456	33.45246	78.30392	52.43224	46.08182	40.73435
8/24/2021	5:00:00 AM	68.02295	35.25742	87.39305	64.10779	48.66678	43.07073
8/24/2021	6:00:00 AM	69.54572	35.46627	89.90603	67.02394	50.73079	42.92859
8/24/2021	7:00:00 AM	54.98748	37.51371	76.75447	56.06292	49.90555	44.44415
8/24/2021	8:00:00 AM	51.70332	33.53552	71.32228	52.69122	46.89775	40.70636
8/24/2021	9:00:00 AM	59.26678	34.15461	80.31534	56.66278	46.24042	41.12193
8/24/2021	10:00:00 AM	53.04763	31.89377	74.99254	55.0188	44.98575	39.02196
8/24/2021	11:00:00 AM	59.70327	29.25778	82.91526	58.83001	46.32638	38.18388
8/24/2021	12:00:00 PM	58.03842	26.93109	77.11399	61.39225	47.29065	36.81199
8/24/2021	1:00:00 PM	57.73149	27.5809	80.0787	59.62879	45.75288	36.372
8/24/2021	2:00:00 PM	61.92963	26.95316	80.82906	64.87325	49.06377	36.46797
8/24/2021	3:00:00 PM	67.811	29.88558	88.8943	68.31195	53.43676	39.62207
8/24/2021	4:00:00 PM	62.21214	30.09925	80.259	65.87611	53.27502	40.56236
8/24/2021	5:00:00 PM	68.91073	30.33937	86.78844	71.40641	51.65663	39.99396
8/24/2021	6:00:00 PM	68.06701	33.47383	86.88856	71.6041	60.36843	47.96712
8/24/2021	7:00:00 PM	62.90439	27.62089	84.52289	64.95309	47.09669	39.24098
8/24/2021	8:00:00 PM	64.44534	25.60024	84.45375	62.16323	44.53041	36.45064
8/24/2021	9:00:00 PM	67.29816	27.18763	86.81709	59.05838	40.91946	34.96839
8/24/2021	10:00:00 PM	68.58767	29.42815	88.41068	65.25659	44.94358	37.43745
8/24/2021	11:00:00 PM	40.96655	25.05664	59.70413	43.32932	37.00467	32.55812
8/25/2021	12:00:00 AM	69.99137	28.2876	90.36879	63.73182	45.36066	37.49524
8/25/2021	1:00:00 AM	43.95474	26.25202	65.2362	46.02702	39.79676	34.59817
8/25/2021	2:00:00 AM	40.21023	27.78644	52.93826	43.2447	38.87414	34.75169
8/25/2021	3:00:00 AM	65.86785	28.21023	84.63238	61.87445	44.24236	37.22771

8/25/2021	4:00:00 AM	53.74426	32.93173	76.18701	50.6485	44.53848	40.1496
8/25/2021	5:00:00 AM	67.24373	37.94887	86.88402	63.15942	49.54785	44.74525
8/25/2021	6:00:00 AM	66.22102	38.29323	86.36212	61.80636	50.03892	45.22258
8/25/2021	7:00:00 AM	65.86772	39.96506	85.35954	64.62256	52.15662	47.27069
8/25/2021	8:00:00 AM	66.69509	37.73912	87.6756	63.40613	50.93925	45.1448
8/25/2021	9:00:00 AM	54.79741	33.81353	77.49458	55.67142	46.78823	41.23198
8/25/2021	10:00:00 AM	60.75477	30.19781	80.17709	56.8045	45.67281	38.91973
8/25/2021	11:00:00 AM	57.14944	27.04611	79.79004	58.02792	47.04832	37.63772
8/25/2021	12:00:00 PM	60.51247	26.9379	84.23052	59.61099	46.78101	37.31455
8/25/2021	1:00:00 PM	60.25855	29.018	79.40529	63.3433	50.23379	38.36515
8/25/2021	2:00:00 PM	60.11594	29.08864	79.93666	63.32472	46.98187	37.50404
8/25/2021	3:00:00 PM	60.63375	27.49449	83.72876	61.75103	48.39999	38.29816
8/25/2021	4:00:00 PM	65.70382	29.08333	85.08606	69.05635	53.50154	40.2474
8/25/2021	5:00:00 PM	70.33284	34.26986	89.37129	73.83466	61.71718	49.41732
8/25/2021	6:00:00 PM	69.55828	36.43119	88.47612	72.70953	61.92128	50.32194
8/25/2021	7:00:00 PM	59.02392	26.60331	81.4043	60.93751	44.28264	36.72798
8/25/2021	8:00:00 PM	53.27085	25.67618	76.50337	49.75688	40.89841	34.3795
8/25/2021	9:00:00 PM	63.88586	25.44555	84.37097	55.8832	41.17491	34.27177
8/25/2021	10:00:00 PM	69.89062	27.76171	87.96688	72.81438	48.85727	39.09902
8/25/2021	11:00:00 PM	62.05346	28.79687	81.22696	53.26871	43.00122	36.73063
8/26/2021	12:00:00 AM	70.01248	24.94122	90.72588	57.9979	40.79642	33.99048
8/26/2021	1:00:00 AM	45.18106	24.42956	65.30969	46.91524	38.87946	32.58181
8/26/2021	2:00:00 AM	42.79724	23.86629	61.36914	46.54306	38.42174	32.28009
8/26/2021	3:00:00 AM	60.54308	32.22223	82.83015	55.49558	44.81192	39.67615
8/26/2021	4:00:00 AM	56.28003	30.21589	80.15965	51.23041	44.23393	38.57024
8/26/2021	5:00:00 AM	55.65849	34.55443	79.02725	56.34376	47.74453	41.90163
8/26/2021	6:00:00 AM	62.21216	36.583	82.70131	67.7596	51.3749	44.18767
8/26/2021	7:00:00 AM	65.77424	38.6845	84.60374	66.21459	51.92972	45.81709
8/26/2021	8:00:00 AM	60.44471	35.47023	79.14662	61.65284	48.41019	42.60023
8/26/2021	9:00:00 AM	53.40052	34.38955	78.21478	54.72876	46.33706	41.43794
8/26/2021	10:00:00 AM	58.76152	32.27866	79.03678	58.03144	47.79705	40.73955
8/26/2021	11:00:00 AM	65.77546	31.70761	88.56855	61.52735	46.92936	39.52777
8/26/2021	12:00:00 PM	63.29618	29.86488	87.00807	63.91149	51.11157	39.31082
8/26/2021	1:00:00 PM	61.02363	26.82724	83.56584	61.03534	48.42662	37.08206
8/26/2021	2:00:00 PM	62.86796	28.0801	83.59177	65.68413	50.11381	37.46659
8/26/2021	3:00:00 PM	69.32857	30.87906	87.82448	72.86095	59.02244	44.08346
8/26/2021	4:00:00 PM	71.01619	33.90368	89.13407	74.94188	63.42852	49.60235
8/26/2021	5:00:00 PM	67.42726	33.70266	85.42636	70.97609	58.25665	46.07695
8/26/2021	6:00:00 PM	57.46196	27.24406	77.66955	59.88025	47.69272	38.01845
8/26/2021	7:00:00 PM	47.54875	26.07393	72.54877	48.02883	42.13928	35.73812
8/26/2021	8:00:00 PM	60.33608	27.14493	82.7428	52.82235	42.9512	36.35599
8/26/2021	9:00:00 PM	56.29199	27.37725	79.1224	49.45231	40.35614	34.92505
8/26/2021	10:00:00 PM	67.22833	32.60804	86.26745	64.36049	46.28791	40.476

8/26/2021	11:00:00 PM	65.47489	26.03003	84.26509	62.29411	42.3312	34.50968
8/27/2021	12:00:00 AM	43.70818	26.63655	61.92186	47.05853	40.99877	34.96411
8/27/2021	1:00:00 AM	56.74964	28.41021	74.13964	62.85675	44.05616	36.23669
8/27/2021	2:00:00 AM	69.62091	29.86166	88.35043	69.28467	45.90234	38.03644
8/27/2021	3:00:00 AM	65.19337	28.57355	84.57139	56.49991	42.29734	36.48565
8/27/2021	4:00:00 AM	52.82261	32.03737	75.48012	50.41063	44.63672	39.74959
8/27/2021	5:00:00 AM	68.41056	34.55169	86.962	69.26871	49.60061	41.64317
8/27/2021	6:00:00 AM	69.33052	32.38767	88.23295	64.37636	47.20754	40.86341
8/27/2021	7:00:00 AM	55.61122	34.04801	87.63362	52.79412	45.82644	40.93378
8/27/2021	8:00:00 AM	53.14169	34.65699	71.67993	53.2918	46.05615	41.18712
8/27/2021	9:00:00 AM	55.45881	33.70172	74.06279	58.88992	45.28499	40.53649
8/27/2021	10:00:00 AM	60.66856	31.1701	81.64933	56.57779	45.41575	39.65272
8/27/2021	11:00:00 AM	64.65663	29.09661	86.23011	63.08686	46.93001	37.96682
8/27/2021	12:00:00 PM	58.86821	27.84639	82.75727	59.25126	44.42433	35.9674
8/27/2021	1:00:00 PM	62.95522	27.56974	85.05464	61.49589	45.22352	35.75558
8/27/2021	2:00:00 PM	61.20513	27.98996	83.27928	63.10999	45.40074	36.72968
8/27/2021	3:00:00 PM	65.21097	27.54985	86.96048	66.92241	51.62218	37.65146
8/27/2021	4:00:00 PM	61.51882	27.99862	83.90709	64.16111	49.01786	38.02362
8/27/2021	5:00:00 PM	66.71887	29.05563	87.80643	63.63975	50.72768	40.09943
8/27/2021	6:00:00 PM	67.27252	29.88622	86.23528	64.69945	49.74252	39.09955
8/27/2021	7:00:00 PM	63.24556	28.89255	85.08454	54.21508	44.18444	38.15831
8/27/2021	8:00:00 PM	50.5581	26.13401	74.0326	47.95455	40.13323	34.08207
8/27/2021	9:00:00 PM	61.84481	27.24313	84.38734	53.95491	41.02664	35.66608
8/27/2021	10:00:00 PM	64.00389	26.71551	83.14733	58.34647	42.99155	36.08462
8/27/2021	11:00:00 PM	44.66285	24.79382	71.18157	45.75855	38.36802	33.11147
8/28/2021	12:00:00 AM	67.33123	26.7035	87.30127	63.78323	42.82722	34.6922
8/28/2021	1:00:00 AM	68.60112	27.92658	89.27716	61.02683	42.20261	36.10093
8/28/2021	2:00:00 AM	57.16159	27.33907	84.08738	48.02217	39.59604	34.88866
8/28/2021	3:00:00 AM	64.89547	29.12993	86.54075	50.80085	40.06699	36.02355
8/28/2021	4:00:00 AM	40.45774	28.40809	55.28355	43.31813	39.09941	35.28308
8/28/2021	5:00:00 AM	46.05615	30.84896	62.58274	48.10848	42.1593	37.8506
8/28/2021	6:00:00 AM	45.21242	30.34265	65.39828	46.98329	41.77087	37.45842
8/28/2021	7:00:00 AM	62.66743	32.98738	81.48784	58.54935	44.64382	39.65255
8/28/2021	8:00:00 AM	52.73366	31.13116	75.49756	49.92166	42.99127	38.77679
8/28/2021	9:00:00 AM	62.61137	31.49773	83.06935	56.53355	44.91556	39.73019
8/28/2021	10:00:00 AM	67.51463	26.31067	86.18294	65.92029	43.44162	35.10439
8/28/2021	11:00:00 AM	54.92663	25.24364	80.67637	55.40275	41.89747	33.99662
8/28/2021	12:00:00 PM	60.8634	25.92209	81.47149	60.15869	44.37219	34.43786
8/28/2021	1:00:00 PM	53.8679	25.05532	74.4604	55.89887	40.79557	33.438
8/28/2021	2:00:00 PM	62.6977	23.99938	89.24571	58.51084	41.54429	32.20474
8/28/2021	3:00:00 PM	53.21808	24.41453	78.19659	55.30811	41.17382	33.19589
8/28/2021	4:00:00 PM	52.68908	23.76806	74.30209	55.61317	41.10817	32.29331
8/28/2021	5:00:00 PM	65.37738	24.27076	83.66114	57.99339	41.26257	33.88033

8/28/2021	6:00:00 PM	42.07805	24.02354	67.04402	43.49941	36.84851	32.12396
8/28/2021	7:00:00 PM	63.96359	24.69812	86.35585	53.73923	40.74977	33.39532
8/28/2021	8:00:00 PM	42.50473	23.32543	62.21073	45.74429	39.21352	32.98514
8/28/2021	9:00:00 PM	68.20504	28.96144	86.94639	62.83983	43.54736	37.3189
8/28/2021	10:00:00 PM	42.21035	25.02395	62.37577	45.43545	38.44703	32.83161
8/28/2021	11:00:00 PM	41.41635	24.4605	63.05957	43.63361	37.12154	32.31057
8/29/2021	12:00:00 AM	55.07227	24.9243	80.05269	44.83937	36.52294	32.36987
8/29/2021	1:00:00 AM	63.49567	26.79609	84.26973	46.42379	38.33806	34.14809
8/29/2021	2:00:00 AM	40.04483	28.71845	51.41212	42.8628	39.09959	35.47129
8/29/2021	3:00:00 AM	51.88946	26.42283	75.55154	44.06783	37.6113	33.37897
8/29/2021	4:00:00 AM	41.33885	27.87028	55.42145	43.94589	39.37379	35.30148
8/29/2021	5:00:00 AM	69.25576	32.46947	86.64601	73.08946	49.21761	40.38642
8/29/2021	6:00:00 AM	71.32342	34.21218	90.63471	69.2083	48.60117	41.60916
8/29/2021	7:00:00 AM	46.83079	34.06283	63.15498	49.80266	44.71533	40.55569
8/29/2021	8:00:00 AM	64.71849	36.59424	84.76348	60.98676	48.785	43.65564
8/29/2021	9:00:00 AM	48.21916	35.21548	65.00364	51.06474	45.7132	41.78524
8/29/2021	10:00:00 AM	61.95388	32.06633	81.57454	55.42161	45.83057	39.90121
8/29/2021	11:00:00 AM	50.85015	30.13171	72.94018	53.06354	42.73121	37.28238
8/29/2021	12:00:00 PM	52.15929	24.74296	72.81689	55.403	43.4386	34.12448
8/29/2021	1:00:00 PM	63.82327	23.15593	85.05031	55.75935	40.42021	32.05947
8/29/2021	2:00:00 PM	54.42655	24.53066	78.99854	54.13809	41.28024	33.40265
8/29/2021	3:00:00 PM	65.24816	24.91566	85.97179	66.51228	49.84722	35.92871
8/29/2021	4:00:00 PM	66.56566	23.06593	86.34344	60.78366	41.14972	32.8351
8/29/2021	5:00:00 PM	64.61113	23.48973	84.02069	51.61751	38.56643	31.94923
8/29/2021	6:00:00 PM	51.04307	21.93226	77.38441	47.94459	39.06323	32.31546
8/29/2021	7:00:00 PM	45.7451	22.28909	64.07979	48.73873	41.1129	33.39192
8/29/2021	8:00:00 PM	66.35499	22.38099	86.12672	61.7772	42.38983	32.49422
8/29/2021	9:00:00 PM	45.8936	24.45237	74.99994	47.23232	39.78258	33.16009
8/29/2021	10:00:00 PM	43.08147	23.14423	61.50393	46.59628	39.10907	32.81945
8/29/2021	11:00:00 PM	44.20841	28.50509	57.72075	47.95716	41.29697	36.28892
8/30/2021	12:00:00 AM	63.63802	27.61359	83.07439	57.11198	42.02582	35.75198
8/30/2021	1:00:00 AM	66.82489	24.46437	86.8837	60.06258	41.35604	33.03519
8/30/2021	2:00:00 AM	67.01109	25.96579	87.14535	57.26436	41.24454	34.73291
8/30/2021	3:00:00 AM	43.73869	29.93679	62.45044	46.39897	41.43386	36.93551
8/30/2021	4:00:00 AM	62.67989	33.42003	83.11141	57.01335	46.83309	41.44313
8/30/2021	5:00:00 AM	48.13445	34.33847	65.78092	50.67784	45.57125	41.20874
8/30/2021	6:00:00 AM	64.62481	36.78467	83.62394	63.68509	49.91253	43.89835
8/30/2021	7:00:00 AM	72.96628	38.2803	90.29598	77.02561	55.56598	47.36473
8/30/2021	8:00:00 AM	65.712	34.73784	85.11649	68.67578	54.14297	43.49081
8/30/2021	9:00:00 AM	63.46912	33.06314	80.42197	67.50844	51.86309	42.26258
8/30/2021	10:00:00 AM	61.04424	31.92916	81.40633	63.57904	48.57982	39.59227
8/30/2021	11:00:00 AM	60.06593	32.81403	79.57448	62.19829	50.75164	41.88462
8/30/2021	12:00:00 PM	63.41809	30.27089	84.08707	65.61247	51.34708	39.87771

8/30/2021	1:00:00 PM	73.10701	33.41806	90.73761	77.55712	62.56917	46.5065
8/30/2021	2:00:00 PM	77.368	36.7848	90.92615	81.83474	71.91471	56.31132
8/30/2021	3:00:00 PM	76.7501	39.62375	90.57472	81.04774	72.30217	60.32903
8/30/2021	4:00:00 PM	76.10819	41.52036	90.38894	80.43873	71.45321	59.82426
8/30/2021	5:00:00 PM	73.05066	38.37748	88.92923	77.04265	66.90014	54.89733
8/30/2021	6:00:00 PM	62.83942	29.1731	83.33242	65.25174	49.5936	39.21139
8/30/2021	7:00:00 PM	47.56932	28.00922	66.27154	49.64371	43.09693	36.86178
8/30/2021	8:00:00 PM	61.18484	27.76915	82.90532	54.66899	42.95629	36.03856
8/30/2021	9:00:00 PM	43.43609	24.25394	64.38901	45.81942	38.05542	32.67638
8/30/2021	10:00:00 PM	65.10949	27.96293	85.1674	55.63097	42.62973	36.12349
8/30/2021	11:00:00 PM	67.1073	22.60602	86.75557	57.86349	42.2965	33.61832
8/31/2021	12:00:00 AM	42.48726	23.13436	61.88211	45.77894	38.52132	31.97955
8/31/2021	1:00:00 AM	68.21471	28.90822	87.85876	69.40555	48.64538	39.60894
8/31/2021	2:00:00 AM	66.21845	28.78785	86.26609	59.97183	43.92574	37.69648
8/31/2021	3:00:00 AM	62.77378	31.15254	83.32738	54.0892	44.34745	38.92983
8/31/2021	4:00:00 AM	53.58813	33.39646	76.60959	50.63294	45.19638	40.51305
8/31/2021	5:00:00 AM	53.56997	34.71036	76.24201	53.68457	47.49175	42.96848
8/31/2021	6:00:00 AM	55.0544	35.16	77.01667	53.37303	46.7661	42.35132
8/31/2021	7:00:00 AM	67.95346	39.08094	86.09572	66.42742	51.27461	45.71775
8/31/2021	8:00:00 AM	59.04118	36.56997	79.54779	60.02318	49.60323	44.14284
8/31/2021	9:00:00 AM	64.28056	37.59645	82.91715	62.38067	49.80788	44.33489
8/31/2021	10:00:00 AM	63.555	32.28618	83.78979	59.7905	47.76995	40.09831
8/31/2021	11:00:00 AM	64.36695	31.4675	82.7561	64.58561	49.50257	41.179
8/31/2021	12:00:00 PM	61.58045	29.09371	85.9448	56.22584	44.7114	37.48524
8/31/2021	1:00:00 PM	62.04479	27.99874	81.34867	65.50801	51.65641	38.12134
8/31/2021	2:00:00 PM	62.65981	28.02094	84.48233	65.78535	52.77805	40.52191
8/31/2021	3:00:00 PM	65.6682	29.23142	86.02213	67.85497	54.69813	41.05969
8/31/2021	4:00:00 PM	71.58346	33.11796	88.93884	75.49505	64.23225	49.98343
8/31/2021	5:00:00 PM	64.86355	30.3029	84.8356	67.77179	50.49677	39.43656
8/31/2021	6:00:00 PM	45.18569	26.43011	62.83274	48.14061	40.35307	34.24105
8/31/2021	7:00:00 PM	63.52278	27.70611	84.1718	54.60325	42.39993	36.776
8/31/2021	8:00:00 PM	66.74498	28.14852	87.33808	59.7161	43.25181	36.73167
8/31/2021	9:00:00 PM	60.33528	27.81313	82.3242	57.05932	43.34695	36.34821
8/31/2021	10:00:00 PM	43.94681	25.65623	62.91498	46.86273	40.0603	34.71317
8/31/2021	11:00:00 PM	43.74245	26.94283	60.68985	46.99151	41.39424	35.50861
9/1/2021	12:00:00 AM	65.36728	27.56202	85.38366	56.8472	43.01394	36.55048
9/1/2021	1:00:00 AM	66.50987	23.40866	86.62961	57.67447	40.71541	32.98472
9/1/2021	2:00:00 AM	66.36045	23.10502	86.05814	59.19912	40.80557	32.66292
9/1/2021	3:00:00 AM	70.17464	29.88998	88.74131	72.12804	48.92104	39.45385
9/1/2021	4:00:00 AM	55.8327	29.80008	79.35001	52.13804	43.23054	37.31661
9/1/2021	5:00:00 AM	53.64222	35.89809	75.8926	53.61671	47.22356	42.66595
9/1/2021	6:00:00 AM	60.10766	35.57619	81.23981	59.16298	48.56587	42.89081
9/1/2021	7:00:00 AM	58.57515	37.68905	82.30821	57.29587	49.40434	44.89128

9/1/2021	8:00:00 AM	68.2195	38.74248	86.44216	64.98433	50.79619	45.77321
9/1/2021	9:00:00 AM	48.76214	34.48011	65.28521	51.70688	45.98455	41.52685
9/1/2021	10:00:00 AM	62.19973	31.68733	81.97455	58.69403	44.32656	38.89947
9/1/2021	11:00:00 AM	64.56627	29.2191	84.10055	58.60784	44.61618	37.80684
9/1/2021	12:00:00 PM	58.2832	28.77361	78.87267	59.20807	46.52595	37.71858
9/1/2021	1:00:00 PM	63.29512	27.23468	85.85568	64.956	49.62932	38.46438
9/1/2021	2:00:00 PM	64.13889	30.43165	84.13748	67.41691	51.32236	39.89504
9/1/2021	3:00:00 PM	61.45812	28.74746	81.9375	63.73964	49.13827	37.63485
9/1/2021	4:00:00 PM	59.667	26.8228	82.44357	60.98517	45.67979	35.79399
9/1/2021	5:00:00 PM	65.24311	27.89593	86.04865	62.91452	49.37899	38.27144
9/1/2021	6:00:00 PM	64.81477	27.00876	84.78069	57.29099	43.51942	36.1566
9/1/2021	7:00:00 PM	70.45464	28.55611	88.79336	69.20828	44.93925	37.50945
9/1/2021	8:00:00 PM	52.30229	28.8534	75.60064	48.25439	40.94966	35.91721
9/1/2021	9:00:00 PM	42.87988	26.97543	58.25615	46.0913	40.11379	35.04161
9/1/2021	10:00:00 PM	57.68369	28.78846	81.88125	49.65247	42.90498	37.48549
9/1/2021	11:00:00 PM	43.73475	30.15356	56.68283	46.88081	42.2216	37.62419
9/2/2021	12:00:00 AM	68.83805	31.85209	85.91218	68.28418	47.79217	40.66297
9/2/2021	1:00:00 AM	43.85464	29.41788	63.95893	46.16614	41.13173	36.78084
9/2/2021	2:00:00 AM	45.33519	28.38177	63.25455	47.77266	42.67708	37.73399
9/2/2021	3:00:00 AM	63.58043	29.68536	87.08246	53.11074	43.15449	37.46393
9/2/2021	4:00:00 AM	66.83231	31.02212	86.45078	60.35343	46.31769	39.76031
9/2/2021	5:00:00 AM	62.76019	36.76722	83.07377	60.98965	48.91873	43.97291
9/2/2021	6:00:00 AM	61.67374	35.53569	85.74981	55.79741	47.68765	42.70599
9/2/2021	7:00:00 AM	70.24539	38.85687	88.11182	69.40646	53.25653	47.25107
9/2/2021	8:00:00 AM	61.99825	35.72051	80.55133	61.01714	49.57636	43.58347
9/2/2021	9:00:00 AM	54.95951	34.93935	76.63357	56.99322	47.90888	42.76435
9/2/2021	10:00:00 AM	53.22065	29.75467	75.21219	54.18659	45.17491	38.53602
9/2/2021	11:00:00 AM	57.18813	28.3614	78.29984	56.20252	43.74251	36.46807
9/2/2021	12:00:00 PM	64.83954	28.36567	89.36006	61.20906	46.26977	37.12758
9/2/2021	1:00:00 PM	58.015	28.11947	80.18869	59.07818	43.80118	36.26141
9/2/2021	2:00:00 PM	63.035	28.95346	85.64759	64.46363	49.68732	39.29159
9/2/2021	3:00:00 PM	68.24271	29.13936	86.98528	71.50472	53.28713	39.0699
9/2/2021	4:00:00 PM	75.07221	30.3768	90.68169	79.30761	67.04983	46.80691
9/2/2021	5:00:00 PM	76.32437	39.07117	91.44023	80.56753	70.73976	57.47777
9/2/2021	6:00:00 PM	69.53153	32.9695	87.31253	72.96154	61.14469	48.5425
9/2/2021	7:00:00 PM	64.40636	31.80524	87.13167	63.68897	46.24656	39.64469
9/2/2021	8:00:00 PM	53.59966	27.72694	77.99823	50.32887	42.48108	36.08706
9/2/2021	9:00:00 PM	40.57386	21.5406	55.62839	45.46648	24.86303	24.86303
9/2/2021	10:00:00 PM	44.39362	29.88295	62.05485	47.30369	42.1131	37.48426
9/2/2021	11:00:00 PM	44.77897	26.82655	63.55473	47.64464	40.05523	34.58643
9/3/2021	12:00:00 AM	72.86078	31.41133	90.22832	75.94782	49.71819	39.30267
9/3/2021	1:00:00 AM	42.67484	21.2689	65.57657	44.31815	39.46904	24.86303

WM10: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
8/23/2021	12:46:29 PM	55.6	53.6	51.5	49.4	47	45.7	43.1	43.4	44.4	48.6	42.6	40	39.2	38.7	36.8	35.3	37.1	34.1	29.5	32.5	33.8	29.7	29.1	29.5	27.8	29.8	34.4	33.1	33.4	29.6	27.6	26.1	26.7	21.5	20.1	17.2
8/23/2021	1:00:00 PM	54.9	52.8	51.6	48.9	46.9	43.9	41.5	40.2	39.4	38.2	39	43.2	44.2	36	33.7	33.6	27.4	22.5	17.4	14.9	13	10.5	10	10.3	9.5	8	5.1	2.6	0.8	-0.2	-0.1	0.3	-0.1	-0.7	4.5	10.1
8/23/2021	2:00:00 PM	62	60.7	58.8	56.7	54.5	51.8	49.4	48.9	47.3	47.4	48	44.9	41	42.6	48.5	46.1	33.4	32.4	28.9	22.7	21.2	19.4	16.9	16.8	14.8	12.1	9.4	6.3	3.5	1.2	0.6	0.7	0.8	0.8	7.3	11.5
8/23/2021	3:00:00 PM	61.6	60.2	58.1	56.2	54.5	51.1	49.4	47.4	47.2	49.8	45.4	45.9	54.7	41.5	36.5	35.3	32.4	28.3	25	24.4	23.4	21.5	21.3	20.5	18.8	17.2	12.6	8.1	3.4	0.1	0	0.4	0.4	-0.4	1.2	4.6
8/23/2021	4:00:00 PM	66.6	65.3	63.7	62	60	58.8	58.3	58.1	57.7	58.8	56.3	52.3	46.7	43.4	41	39.2	39.3	39.3	36.4	36.4	35.7	33	33.2	29.2	28.2	24.8	20.4	14.1	7.7	4.2	3.4	3.6	3.7	2.6	2.3	3.6
8/23/2021	5:00:00 PM	67.2	65.5	63.7	61.8	58.9	56.2	53.3	49.9	46.5	43.4	40.8	38.4	37.8	39.8	41.9	36.6	30.7	28.4	24.7	22.4	21	19.8	20	19.2	16.5	13.8	11.1	8.3	5.6	3.8	3.6	4.1	4	3.2	2.6	3.6
8/23/2021	6:00:00 PM	65.2	63.6	61.8	59.9	57.3	54.4	51.2	48.4	44.6	41.6	38.6	36.5	34.7	31.7	29.3	27.7	25.8	24	22.4	21.4	20	18.2	17.9	17.2	14.2	11.4	8.9	5.7	3.1	1.4	1.3	1.8	1.8	0.6	-0.4	0.1
8/23/2021	7:00:00 PM	50.2	51.5	50.2	53.8	56.7	54.7	60.2	60.2	61.6	60.2	56.5	52.9	50.6	49	44.4	44.4	45.5	44.1	43.1	43.7	44.1	40.1	38.1	39.7	36.5	35.5	31.9	27.1	19.6	9	-1.2	-1.9	-1.7	-3.1	-3	2.4
8/23/2021	8:00:00 PM	33.2	35.5	36.8	36.9	37.1	38.9	39.7	43	46	43	43.6	41.3	37.5	35.8	31.8	30.6	29.6	28.7	27.2	27.6	25.3	23.9	21.1	20.5	19.3	16.6	11.6	7	0	-2	-3.1	-2.4	-2	-3.3	-3.3	-1.5
8/23/2021	9:00:00 PM	42.1	53	51.3	53	59.4	56	58.9	60.2	61	62.2	57.9	52.3	47.7	48.4	45	46.4	47.2	44.7	40.6	41.6	39.7	36.9	37.8	37.3	33	31.5	27.7	20.6	11.1	0.9	-2.9	-2.2	-1.9	-3.4	-3.1	3.1
8/23/2021	10:00:00 PM	42.9	51.3	52.3	53.2	57	55.7	57.9	56.6	57.6	57.3	56.2	53.6	49.5	42.4	41.1	43.9	48.4	44.8	41.9	42.8	40.3	38.1	39.7	38.9	36.5	34.9	32.2	27.4	20.5	11.3	0.4	-2.4	-2.1	-3.6	-3.6	-1.6
8/23/2021	11:00:00 PM	31.2	32.7	35	34.6	34.7	33	32.6	31.2	30.5	30.6	32.1	31.2	29.9	29.7	28.8	27.7	24.8	22	21	20.8	18.4	12.5	6.6	-2.9	-6.2	-5	-5	-5	-3.4	-3.2	-3.5	-2.8	-2.2	-3.8	-3.7	-1.7
8/24/2021	12:00:00 AM	41.7	48.6	49.4	51.7	54.7	55.7	56	54.9	55.2	55.9	54.5	51.8	47.3	38.7	36	39.7	45.1	41	38.5	39.5	38.3	36.2	34.8	33.3	32.5	31.1	29.3	24	16.8	7.4	-1.7	-2.7	-2.3	-3.8	-3.8	-1.8
8/24/2021	1:00:00 AM	41.6	49.4	50.9	52.2	55.9	54.8	54.6	55.5	54.9	59.7	54.8	53.6	48.8	39.9	37.1	39.3	45.6	41.8	39.7	42.2	41.4	39.2	37.1	35.4	33.8	33.4	30.2	25	18.4	10.2	0.1	-2.6	-2.2	-3.8	-3.8	-1.8
8/24/2021	2:00:00 AM	34.2	36.4	41.8	44.2	47.6	44	45.7	46.3	53	47.7	43.9	54.7	52.5	46.2	41.1	37.6	32	31.5	29.3	27.6	24.5	22.2	19.3	16.1	13.9	6.3	0.7	-3.8	-4.3	-4.1	-3.6	-2.8	-2.2	-3.9	-3.9	-1.8
8/24/2021	3:00:00 AM	45.8	49.4	53.7	54.7	61.5	62.8	63.8	64.8	66.3	66.5	62.6	60.2	58.2	55.9	51.2	51	50	49.5	47.3	45.6	43.8	42.7	41.5	40.1	38.6	37.4	33.8	28.4	20.2	10.6	-0.3	-2.6	-2.1	-3.9	-3.6	3
8/24/2021	4:00:00 AM	36.6	36.1	37.4	38.2	37.9	38	38.4	42.1	43	41.4	49.5	47.4	39.1	38.6	35.7	35.7	33	33	30.9	31	29	27.1	24.2	23.8	23	20.7	19.2	15.3	10.6	4.2	-1	-2.6	-2.3	-4	-3.9	-1.8
8/24/2021	5:00:00 AM	45.5	54.4	53.6	53.5	56.3	56.1	57.8	59.5	59.4	59.3	58.4	55.1	47.5	43.1	44.2	47.1	49.4	48.6	47.6	47.6	44.8	41.5	42.1	39.2	38	37.5	34.6	30.2	23.4	14.2	3.2	-1.3	-1.9	-3.9	-3.9	-1.8
8/24/2021	6:00:00 AM	45.6	53.9	51.5	50.8	54.5	59	59.3	61	61.7	61.7	59.4	56.3	51	47.3	49.1	51.6	52.2	50.2	49.4	48.3	46.9	45.1	44.7	43.2	43.9	43	39.9	35.9	28.9	19.9	9.1	-2.6	0.2	-2	-2.8	-1.4
8/24/2021	7:00:00 AM	31.2	33.7	37.2	38.6	38.7	43.5	40.3	42.2	43.7	43.3	49	47.6	44.8	41.8	38.2	36.5	32.6	29.5	26.1	25.1	22	19.9	16.7	12.5	10.9	12.6	12.6	11.6	11.4	-2.1	-3.2	-2.7	-2.2	-3.7	-3.7	-1.8
8/24/2021	8:00:00 AM	30.4	30.8	33.4	33.2	42.5	47.4	36.9	35.8	41.1	39.1	41.2	40.7	38.1	34.4	32	33.1	28	25.3	21.5	18.5	14	10.5	5.5	0.8	-2.1	-2.5	-0.9	1.3	1.1	-2.2	-2.9	-2.4	-2	-3.3	-2.3	0
8/24/2021	9:00:00 AM	40.6	51.2	43.3	42.6	44.9	45.5	46.2	47.3	48.2	49.9	51.5	49.5	44.7	44.5	44.8	40.9	31.4	34.2	31.2	20.9	17.5	14.7	14.3	12.4	11	11	8.9	4.6	0.5	-2.2	-2.3	-2	-1.7	-2.9	-1.2	1.8
8/24/2021	10:00:00 AM	45.6	43.5	41.5	40.5	38.7	37	37.8	38.7	38.5	38.7	44.2	44	37.9	37.5	38.2	36.6	32.9	28.2	22.5	17.3	14	9.1	5.9	5.8	4.3	1.9	0.8	-0.8	-1.8	-2	-2	-1.6	-1.3	-1	9.8	15.8
8/24/2021	11:00:00 AM	50	48.8	46.7	45.6	44.8	43	44.8	47.3	51.5	50	51.3	50.9	43.5	39	37.2	35.3	31.9	27.6	22.9	21.5	19.7	16.4	14.5	14.6	14.1	12	9.5	6.1	2	-0.8	-1.5	-0.7	-0.9	0.2	12.5	19.4
8/24/2021	12:00:00 PM	53.2	51.5	49.4	47.1	44.5	41.7	40.5	41.1	41.7	41.6	42.6	41.3	38.6	37.2	34.6	34	31.4	26.2	20.8	17.4	14.9	11.4	9.5	10.1	9.4	6.3	4.8	3	0.2	-1	-1.3	-0.9	-0.5	-0.1	9	15.1
8/24/2021	1:00:00 PM	52.9	51.1	48.9	46.8	43.9	41.3	39.4	41.3	42.7	41.4	40	40.7	39.3	38.2	35.8	35.2	31.3	27.6	25.5	29.4	26.4	26.1	21.8	25.4	29.6	22	23.7	28.2	23.2	20.7	19.4	22.2	18.4	16.3	13	13.3
8/24/2021	2:00:00 PM	57.7	56	53.8	51.6	49	46.2	42.9	40.6	39	37.9	36.9	37.1	35.8	35	33.2	32.3	28.2	23.6	18.2	15.7	14.3	10.7	7.8	6.1	4.4	3.3	2	-0.1	-1.2	-1.6	-1.3	-0.9	-0.7	-1.6	-0.9	1.5
8/24/2021	3:00:00 PM	60.6	59.3	57.4	55.5	54.9	50.8	53.8	52.5	55.3	56	55.9	60	49.5	46.3	39.7	36.7	35.9	34.8	32.2	31.7	33.8	31.2	30.8	32.3	29.8	27.4	23.6	17.5	9.2	1.3	-0.9	-0.6	-0.5	-1.6	-1.5	0.3
8/24/2021	4:00:00 PM	57.7	56.1	54.3	51.8	49.3	46.3	43.6	42.4	43.8	42.8	41.2	40	37.9	35.4	32.1	30.6	25.4	21.6	18	18	17.2	15.1	13.3	13.9	14	11.7	10.2	7.2	4.7	1.4	-0.5	0.1	0.1	-1.1	-1.3	-0.8

8/24/2021	5:00:00 PM	56.1	56.3	54.3	56.1	56	58.1	58	58.3	60.4	60.5	58	57.5	55.2	50.2	44	41.9	40	36.6	34.5	35.6	35.1	32.8	33.9	31.8	30.6	27.5	23.5	17.8	9.2	1.2	-1	-0.6	-0.7	-1.9	-2	-1.1
8/24/2021	6:00:00 PM	63.5	62.2	60.4	58.3	55.6	52.9	49.7	46.2	43.1	39.8	36.9	35	32.6	32.4	28.7	26.7	24.8	22.8	21.7	19.9	18.1	16.6	15.8	14.4	11.7	8.7	6	3.1	1.2	0.3	0.4	0.8	0.9	-0.4	-1	-0.1
8/24/2021	7:00:00 PM	58	57.4	55.3	53.1	50.2	47.4	44.2	41.5	38.8	36.7	36.4	34.7	35.5	33	29.9	28.5	26.1	24.4	23.2	23	21.4	18.2	15.6	14.4	11.3	8.4	9.5	5.8	2	-1.5	-1.8	-1.1	-0.9	-2.2	-2.6	-1.3
8/24/2021	8:00:00 PM	39.5	53.5	50.2	47.2	50.2	47.1	50.3	52.9	54.8	58.7	56.7	54.8	46.6	39.6	35.4	36.1	38.5	39.6	39.8	40.3	39.9	36.9	34.5	32.8	32	31.5	27.5	22.1	14.6	4.7	-2.4	-2.4	-1.9	-3.3	-3.3	-1.2
8/24/2021	9:00:00 PM	40.6	49.2	50.1	53.3	57.2	56.3	57.7	59	59.5	59.3	57.3	53.2	45.9	40.4	38.7	40.7	45	40.7	36.9	37.9	36.7	33.8	31.5	30.2	28.1	26.4	22	16	7.4	0.7	-3	-2.6	-2.2	-3.7	16.4	11.4
8/24/2021	10:00:00 PM	46	50.2	54.5	55.6	57	58.7	59.2	58.9	58.6	60.2	57.7	56	51.9	54.2	48.5	46.6	48.8	47.4	46	45.7	44.8	43.6	39.7	38.8	38.3	36	32.7	26.5	18	7.2	-1.5	-2.5	-2.1	-3.7	12.5	6.8
8/24/2021	11:00:00 PM	25.3	27.3	31.2	29.7	31.6	30.9	29	29.1	28.1	28.2	29	28.9	26.6	24.6	22.7	26.2	27.5	21.5	14.3	12.6	12.7	18.5	7.6	7	3.7	-0.8	-2.2	-3.8	-4.3	-4.1	-3.6	-2.8	-2.3	-3.9	-3.9	-1.6
8/25/2021	12:00:00 AM	42.5	49.8	50.3	55	57.6	60.6	61.3	61.9	61.5	61.5	58.8	54.6	52.2	52.8	50.1	50.9	49.9	48.2	46.1	46	46.2	44.5	41.4	40.6	41.8	39.6	35.3	29.5	21.4	11.3	1.6	-1.1	-1.5	-3.4	-3.6	-1.6
8/25/2021	1:00:00 AM	31.1	31.2	33.6	33.1	33.4	32.6	31.1	30.8	30.5	30.5	31.4	31.9	32.3	34	27.8	26.4	23.1	21.9	21.5	22.6	21.6	18.7	15.9	14.4	11.3	8.4	6.6	3.2	-0.5	-3	-3.4	-2.8	-2.2	-3.9	-3.9	-1.8
8/25/2021	2:00:00 AM	26.8	28.3	32.6	31.6	31.6	29.8	28.2	28.4	25.7	25.4	28.9	24.3	21	20.2	18.8	19.2	15.7	15.2	15.1	15.2	13.3	7.7	1.9	-3.2	-5.8	-5.8	-5	-5.3	-4.7	-4.3	-3.8	-3	-2.3	-4	-4	-1.8
8/25/2021	3:00:00 AM	40.3	49.8	50.9	52.4	56.1	54.8	57.3	55.3	57.2	56.8	53.9	54.9	49.6	48.6	44.5	43.8	45.2	43.2	39.2	38.7	39.9	34.7	34.7	40.6	30.4	30	27.6	21.4	13.1	3.7	-2.9	2.9	-2.3	-4	-4	-1.8
8/25/2021	4:00:00 AM	33.5	36.4	38.9	38.3	39.6	40.7	42.5	43.9	44.8	45.7	46.7	41.5	38	35.6	32.3	33.6	34.3	33.9	30.8	31	29.5	27.1	25.5	25.2	24.1	22.6	20.2	17.1	12.4	5.1	-1.1	-2.7	-2.3	-4.1	-4	-1.8
8/25/2021	5:00:00 AM	43.1	51.1	50.6	51.4	54.1	51	55.8	56.5	60.9	61	57.2	53.9	52.3	48.9	44.5	45.5	46	43.8	41.2	41	39.8	37	38	36.6	32.8	30.5	27	21.1	13.4	4.8	-2	-2.7	-2.3	-4.1	-4.1	-1.8
8/25/2021	6:00:00 AM	38.6	49.8	51.4	48.9	53.9	52.1	55.3	53.5	56	60.3	55.5	53.9	51.8	55.6	49.1	46.8	47.4	45.3	42.8	42.1	41.6	39.8	41	41.4	37.3	35.4	33.4	29.7	22.3	11.8	1	-2.5	-2.3	-4.1	-4	-1.8
8/25/2021	7:00:00 AM	39.2	45.3	46.2	50.3	60.5	53.7	56.8	57.3	56.7	56.1	53.4	49.3	48.7	42.3	39.7	38.5	37	33.5	31.1	31	28.9	26.6	25	23.9	22.9	20.2	16.6	12.6	4.9	-2.1	-3.4	-2.8	-2.2	-3.8	-3.7	-1.8
8/25/2021	8:00:00 AM	43.8	51	49	50.5	54.9	53.4	54.8	54	57.7	58.6	57.7	59.8	54.5	48.5	42.9	39.9	36.1	32.9	29.9	29.3	27.9	26.1	25.7	25.3	25.4	25.5	22.4	18.1	11.2	3	-2.3	-2.4	-2	-3.4	-3.4	-1.7
8/25/2021	9:00:00 AM	40.2	39.2	39.5	39.4	40.6	40.5	43.2	44.3	44.6	44.5	44.9	44.2	44	41.3	41.1	43.8	36.3	28.2	22.1	16.9	14	9.1	5	3.3	2.5	0.8	-1.1	-2.4	-2.8	-2.1	-2.8	-2.5	-1.9	-1.7	-2.9	-2.9	-1.5
8/25/2021	10:00:00 AM	42.7	44.7	42.5	45.7	49.7	51	52.5	53.2	51	51.9	47.9	48.2	46.4	42.9	36.8	34.3	30.3	24.8	19.6	17.4	15.5	12.5	12.9	12.4	9.5	7	4.5	1.2	0.7	1.2	-1.2	0.9	0.8	-2.2	-2.3	-0.9
8/25/2021	11:00:00 AM	49	47	45	44	42.6	42.4	43.9	46.4	46.8	45.6	46.7	43.7	40.8	39.8	46.2	40.1	27.2	22.3	16.3	12.3	10.3	7.4	4.7	4.3	3.5	2	0.5	-1.1	-1.8	-1.9	-1.8	-1.4	-1.2	-2.2	-1.7	0.9
8/25/2021	12:00:00 PM	51	49.3	47	44.7	42.4	40.8	41.4	42.9	43.9	46.8	46.2	48.5	57.5	42.2	35.6	34.3	30.1	25.3	21	18.9	17.5	15.4	14.8	12.7	12.6	11.5	7.5	4.2	0.4	-1.8	-1.7	-1.3	-1.2	-2.1	-1.6	1.4
8/25/2021	1:00:00 PM	55.6	53.8	51.5	49.4	46.8	44.4	42.9	45.7	44.1	43.1	41.5	42.2	39.3	39.1	34	30.5	26.9	21.4	18.2	15.3	14.4	13.4	12.7	13.2	11.7	9.5	8	5	1.2	-1.1	-1.3	-1	-0.9	-1.8	-1.3	1.8
8/25/2021	2:00:00 PM	55.9	53.9	52	49.7	46.9	43.9	41.8	41.3	38.9	38.6	38.9	37.9	36.6	34.1	31.3	28.2	24.6	20.2	15	13.1	11	8.2	6.9	7.8	5.9	2.5	0.7	-0.8	-1.6	-1.8	-1.6	-1	-0.8	-1.7	-1.8	0.5
8/25/2021	3:00:00 PM	55.7	54.4	51.8	49.7	47.6	44.4	43.3	47.1	44.4	43.7	43.8	41.9	38.6	37.7	33.6	31	25.1	19.4	16.4	15.2	13.9	12.1	11.3	10.4	8.7	6.4	4.7	1.8	-0.5	-1.4	-1.4	-1	-1.1	-2	-1.2	2.7
8/25/2021	4:00:00 PM	61.3	59.6	57.9	55.7	53.4	50.9	47.3	44.6	41.1	39.2	38.4	37.7	36.3	35.6	32.3	28.9	25.4	21.7	19.3	18	17.2	15.5	13.9	12.2	9.1	6.5	3.8	1.5	0.2	0.4	-0.2	0.3	0.5	-0.9	-1.2	1.1
8/25/2021	5:00:00 PM	65.3	63.8	62.3	60.3	58	55.2	53.5	51	48.8	57.1	52.5	50.9	43.1	38	34.7	31.8	31.1	29.7	28.3	30.4	31.1	28.7	24.8	24.8	21.1	17.4	13.3	9.1	6.6	3.3	3	2.9	2.8	1.7	1.3	2.2
8/25/2021	6:00:00 PM	64.2	62.9	60.8	60.3	57	55.8	54.9	51.5	51.3	54.4	50.7	49.8	51.8	46.1	37.6	38.1	37.1	36.2	34	31.9	32.1	34.7	29.7	25.8	25.6	19.3	15.1	6.9	2.5	0.7	0.7	1.3	1.4	0.1	-0.5	1.2
8/25/2021	7:00:00 PM	54.5	53.3	51.1	49.2	46.8	43.5	40.2	38.1	36	34.8	34.3	34.5	32.9	31.3	28.7	27.3	24.5	23.1	22.1	22.3	20.9	18.1	15.4	13.4	9.7	6.3	3.6	0	-2.3	-2.8	-2.5	-1.9	-1.7	-3	-2.8	0.2
8/25/2021	8:00:00 PM	33.9	35.5	37.2	36.9	38.2	38	40.6	41.7	44.2	43.5	47.2	41.9	41.4	42	34.1	29.8	29.4	31.1	32.4	30.2	28.3	28.5	25.7	22.8	21.5	20.3	14.6	12.2	2.8	-2	-2.9	-2.3	1.9	-3.2	-2.3	2.7
8/25/2021	9:00:00 PM	40.9	47.9	47.6	47.2	51	49.4	52.2	53.2	56.9	57.8	53.4	51	47.6	47	42.6	43.9	43.6	43.2	41.4	38	38.8	36.5	37.2	35.4	32.1	29.2	24.2	16.5	6.6	-1.4	-3.2	-2.5	-2.1	-3.5	-2.5	1.9
8/25/2021	10:00:00 PM	44.2	54.8	53.6	54.1	58.2	56.1	58.3	58.5	61.2	63.3	61.2	58.5	51.9	45.2	46.8	49.7	52.6	51.8	49.7	49.7	48.1	44.9	43.2	42.1	40	38.3	34.7	28.8	20.5	9.9	-0.3	2.4	2.2	-3.8	3.6	5.4
8/25/2021	11:00:00 PM	37.5	45.4	47.9	41.4	41.5	47.9	51.9	52.6	55.5	56	51.1	47.7	47.4	40.1	39	40.4	43.1	39.5	37.2	38.1	36.4	34.3	32.4	29	26.4	23.1	19.9	15	7.2	0.8	-3.3	-2.7	-2.2	-3.8	-3.8	-1.8

8/26/2021	12:00:00 AM		39	45.1	49.6	52.6	59.6	64.3	58.8	61.9	62.3	60.4	56.2	49.1	48	51.2	47.8	48.8	46.8	45.7	43.9	43.5	42.4	40.4	38.9	36.6	36.4	33.8	29.2	23	15	5.6	-1.4	-2.2	-2	-3.8	-3.8	-1.7
8/26/2021	1:00:00 AM	34.8	33.4	33.3	32.7	32.6	30.8	30.4	32.8	32.4	32.4	34.3	35	34	33.8	31.2	28.5	25.4	24.1	24.1	25.2	22.2	17.9	13.4	10.8	8.5	6	3	-1.7	-3.6	-4	-3.7	-2.9	-2.3	-4	-3.9	-1.7
8/26/2021	2:00:00 AM	32.4	32.1	33	32.4	31.5	30.6	30.2	30.6	29.2	28.9	31.3	30.7	27	28.4	26.5	26.2	22.7	22.9	24.2	23.5	20.1	14	6.8	-4.3	-6.7	-6.4	-5.9	-5.3	-4.7	-4.3	-3.7	-2.9	-2.3	-4	-3.9	-1.7
8/26/2021	3:00:00 AM	39.1	45.1	47.2	46.2	50.4	50.6	49.2	50.1	50.3	50.4	48.8	48.5	51.9	38.7	36.5	40	40.4	40.3	38.3	38	36.2	35.8	34.1	30.6	30.3	27.9	22.7	16.3	8	-0.3	-3.3	-2.9	-2.3	-4	-3.9	-1.7
8/26/2021	4:00:00 AM	34.8	36	38.5	38.6	42.6	42.7	43.6	48.1	49.2	48.9	47.7	43.8	40.9	37.9	33.9	33.4	33.4	34.1	32	32.9	31.6	28.8	26.5	26.3	25.8	24.1	21.4	17.4	11.6	4.5	-1.7	-2.7	-2.3	-4.1	-4	-1.8
8/26/2021	5:00:00 AM	42.3	41	41.9	41.5	42.4	41.5	44.7	45.7	46.5	45.1	45	46.2	42.7	40.2	38.1	37	35.1	34.8	32.5	32.1	30.9	29.1	26.9	26.3	26.3	26.4	26.4	28	28.6	28.8	28.1	28.9	29.6	27	24.9	27.6
8/26/2021	6:00:00 AM	40.1	43.7	43.5	44.6	42.4	42.4	44.2	49	48.8	46.3	49.1	60.3	48	42.8	46.5	37.1	36	32.9	31.7	32.2	31.8	33.5	34	36.5	37	36.6	34.5	33.4	27.4	22.4	20.2	19.9	19.7	17.3	15.6	19.2
8/26/2021	7:00:00 AM	42.2	50.2	50.8	50.1	54.1	52.3	55	57.6	56.8	56.2	56.5	56.9	51.1	46.3	45.9	41.3	43.5	40.1	37	37.7	37.8	35	33.4	33.2	31.3	32	29.4	25	17.1	9.3	1.9	-1.6	-2.1	-3.8	-3.8	-1.8
8/26/2021	8:00:00 AM	38	41.2	40.9	42.5	48.2	47.2	51.9	50.5	51.3	52.2	51.1	49.3	48.1	46.4	44.1	41.3	38.2	32.5	26.4	25.9	24.6	22.5	21.5	22.3	22.3	22.3	17.6	12.1	4.3	-1.9	-2.9	-2.3	-1.8	-3	-1.8	0.9
8/26/2021	9:00:00 AM	42.7	41.6	41.7	41.3	41.9	42.7	41.9	43.5	43.5	42.2	41.5	41.4	39.2	37.5	34.7	30.5	25.6	19.2	15.2	12.1	9.6	6.9	6	5.2	3.8	4.4	2.1	0.8	0	-0.3	1.2	0.6	0.9	-0.6	0.6	4.8
8/26/2021	10:00:00 AM	47.6	51	48.6	45.3	46.1	44.9	46.1	46.9	46.7	47.4	49.7	48.6	43	38.8	34.9	31.8	28.4	22.9	18.4	17.5	15.6	12.3	12.8	11.5	9.1	7.4	4.1	2	2	-2	-1.8	-1.5	-1.2	-2.2	-1.1	4.6
8/26/2021	11:00:00 AM	52.5	52.9	52.4	53.8	56.4	55.1	55.2	53.6	55.9	53.8	57.6	53.8	52.6	45.1	39.2	34.9	34.1	28	21.8	20.3	18.1	15.6	15	15.2	12	11.3	8.8	4.5	0.4	-1.4	-1.5	-1	-0.8	-1.4	2.5	10.3
8/26/2021	12:00:00 PM	56.5	54.7	53.1	52.8	51.1	51.2	51.1	50.4	50.2	52.3	48.5	49	46.9	43.2	35	31.4	27.6	24.1	21.9	18.7	16.3	14.2	15.1	13.9	12.9	11.4	10.1	8.3	6	3.5	2	1.2	0.9	-0.3	1.8	8.8
8/26/2021	1:00:00 PM	54	52.2	49.6	47.4	47	42.6	43.8	45.8	46.2	55.7	47.7	47.6	45.1	36.3	35.3	31.6	28.1	21.8	18.2	18	15.9	14.3	12.7	11	11.5	9.6	6	1.9	-0.8	-1.5	-1.4	-1	-0.9	-2	-1.9	1.1
8/26/2021	2:00:00 PM	58.4	57	54.8	52.8	50.6	47.7	44.5	42.5	39.4	38.1	37.4	34.9	34.3	33.2	29.3	26.9	23.5	19.5	15.2	12.7	11.1	9.1	8.4	7.1	5	3.1	1.3	-0.2	-1.1	-1.3	-1.1	-0.7	-0.5	-1.5	-1.5	0.8
8/26/2021	3:00:00 PM	64.7	63.3	61.6	59.3	57.3	54.8	52.1	49.3	45.8	43.4	41.5	38.6	39	34.6	31.5	28.6	25.9	23.9	21.9	20.4	19.1	18.4	18.4	17.8	14.9	12.3	9.6	6.7	4.1	2.5	2.1	2.4	2.4	1.6	1	3.2
8/26/2021	4:00:00 PM	66.3	64.8	63	61.4	58.8	55.9	53.3	50.3	47.5	45.9	44.6	51.9	53.3	39.3	32.7	30.8	27.8	25.7	24.1	23.7	22.7	21.4	21	19.2	16.1	12.9	9.9	6.8	4.3	2.7	2.6	2.9	3	2.2	1.4	2
8/26/2021	5:00:00 PM	63.1	61.7	59.3	57	54.6	51.9	48.8	46	42.4	40.5	38.8	43.6	45.2	34.2	31.7	29.1	24.6	21.8	19.7	18.3	16	14.4	14.8	14.2	11.3	8.4	6.1	3.6	1.8	0.8	1	1.4	1.6	0.7	0	0.6
8/26/2021	6:00:00 PM	53.4	51.6	49.2	46.6	43.7	40.5	38.1	36.8	35.9	35	35.2	35	34.8	31.5	28.1	24.8	20.4	18.9	18.2	17.5	16.1	13.8	12.1	10.7	7.9	4.4	3.1	-0.9	-1.9	-2.1	-1.6	-1	-0.8	-1.9	-2.2	-1.2
8/26/2021	7:00:00 PM	31.1	32.6	34.5	35.2	35.9	34.7	34	34.2	34.9	35.8	37.4	38.1	40.8	32.9	28.8	26.9	24.6	23.5	23.4	24.5	23.8	21.5	18.9	16.7	14.2	12.3	10.3	6.5	1.6	-2	-2.7	-1.6	-1.7	-3.2	-3.3	-1.6
8/26/2021	8:00:00 PM	35.7	49.2	46.3	44	47.3	46.8	45.9	47.5	52.9	55.4	49.9	47	39.8	34.4	32.4	33.1	36.1	36.6	36.1	34.6	34.3	30.7	29.5	32.6	27.5	26.6	22.6	16.6	8.5	0	-2.9	-2.4	-2	-3.5	-3.5	-1.3
8/26/2021	9:00:00 PM	35.1	47.6	46.3	40.8	43.8	46.6	41.6	44.2	45.7	44.9	48.7	45.6	34.6	32.4	30.2	32.1	33.8	34.9	33.8	32.3	32.7	28.5	27.6	28.4	25.2	23.4	19.6	13.3	4.9	-2.4	-3.3	-2.7	-2.2	-3.7	-3.7	-1.7
8/26/2021	10:00:00 PM	44.9	50.8	51.9	52	58	54.3	56.1	56.1	58.6	59.5	58.2	56.9	50.3	46.5	41.9	44.1	45.6	44.5	43.2	43.3	41.5	38.5	39.2	35.1	33.6	31.5	26.9	21.2	13.8	4	-2.8	-2.7	-2.1	-3.7	-3.6	-1.8
8/26/2021	11:00:00 PM	42.4	46.3	47	50.3	51.2	53.9	57	55.5	58	59.3	56	50.9	43.7	43.1	39.4	36.7	36.6	35.6	35	33.1	31.5	27.3	26.8	24	23.8	21.9	19.4	14	5.2	2.5	-3.5	-2.9	-2.2	-3.9	-3.8	-1.7
8/27/2021	12:00:00 AM	33	32.9	34.7	33.1	33.9	31.6	30.7	30.5	30.1	29.6	32.5	30.6	30	27.9	25.7	26.2	23.4	22.5	24.2	23.8	21.3	15.6	9	-1.6	-4.5	-5	-4.8	-5	-3	-3.8	-3.6	-2.8	-2.2	-3.9	-3.9	-1.8
8/27/2021	1:00:00 AM	36.7	36.7	39.1	37.6	36.6	36.1	36.1	40.1	54.9	45.3	41.1	46.2	43.6	33.3	29.2	30.5	27.6	26	25.7	26.9	24.6	22.1	18.7	16.1	13.3	9.1	6.3	0.9	-2	-3.8	-3.6	-2.9	-2.3	-3.9	-3.9	-1.8
8/27/2021	2:00:00 AM	42.2	55.7	52.5	53.1	58.7	54	57.3	56.9	60.5	62.5	62.9	57.5	51.1	45.4	45.6	48.7	51.5	50.5	48.9	49.9	48.9	46.7	46	45.4	44.9	42.5	39.2	34.4	28.5	20.1	6.6	-1.6	-2.2	-4	-4	-1.8
8/27/2021	3:00:00 AM	41.6	49.2	50.1	51.5	55.5	54.8	55.9	55.4	56.4	55.5	54.7	53.8	48.2	39.1	38.8	42.1	47.1	43.1	40.5	42.9	42.1	37.4	38.6	39.8	35.1	33.7	30.7	25.4	18.9	9.2	-0.7	-2.8	-2.3	-4	-4	-1.8
8/27/2021	4:00:00 AM	35.4	36.9	38	36.8	39.3	39.6	39.7	41.8	46.2	44.7	43.6	39.8	35	34.2	33.3	34.1	34.8	33.5	33.6	34.7	32.2	30.5	28.7	27.8	26.3	26.3	23.8	18.8	13	5.3	-2.5	-2.9	-2.3	-4	-4	-1.8
8/27/2021	5:00:00 AM	47.2	52.7	51.5	55.1	51.5	56	59.5	58.3	60.1	61.2	58.6	56.8	51.3	52	48.3	47.7	46	45.3	42.8	41.9	41.3	40.6	41.4	37.7	35.9	33.8	29.7	23.9	16.5	8.1	-0.7	-2.1	-2.2	-4	-4	-1.8
8/27/2021	6:00:00 AM	43.6	52.7	51.9	52.6	55.7	54.9	58.6	59.8	63.2	63.5	58.1	52.4	49.2	47.2	47.4	47.9	49.3	47	45.5	44.6	43.3	41	41.2	38.3	37.5	35.7	33.1	28.6	20.7	12.5	5.3	0.7	-0.3	-3.4	-3.9	-1.8

8/27/2021	7:00:00 AM	44.2	40.8	41.2	45	50.5	45.9	41.1	43.5	41.2	40.4	41.3	41	38.8	36.1	32.9	31	28.7	26.1	24.4	24.1	23	22.4	20.6	22.8	28.5	31.2	41.3	38.2	36.7	23	12.5	10.9	12.6	6.1	3.3	3.2
8/27/2021	8:00:00 AM	36.5	36.3	38.4	38.8	39.7	38.9	39.8	41.3	41.8	43.3	44.1	43.9	43.1	42.2	40.2	37	32.5	29	25.1	25.1	22.7	18.3	13.8	5.3	1.2	0.6	-0.2	-2.5	-3.5	-3.5	-3.1	-2.5	-2	-3.4	-3.4	-1.7
8/27/2021	9:00:00 AM	36.1	35	36.5	36.3	38.6	40.4	41.3	43.3	44.6	45.4	46.2	47.9	47.7	44.5	42.4	39	34	27.6	16.9	11.3	7.6	4	0.6	-0.6	-1.4	-2.2	-2.9	-3.3	-3.1	-2.8	-2.5	-2	-1.7	-2.9	-3	-1.5
8/27/2021	10:00:00 AM	42.8	43.8	48.1	46.5	46.9	47.4	48.3	47.9	49.1	53.5	51.6	51.4	50.2	48.6	40.1	35.5	32	25.5	20.4	17	17.5	16.2	13	12.5	11.7	9.5	6.1	2	-1.5	-2.1	-1.6	-1.1	-1.2	-2.4	-2.5	-1.3
8/27/2021	11:00:00 AM	53.4	53	52.3	51.9	53.5	53.4	53.4	52.4	54.9	55.4	52.9	53.6	52.8	47.3	40.3	36.2	34.3	28.8	24.6	24.1	23.3	20.2	19.6	21.6	17.9	16.5	14.1	9	3.6	-0.4	-1.1	-0.8	-0.6	-1.8	-1.9	-0.4
8/27/2021	12:00:00 PM	53.2	51.5	50.7	47.4	45.6	42	40.1	40.5	50.5	43.3	39.1	43.6	37.6	32.1	30.3	27.6	25.7	22.2	17.9	15.3	13.6	11.1	9.8	8.1	8.1	7.2	4.8	1.6	-0.5	-1.4	-1.3	-0.9	-0.7	-1.7	-1.2	1.6
8/27/2021	1:00:00 PM	53.4	52.2	50.7	50.2	52.2	49.2	53.3	50	51.1	53.8	50	52.3	49.6	46.9	40.7	36.6	33.8	31.4	28	31.6	27.4	25.2	26.1	26.9	25	21.9	27.5	25.4	23.8	22.8	22.2	20.8	20.1	15.3	12.1	10.6
8/27/2021	2:00:00 PM	56.8	55	52.8	51.1	48.7	46.3	42.6	42.6	39.4	38.6	40	38.5	39.2	37.5	35	31.1	27.7	23.4	17.3	14.7	12.9	11.3	11.3	11.5	9.6	7.2	5.4	2.8	3.3	-0.7	-0.6	-0.4	-0.2	-1.3	-1.4	-0.1
8/27/2021	3:00:00 PM	59.6	58.1	56	54	51.5	48.2	45.5	44.6	47	46.5	45.8	56.6	53.7	37.2	35.1	32.8	31.7	29.7	27.1	27.8	28.4	28.6	27.8	24.3	24.1	22.6	18.6	15.5	6.7	0.8	-0.6	-0.2	-0.4	-1.5	-1.8	0.3
8/27/2021	4:00:00 PM	57.3	55.5	53.6	50.8	48.8	45.4	42.6	41.6	38.7	37.3	38.1	35.4	37.1	35.4	32	28.9	25.5	20.9	17.3	16	14.5	12.4	11.7	10.8	9.4	6.5	4.2	1.4	0.6	-1.5	-1.3	-0.9	-0.8	-1.8	-1.9	-0.7
8/27/2021	5:00:00 PM	55.5	53.9	51.8	51.4	60.2	55.3	58	56.7	57	56.1	54.5	49.1	45.2	39.9	36.2	33.6	30.4	25.8	21.8	21.1	22.9	18.5	18	21.8	16.9	14.7	10.9	3.8	0.7	-1.7	-1.2	-0.8	-0.6	-1.7	-1.9	-0.9
8/27/2021	6:00:00 PM	55.1	53.8	52	53.2	52.4	54.4	56.1	58.6	58.4	59.6	58.6	54	50.4	45.2	40.7	41.5	41.1	40.9	40.1	40.7	39.6	37.9	38	34.3	33.6	32.1	29	23.6	15.4	5.2	-1.5	-1.5	-1.3	-2.6	-2.8	-1.4
8/27/2021	7:00:00 PM	39.4	45.6	46.9	48.8	52.3	50.3	52.8	51.9	54.1	56.5	52.4	52.7	50	48.2	39.4	39.5	42.7	40.3	39.1	39.9	40.3	35.7	33.4	35.1	32.3	32	29.6	24.8	18.4	9.1	-0.8	-2.2	-1.9	-3.3	-3.3	-1.6
8/27/2021	8:00:00 PM	31.4	34.2	36.7	37	37.2	38.5	39.3	39.8	42.7	41.4	41.2	36.9	36.4	34.2	30.4	29.6	29.1	31.9	34.3	32.6	31	28.3	25.8	26.6	23.6	22.7	15.5	10.9	5	-1.8	-3.2	-2.6	-2.1	-3.6	-3.6	-1.7
8/27/2021	9:00:00 PM	37.8	46	45.1	46.2	47.8	46	48.6	50.6	55	56.6	50.1	45.8	48.1	48.1	41.4	42.3	38.8	39.9	38.2	38.5	37	35.9	35.2	33.8	31.8	29.5	25.1	18.5	9.4	0	-3.1	-2.4	-2.1	-3.7	-3.1	-0.7
8/27/2021	10:00:00 PM	37.2	49	49.9	43.2	45.5	49.8	53.6	53.4	57.4	56.7	52.2	50.7	47.9	44.1	44.2	45.7	49.2	45.5	43.7	45.3	44.8	43	42.4	41.9	39.8	38	35.6	31.9	25.6	16.2	4.6	-2.2	-2.2	-3.8	-1.7	5.1
8/27/2021	11:00:00 PM	38.4	35.8	36	34.9	33.3	31.6	30.2	30.4	28.9	29.1	29.5	29.4	28.3	27.2	25.9	24.6	21.2	21.2	19	19.2	16.8	11.2	6.2	3.3	-2.8	-4.9	-5.5	-5	-2.9	-3.9	-3.5	-2.8	-2.2	-3.8	-3.5	11.5
8/28/2021	12:00:00 AM	43.8	53.8	51.5	48.8	53.8	53.1	56.2	57.8	59.1	59	58.9	56.3	49.8	46.5	46	47.6	48.7	47.4	46.6	48.1	47.7	44.9	44.3	42.9	42.9	41.3	37.7	33.2	27.1	17.6	5.8	-1.6	-2.1	-3.7	-3.8	-1.7
8/28/2021	1:00:00 AM	42.2	50.1	51.4	53.5	57.5	55.8	57.8	59.5	59.7	61	56.1	52.8	52.4	57.6	51.6	51.4	50.9	49.6	47.7	47.7	46.4	44.2	45.9	43.4	42.8	42.1	38.5	32.4	24.7	13.7	1.7	-2.1	-2	-3.8	-3.8	-1.8
8/28/2021	2:00:00 AM	31.8	36.5	38.4	37.2	37.7	36.5	36.7	36.5	40	55.9	43.8	43.9	43.8	32.9	32.1	30.6	29.4	30.4	29.4	30.7	29	25.8	25.5	23.4	24.7	20.3	18.2	11.9	4.2	-2.4	-3.6	-2.9	-2.3	-4	-4	-1.8
8/28/2021	3:00:00 AM	40.2	47.8	49.9	51.3	54.5	53.6	55.5	54	56.9	54.4	53.2	52.4	53.5	46.3	43.9	46	49.4	44.5	40.8	42.2	40.7	37.2	38.6	40.4	35.1	35.1	32.5	27.1	20.6	10.9	2	-1.8	-2.3	-4	-4	-1.8
8/28/2021	4:00:00 AM	27.1	28.6	32.4	31.1	32.5	30	28.7	30.5	25.5	24.7	26.6	25.3	22.4	20.6	20	19.9	16.5	16.5	17.1	17	16	14	10.3	2.5	-2.9	-1.8	-0.3	-4.3	-4.3	-4.2	-3.7	-2.9	-2.3	-4	-4	-1.8
8/28/2021	5:00:00 AM	28.5	31.7	37.5	41.9	36.1	33.7	32.8	33	29.7	29.2	32.4	29.5	27.4	27.4	25	24	21.4	19.8	20.2	20.3	19.7	17.6	14	10.4	8.4	5.9	3.8	0.8	-1.9	-3.7	-3.7	-2.5	-2.3	-4.1	-4.1	-1.8
8/28/2021	6:00:00 AM	29	30.7	34.1	33.7	33.9	33.1	33.4	34.5	34.3	33.8	34.1	33.9	32.6	30.8	27.8	27.3	26.2	24.9	25.2	26	25.6	24.5	22.6	19.7	17.7	16.8	14.9	12	9.7	4	0.2	-1.9	-2.2	-4	-4	-1.8
8/28/2021	7:00:00 AM	41.4	51.2	50	48.8	51.9	49	49.9	50.7	53.2	54.3	54.9	53	47.6	42.4	38.2	35.2	33.6	30	26.8	26.2	24.7	22.5	22.7	20.8	22.2	22.9	22.3	20.4	17.5	10.8	1.3	-2.1	-2.2	-3.8	-3.8	-1.8
8/28/2021	8:00:00 AM	37.3	36.6	37.7	36.3	37.5	36.6	38.2	40.9	42.4	42.9	47.8	44.9	38.8	31.3	30.4	22.6	20	16	12.9	11.6	9	6.6	5.3	4.3	6.3	5.6	4.1	1.8	0.3	-2.1	-2.9	-1.8	-1.9	-3.3	-3.4	-1.7
8/28/2021	9:00:00 AM	45	48.3	47.7	48.8	52.6	50.9	53.5	50.5	51.1	54.2	50.1	53.8	51.1	48.7	38	34.5	32.6	28.6	24.4	20.8	19.4	14.8	15.4	20.8	12.9	12.9	11.7	8	3.7	-0.6	-2.2	-2.1	-1.4	-2.8	-2.8	-1.5
8/28/2021	10:00:00 AM	46.7	51.4	50	50.6	59.9	53.8	57.7	59.2	58.8	59.1	57	55	50.9	48.1	41.2	38	36	32.3	29.9	28.2	26.5	24.5	24.6	24.2	23.1	22.4	19.8	15.5	10	2.9	-1.1	-1.1	-0.9	-2.1	-2.2	-1.1
8/28/2021	11:00:00 AM	49	47.7	45.1	43.7	41.8	43.3	43.4	38	39.8	39.2	35.1	35.4	43.2	33.4	35.7	26.9	21.2	17.9	12.6	9.6	7.9	6.7	5.6	5	4.2	3.3	1.9	0.5	-0.8	-1.3	-1.2	-0.9	-0.8	-1.9	-1.8	0.1
8/28/2021	12:00:00 PM	52.6	51.3	49.2	47.2	45.7	45.1	46.4	48.2	47.8	51.5	53.1	51.4	44.6	39.9	34.9	31	28.8	24	20.4	20.3	18.9	16.4	16.8	14.2	15.2	13.9	10.3	6.5	1.7	-1	-1.4	-1.1	0.9	-1.9	-1.3	2
8/28/2021	1:00:00 PM	49.7	47.6	45.6	42.9	39.6	38.3	39	34.7	34.8	33.9	31.3	30.7	29.9	28.3	24.9	21.3	17.2	13.1	9.6	7.8	6.7	4.7	4.9	5.9	6.4	1.6	-0.3	-1.1	-1.7	-1.8	-1.4	-1.1	-0.9	-1.7	-1.7	-0.2

8/28/2021	2:00:00 PM	54.4	52.2	50.3	49.4	46.9	45	52.7	56.3	39.7	45.4	53.2	43.8	50.3	46.6	44.7	44.5	41.8	40.6	36.9	33.1	32.6	34.8	35.6	32.7	25.8	24.2	17.1	9.3	1.3	-0.4	0	0.4	0.4	-0.4	0	3.3
8/28/2021	3:00:00 PM	49.3	47.5	45.2	41.9	38.6	36.3	33.3	32.4	30	30.4	28	27	26.4	24.6	24.1	21.1	15.4	14.8	11.8	13.1	7.3	5.3	5.7	3.5	3.3	1.4	0.1	-0.6	-1	-1.4	-1.1	-0.9	-0.8	-1.7	-1.6	0.2
8/28/2021	4:00:00 PM	48.9	46.4	44.5	41.6	38.4	35.5	33.8	33.3	31.1	30.3	29.8	30.5	30.3	27.5	25	22.3	17.8	16.7	19.3	15.1	9.6	10.4	7.1	4.7	4.5	3.7	1.8	0.1	-0.7	-1.1	-1	-0.9	-0.8	-1.9	-2	-1
8/28/2021	5:00:00 PM	44.6	52.8	48.9	50.4	55.1	52.3	55.5	54	56.4	57.8	57.3	53.9	48.4	43.4	40	37.5	36.6	33.9	31.2	32.1	31.1	29.1	28.8	28.7	29.1	26.3	22	15.9	8.5	0.3	-1.8	-1.6	-1.5	-2.6	-2.6	-1.3
8/28/2021	6:00:00 PM	36.7	34.9	32.4	30.9	30.3	28.6	28.5	31.4	25.4	23.1	24.8	23.1	23.9	19.2	15.6	14.1	10.3	10	10.8	10.4	7.7	4.6	3.7	3.8	4	2.4	0.2	-1.5	-1.8	-2	-1.7	-1.3	-1.2	-2.3	-2.5	-1.3
8/28/2021	7:00:00 PM	42.4	43.4	49.6	51.9	51.8	54.2	55.5	53	54.4	56.7	52.9	48.8	44.8	47.1	44	43.5	44.4	45.1	40.3	36.6	36.1	39.6	33.1	29.1	32.6	26.5	25	15.3	7.6	0.5	-2.8	-2.3	-2	-3.4	-3.4	-1.7
8/28/2021	8:00:00 PM	28.8	30.9	32.7	32.8	31.3	30.9	29.3	30.4	29.9	30.1	31.4	30.9	29.6	27.6	25.6	25.1	22.6	21.2	21.3	20.7	18.3	16.4	14.1	11.7	7.5	4.7	3.4	-0.9	-3.2	-3.5	-3.2	-2.6	-2.1	-3.6	-3.6	-1.7
8/28/2021	9:00:00 PM	39.9	52.7	51.6	52.2	58.6	51.9	59.2	58.9	60.8	60.4	58.5	53.1	49.1	47.7	46.3	46	46.5	45.9	45.6	43.6	41.8	39	37.9	39.3	35.1	33.4	30.2	23.9	15.3	3.9	-2.9	-2.7	-2.2	-3.7	-3.4	-1.6
8/28/2021	10:00:00 PM	33.4	32.3	32.8	32.5	32.4	30.7	29.3	29.7	27.2	27.1	28.4	27.9	26.9	26	24.4	24.2	21	20.6	21.4	21.4	17.6	10.9	4	-5.2	-6	-5.5	-5.2	-5.1	-4.3	-3.9	-3.5	-2.8	-2.2	-3.8	3	-0.8
8/28/2021	11:00:00 PM	34.1	32.5	31.8	29.5	30.2	28.5	28	31.1	26.9	26.7	26.6	26.1	25.7	28.3	24.7	20.7	17.5	15.2	13	12.4	10.2	4.3	-1.6	-6.1	-5.9	-5.1	-5.2	-5	-3.2	-3.9	-3.5	-2.8	-2.2	-3.8	-3.8	-1.7
8/29/2021	12:00:00 AM	31.4	40.8	39.1	41.5	40	41.1	46.6	46.2	46.1	46.6	45.1	43.6	40.5	35.4	32.9	30.5	32.1	29.9	29.4	33.6	36.1	25.4	31.9	35.1	25.6	27	23.5	17.8	8	0.2	-3.3	-2.8	-2.2	-3.8	-3.8	-1.8
8/29/2021	1:00:00 AM	34.9	44.4	45.4	42	44.6	43.7	49.6	54.4	54.4	57.1	57.4	54.1	47.1	42.4	39.4	39.3	40.4	39.7	39.3	39.9	38	35.1	34.4	32.7	32.5	33.3	29.9	25.7	19	10.1	0.2	-2.7	-2.3	-3.9	-3.9	-1.8
8/29/2021	2:00:00 AM	24.7	26.7	31.6	30.7	33.6	29	26.8	31.6	26.3	24.6	28.4	21.6	17.1	15.2	12.6	12.3	7.6	12.5	7.6	3.5	1.5	-1.5	-3.8	0.7	-3.5	-5.1	-5.2	-5.2	-4.6	-4.2	-3.6	-2.9	-2.3	-3.9	-3.9	-1.6
8/29/2021	3:00:00 AM	29.6	34.7	35.7	32.1	38.8	35.3	36.9	44.6	45.1	45.9	42.8	38	34.5	26.5	22.7	19	21	23.4	19.5	21.1	20.7	16.5	15.9	16.1	14.3	13.2	10.2	7.9	1	-2.5	-3.1	-2.6	-1.5	-2.9	-2.8	-1.7
8/29/2021	4:00:00 AM	27.1	28.3	32.2	31.8	32.5	30.8	29.7	31.9	27.9	27.1	29.6	27.3	26.2	25.4	21.9	20.4	16.8	16.5	14.7	14.6	11.7	7.1	1	-4	-1.4	-0.2	0.7	-4.1	-3.9	-4.1	-3.7	-2.9	-2.3	-4	-4	-1.8
8/29/2021	5:00:00 AM	44.6	52.7	54.1	55	59.1	57.7	59.3	58.8	60.1	61.9	59.7	56.9	51.3	53.1	46.7	46.3	47.5	47.1	44.7	43	41.7	39.1	38.4	39.2	34.4	33.5	30.9	25.2	17.9	7.5	-1.5	-2.8	-2.3	-4.1	-4	-1.8
8/29/2021	6:00:00 AM	43.2	53.6	52.5	55.4	60.1	58.2	62.1	62	62.5	64.9	61.1	58.3	53.5	49.7	48	49.8	51.3	49.8	49	49.8	48.9	46	44	41.6	41	39.6	35.4	29.8	21.9	11.8	1.6	-2.1	-2.1	-3.9	-4	-1.8
8/29/2021	7:00:00 AM	30.7	32.5	36.2	35.4	37	35.2	34.8	35.9	34	34.7	36.2	35.1	36.2	33.9	30.1	28.2	25.4	22.9	21.9	22.6	20.9	20	16.8	13.6	11.7	8.8	7.1	2.5	-2.4	-3.7	-3.7	-2.9	-2.3	-3.9	-3.9	-1.8
8/29/2021	8:00:00 AM	44.1	48.2	49.2	53	54.8	55.1	55.1	56.2	56	55.3	52.6	52	50.1	44.6	39.3	35.8	34.9	30.3	26.4	25.3	22.9	19.2	17.7	16.6	11.4	9.6	6.8	2.1	-1.4	-2.7	-2.8	-1.9	-2.1	-3.6	-3.6	-1.8
8/29/2021	9:00:00 AM	41	39.5	39.6	38	38.3	37	35.6	35.9	33.5	33.3	33.2	31.9	28.3	28.3	25.4	23.2	18.9	14.5	15.2	15.1	13.4	10	5.2	-0.8	-2.9	-3.7	-4.2	-4	-3.6	-3.1	-2.7	-2.1	-1.8	-3.1	-3.2	-1.6
8/29/2021	10:00:00 AM	44.8	48.2	49.2	46.1	49.7	48.8	49.7	49.5	51.5	56	51.8	52.6	48.6	46.4	36.7	31.9	28.8	24.2	19.5	17.2	16.5	13.6	13.7	16.2	10.7	8.8	6.7	1.4	-1.5	-2.3	-2	-1.5	-1.4	-2.7	-2.8	-1.4
8/29/2021	11:00:00 AM	45.9	43.6	41.1	38.7	37.1	35.9	34.7	35.4	34.4	34.6	35.1	39.6	35.3	31.7	28.4	25.1	21.1	15.7	9.6	7.5	5.4	3.1	2.5	2.7	1.4	-0.2	-1.1	-2.1	-2.1	-2	-1.7	-1.3	-1.1	-2.3	-2.4	-1.1
8/29/2021	12:00:00 PM	47.9	46	43.3	40.7	37.9	36.2	34.1	33.4	32.5	32.1	32.3	36.6	33.5	30.9	28.1	27.1	24.9	18.6	12	7.9	5.4	3.6	2.4	2.1	1.5	0.1	-1.1	-1.9	-2	-1.9	-1.6	-1.2	-1.1	-2.2	-2.2	-0.5
8/29/2021	1:00:00 PM	43.5	49.1	47.2	45.3	51.6	48.3	54.7	52.9	55.1	56.8	54.8	53.3	50.8	47.2	42.6	36.9	34.6	31.3	28.5	24.4	21.2	18.3	18.1	18.4	14.5	12.2	8.9	3.6	-0.1	-0.8	-1.1	-1	-0.9	-2	-2	-0.6
8/29/2021	2:00:00 PM	48.8	47.2	46.2	43.7	42.3	40.3	37.4	36	34.1	36.9	41.9	38.5	41.1	33.4	28.9	25.4	20.6	17.1	15.2	9.8	8.5	9.1	5.3	3.9	3.2	0.6	-0.2	-1	-1.3	-1.5	-1.3	-1.1	-1	-1.9	-2.1	-0.9
8/29/2021	3:00:00 PM	57.3	57.4	55.7	52.8	51.6	49.9	49.5	49.8	49.6	54.9	56.1	55.5	48.9	42.7	37.6	34.6	33.1	30.3	27.7	27.2	25.8	22.8	22.9	22.6	19.7	18.5	14.5	8.4	2.4	-1	-1.1	-0.9	-0.8	-1.8	-2	-1
8/29/2021	4:00:00 PM	45.4	50.1	49.5	50.7	53.8	55	56.2	56.9	56.8	59.1	57.7	56.3	55.4	46.9	40.1	36.9	36.1	32.1	29	28.8	28.3	27.1	27.6	27.8	27	26.5	22.2	15.1	6.6	0.3	-1.1	-0.7	-1.1	-2.2	-2.3	-0.9
8/29/2021	5:00:00 PM	43.7	44.8	45.9	51.4	50.3	53.4	53.8	56.3	57.2	58.1	54.5	49.8	49.3	41.7	38.4	37.2	35.3	32.5	29.6	28.3	27.6	25.4	24.9	22.9	23.3	20.6	17.4	10.6	2.2	-1.3	-1.5	-1	-1.2	-2.1	-2.3	-1.2
8/29/2021	6:00:00 PM	35.1	34.1	33.9	33.8	34.6	38.5	43.5	41.2	40.9	40.4	34.4	34.8	45	34.8	38	27.2	22.1	20	17.4	14.7	13.3	11.3	10.5	10.9	10.5	8.8	6.2	2.5	-0.7	-1.6	-1.6	-1.3	-1.2	-2.3	-2.4	-1.2
8/29/2021	7:00:00 PM	30.5	33.6	36.3	36.7	35.6	34.1	32.6	32.9	33.6	34	33.7	34.5	33	31	27.9	26.5	23.6	22	20.8	21.8	20.4	18.6	16.1	13.9	10.9	7.1	3.5	-0.1	-2.3	-3	-2.7	-2.1	-1.7	-3	-3	-1.5
8/29/2021	8:00:00 PM	41	50.5	50.9	50.2	53.2	52.6	56.6	54.9	59.1	59.5	55.7	53.5	52	50.8	46.6	45.2	47.5	45	41.7	42.1	41.9	36.5	35.6	38.8	32	31	27.4	20.8	12.2	2.7	-2.6	-2.5	-2	-3.5	-3.5	-1.7

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8/31/2021	4:00:00 AM	34.2	36.7	38.9	37.8	38.9	39.5	41.1	44.8	44	46.1	47.3	41	35.6	33.2	31.4	31.4	30.6	31.7	31	30.7	28.6	26.1	23.7	23.4	21.3	20.4	17.4	13.5	8	0.2	-3.2	-2.9	-2.3	-3.9	-3.9	-1.8
8/31/2021	5:00:00 AM	36	37	39	40.3	39.6	38.6	38.9	42.6	42.2	41.8	44.8	47.1	41.1	39.6	37.4	36.9	34.4	34.9	32.4	31.8	30.5	28.7	25.1	23.3	22.7	20.9	18.6	14.5	9.2	3	-2.1	-2.6	-2.3	-3.9	-3.9	-1.8
8/31/2021	6:00:00 AM	33.8	35.6	39.7	40.5	40.9	41.4	42.6	43.4	43.7	49.8	46.3	42.9	43.2	37.4	36.5	35.6	33.4	32.5	31.1	31.4	32	30.6	28.7	28.4	26.4	25.3	22.2	19.9	12.7	5.7	-0.1	-1.4	-1.9	-3.9	-3.9	-1.8
8/31/2021	7:00:00 AM	43.1	50.5	50.7	53.7	54.6	55	57.2	58.6	59.8	61.4	58.2	55.3	52.5	50.8	47.4	47.5	47.6	45.2	42.4	41.7	40.7	38.1	39.2	35.4	35.2	33.4	30.3	24.8	17.2	9.2	-0.6	-2.5	-2.2	-3.8	-3.8	-1.8
8/31/2021	8:00:00 AM	35.2	35.9	39.6	40.9	40.5	40.1	43.6	46.8	50.3	52.7	52.5	52.4	42.3	39.7	35.9	34.1	29.6	27	26	26.3	23.7	20.3	16.7	13.4	14.8	14.6	23.2	24.3	19.7	12.7	0.2	-1	-0.9	-2.5	-2.8	-1.5
8/31/2021	9:00:00 AM	42.5	49.6	50.6	52.1	55	53.7	55	52.8	54.2	53.8	53.1	54	53.4	45.7	40.1	37	35.4	30.4	27.8	27.7	25.7	21.8	19.3	19.2	18.1	19	16.8	12.2	6.3	0.8	-2.5	-2.2	-1.9	-3.1	-3.1	-1.6
8/31/2021	10:00:00 AM	40.9	42.8	43.7	49.8	53.3	49.4	56.3	56.3	56.7	53.7	51.9	47.5	43.3	42.4	37.8	34.5	31.6	25.1	19.6	16.8	14.5	12	12.2	14.4	11	9.4	6	1.7	-1.1	-2.1	-2.1	-1.7	-1.5	-2.7	-2.8	-1.5
8/31/2021	11:00:00 AM	42.7	48.7	46.8	47.3	55	49.6	52.9	54.9	55.6	56.8	56.6	52.6	48.3	47.4	41.4	37.8	33.8	30.4	25.5	22.1	20.5	18.1	18	19.3	16.2	14.9	10.7	5.3	0.7	-1.5	-1.6	-1.2	-1.1	-2.2	-2.1	-0.6
8/31/2021	12:00:00 PM	47.4	46.6	44.2	43.2	41.6	39.6	42.5	44.4	45.9	47.4	48.8	50.6	59.6	42	36.7	35.2	30.1	25.5	22.1	19.3	17.3	15.6	13.7	12	12.3	11	9	2.8	0.1	-1.1	-1.2	-0.9	-0.7	-1.5	1.7	8.7
8/31/2021	1:00:00 PM	57.6	55.9	54	51.6	49	45.8	42.8	41.1	41.5	41.2	45.4	40.9	38.6	36.3	35.4	32	24.5	20.9	17.2	16.3	16.1	15.1	15.8	17.6	17.8	18	17.4	9.2	4.3	1.6	0.4	-0.1	0.1	-1	1.3	7.5
8/31/2021	2:00:00 PM	58.4	56.3	54	51.7	49	46.3	43.4	42.4	43	42.3	48.7	44.9	40.4	38.9	34.6	32.5	26.1	21.1	16.7	14.9	13.2	11.8	11.8	12	11.4	8.8	6.3	3.7	0.7	0.4	-0.4	-0.1	-0.2	-1.2	1	7.1
8/31/2021	3:00:00 PM	60.4	58.7	57	54.6	52	49.7	48	49.2	51.5	53.8	51.6	49.3	44.6	40.1	36	34.6	30.6	28.3	27.1	28.1	28	27.2	27.3	27.8	26.4	23.4	19.1	12.9	6.4	1.2	-0.4	-0.1	0.4	-1.1	-1.4	0.4
8/31/2021	4:00:00 PM	66.9	65.5	63.9	61.9	59.6	57.1	54.2	51	48	44.8	41.8	41.9	37	34.7	32.4	29.7	27.3	24.9	22.9	21.3	20.1	19.8	20.1	19.3	16.2	13.9	11.3	8.5	5.8	3.6	3.2	3.5	3.3	2.3	1.9	3
8/31/2021	5:00:00 PM	61	59	56.6	54.1	51.5	48	44.8	41.9	39.4	38.2	39.3	36.3	37.8	40	31.5	28.3	25.4	22.1	19.4	18.3	16.8	15.8	15.5	14.5	11.1	7.2	4.6	1.5	0	-0.6	-0.2	0.2	0.3	-0.8	-1	0
8/31/2021	6:00:00 PM	28.9	30.4	33.2	33.4	33.6	33.1	33.4	34	34	34.7	34.7	35.4	34.2	31.7	28.5	25.4	22.4	20.3	19.9	20.9	20	18.2	16	14.5	12	9.9	7.6	4.6	1.9	-1.2	-1.7	-1.3	-1.1	-2.3	-2.5	-1.3
8/31/2021	7:00:00 PM	44.2	44.5	50.1	51.7	53	55.6	54.5	54.1	54.6	54.3	50.3	48.4	46.7	43.5	37	37.8	38.7	40.6	35	32.8	34.3	32.6	27.4	25.8	27.6	21.7	17.4	9	0.7	-3.2	-3	-2.4	-2	-3.4	-3.3	-0.3
8/31/2021	8:00:00 PM	45.7	50.4	51	53.5	52.8	57.2	55.7	56.3	60.1	59.8	56.2	51.7	43.1	40	41.8	44.2	45.9	43.5	40.8	40.9	38.6	34.6	33.2	30.1	30	29.2	24.8	19	10.3	2.2	-2.9	-2.6	-2	-3.5	-2.8	-0.5
8/31/2021	9:00:00 PM	36.4	45.6	45.5	42.6	53.5	44.2	47.7	49.6	50.3	50.4	51	51.2	46.6	41.9	38.6	39.2	39.6	37.5	37.3	36.9	36.4	33	30.4	29.2	27.2	25.8	20.8	15.3	7.8	0.4	-3	-2.6	-2.1	-3.6	-3.6	3.3
8/31/2021	10:00:00 PM	30.1	31.9	33.7	33.1	32.7	31.9	31.3	30.4	29	29.1	30.6	28.9	36.1	33.5	29.1	27.5	24.2	22.6	22.1	20.1	16.8	10.7	3.5	-5.5	-6.5	6.2	-5.7	-5.1	4.3	3.9	-3.5	2.8	2.2	-3.8	3.5	2.4
8/31/2021	11:00:00 PM	31	33	35.3	34.8	34.3	33	31.2	31.9	30	29.1	30.9	29.6	27.8	26.9	25.5	26	22.5	20.5	21.4	21.9	17	10.2	5.3	2.7	0.1	0.7	-2.5	-3.3	3.9	-4	-3.6	2.9	2.3	-3.9	3.5	0.8
9/1/2021	12:00:00 AM	38.9	52.3	49.4	47.7	52.4	46.7	55.3	55	56.6	58.2	56.5	53.8	47.4	43.5	42.7	45.7	47.6	47.4	45.6	46.6	46	42.8	41.9	42.7	39.8	37.4	32.2	25.6	18.4	9.3	-0.1	2.3	2.2	-3.9	14.6	12.5
9/1/2021	1:00:00 AM	40.8	48.5	48.4	48.9	53.2	49.6	55.5	58.2	59.5	58.8	55.4	50.7	51.4	51	47	50.6	51	49.9	47.1	44.8	44.7	42.3	41.5	39.7	38.5	36.5	32.4	26.2	17.5	7	-2	2.8	2.3	-3.9	3.9	1.7
9/1/2021	2:00:00 AM	42.8	50.9	51.5	53.5	57.9	55.8	58.2	56.9	57.9	55.7	54.4	52.6	47.9	39.8	39.3	41.5	46.3	43	40.5	42.5	41.4	37.6	39.4	38.6	33.3	31.9	28.5	22.8	15.4	5.7	-2.1	2.7	2.3	-4	-4	1.8
9/1/2021	3:00:00 AM	43.4	53.1	55.4	55.2	60.2	57.9	60.1	59.4	60.2	63.5	58.8	56.1	56.8	56.5	50.7	49.7	50.2	48.1	45.6	45.5	46.1	43.5	41.5	44.5	38.3	36.7	33	26.6	18.7	8.7	-1	2.8	2.1	-4	3.8	1.7
9/1/2021	4:00:00 AM	32.9	36.1	39.3	40.9	41.4	40.6	41.8	44.7	47.7	49.7	49.2	42.3	40.8	37.7	34.2	34.6	34.9	34.6	31.2	31.6	28.3	25.8	22.9	22.6	21.5	20	16.9	14.2	7.5	0.5	-2.7	2.5	2.3	-4.1	-4	1.8
9/1/2021	5:00:00 AM	33.6	36	40	43.2	39.5	39.6	40.6	41.3	42.3	40.9	44.4	48	40.2	38.2	34.5	34.2	33.3	31.4	31.1	31.8	30.2	27.7	24.2	22.9	21.2	18.9	16.5	13.9	8.7	3.3	-1.2	2.2	-2	-3.8	3.9	1.8
9/1/2021	6:00:00 AM	35.1	42.7	43.7	44.6	45.2	44.7	48.8	49.8	52.7	52.5	50.1	49.8	48.7	46.6	39.1	38.2	37	35.4	33.7	35.1	34.2	30	28.3	30.5	27	25	22	16.9	12	4.6	-0.8	3.7	1.9	-4.1	-4	1.8
9/1/2021	7:00:00 AM	36	47.7	44.2	44.1	43.9	44	42.4	46.2	47.3	47.7	51.5	52.7	44.8	40.1	37.5	35.9	33.6	30.9	28.7	27.6	26.5	25.6	23.8	23.4	23.7	21.5	19.8	16.2	11.9	9.9	10.1	14.6	8.5	7.5	3	7.3
9/1/2021	8:00:00 AM	41	48.4	49.1	52.5	61.2	59.5	59.8	57.9	59.4	58.6	56.5	54.6	50.2	46.4	42.2	39.6	37.3	33.5	29.8	27.2	25.3	22.6	21.2	21.2	20.1	18.3	15.7	11.7	9.2	5.2	6.1	6.2	3.9	2.4	1.5	2.7
9/1/2021	9:00:00 AM	38.5	37.4	38.9	38.4	38.6	38.9	36.6	36.4	37.9	35.7	36.7	35.3	33.9	32.6	30.1	26.9	22.7	17	10.1	8	4.9	2.3	0.6	-1.3	-2.5	2.6	-2.3	-3.2	2.9	2.5	-2.6	2.1	1.8	-3	3.1	1.6
9/1/2021	10:00:00 AM	40.2	44.7	42.8	45.3	51.1	50.1	53.7	54.6	53.3	52.6	51.5	50.9	50.6	44.3	37.7	35	30.2	24.6	19.4	18.1	18.8	14.3	15.3	18.6	13	12.1	10	5.9	1.6	1.1	-1.8	1.4	1.2	-2.4	2.5	1.3

9/1/2021	11:00:00 AM	46.2	49.6	49.9	52.6	53.9	52.4	54.1	53.8	55.2	55.2	54.6	54.8	53.2	47.5	39.1	35	34	27.9	23	21.9	20.8	17.4	16.6	18.3	14.6	13.7	11.3	6.5	2.2	-0.4	-0.4	-0.7	-0.8	-2.1	-2.3	-1.2
9/1/2021	12:00:00 PM	48.6	47.7	45.6	45.1	44.7	41.2	43.4	46.3	46.5	48.2	49.3	48	46.1	47.2	39.2	35.5	32	25	20.2	18.7	16.4	14	13.2	12	10.5	8.6	5.3	1.7	0.1	-0.6	-0.4	0.2	-0.3	-1.8	-2.1	-0.9
9/1/2021	1:00:00 PM	58.2	56.6	54.8	53.2	51.6	48.2	45.9	44.5	44.7	46.3	48.3	46.2	41	44.2	36.9	33.2	28.9	23.8	19.8	18.2	17.1	18.3	20.3	22.8	19.3	18.4	15	12.1	8.4	2.3	0.5	0.5	0.3	-1.3	-1.6	-0.2
9/1/2021	2:00:00 PM	59.3	57.7	56.1	54.1	51.5	48.4	45.2	45.1	45.6	45.9	48.4	44.2	40.6	43.2	36.9	33.6	30.1	25.9	21.6	19.8	18.7	18	19.1	27.3	23.7	22	19.7	15.1	8.6	2.3	0.6	0.6	0.5	-0.6	-0.4	2.4
9/1/2021	3:00:00 PM	56.2	54.3	52.3	49.8	47.3	44.6	42.3	45.4	45.1	45.9	52.7	42.4	40.1	42.7	34.8	34.1	30.7	25.2	20.3	19.9	19.3	20	20.8	31.3	24.8	24.2	22.3	14.3	8.4	1.5	-0.9	-0.8	-0.7	-1.8	-2	-0.9
9/1/2021	4:00:00 PM	55.4	53.7	50.9	48.4	46.1	42.6	39.7	37.6	34.9	33.6	36.8	41.6	45.1	42.3	31.4	34.4	25.8	21.7	16.9	15.5	13.9	12	11.6	10.6	8.2	5.9	3.8	1.2	-0.1	-0.5	-0.6	-0.5	-0.3	-1.6	-1.9	-0.1
9/1/2021	5:00:00 PM	54.4	53.7	51.5	49.7	53.9	48.1	53.9	56.3	56.6	57.9	55.4	50.1	44.6	41.2	37.1	36.4	38.5	38.9	37.3	37.7	37.6	35.3	34.2	36.2	29.3	26.7	22.3	14.3	4.5	-1.4	-1.8	-1.5	-1.3	-2.4	-2.5	-1.2
9/1/2021	6:00:00 PM	46.8	48.3	50.5	47.9	51.2	52.3	52.9	52.4	55.7	56.4	59.6	53	48.1	39.5	36	38.1	42.9	39.9	38.1	39.7	40.2	36.8	33.8	33.9	28.9	27.9	25.1	19.1	10.9	1.9	-1.6	-1.3	-1	-1.9	-2.3	-1.1
9/1/2021	7:00:00 PM	42.9	52.6	52.2	53.8	60.5	55.4	60.4	61.2	62.3	64.4	59.8	55.4	53.6	51.1	47.1	48.8	50.3	49.1	46.8	46.2	45.6	41.9	40.2	44	36.5	34.2	29.7	21.1	11.2	0.4	-2.6	-2.3	-1.9	-3.3	-3.4	-1.6
9/1/2021	8:00:00 PM	31.2	34.9	37	35.2	36.3	38	40.8	43.4	44.8	42.6	45.6	40.4	38.3	33.4	30.7	29.2	31	31.9	28.3	29.3	29.8	24.6	22.4	22.3	19.5	16.5	11.8	7.6	1.5	2.4	-2.3	-2.1	-1.6	-2.8	-3.4	-1.6
9/1/2021	9:00:00 PM	27.4	31.4	34.3	33.4	35.9	31.8	30.5	29.9	28.7	28.5	29.4	29.2	26.9	26.9	25.4	23.8	20.9	20.1	18.1	17.7	13.1	4.5	-3	-7.4	-7	6.2	-5.6	-5.1	4.5	-4	-3.5	2.7	2.2	-3.8	-3.8	-1.3
9/1/2021	10:00:00 PM	31.4	37.9	39.2	38.3	44.8	41	44.9	47.9	54.4	48.6	45.9	40.4	35.5	32.4	33.6	37	37.6	35.6	34.7	34.9	31	28.5	25.7	22.2	23.8	20.5	15.3	10	3.3	2.9	-3.5	2.9	2.3	-3.9	-3.8	6.5
9/1/2021	11:00:00 PM	31.4	32.8	35.1	35.1	34.2	33.5	31.6	30.4	29	28.8	29.8	29.7	27.9	28	26.8	27.2	23.8	22.4	22.2	21.3	16	7.9	0.8	-7.4	-7.2	6.6	-5.9	-5.3	4.7	4.2	-3.7	2.9	2.3	-4	2.2	4.9
9/2/2021	12:00:00 AM	45.8	55	53.9	54.9	59	56.8	58.1	58.5	59.4	61.4	59.3	56.2	50.5	45.1	44.2	46.9	49.3	48.4	46.4	47.2	46.6	44.1	43.1	42.2	40.5	37.2	33	27.6	20.6	11.2	1.9	2.2	2.2	-4	0.8	2.8
9/2/2021	1:00:00 AM	31.3	32.5	34.6	34.1	34.5	33.3	30.7	30.4	29.3	29	31.1	31.7	30.6	28.8	27.3	27.2	25	23	22.1	22.3	20.4	17.9	15.5	13.5	10.1	6.7	4.4	0.9	2.6	3.8	-3.6	2.9	2.3	-4	2.5	1.3
9/2/2021	2:00:00 AM	32.6	33.2	35.7	35.4	35.4	33.5	32.1	31.7	30.1	29	31.2	31	33.1	36.6	27.4	30.1	29.1	24.9	24.1	23.1	18.9	11.4	2.4	-6.7	-7	6.4	-5.8	-5.3	4.8	4.3	-3.8	-3	2.3	-4	-4	1.8
9/2/2021	3:00:00 AM	33.9	43.4	41	42.8	56.7	43.1	48.9	53.4	54.9	55.5	52.1	57.2	43.9	37.9	39.8	41.6	41	38.5	37.7	36	32.7	31.8	28.1	25.3	24.9	22.7	18.6	12.2	4.1	2.5	-3.7	-3	2.3	-4	-4	2.3
9/2/2021	4:00:00 AM	41.5	49.1	52.3	53	56.7	57.4	58	55.5	56.4	56.9	55	55.8	54.2	53	48.1	46.5	48.2	45.1	41.8	41.1	41.2	38.1	36	36.8	33.6	32.2	28.7	22	13.7	4.3	-1.9	1.5	2.2	-4.1	4.1	1.8
9/2/2021	5:00:00 AM	39.2	52.1	47	48.5	48.5	48.2	49.5	53.1	54.6	55.8	53.2	51.6	47.7	42.3	38.6	39.1	40.5	39.4	38.8	39.6	38.4	35.8	32.9	32.6	29.8	28.6	24.4	19.2	13.4	6.3	0	1.3	-2	-4.1	4.1	1.8
9/2/2021	6:00:00 AM	35.9	39.9	47.6	46.2	42.5	44.8	46.1	49.8	52	54.1	51.9	50.3	47.4	51.7	47.4	41.9	45.2	45.6	47.4	47.3	41.7	40.7	38.7	36.8	34.6	32.2	28.1	22.1	15	7.2	0.5	1.9	2.1	-4.1	4.2	1.8
9/2/2021	7:00:00 AM	41.1	50.9	53.1	54.5	62.5	60.2	61.6	60.8	61.8	61.5	58.7	54.4	52.1	50.9	47.7	46.8	47.6	45.2	41.6	40.4	41.5	37.9	35.8	38.7	32.6	31.3	27.2	22	14	5.7	-1.4	2.6	2.2	-3.6	3.9	1.8
9/2/2021	8:00:00 AM	42.4	44.4	47.3	49.2	50	51.2	52.6	51.7	52.3	52	52.5	52.9	50	44.1	38.6	36.4	32.4	29.4	28.7	29	25.4	20.8	17.2	13.9	12.5	11.2	8.1	3.5	1.3	-3	-3	2.4	1.9	-3.3	3.4	1.7
9/2/2021	9:00:00 AM	35.6	36.7	40.7	41.2	43.4	41.9	42.1	43.7	44.1	46.5	47.5	44.1	43.2	42.2	39.6	34.5	29.5	24.1	16.8	14.9	12.2	8.4	5.6	5.9	5.3	3.9	1.5	0.1	1.4	1.4	8.7	10.8	0.9	-2.6	2.6	1.5
9/2/2021	10:00:00 AM	42	39.4	39.2	40.8	40.1	37.5	38.2	40.8	41.5	42	41.6	46.8	43.2	38.8	36.8	35.5	30	24.5	18.3	16	13.9	8.5	3.6	2.8	2.4	1	-0.7	-1.5	1.5	0.8	0.1	0.9	0.7	-2.2	2.4	1.2
9/2/2021	11:00:00 AM	47.1	46.3	44.4	42.3	40.1	38.9	40.5	41.1	48.6	53.1	44.8	42.2	37.6	39.1	35.4	30.9	26.4	22.7	18.8	15.5	13.9	12.3	10	9.1	9.3	6	4	-0.1	1.8	1.8	-1.6	1.2	-1	-2.2	2.1	0.4
9/2/2021	12:00:00 PM	55.6	56.7	55.3	53	52.8	51.8	51	50.8	54.2	54.7	53.7	52.7	48	43.7	40.3	38.8	36.2	30.9	26.9	25.1	22.2	19.7	19.1	18.3	17.1	15.6	12.9	9.3	6.3	3.3	2.1	1.3	1.1	0.1	0.3	1.5
9/2/2021	1:00:00 PM	53.1	51.8	49.5	47.8	44.7	41.6	39.6	39.4	40.3	40.4	41.5	42.2	37.4	35	31.7	35.4	24	19.4	14.5	12.6	10.6	8.3	6.8	6.3	5.1	3.3	1.6	0.6	0.1	0	0	0.1	0	-1.4	1.6	0.1
9/2/2021	2:00:00 PM	58.3	56.6	55.1	52.9	50.3	47.8	45.8	46.8	45	44.2	42.6	40.8	39.5	37.1	33.3	30.5	27.4	22.4	18	15.6	13.4	11.4	11.6	11.2	10.1	8.4	7.7	5	2.5	0.2	-0.2	0.2	0.3	-0.8	1.3	0.4
9/2/2021	3:00:00 PM	59.8	59.1	57.6	56.6	57.3	54.8	56.7	54.7	57.4	57.9	57.1	55	53.2	46.1	41	36.8	35.4	30.9	26.8	27.7	27.6	25.7	26	25	22.5	19	14.6	7.5	2	0.3	-0.5	0.1	0.1	-1.2	1.4	0.6
9/2/2021	4:00:00 PM	69.9	68.4	67	65.2	63.5	61	60.8	58.7	58.2	56.9	53.2	52.3	49.2	46.8	40.5	38.9	37.6	34.9	32.7	33.2	33.4	29.9	28.6	30.6	25.3	23	20	17	13.9	11	9.5	9.2	9.1	8.1	7.4	8.4
9/2/2021	5:00:00 PM	71	69.8	68.4	66.6	64.6	62.9	60.8	59	57.6	58.4	55.2	52.6	57.2	48.5	42.1	42.1	40.3	38	35.8	35.9	34	31.3	30.1	27	24.5	22	19.3	16.1	13	10.2	8.8	8.8	8.5	7.4	6.3	6.5

9/2/2021	6:00:00 PM	64.9	63.8	61.7	59.7	57.2	54.5	51.6	48	44.8	41.2	38.5	36.2	34.5	32.8	29.6	27	24.6	22.8	20.5	18.6	16.7	16.8	17.3	16.3	13.3	10.8	8.3	5.7	3.5	2.3	2	2.5	2.6	1.3	0.3	0.8
9/2/2021	7:00:00 PM	55.2	53.9	52.5	51.7	54.1	52.5	53	51.1	52.7	54.8	52.8	52	51.7	47.1	36.6	39.2	41.8	39.8	36.2	36.9	37.1	32.2	29.7	31.3	24.4	22.9	18.3	11.6	4.6	-1	-2.4	-1.9	-1.7	-3.1	-3.2	-0.9
9/2/2021	8:00:00 PM	41.5	40.5	40.1	37.6	38.5	37.3	41	43.7	47.9	43.8	44	40.6	39.3	34.6	29.1	28.3	28.8	31.5	29	27.4	24.8	20.5	17.6	16.3	17.4	13.6	9	3.6	-1.3	-3.1	-3.1	-2.5	-2.1	-3.6	-3.6	-1.7
9/2/2021	9:00:00 PM	26.6	28.5	31.4	30.8	31.4	30.3	29.3	28.4	27.3	27.6	28.6	27.8	25.7	25.2	22.9	21	16.7	15.2	13.6	12.7	9.4	7.2	7	7	7	7	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.1	7.1	7.2
9/2/2021	10:00:00 PM	29	31.2	34.6	35.4	35.2	34.1	32.7	32.1	31	31.5	32.2	32.7	31	28.7	27.4	25.5	22.8	20.8	18.6	18.1	16	14.9	12.9	9.2	5	0.4	-1.2	-3.5	-4.1	-4.1	-3.6	-2.9	-2.3	-3.9	6.6	11.9
9/2/2021	11:00:00 PM	34.7	35.5	35.4	35.6	36.8	32.6	31.7	32.2	30.4	30.4	30.3	29.9	29.1	27.9	25.3	24.1	21	19	19.5	19.5	16.3	10.2	4	-4.6	-6.4	-5.9	-5.4	-5.2	-4.6	-4.2	-3.6	-2.9	-2.3	-3.9	-3.9	-1.7
9/3/2021	12:00:00 AM	46.6	53	54	58.1	64.1	60.2	63.9	64.2	64.7	64.7	61.8	57.6	54.1	53.6	51.2	53.5	52.6	51.3	49.6	49.5	48.3	44.8	43.1	41.6	39.4	36.8	31.9	25.4	17.8	9.4	1.1	-2	-2.1	-3.8	-3.5	0.6
9/3/2021	1:00:00 AM	27.1	28.8	32.3	32	34.5	30.9	29.4	31.5	29.2	29.1	29.7	31.5	29.7	27.7	25.5	24.4	23.8	22.2	22	23.3	24.5	21.9	19.9	19.1	15.7	13.5	10.7	7.3	3.6	2.1	1.8	2	2.2	1.7	1.7	2.3

WM11: Overall Hourly Intervals – A-weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	4:52:29 PM	49.53152	9.611618	71.32033	43.9576	23.7284	22.0679
8/23/2021	5:00:00 PM	26.21749	10.22623	44.95965	29.34568	25.10388	22.61449
8/23/2021	6:00:00 PM	29.02191	7.43693	49.93161	30.84456	24.21633	22.26768
8/23/2021	7:00:00 PM	29.31905	10.18053	49.08447	31.44608	25.08048	22.60715
8/23/2021	8:00:00 PM	31.2192	13.59212	51.90404	33.57284	26.99988	24.40951
8/23/2021	9:00:00 PM	30.87935	0	54.2823	31.85338	22.95221	21.60161
8/23/2021	10:00:00 PM	13.28653	0	34.07517	22.25109	21.60999	21.59454
8/23/2021	11:00:00 PM	10.33097	0	29.58156	22.17976	21.63204	21.59211
8/24/2021	12:00:00 AM	10.51623	0	24.54258	22.23459	21.64112	21.59815
8/24/2021	1:00:00 AM	18.4172	0	39.6733	22.46028	21.7675	21.64275
8/24/2021	2:00:00 AM	14.70576	0.893516	32.34244	22.76804	21.96359	21.70588
8/24/2021	3:00:00 AM	21.24595	0	46.13157	22.76269	21.88883	21.67563
8/24/2021	4:00:00 AM	23.12661	3.308729	57.64201	23.3474	22.12547	21.77356
8/24/2021	5:00:00 AM	22.42166	0	45.89025	22.85907	21.88678	21.66184
8/24/2021	6:00:00 AM	12.99072	0	34.55263	22.32974	21.75971	21.62759
8/24/2021	7:00:00 AM	18.35548	2.101508	39.44443	23.92722	21.992	21.69719
8/24/2021	8:00:00 AM	23.08094	2.152053	48.6038	24.0313	21.97656	21.71047
8/24/2021	9:00:00 AM	22.85656	0	43.44634	25.22019	21.70856	21.60751
8/24/2021	10:00:00 AM	19.16265	1.593516	40.79207	23.9384	21.78316	21.61158
8/24/2021	11:00:00 AM	26.39476	4.190364	49.15884	27.97144	22.68868	21.66576
8/24/2021	12:00:00 PM	25.04209	4.355399	45.64518	28.4243	22.52895	21.67193
8/24/2021	1:00:00 PM	28.4711	2.994823	48.76683	29.3828	22.53164	21.6569
8/24/2021	2:00:00 PM	38.77719	2.724503	72.34458	28.67479	22.64423	21.63899
8/24/2021	3:00:00 PM	31.90233	2.200783	59.91456	28.27951	22.38522	21.63186
8/24/2021	4:00:00 PM	28.84133	2.393264	52.09799	31.18192	23.42236	21.73573
8/24/2021	5:00:00 PM	24.84979	0	44.54822	28.24839	21.76768	21.59603
8/24/2021	6:00:00 PM	21.70624	0.014554	43.24281	25.31778	22.1925	21.62911
8/24/2021	7:00:00 PM	21.93149	1.730599	41.8897	25.42956	22.06218	21.66587
8/24/2021	8:00:00 PM	21.33247	0	45.84064	23.61013	21.74948	21.62349
8/24/2021	9:00:00 PM	22.29249	0	43.1928	24.88865	21.79174	21.61819
8/24/2021	10:00:00 PM	10.20406	0	32.74141	21.95488	21.67745	21.61995
8/24/2021	11:00:00 PM	20.05873	0	54.63605	21.89706	21.64264	21.60113
8/25/2021	12:00:00 AM	13.73618	0	31.77262	22.77077	21.84849	21.63813
8/25/2021	1:00:00 AM	16.49128	0	37.3678	22.76617	21.83249	21.64886
8/25/2021	2:00:00 AM	25.74962	0.254849	52.53924	23.50302	22.03229	21.72206
8/25/2021	3:00:00 AM	14.22628	0	35.50566	22.44079	21.73216	21.62716
8/25/2021	4:00:00 AM	8.997073	0	29.90259	21.9172	21.64239	21.60875
8/25/2021	5:00:00 AM	8.717482	0	28.34747	21.841	21.67814	21.62602
8/25/2021	6:00:00 AM	17.51156	0	38.68787	22.25443	21.74479	21.62469
8/25/2021	7:00:00 AM	26.66305	0	44.98057	30.7608	23.07992	21.67784

8/25/2021	8:00:00 AM	24.1044	0	45.19094	26.9029	22.03598	21.65177
8/25/2021	9:00:00 AM	23.8301	0.034355	45.20802	27.29838	21.95081	21.62375
8/25/2021	10:00:00 AM	25.24856	1.964064	47.041	27.38995	22.18904	21.63337
8/25/2021	11:00:00 AM	28.02896	6.348044	48.40105	30.60372	23.27881	21.84551
8/25/2021	12:00:00 PM	27.68471	4.133492	50.37921	29.81999	22.68129	21.6681
8/25/2021	1:00:00 PM	35.61858	7.781728	59.08891	38.01177	28.55618	22.43236
8/25/2021	2:00:00 PM	42.75202	7.386151	65.43221	41.2954	28.78183	22.5161
8/25/2021	3:00:00 PM	34.62175	6.205167	51.50754	38.66795	30.37198	22.49497
8/25/2021	4:00:00 PM	35.40794	10.79291	57.00774	38.82242	31.24411	23.83248
8/25/2021	5:00:00 PM	30.20885	2.363701	48.34855	34.39348	25.57197	22.02308
8/25/2021	6:00:00 PM	32.89909	19.08157	52.43189	34.97464	29.86555	26.20988
8/25/2021	7:00:00 PM	32.21921	17.76392	51.28228	34.60825	27.7232	24.55823
8/25/2021	8:00:00 PM	28.29637	4.021009	49.34693	30.71856	23.68105	21.92653
8/25/2021	9:00:00 PM	19.12348	0	42.90011	23.36016	21.6417	21.59457
8/25/2021	10:00:00 PM	22.50924	0	45.19255	23.88097	21.869	21.63516
8/25/2021	11:00:00 PM	12.7903	0	34.38294	22.12925	21.67836	21.61572
8/26/2021	12:00:00 AM	19.8106	0	37.31292	24.40283	21.75308	21.62826
8/26/2021	1:00:00 AM	16.80776	0	36.83555	22.76249	21.7789	21.64073
8/26/2021	2:00:00 AM	26.89101	0.142762	52.47714	22.92275	21.85142	21.65797
8/26/2021	3:00:00 AM	12.76037	0	32.07038	22.3539	21.75066	21.63863
8/26/2021	4:00:00 AM	16.08246	0	33.29749	23.43387	22.0457	21.69818
8/26/2021	5:00:00 AM	16.64857	0	34.65454	23.79397	22.06062	21.61498
8/26/2021	6:00:00 AM	15.70165	0	45.43725	22.33314	21.68653	21.60537
8/26/2021	7:00:00 AM	25.74883	1.228327	46.3008	27.54646	22.69303	21.76834
8/26/2021	8:00:00 AM	22.60676	0	44.71612	26.16861	21.99663	21.65263
8/26/2021	9:00:00 AM	16.62915	0	34.23476	23.66409	21.81981	21.59506
8/26/2021	10:00:00 AM	28.04782	2.345208	52.10513	25.39623	21.82166	21.61613
8/26/2021	11:00:00 AM	21.98437	4.452342	44.3759	25.05142	21.89515	21.63319
8/26/2021	12:00:00 PM	28.50739	5.522097	56.53814	29.96003	23.07756	21.79284
8/26/2021	1:00:00 PM	30.28636	4.029498	52.38074	32.64257	22.9444	21.65813
8/26/2021	2:00:00 PM	35.30773	4.155781	58.65232	36.64603	25.98978	21.8654
8/26/2021	3:00:00 PM	31.98685	3.120674	52.26604	35.69454	27.54403	21.80629
8/26/2021	4:00:00 PM	28.96442	4.002534	48.00558	32.86535	24.70366	21.85493
8/26/2021	5:00:00 PM	28.40211	5.522141	50.70417	30.78132	25.30611	22.11003
8/26/2021	6:00:00 PM	27.6851	7.201088	50.78087	29.42577	24.19688	22.1925
8/26/2021	7:00:00 PM	30.25569	14.58354	51.55965	32.01392	26.1106	23.3098
8/26/2021	8:00:00 PM	29.74176	13.88585	49.27928	32.02948	25.68277	23.2817
8/26/2021	9:00:00 PM	26.77159	1.478819	47.4359	29.76766	23.4361	21.74277
8/26/2021	10:00:00 PM	12.67379	0	34.31492	22.29782	21.6384	21.59925
8/26/2021	11:00:00 PM	16.48594	0	37.96947	22.17217	21.67058	21.61142
8/27/2021	12:00:00 AM	11.30659	0	35.49424	21.94145	21.66575	21.60689
8/27/2021	1:00:00 AM	18.11035	2.091332	35.30431	23.24593	21.92429	21.70711
8/27/2021	2:00:00 AM	29.97557	3.502362	56.06866	23.96647	22.09999	21.75466

8/27/2021	3:00:00 AM	13.19846	0	29.98372	22.58371	21.87493	21.68133
8/27/2021	4:00:00 AM	32.57679	0.722444	57.96066	24.92316	21.95231	21.69818
8/27/2021	5:00:00 AM	20.00377	6.470789	49.90021	24.47226	22.53506	21.93486
8/27/2021	6:00:00 AM	29.88309	5.115273	53.71248	28.32739	22.92836	21.93408
8/27/2021	7:00:00 AM	23.76579	10.55001	41.72848	28.11893	23.8146	22.48294
8/27/2021	8:00:00 AM	23.97079	6.238817	45.75361	26.38935	22.76058	21.96708
8/27/2021	9:00:00 AM	38.58925	4.999551	72.84107	27.79386	22.45061	21.83475
8/27/2021	10:00:00 AM	28.29437	1.539333	54.36515	26.13935	21.7264	21.60096
8/27/2021	11:00:00 AM	24.44854	4.896369	47.3856	26.98402	22.22792	21.65053
8/27/2021	12:00:00 PM	28.90949	4.502553	53.39374	30.35615	22.1448	21.63052
8/27/2021	1:00:00 PM	28.28117	3.991246	56.58694	31.47682	22.6356	21.65505
8/27/2021	2:00:00 PM	32.95383	7.813864	53.34861	35.86158	27.83905	22.25828
8/27/2021	3:00:00 PM	30.48	7.379967	48.41526	33.92192	26.39201	22.21697
8/27/2021	4:00:00 PM	29.2701	5.163116	48.45942	32.3364	25.59693	21.92671
8/27/2021	5:00:00 PM	29.86379	0	54.73497	32.25926	25.233	21.91434
8/27/2021	6:00:00 PM	19.10607	0	42.42283	23.21639	21.72832	21.60844
8/27/2021	7:00:00 PM	23.3474	0	44.68294	27.24649	21.8856	21.6246
8/27/2021	8:00:00 PM	23.34528	0	48.32664	24.26127	21.76247	21.60835
8/27/2021	9:00:00 PM	22.00067	0	53.59622	24.05754	21.6846	21.59517
8/27/2021	10:00:00 PM	28.34066	2.718588	49.9502	30.51944	22.15198	21.65487
8/27/2021	11:00:00 PM	24.20722	4.266353	46.47853	26.16544	21.9466	21.72179
8/28/2021	12:00:00 AM	18.66026	5.304326	36.5891	23.84098	22.27409	21.80703
8/28/2021	1:00:00 AM	19.44748	6.636632	38.35374	24.10111	22.47808	21.97545
8/28/2021	2:00:00 AM	22.08209	6.422605	51.95032	24.04116	22.42096	21.92751
8/28/2021	3:00:00 AM	17.29664	5.096204	35.96019	23.55744	22.36284	21.87979
8/28/2021	4:00:00 AM	20.89635	5.190759	48.43513	25.14278	22.80106	21.94007
8/28/2021	5:00:00 AM	24.03627	3.630608	48.4286	24.10948	22.21885	21.75188
8/28/2021	6:00:00 AM	21.38199	3.92018	43.27896	24.75689	22.59313	21.90596
8/28/2021	7:00:00 AM	23.54589	0.380086	44.73154	26.18909	22.15281	21.64667
8/28/2021	8:00:00 AM	21.37118	0.976799	55.04699	22.69152	21.77784	21.64899
8/28/2021	9:00:00 AM	18.8559	2.74557	43.59129	23.03126	21.75708	21.63809
8/28/2021	10:00:00 AM	21.76902	6.05698	54.85605	22.98795	21.88274	21.71387
8/28/2021	11:00:00 AM	25.78526	5.827231	48.50929	27.83948	22.14886	21.69897
8/28/2021	12:00:00 PM	27.80032	4.641723	54.12704	28.26456	22.04455	21.65902
8/28/2021	1:00:00 PM	26.84869	4.556935	50.17559	29.00022	22.14676	21.66682
8/28/2021	2:00:00 PM	23.44086	3.643645	46.64244	26.23726	21.76804	21.62521
8/28/2021	3:00:00 PM	25.91637	2.278772	46.43727	28.89574	21.99117	21.60985
8/28/2021	4:00:00 PM	21.60781	0.104143	43.68771	24.93402	21.74277	21.59701
8/28/2021	5:00:00 PM	20.94645	0	44.0807	22.68639	21.59401	21.59102
8/28/2021	6:00:00 PM	17.50502	0	42.7457	21.64518	21.5947	21.59161
8/28/2021	7:00:00 PM	26.74267	0	54.5976	22.14984	21.5952	21.5923
8/28/2021	8:00:00 PM	23.35754	0	48.12302	23.36629	21.61504	21.59269
8/28/2021	9:00:00 PM	16.11198	0	39.80319	21.91542	21.63133	21.59698

8/28/2021	10:00:00 PM	12.5095	0	40.12439	22.27536	21.71589	21.61633
8/28/2021	11:00:00 PM	17.32636	0	37.74811	22.73017	21.73614	21.63308
8/29/2021	12:00:00 AM	14.48732	0	41.14837	22.19519	21.7438	21.63532
8/29/2021	1:00:00 AM	10.34417	0	30.70971	22.08636	21.68572	21.61552
8/29/2021	2:00:00 AM	13.89451	0.547948	30.1499	22.6139	21.95199	21.7161
8/29/2021	3:00:00 AM	17.81001	2.411374	32.81503	24.22039	22.2334	21.76094
8/29/2021	4:00:00 AM	19.64962	6.282458	40.88596	24.81827	22.85968	22.02973
8/29/2021	5:00:00 AM	31.85604	4.627787	57.14947	25.66671	22.83811	21.96226
8/29/2021	6:00:00 AM	25.88757	0	48.62742	23.37964	21.98888	21.67422
8/29/2021	7:00:00 AM	28.41254	2.575097	49.67608	26.52223	22.04542	21.72511
8/29/2021	8:00:00 AM	19.98419	5.086103	38.28887	24.56506	22.46448	21.87061
8/29/2021	9:00:00 AM	23.28771	4.583961	54.42269	23.88338	22.20349	21.77368
8/29/2021	10:00:00 AM	19.90456	6.273595	47.19528	23.90683	22.36116	21.81167
8/29/2021	11:00:00 AM	23.5002	5.12906	48.44134	24.44389	21.94874	21.68398
8/29/2021	12:00:00 PM	22.48635	2.887733	44.55545	25.32562	21.86051	21.6174
8/29/2021	1:00:00 PM	23.1672	3.335142	47.66985	25.53802	21.8058	21.60988
8/29/2021	2:00:00 PM	30.23618	3.810188	59.68546	30.10711	22.33781	21.63776
8/29/2021	3:00:00 PM	30.49592	4.021974	50.92234	33.21848	22.853	21.66643
8/29/2021	4:00:00 PM	23.39062	0.29989	46.70994	25.89129	21.82815	21.60608
8/29/2021	5:00:00 PM	18.26685	0	41.64036	23.54606	21.66488	21.59275
8/29/2021	6:00:00 PM	25.05737	0	50.02743	24.66304	21.61075	21.59506
8/29/2021	7:00:00 PM	23.30588	0	50.79003	23.53427	21.59928	21.59118
8/29/2021	8:00:00 PM	13.69148	0	33.73608	21.88412	21.63967	21.59156
8/29/2021	9:00:00 PM	14.43546	0	34.68433	22.54579	21.66592	21.59185
8/29/2021	10:00:00 PM	26.75292	0	52.16901	23.79806	21.82784	21.63061
8/29/2021	11:00:00 PM	21.1028	0	44.21137	22.66127	21.72334	21.61883
8/30/2021	12:00:00 AM	20.04169	0	50.08267	23.06848	21.83795	21.63739
8/30/2021	1:00:00 AM	16.79445	0	40.42193	23.20172	21.89266	21.66267
8/30/2021	2:00:00 AM	13.41321	0	31.83182	22.67056	21.83937	21.6501
8/30/2021	3:00:00 AM	10.93835	0	33.27996	22.05599	21.68373	21.61569
8/30/2021	4:00:00 AM	20.94756	0	44.46109	22.96779	21.78121	21.62692
8/30/2021	5:00:00 AM	19.80043	0	43.59195	23.21759	21.91981	21.65758
8/30/2021	6:00:00 AM	27.13941	5.504843	49.25319	25.07704	22.38836	21.8487
8/30/2021	7:00:00 AM	28.52855	5.43323	51.83277	28.81055	22.74047	21.95523
8/30/2021	8:00:00 AM	22.89191	5.584459	47.47106	26.59854	22.57097	21.883
8/30/2021	9:00:00 AM	27.29405	6.348134	53.50157	30.07218	22.85893	21.92968
8/30/2021	10:00:00 AM	28.15165	9.144871	54.231	28.72932	23.04153	22.11983
8/30/2021	11:00:00 AM	26.41255	7.232069	50.1758	29.37211	23.15609	21.87915
8/30/2021	12:00:00 PM	29.67887	4.965744	56.01289	29.67103	22.46117	21.66472
8/30/2021	1:00:00 PM	28.10464	5.805453	48.15028	32.1568	23.91682	21.83456
8/30/2021	2:00:00 PM	31.07077	3.826803	58.89884	31.82924	24.02444	21.73807
8/30/2021	3:00:00 PM	28.93535	5.869606	46.76258	32.44522	25.49734	22.02329
8/30/2021	4:00:00 PM	28.81897	6.803008	48.82021	30.82315	24.67028	22.20217

8/30/2021	5:00:00 PM	20.58601	0	43.58805	24.89887	21.63252	21.59354
8/30/2021	6:00:00 PM	18.55378	0	39.26644	23.63518	21.74363	21.60277
8/30/2021	7:00:00 PM	19.18099	1.626751	38.05482	24.67611	21.90678	21.64848
8/30/2021	8:00:00 PM	21.76312	0.047602	51.48648	23.92957	21.86813	21.65055
8/30/2021	9:00:00 PM	13.46635	0	31.83313	22.44342	21.73785	21.62332
8/30/2021	10:00:00 PM	17.69439	0	36.25788	23.72571	22.04525	21.63466
8/30/2021	11:00:00 PM	14.15616	0	35.09333	22.16605	21.67532	21.60512
8/31/2021	12:00:00 AM	12.5001	0	30.9032	22.28726	21.71356	21.62472
8/31/2021	1:00:00 AM	19.1489	0.303684	51.93914	23.15928	22.05232	21.71305
8/31/2021	2:00:00 AM	12.70606	0	31.37667	22.29153	21.77013	21.65169
8/31/2021	3:00:00 AM	18.02801	4.222027	38.17825	23.89958	22.2557	21.82389
8/31/2021	4:00:00 AM	24.37063	4.071598	49.13806	24.66016	22.27449	21.80874
8/31/2021	5:00:00 AM	25.39444	1.839253	47.79472	28.6945	22.7194	21.78662
8/31/2021	6:00:00 AM	24.73073	4.322959	52.30954	25.17013	22.21094	21.78932
8/31/2021	7:00:00 AM	24.32368	3.788228	46.04205	28.63462	22.37415	21.76723
8/31/2021	8:00:00 AM	23.59156	1.506559	50.02292	28.11949	22.37831	21.71801
8/31/2021	9:00:00 AM	20.58898	3.376953	42.05561	25.05463	22.07987	21.72728
8/31/2021	10:00:00 AM	26.05366	2.334213	48.10392	28.63632	22.27551	21.67318
8/31/2021	11:00:00 AM	22.95706	1.958447	43.45431	26.48936	21.78982	21.62574
8/31/2021	12:00:00 PM	20.93608	2.946953	44.68708	25.08388	21.93204	21.64686
8/31/2021	1:00:00 PM	23.68428	1.829069	43.35561	27.84595	21.97709	21.62413
8/31/2021	2:00:00 PM	25.96767	1.613077	54.44732	27.07097	22.11118	21.61252
8/31/2021	3:00:00 PM	22.60597	1.203486	42.62535	26.25531	22.05084	21.61511
8/31/2021	4:00:00 PM	22.5851	0.444943	45.08217	26.00505	22.14338	21.60642
8/31/2021	5:00:00 PM	21.69766	0	41.89162	25.45562	22.27583	21.60797
8/31/2021	6:00:00 PM	28.01066	0.849955	51.54409	30.94707	23.35687	21.71115
8/31/2021	7:00:00 PM	29.4121	6.198324	49.95615	32.38898	24.08361	21.89247
8/31/2021	8:00:00 PM	25.75831	0.676837	52.391	27.1558	22.30923	21.68418
8/31/2021	9:00:00 PM	17.98714	0	38.74781	24.16705	21.65273	21.59634
8/31/2021	10:00:00 PM	14.30092	0	32.62031	22.80046	21.80171	21.61213
8/31/2021	11:00:00 PM	16.28076	0	34.12882	23.03617	21.86367	21.63263
9/1/2021	12:00:00 AM	18.44022	1.503983	48.7128	23.46945	22.15068	21.73548
9/1/2021	1:00:00 AM	17.85765	2.281216	33.73083	23.76679	22.27513	21.79954
9/1/2021	2:00:00 AM	17.48374	2.978486	37.43503	23.94469	22.28981	21.78433
9/1/2021	3:00:00 AM	22.68816	9.090032	33.6866	27.42816	23.95459	22.37103
9/1/2021	4:00:00 AM	21.94577	7.192541	42.53817	25.39084	22.88058	22.0203
9/1/2021	5:00:00 AM	22.88399	6.330825	45.01522	25.57347	22.35836	21.84662
9/1/2021	6:00:00 AM	31.58979	7.053212	54.78026	26.57433	22.67587	22.01933
9/1/2021	7:00:00 AM	31.13608	5.999958	52.41078	29.68863	22.6044	21.87222
9/1/2021	8:00:00 AM	24.97881	8.627462	45.15277	28.28587	23.76753	22.22445
9/1/2021	9:00:00 AM	22.22811	5.458447	49.53308	26.14285	22.91065	21.83911
9/1/2021	10:00:00 AM	27.92005	6.078583	58.24193	25.45605	22.26273	21.78679
9/1/2021	11:00:00 AM	23.69967	6.215569	45.01472	26.59256	22.40315	21.81304

9/1/2021	12:00:00 PM	27.5931	3.211359	50.25471	28.32571	22.08875	21.6381
9/1/2021	1:00:00 PM	29.65981	3.084178	51.83229	32.41076	22.41167	21.63735
9/1/2021	2:00:00 PM	30.70237	3.65151	49.59459	34.55708	26.28805	21.69307
9/1/2021	3:00:00 PM	29.08638	3.351661	58.24549	30.77725	23.84185	21.73578
9/1/2021	4:00:00 PM	27.77454	1.084896	51.86215	29.09705	22.61405	21.62877
9/1/2021	5:00:00 PM	22.87132	0.33044	44.13895	26.21252	22.22882	21.65396
9/1/2021	6:00:00 PM	20.944	0	43.66495	23.99013	22.03974	21.64134
9/1/2021	7:00:00 PM	26.26763	8.728602	50.04054	28.29908	23.01905	21.96419
9/1/2021	8:00:00 PM	27.91552	1.81446	48.89689	31.01871	23.95321	22.071
9/1/2021	9:00:00 PM	32.74247	0	53.69662	34.98847	22.19067	21.61994
9/1/2021	10:00:00 PM	19.26392	0	40.69823	23.63928	21.73029	21.59155
9/1/2021	11:00:00 PM	16.69296	0	36.92623	22.17781	21.60943	21.59189
9/2/2021	12:00:00 AM	11.31002	0	30.40857	22.21549	21.68246	21.61214
9/2/2021	1:00:00 AM	13.26806	0.652654	39.58846	22.49539	21.86444	21.67379
9/2/2021	2:00:00 AM	23.29102	0	46.02408	23.90171	21.85687	21.62803
9/2/2021	3:00:00 AM	17.37926	2.261078	33.7391	23.88321	22.22852	21.77426
9/2/2021	4:00:00 AM	24.16803	2.356397	47.78707	23.71546	22.15079	21.75824
9/2/2021	5:00:00 AM	26.86679	4.021579	50.72703	27.17358	22.94154	21.90711
9/2/2021	6:00:00 AM	51.61612	8.201568	80.71172	36.92909	24.52582	22.33453
9/2/2021	7:00:00 AM	54.26115	10.61449	80.17203	39.42869	27.85678	23.09757
9/2/2021	8:00:00 AM	51.91069	8.777465	78.68186	38.10481	24.55793	22.38033
9/2/2021	9:00:00 AM	52.8988	6.698488	77.21187	30.64354	23.04816	22.03767
9/2/2021	10:00:00 AM	23.12205	1.880283	54.44501	24.76152	22.03805	21.62011
9/2/2021	11:00:00 AM	23.96013	3.479456	45.64406	26.3853	22.12596	21.63627
9/2/2021	12:00:00 PM	27.10388	4.521774	49.95249	29.25159	22.29415	21.66987
9/2/2021	1:00:00 PM	22.30556	4.467533	41.47452	26.20643	22.07371	21.66303
9/2/2021	2:00:00 PM	27.38796	4.028413	49.67116	30.71643	23.22256	21.71597
9/2/2021	3:00:00 PM	28.6867	3.493194	48.01671	32.22469	23.59291	21.71401
9/2/2021	4:00:00 PM	33.11701	8.687149	52.46454	36.82055	28.74058	22.33861
9/2/2021	5:00:00 PM	32.71805	11.50413	56.3743	33.909	27.09351	23.22926
9/2/2021	6:00:00 PM	33.26732	14.20109	54.08034	35.33171	28.53562	24.04814
9/2/2021	7:00:00 PM	42.83782	25.4094	59.89442	46.63646	37.11321	30.71557
9/2/2021	8:00:00 PM	42.25195	18.18038	61.25991	45.40202	34.1707	27.63413
9/2/2021	9:00:00 PM	44.0605	15.00657	61.8104	47.51226	35.41034	25.56268
9/2/2021	10:00:00 PM	40.7518	13.78801	56.03231	45.10462	34.59797	25.60044
9/2/2021	11:00:00 PM	29.74569	5.038304	51.65766	32.13899	22.92626	21.74833
9/3/2021	12:00:00 AM	30.98136	5.83812	52.73979	33.01295	23.39154	21.76486
9/3/2021	1:00:00 AM	23.64215	6.686037	48.58896	25.46598	22.41998	21.9326
9/3/2021	2:00:00 AM	21.72816	11.73636	38.81012	25.45859	23.58863	22.65675
9/3/2021	3:00:00 AM	21.38945	0	44.52011	23.77207	22.46623	21.658
9/3/2021	4:00:00 AM	12.08133	0	32.97295	22.18563	21.80372	21.66334
9/3/2021	5:00:00 AM	18.93989	3.281978	39.40913	24.53752	22.11868	21.76711
9/3/2021	6:00:00 AM	55.57743	8.351379	81.74338	40.9908	24.23545	22.13731

9/3/2021	7:00:00 AM	50.35868	10.34637	77.86881	40.53918	25.43309	22.63001
9/3/2021	8:00:00 AM	52.2924	3.50779	77.0466	41.02965	23.46874	21.90621
9/3/2021	9:00:00 AM	51.31541	0.870515	79.41404	39.45984	23.50009	21.74473
9/3/2021	10:00:00 AM	44.12605	2.085912	74.0951	27.22455	21.87741	21.64361
9/3/2021	11:00:00 AM	32.4014	4.301627	60.17382	25.96809	21.88396	21.63752
9/3/2021	12:00:00 PM	28.61017	4.778213	52.53265	30.74997	23.0191	21.69806
9/3/2021	1:00:00 PM	27.91583	4.652884	48.14254	29.59393	22.57369	21.72226
9/3/2021	2:00:00 PM	28.47503	2.105898	52.13476	29.55401	22.12159	21.61485
9/3/2021	3:00:00 PM	22.48006	0.934304	44.05947	25.99913	22.0217	21.60308
9/3/2021	4:00:00 PM	31.73834	0	56.52101	28.75634	22.90965	21.61867
9/3/2021	5:00:00 PM	21.78074	0	45.3209	25.00557	22.07054	21.65669
9/3/2021	6:00:00 PM	21.76247	0	46.23005	22.59311	21.62137	21.5919
9/3/2021	7:00:00 PM	25.36411	0	51.53607	23.54487	21.60783	21.59187
9/3/2021	8:00:00 PM	8.356193	0	30.01246	21.93406	21.61974	21.59587
9/3/2021	9:00:00 PM	15.75649	0	34.30596	22.96641	21.71921	21.60243
9/3/2021	10:00:00 PM	17.52854	0	37.75772	23.76016	21.73038	21.60292
9/3/2021	11:00:00 PM	14.34456	0	33.54069	22.51321	21.75258	21.62914
9/4/2021	12:00:00 AM	14.49817	0	34.90876	22.68453	21.78153	21.63949
9/4/2021	1:00:00 AM	17.02107	2.005492	37.02947	23.38002	22.04038	21.74032
9/4/2021	2:00:00 AM	13.00528	0	36.82974	22.28461	21.6888	21.62018
9/4/2021	3:00:00 AM	23.39091	0	48.81708	22.75717	21.86005	21.66562
9/4/2021	4:00:00 AM	13.35004	0	27.40919	22.68228	21.89352	21.67878
9/4/2021	5:00:00 AM	15.70173	0	35.92662	22.9678	21.89686	21.66406
9/4/2021	6:00:00 AM	51.66964	0	80.3896	37.90771	22.63416	21.73121
9/4/2021	7:00:00 AM	51.21354	6.675354	77.87451	38.79255	24.02738	22.24354
9/4/2021	8:00:00 AM	50.51863	8.612949	77.65737	38.87093	24.05281	22.28411
9/4/2021	9:00:00 AM	45.9087	7.411616	74.74433	28.00444	22.98617	22.02315
9/4/2021	10:00:00 AM	18.24599	5.293361	43.62531	23.19378	21.97768	21.7241
9/4/2021	11:00:00 AM	30.27274	3.27686	54.32001	23.78129	21.77041	21.61412
9/4/2021	12:00:00 PM	20.14074	2.764799	42.2872	24.30754	21.6933	21.5939
9/4/2021	1:00:00 PM	30.89361	4.604673	53.6613	31.40165	22.53894	21.68737
9/4/2021	2:00:00 PM	32.4955	4.453039	59.10347	32.42028	23.06025	21.68593
9/4/2021	3:00:00 PM	28.80306	1.641199	51.22981	30.17845	23.81418	21.66607
9/4/2021	4:00:00 PM	27.34628	0	55.25838	26.65678	22.39695	21.6208
9/4/2021	5:00:00 PM	24.22512	0	50.91085	23.39611	21.75639	21.59176
9/4/2021	6:00:00 PM	4.219712	0	27.59055	21.64872	21.59125	21.59089
9/4/2021	7:00:00 PM	19.01694	0	46.67516	22.83166	21.6093	21.59106
9/4/2021	8:00:00 PM	24.30764	0	51.73742	22.4552	21.63434	21.59842
9/4/2021	9:00:00 PM	13.32641	0	31.89964	22.52804	21.83627	21.6292
9/4/2021	10:00:00 PM	19.95888	0.05911	48.47309	23.94379	21.83551	21.64153
9/4/2021	11:00:00 PM	16.08205	0	36.64635	22.67176	21.70787	21.59954
9/5/2021	12:00:00 AM	10.6667	0	33.4539	22.02849	21.66321	21.60192
9/5/2021	1:00:00 AM	11.65703	0	33.12865	22.1464	21.67876	21.61121

9/5/2021	2:00:00 AM	15.00184	0.576457	42.59451	22.72087	21.91163	21.69139
9/5/2021	3:00:00 AM	22.55864	0	46.03605	22.91295	21.98061	21.69315
9/5/2021	4:00:00 AM	19.75874	4.394705	38.66185	25.23908	22.5925	21.86601
9/5/2021	5:00:00 AM	17.92325	4.454089	34.3504	23.86414	22.26034	21.84788
9/5/2021	6:00:00 AM	22.67605	5.813762	46.53141	24.77397	22.40567	21.87468
9/5/2021	7:00:00 AM	23.56414	7.528385	52.77827	26.64395	23.69672	22.19392
9/5/2021	8:00:00 AM	22.31939	6.573484	50.06227	26.26087	23.26451	22.03203
9/5/2021	9:00:00 AM	20.24466	5.829261	51.71457	23.43211	22.23887	21.84501
9/5/2021	10:00:00 AM	20.13557	4.572384	49.73403	23.27286	21.83344	21.66839
9/5/2021	11:00:00 AM	21.96586	4.557171	53.93468	23.51669	21.77583	21.62533
9/5/2021	12:00:00 PM	20.98119	2.823799	42.97043	24.01137	21.7024	21.59721

WM11: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	4:52:29 PM	54.13579	26.72963	76.23912	53.18969	40.71796	31.95602
8/23/2021	5:00:00 PM	51.70169	24.56633	74.24871	52.45982	38.32881	31.41532
8/23/2021	6:00:00 PM	54.18455	25.72113	76.29344	53.82583	37.29351	32.06378
8/23/2021	7:00:00 PM	59.42	28.11821	78.43467	62.4927	47.54747	36.01821
8/23/2021	8:00:00 PM	61.23753	30.11201	79.37943	65.22405	49.32819	37.1535
8/23/2021	9:00:00 PM	60.39056	20.38	79.89458	63.46872	46.20644	27.82762
8/23/2021	10:00:00 PM	32.49597	17.20736	52.03203	35.10339	27.84267	25.36133
8/23/2021	11:00:00 PM	39.53429	15.18772	63.58805	41.4187	29.89469	24.98238
8/24/2021	12:00:00 AM	32.80947	17.77828	46.70975	36.5108	30.8886	26.55947
8/24/2021	1:00:00 AM	44.48118	26.19603	66.83385	45.49202	38.03095	32.60643
8/24/2021	2:00:00 AM	40.99282	25.67801	61.54585	43.57511	36.78162	32.59371
8/24/2021	3:00:00 AM	44.40167	26.36117	62.11826	47.6448	38.96981	33.46144
8/24/2021	4:00:00 AM	47.30235	27.18382	67.66211	50.4809	40.71156	34.93077
8/24/2021	5:00:00 AM	43.12824	23.89956	63.05153	45.68066	36.46701	31.49263
8/24/2021	6:00:00 AM	43.20051	23.25955	61.46766	46.65248	36.41668	30.52317
8/24/2021	7:00:00 AM	38.93672	26.76648	57.37456	41.73662	36.47428	32.71121
8/24/2021	8:00:00 AM	42.44319	27.01428	63.70497	43.59762	36.736	33.00187
8/24/2021	9:00:00 AM	46.63213	23.0203	67.11616	45.65166	34.72737	30.03687
8/24/2021	10:00:00 AM	46.06391	22.33585	68.51413	47.20849	34.0114	29.18175
8/24/2021	11:00:00 AM	55.60765	24.19309	78.67578	55.45123	40.04758	31.19116
8/24/2021	12:00:00 PM	54.92129	23.94766	76.13473	57.37439	40.03962	30.32792
8/24/2021	1:00:00 PM	56.14958	22.13359	77.87126	58.10879	41.43953	29.84749
8/24/2021	2:00:00 PM	54.46869	22.23821	78.12399	56.46521	38.92187	29.4228
8/24/2021	3:00:00 PM	59.34499	22.28299	83.85175	58.53209	39.82651	29.60873
8/24/2021	4:00:00 PM	57.50672	21.78468	79.11546	59.83769	43.04969	30.01038
8/24/2021	5:00:00 PM	51.64992	18.82926	72.72584	51.97215	32.81866	26.29649
8/24/2021	6:00:00 PM	49.76234	19.49001	73.64355	49.24735	31.12594	26.43925
8/24/2021	7:00:00 PM	54.22835	25.16248	74.94376	56.27117	40.39989	31.25656
8/24/2021	8:00:00 PM	49.27655	24.69433	69.40903	52.48281	38.77668	31.18452
8/24/2021	9:00:00 PM	48.07399	23.24168	66.9392	51.42323	40.4454	31.77889
8/24/2021	10:00:00 PM	42.59452	22.62784	63.08158	43.66725	33.71927	29.30053
8/24/2021	11:00:00 PM	32.98349	19.44482	55.3768	35.49222	30.38151	27.07165
8/25/2021	12:00:00 AM	45.05723	22.34763	64.13249	48.65078	36.56373	29.83052
8/25/2021	1:00:00 AM	44.13362	24.38714	62.76938	47.38748	37.61905	31.83589
8/25/2021	2:00:00 AM	49.11787	24.44102	66.55687	52.79267	42.77951	34.13358
8/25/2021	3:00:00 AM	49.40191	23.63094	69.92509	52.41988	41.1281	31.71138
8/25/2021	4:00:00 AM	41.82822	22.58311	59.74332	45.34243	33.76701	28.81021
8/25/2021	5:00:00 AM	40.14169	24.92535	59.2672	42.65948	36.07431	31.73253
8/25/2021	6:00:00 AM	47.83492	26.87614	67.08075	50.67584	42.80202	34.46183
8/25/2021	7:00:00 AM	43.38947	24.48094	62.04873	46.82312	38.9341	31.48189

8/25/2021	8:00:00 AM	44.44961	24.1757	62.05054	47.88076	38.12136	31.85045
8/25/2021	9:00:00 AM	44.92721	23.48147	66.79141	47.26814	36.33259	30.37346
8/25/2021	10:00:00 AM	48.02164	22.31261	68.17399	50.61158	38.2894	29.73854
8/25/2021	11:00:00 AM	57.69959	24.94023	76.91186	60.85339	44.9024	33.88655
8/25/2021	12:00:00 PM	56.28788	22.42832	78.41204	57.43179	40.59856	29.68426
8/25/2021	1:00:00 PM	62.89282	26.85511	81.80937	66.46074	51.54187	36.92032
8/25/2021	2:00:00 PM	65.89995	27.12436	84.83108	69.25458	53.46455	36.89441
8/25/2021	3:00:00 PM	59.16477	27.09127	79.45292	62.85372	49.29724	36.79232
8/25/2021	4:00:00 PM	59.63099	27.47733	78.86724	63.43571	50.51731	37.64248
8/25/2021	5:00:00 PM	55.06784	21.76594	75.25626	57.33544	42.19121	30.60215
8/25/2021	6:00:00 PM	58.83159	31.59008	79.55074	60.40727	45.49505	37.83648
8/25/2021	7:00:00 PM	61.44339	30.45909	79.41397	64.80169	48.43733	37.19205
8/25/2021	8:00:00 PM	57.88569	26.28802	77.05463	60.90828	47.3101	34.56425
8/25/2021	9:00:00 PM	45.08496	19.58862	68.70772	44.80097	30.74527	26.74602
8/25/2021	10:00:00 PM	47.02249	22.32399	71.60398	48.17993	34.62438	28.78425
8/25/2021	11:00:00 PM	41.30922	21.73418	61.07521	44.35783	33.37538	28.70022
8/26/2021	12:00:00 AM	40.63575	23.314	59.1247	43.83922	34.5793	30.31377
8/26/2021	1:00:00 AM	47.13008	23.05551	66.49019	50.6651	38.17599	30.6599
8/26/2021	2:00:00 AM	48.29038	25.76297	67.72083	51.65595	41.17742	33.5646
8/26/2021	3:00:00 AM	46.53099	24.77091	65.49462	49.90337	39.72365	32.66057
8/26/2021	4:00:00 AM	46.21429	25.14917	65.55315	49.56554	39.91678	33.31287
8/26/2021	5:00:00 AM	39.52689	22.454	58.69583	42.30363	35.80621	29.68447
8/26/2021	6:00:00 AM	46.56213	21.62598	66.5113	49.84624	37.73963	30.01301
8/26/2021	7:00:00 AM	46.56681	28.19737	64.87955	49.12875	40.85078	35.17695
8/26/2021	8:00:00 AM	43.1948	25.67008	67.11173	45.48625	36.93813	32.26199
8/26/2021	9:00:00 AM	42.39761	20.8169	61.12346	46.06122	36.16389	29.03253
8/26/2021	10:00:00 AM	47.33708	24.22909	69.41299	48.00202	36.13434	30.85523
8/26/2021	11:00:00 AM	51.48368	24.88554	74.34859	53.51475	39.12196	31.73302
8/26/2021	12:00:00 PM	57.54866	25.00574	80.72192	60.34779	44.68618	32.96364
8/26/2021	1:00:00 PM	58.24104	23.85261	80.03548	59.4113	40.85575	30.78705
8/26/2021	2:00:00 PM	62.05971	23.65193	82.63336	63.52304	45.47832	32.63391
8/26/2021	3:00:00 PM	57.2253	23.57271	78.2471	59.21839	45.20151	32.2846
8/26/2021	4:00:00 PM	55.24093	23.52583	75.84514	57.50004	41.93382	31.15089
8/26/2021	5:00:00 PM	55.27093	23.44801	77.85941	55.74596	40.20303	30.91393
8/26/2021	6:00:00 PM	57.69566	22.96017	78.30758	59.48975	38.99794	29.78878
8/26/2021	7:00:00 PM	59.36047	26.90085	79.33622	61.97885	41.59703	32.8326
8/26/2021	8:00:00 PM	59.50412	27.89668	78.40555	62.49056	46.30233	34.76646
8/26/2021	9:00:00 PM	58.67337	24.55902	78.05729	62.28036	49.6678	34.24277
8/26/2021	10:00:00 PM	39.41226	19.39711	61.80969	40.89183	30.76546	27.07083
8/26/2021	11:00:00 PM	40.99016	21.09337	63.19319	42.74344	32.90597	28.43657
8/27/2021	12:00:00 AM	36.18223	18.24105	59.23072	37.08051	30.92114	26.78069
8/27/2021	1:00:00 AM	47.17804	25.45454	64.88117	50.63871	39.73237	32.41023
8/27/2021	2:00:00 AM	51.66425	27.89266	70.18567	55.21473	44.59181	35.78304

8/27/2021	3:00:00 AM	45.07376	26.8236	62.5665	48.38443	39.01408	33.66268
8/27/2021	4:00:00 AM	48.55794	26.97764	70.98479	49.5197	39.58241	34.15063
8/27/2021	5:00:00 AM	45.37383	30.63456	63.21891	48.46585	41.50973	37.06637
8/27/2021	6:00:00 AM	51.51052	30.19208	72.64041	50.58537	41.6488	36.53118
8/27/2021	7:00:00 AM	48.14819	33.01617	65.87001	51.49657	44.35221	39.34408
8/27/2021	8:00:00 AM	43.13368	29.60045	61.61319	45.86063	40.04761	36.0055
8/27/2021	9:00:00 AM	46.56485	29.24861	76.3908	47.32214	40.19178	35.76596
8/27/2021	10:00:00 AM	46.80995	21.61041	71.03264	47.21622	34.92912	28.85704
8/27/2021	11:00:00 AM	52.02325	22.63118	72.47276	54.20578	38.67344	30.16246
8/27/2021	12:00:00 PM	56.15389	22.7441	75.93117	59.18175	41.17967	29.55399
8/27/2021	1:00:00 PM	52.35557	23.02087	78.3344	52.78555	37.97959	29.59085
8/27/2021	2:00:00 PM	57.6325	26.56821	80.75587	58.98608	44.77528	34.34
8/27/2021	3:00:00 PM	55.40671	25.06314	76.69474	56.48334	41.78069	33.23049
8/27/2021	4:00:00 PM	53.93441	23.79054	76.61158	56.08483	40.86872	31.2867
8/27/2021	5:00:00 PM	57.9395	20.40777	80.4937	59.67346	41.16308	29.71786
8/27/2021	6:00:00 PM	45.16834	18.66678	69.33328	44.99587	30.14066	26.12751
8/27/2021	7:00:00 PM	41.28931	19.01236	62.86915	44.82785	33.32198	27.31418
8/27/2021	8:00:00 PM	51.95394	20.95957	70.31963	55.58331	43.65406	30.86407
8/27/2021	9:00:00 PM	51.23715	18.91621	71.72898	54.60219	36.45809	26.97458
8/27/2021	10:00:00 PM	59.85049	25.88242	79.509	62.97425	44.0174	33.06306
8/27/2021	11:00:00 PM	56.81123	27.45252	76.22365	59.62208	42.55425	33.63444
8/28/2021	12:00:00 AM	45.45791	28.41376	68.36698	46.68469	39.90326	34.81701
8/28/2021	1:00:00 AM	50.69201	29.83478	70.40428	53.11793	41.08537	36.61733
8/28/2021	2:00:00 AM	43.47028	29.2319	64.66992	45.12304	40.10034	35.78662
8/28/2021	3:00:00 AM	46.10074	28.23065	65.9291	48.09257	39.96789	35.50819
8/28/2021	4:00:00 AM	48.67992	28.57141	72.53612	51.73014	42.10405	35.79168
8/28/2021	5:00:00 AM	47.09553	28.4024	65.08914	50.67768	41.82712	35.57799
8/28/2021	6:00:00 AM	49.85949	29.8821	67.86922	53.63824	44.3654	37.59505
8/28/2021	7:00:00 AM	50.28967	23.71404	70.91908	53.71189	40.53933	31.80794
8/28/2021	8:00:00 AM	40.01224	26.83347	62.44446	42.22656	36.88321	32.75861
8/28/2021	9:00:00 AM	40.93324	23.82698	64.61748	43.31569	34.41164	30.2396
8/28/2021	10:00:00 AM	49.6089	25.60678	70.25606	52.67827	38.63491	32.11391
8/28/2021	11:00:00 AM	57.16539	24.43484	76.23527	60.72955	47.45585	33.11049
8/28/2021	12:00:00 PM	58.76893	23.59109	79.91884	61.42845	46.07659	31.07779
8/28/2021	1:00:00 PM	57.9678	23.41561	78.57909	60.81789	42.97573	30.74459
8/28/2021	2:00:00 PM	56.40211	22.25222	76.02813	59.43547	41.99634	29.69641
8/28/2021	3:00:00 PM	58.49883	21.45715	76.3851	62.01375	46.43999	29.75162
8/28/2021	4:00:00 PM	53.90232	18.9051	74.09123	56.3009	42.78541	27.77575
8/28/2021	5:00:00 PM	46.92627	13.87765	68.99018	47.2119	27.52784	24.18328
8/28/2021	6:00:00 PM	38.34425	12.88119	61.78176	38.04014	27.30165	24.68144
8/28/2021	7:00:00 PM	42.68253	17.54334	69.71209	36.29496	27.41052	25.44691
8/28/2021	8:00:00 PM	49.62371	17.82006	70.10373	50.77251	29.90813	25.77598
8/28/2021	9:00:00 PM	43.13035	20.19886	67.04715	44.28867	32.59284	27.83866

8/28/2021	10:00:00 PM	37.6824	21.57596	61.625	37.88462	31.68903	28.2471
8/28/2021	11:00:00 PM	51.57586	22.24475	71.71177	52.59184	36.41649	29.07708
8/29/2021	12:00:00 AM	47.0076	21.71597	72.3984	46.20835	33.88185	29.54838
8/29/2021	1:00:00 AM	42.94435	21.98997	64.80346	45.10656	34.09548	28.67418
8/29/2021	2:00:00 AM	44.9893	25.28043	64.84074	47.57141	37.46282	32.43534
8/29/2021	3:00:00 AM	46.84978	25.52715	66.24307	50.1669	39.63373	32.85182
8/29/2021	4:00:00 AM	48.2513	29.37184	69.03641	51.0292	41.34887	35.83682
8/29/2021	5:00:00 AM	50.54236	27.66822	72.25848	51.25886	42.01871	36.28981
8/29/2021	6:00:00 AM	42.92685	24.37599	62.9545	44.4606	36.18957	31.10096
8/29/2021	7:00:00 AM	45.4857	27.89591	64.83105	45.36395	38.63511	34.64204
8/29/2021	8:00:00 AM	42.71059	29.75187	58.1026	45.2183	40.26812	36.11803
8/29/2021	9:00:00 AM	42.85728	29.0619	63.46436	44.53847	39.24621	35.17167
8/29/2021	10:00:00 AM	45.04798	27.97488	63.4445	47.43194	40.17028	34.39212
8/29/2021	11:00:00 AM	51.00364	25.47479	72.16018	53.90808	39.40421	32.3879
8/29/2021	12:00:00 PM	55.58192	21.97233	75.61057	58.09215	42.51221	29.95982
8/29/2021	1:00:00 PM	55.49368	21.25339	76.04389	58.27752	41.89345	29.29848
8/29/2021	2:00:00 PM	59.95745	22.33823	82.46918	62.96734	47.78044	31.68501
8/29/2021	3:00:00 PM	61.98287	22.30721	79.48942	65.92096	49.92334	30.54299
8/29/2021	4:00:00 PM	52.94151	20.04959	76.45715	54.61118	35.55573	27.04032
8/29/2021	5:00:00 PM	51.99519	16.47184	72.2877	55.32135	41.34285	26.24579
8/29/2021	6:00:00 PM	42.53072	16.23573	65.91793	42.32784	29.21621	25.39252
8/29/2021	7:00:00 PM	39.69626	12.51847	62.19126	41.17187	27.97134	24.22796
8/29/2021	8:00:00 PM	36.58756	12.67916	54.79641	39.21292	30.14723	24.17274
8/29/2021	9:00:00 PM	46.68879	14.40874	66.218	49.6356	34.0697	25.00251
8/29/2021	10:00:00 PM	49.42246	21.74979	72.52829	51.36078	39.62693	30.62379
8/29/2021	11:00:00 PM	44.05864	21.84784	63.88931	46.38972	35.92014	29.96442
8/30/2021	12:00:00 AM	44.76044	22.68826	62.85726	48.1352	37.53328	30.6654
8/30/2021	1:00:00 AM	51.18109	24.27929	71.43122	54.59724	43.24459	33.64542
8/30/2021	2:00:00 AM	45.15283	24.23259	64.95937	47.66727	37.33937	31.7186
8/30/2021	3:00:00 AM	46.19968	23.09808	66.42142	49.47446	38.81121	31.18367
8/30/2021	4:00:00 AM	48.71807	22.83968	68.52068	52.477	40.3799	30.96338
8/30/2021	5:00:00 AM	47.8707	23.58103	66.7635	51.36983	41.20923	33.12655
8/30/2021	6:00:00 AM	50.15034	29.70395	68.43636	53.60181	44.58205	37.43115
8/30/2021	7:00:00 AM	48.07797	29.85541	67.35173	51.23326	41.98041	36.565
8/30/2021	8:00:00 AM	41.89885	28.66232	55.77908	45.3354	39.09951	35.12551
8/30/2021	9:00:00 AM	43.94711	28.831	62.08891	47.64389	39.36242	34.94691
8/30/2021	10:00:00 AM	49.61987	30.57912	75.05077	49.53468	41.35593	36.89923
8/30/2021	11:00:00 AM	52.48242	26.74478	74.3399	55.04804	41.86448	34.33407
8/30/2021	12:00:00 PM	57.92416	23.72074	79.05907	58.42332	40.12603	30.81927
8/30/2021	1:00:00 PM	52.27133	25.34316	75.71131	54.05862	41.04062	32.56248
8/30/2021	2:00:00 PM	55.29192	23.91246	82.86127	54.14541	40.98986	31.32153
8/30/2021	3:00:00 PM	55.17892	23.82123	75.16672	56.78748	40.85858	31.32676
8/30/2021	4:00:00 PM	58.40888	24.29807	77.79561	60.17249	40.23789	31.50492

8/30/2021	5:00:00 PM	48.92481	16.62444	75.13688	46.48339	29.25359	25.3421
8/30/2021	6:00:00 PM	47.0578	17.84934	70.86463	45.17889	29.7528	25.52736
8/30/2021	7:00:00 PM	41.60363	20.15927	67.99761	43.19186	31.82771	27.19037
8/30/2021	8:00:00 PM	48.7299	20.553	73.5919	45.77958	31.93647	27.37509
8/30/2021	9:00:00 PM	36.68834	20.92933	56.66419	39.13473	32.93694	28.7924
8/30/2021	10:00:00 PM	44.93445	21.51481	62.86378	48.30441	39.06769	30.53252
8/30/2021	11:00:00 PM	44.29887	20.15187	66.054	47.64331	36.43697	28.57463
8/31/2021	12:00:00 AM	42.8325	22.67168	61.18982	46.02778	35.9525	30.37933
8/31/2021	1:00:00 AM	46.78494	25.1602	68.02144	49.78942	40.3388	33.96765
8/31/2021	2:00:00 AM	46.6784	25.71086	64.58095	50.17549	39.87072	33.20904
8/31/2021	3:00:00 AM	50.00142	27.9481	70.2412	53.16679	42.70045	35.61176
8/31/2021	4:00:00 AM	52.28179	27.39008	71.34182	55.6526	44.21435	35.73374
8/31/2021	5:00:00 AM	46.86247	26.4157	67.79366	49.34672	39.22458	32.87124
8/31/2021	6:00:00 AM	47.02349	29.49377	65.87073	49.52873	41.13406	36.16112
8/31/2021	7:00:00 AM	50.66062	28.61224	69.52147	53.90601	43.82506	36.73199
8/31/2021	8:00:00 AM	48.48238	27.81529	68.38845	51.27686	40.15211	34.76124
8/31/2021	9:00:00 AM	43.3647	29.89644	62.72509	46.11447	39.62509	35.84254
8/31/2021	10:00:00 AM	44.83773	27.70129	65.13455	47.35421	40.12244	34.99094
8/31/2021	11:00:00 AM	42.24162	26.52904	60.26501	45.98895	36.09711	32.28779
8/31/2021	12:00:00 PM	44.84785	26.89765	64.35161	47.18294	37.46853	33.26526
8/31/2021	1:00:00 PM	48.42936	25.16068	71.09908	50.26376	37.71554	31.73986
8/31/2021	2:00:00 PM	55.56779	19.77537	77.52671	56.43663	38.70796	28.3008
8/31/2021	3:00:00 PM	52.43875	21.47155	72.23213	53.94731	38.61003	29.57576
8/31/2021	4:00:00 PM	50.64891	19.66904	74.14294	50.00176	35.64219	27.83307
8/31/2021	5:00:00 PM	45.69878	17.91343	70.346	45.71671	33.0145	26.5823
8/31/2021	6:00:00 PM	59.98677	23.25789	77.63354	63.65614	51.78892	37.72287
8/31/2021	7:00:00 PM	61.50944	26.27691	79.26227	65.31195	54.0229	40.17039
8/31/2021	8:00:00 PM	55.92987	24.89216	78.09095	58.87808	47.07144	36.06528
8/31/2021	9:00:00 PM	47.75107	18.61996	71.03033	47.4946	32.96985	27.16615
8/31/2021	10:00:00 PM	43.06517	21.08663	65.01146	44.57909	35.15943	28.86867
8/31/2021	11:00:00 PM	46.17051	21.31654	65.08164	48.91666	38.0423	30.85007
9/1/2021	12:00:00 AM	41.51092	28.0822	60.59777	43.72476	38.98604	34.63508
9/1/2021	1:00:00 AM	40.60336	27.28514	55.24725	43.38988	38.60163	34.19454
9/1/2021	2:00:00 AM	39.77821	27.33318	55.17082	42.87913	37.60728	33.48732
9/1/2021	3:00:00 AM	43.92321	32.2889	55.21446	46.87965	42.73051	38.63557
9/1/2021	4:00:00 AM	41.85744	30.14505	59.57317	44.09745	39.60779	35.80465
9/1/2021	5:00:00 AM	41.71895	29.36542	60.49408	44.14505	38.43601	34.54536
9/1/2021	6:00:00 AM	47.49569	30.31508	68.9235	48.02942	41.07188	36.56013
9/1/2021	7:00:00 AM	48.8586	30.34153	67.55003	50.23776	41.75124	36.69557
9/1/2021	8:00:00 AM	46.48116	32.64907	63.63389	49.65451	43.25738	38.67875
9/1/2021	9:00:00 AM	45.68414	31.18983	64.70954	48.43541	42.83727	38.17941
9/1/2021	10:00:00 AM	50.00463	30.27529	72.75822	50.66238	41.82771	36.7555
9/1/2021	11:00:00 AM	53.52089	28.34918	75.22594	55.08496	43.29999	36.66767

9/1/2021	12:00:00 PM	53.93932	25.50206	76.16507	55.4092	41.15016	33.26027
9/1/2021	1:00:00 PM	58.80098	21.93612	77.44467	61.74956	44.21697	30.22257
9/1/2021	2:00:00 PM	55.51136	22.25968	75.56381	58.21556	43.33454	30.46324
9/1/2021	3:00:00 PM	54.30004	23.28435	79.20173	55.46875	41.37885	31.20497
9/1/2021	4:00:00 PM	58.62445	21.41644	78.72705	60.51802	39.89372	28.82662
9/1/2021	5:00:00 PM	52.93652	20.20131	74.83593	53.99056	34.55152	27.65558
9/1/2021	6:00:00 PM	50.10368	19.93684	72.40767	49.29326	32.12133	27.14542
9/1/2021	7:00:00 PM	56.07018	25.54421	77.05948	59.12582	43.59117	31.78665
9/1/2021	8:00:00 PM	59.9421	25.38696	77.54627	63.83258	52.03515	37.86832
9/1/2021	9:00:00 PM	62.94956	21.1527	80.78138	66.61011	48.91692	31.98029
9/1/2021	10:00:00 PM	50.49985	15.13947	70.187	53.57658	32.95036	24.81788
9/1/2021	11:00:00 PM	39.35372	14.33788	58.30836	41.7556	28.50491	24.67385
9/2/2021	12:00:00 AM	39.93623	20.73603	60.53374	41.83645	32.52413	28.18318
9/2/2021	1:00:00 AM	37.33455	25.3594	53.56875	40.1674	35.18012	31.25936
9/2/2021	2:00:00 AM	47.82205	21.66712	69.7732	50.7714	37.32052	29.87987
9/2/2021	3:00:00 AM	47.80923	26.83651	66.21557	51.20458	39.74299	33.63251
9/2/2021	4:00:00 AM	43.57723	27.62598	63.43794	45.61782	38.96646	34.32073
9/2/2021	5:00:00 AM	45.71743	27.33048	65.70107	48.48057	40.56826	34.90882
9/2/2021	6:00:00 AM	66.13261	30.69385	93.51747	54.48168	44.64154	38.36846
9/2/2021	7:00:00 AM	68.51231	31.73142	93.37467	54.8609	44.34987	38.17977
9/2/2021	8:00:00 AM	68.41996	32.19201	92.76631	56.92923	43.8768	38.37078
9/2/2021	9:00:00 AM	67.21231	30.79636	92.12056	49.731	41.17069	36.86716
9/2/2021	10:00:00 AM	45.56894	21.93934	68.8977	46.62579	38.1447	30.47646
9/2/2021	11:00:00 AM	52.59235	22.48795	72.38813	55.51475	39.59561	30.18522
9/2/2021	12:00:00 PM	55.56511	24.09492	76.10042	58.526	41.47488	31.47545
9/2/2021	1:00:00 PM	49.15766	22.89408	70.78538	50.53736	37.59998	30.01811
9/2/2021	2:00:00 PM	54.58539	23.95175	75.56134	56.97813	41.19934	31.04706
9/2/2021	3:00:00 PM	53.84462	23.95549	75.81454	55.62591	40.19268	30.72851
9/2/2021	4:00:00 PM	56.51335	26.14883	78.07653	58.44154	43.93608	33.58505
9/2/2021	5:00:00 PM	58.83578	26.43683	80.97766	57.02309	41.0655	33.09813
9/2/2021	6:00:00 PM	61.1578	27.89112	81.02225	64.39931	44.37229	34.51254
9/2/2021	7:00:00 PM	69.86657	36.74114	83.25444	74.36417	64.58082	48.30905
9/2/2021	8:00:00 PM	69.60194	33.13948	84.48102	74.1429	62.63735	45.54627
9/2/2021	9:00:00 PM	71.57611	37.43026	85.39567	75.86287	66.96486	56.28026
9/2/2021	10:00:00 PM	70.38018	34.38408	82.62486	74.6544	66.6758	55.39906
9/2/2021	11:00:00 PM	61.15515	27.37966	79.63625	64.79955	48.96046	34.55841
9/3/2021	12:00:00 AM	61.49673	28.82132	79.75637	65.35396	49.77023	35.3533
9/3/2021	1:00:00 AM	48.03087	30.06096	71.42388	49.19804	40.40696	36.23303
9/3/2021	2:00:00 AM	45.0969	34.77495	56.78912	47.86962	43.88405	40.56016
9/3/2021	3:00:00 AM	44.3826	27.16218	58.63993	47.39639	42.47656	34.89238
9/3/2021	4:00:00 AM	44.57621	25.03981	68.20135	46.41805	37.9984	32.41308
9/3/2021	5:00:00 AM	41.60579	26.98201	61.70446	43.9457	37.07198	32.84135
9/3/2021	6:00:00 AM	68.33467	29.61074	93.76423	56.8643	43.56953	36.7634

9/3/2021	7:00:00 AM	65.30723	31.76734	92.15396	57.57562	45.05023	38.60704
9/3/2021	8:00:00 AM	67.61305	28.78138	91.98927	58.28768	42.95924	36.04312
9/3/2021	9:00:00 AM	65.51908	27.42306	92.49782	55.49313	41.06918	33.90286
9/3/2021	10:00:00 AM	61.61754	22.50416	90.97173	49.10681	37.11163	30.7415
9/3/2021	11:00:00 AM	56.73962	22.2835	84.00432	54.32147	38.15659	28.92433
9/3/2021	12:00:00 PM	58.40317	23.13476	75.98687	62.26081	48.66352	32.96156
9/3/2021	1:00:00 PM	58.69703	22.98961	78.11312	61.18004	43.23947	30.35672
9/3/2021	2:00:00 PM	58.48998	19.51078	78.77438	60.66152	39.95632	27.08121
9/3/2021	3:00:00 PM	47.55018	18.92383	69.98481	48.60706	34.2009	26.47186
9/3/2021	4:00:00 PM	53.55857	18.33634	80.15008	49.76264	35.16265	26.60936
9/3/2021	5:00:00 PM	49.43228	18.37108	74.42747	49.50277	32.66618	26.34468
9/3/2021	6:00:00 PM	48.25801	13.99356	71.88181	45.75545	29.37026	24.46461
9/3/2021	7:00:00 PM	46.17644	14.7623	71.53882	42.25399	29.64869	24.85192
9/3/2021	8:00:00 PM	40.45739	17.1572	64.17646	42.3345	29.71931	25.93026
9/3/2021	9:00:00 PM	43.84487	18.88995	63.5601	47.4138	35.49234	26.89941
9/3/2021	10:00:00 PM	44.98104	20.14136	66.10045	48.17562	35.46423	28.01097
9/3/2021	11:00:00 PM	44.818	22.8811	65.84847	47.98495	36.74223	30.47107
9/4/2021	12:00:00 AM	48.75332	22.32946	68.08141	52.17894	41.04805	31.32024
9/4/2021	1:00:00 AM	50.11527	26.23976	68.79669	53.5687	42.01577	33.64725
9/4/2021	2:00:00 AM	47.06876	21.57895	69.36117	49.86507	34.02206	28.46434
9/4/2021	3:00:00 AM	43.61019	23.36284	62.22768	46.6806	37.44312	30.95482
9/4/2021	4:00:00 AM	43.2751	23.7314	61.92833	46.67977	37.00065	31.15641
9/4/2021	5:00:00 AM	44.71477	22.90607	68.81212	45.50956	35.20723	30.02022
9/4/2021	6:00:00 AM	65.27262	24.11049	93.16748	51.41516	37.714	31.68508
9/4/2021	7:00:00 AM	65.47435	28.48873	91.83468	53.36593	41.35192	36.37212
9/4/2021	8:00:00 AM	66.71855	31.80118	92.35664	56.45154	41.61863	37.20754
9/4/2021	9:00:00 AM	62.27773	30.14399	91.36453	49.74153	40.82851	36.28906
9/4/2021	10:00:00 AM	46.81093	25.8557	73.41577	48.30433	37.99874	32.68904
9/4/2021	11:00:00 AM	50.59538	19.366	72.59456	51.72197	38.38622	28.43218
9/4/2021	12:00:00 PM	53.59157	17.73249	73.29293	56.80158	37.89698	25.79219
9/4/2021	1:00:00 PM	60.82172	21.55258	80.65874	63.75351	49.65881	32.50866
9/4/2021	2:00:00 PM	61.73483	21.69765	82.64412	64.11909	47.41227	30.24554
9/4/2021	3:00:00 PM	57.32136	19.89669	80.43258	55.76645	38.74288	27.92255
9/4/2021	4:00:00 PM	56.48614	17.1481	81.17777	54.21458	34.03948	25.94384
9/4/2021	5:00:00 PM	45.92924	14.00501	71.18521	44.86632	28.86695	24.19624
9/4/2021	6:00:00 PM	31.87081	10.03557	61.16235	30.11059	24.24268	23.51852
9/4/2021	7:00:00 PM	36.40261	11.56731	58.14278	38.09015	27.37064	23.92817
9/4/2021	8:00:00 PM	43.48027	18.04942	63.30297	46.36106	35.09642	27.42024
9/4/2021	9:00:00 PM	47.07544	23.28174	65.71536	50.75692	40.62208	31.48153
9/4/2021	10:00:00 PM	52.21911	22.65582	71.79351	55.24333	41.60641	31.65147
9/4/2021	11:00:00 PM	47.68686	17.32783	68.30022	49.96726	33.55481	26.27622
9/5/2021	12:00:00 AM	45.86186	20.08183	66.84555	49.30715	37.85079	29.64295
9/5/2021	1:00:00 AM	46.79292	19.69682	66.09742	50.36616	39.46523	30.80696

9/5/2021	2:00:00 AM	47.91984	25.30416	66.18091	51.49813	42.01238	34.17004
9/5/2021	3:00:00 AM	42.15502	25.41567	60.54051	44.95039	37.34953	32.17721
9/5/2021	4:00:00 AM	50.81853	28.79144	70.40993	54.10791	43.4361	36.298
9/5/2021	5:00:00 AM	51.25122	27.98851	69.66108	54.93157	44.40391	35.84349
9/5/2021	6:00:00 AM	45.74084	28.36518	65.28623	48.40595	39.74526	34.92247
9/5/2021	7:00:00 AM	44.23664	29.65835	59.18526	47.44389	42.14019	36.75415
9/5/2021	8:00:00 AM	44.38828	30.75214	60.25483	47.4708	42.06757	37.4312
9/5/2021	9:00:00 AM	43.46698	30.72674	64.52866	45.47267	40.41892	36.73483
9/5/2021	10:00:00 AM	44.97931	24.75501	65.77284	46.96724	36.38094	31.10078
9/5/2021	11:00:00 AM	51.31571	21.02765	75.08581	53.70365	37.37494	28.58967
9/5/2021	12:00:00 PM	53.07492	18.18777	73.47363	55.44979	38.85048	26.48751

WM11: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	4:52:29 PM	60.40516	30.88409	80.94251	62.14586	50.00252	38.06685
8/23/2021	5:00:00 PM	63.36597	27.88237	84.87326	65.23013	50.34189	38.37267
8/23/2021	6:00:00 PM	65.19556	29.10301	85.83	66.07153	46.26057	37.20259
8/23/2021	7:00:00 PM	70.46468	32.61177	87.51389	74.2008	61.00622	45.43848
8/23/2021	8:00:00 PM	72.21088	34.24292	88.58242	76.55479	62.82018	46.88081
8/23/2021	9:00:00 PM	70.97459	25.42779	88.32956	74.89527	59.54092	34.43433
8/23/2021	10:00:00 PM	40.13486	21.85537	65.34372	40.46616	33.69261	29.82167
8/23/2021	11:00:00 PM	51.84027	21.97874	75.33936	54.51372	39.46204	32.08425
8/24/2021	12:00:00 AM	39.55636	22.88565	57.49862	42.57724	37.21344	32.31978
8/24/2021	1:00:00 AM	55.19155	30.44321	78.21734	56.62204	44.50676	38.43528
8/24/2021	2:00:00 AM	52.26306	29.83891	73.52451	55.496	44.78507	38.56719
8/24/2021	3:00:00 AM	56.32776	31.83251	73.61593	59.97549	50.23587	41.82801
8/24/2021	4:00:00 AM	59.54869	33.35842	78.6233	63.09482	52.79367	43.73885
8/24/2021	5:00:00 AM	55.16371	29.07973	75.47564	58.38093	47.21353	39.56456
8/24/2021	6:00:00 AM	55.91255	29.73444	73.60243	59.64021	48.72911	40.13471
8/24/2021	7:00:00 AM	45.46579	31.30306	65.54404	47.32908	42.48082	38.52789
8/24/2021	8:00:00 AM	50.56553	31.25482	71.14156	51.17185	43.07004	38.78812
8/24/2021	9:00:00 AM	54.64024	28.03741	75.4482	55.16477	42.8907	36.61552
8/24/2021	10:00:00 AM	57.35705	28.16912	79.45219	59.48093	43.85732	36.20781
8/24/2021	11:00:00 AM	65.6668	28.99994	87.82569	66.99083	51.31827	38.65064
8/24/2021	12:00:00 PM	65.87371	28.1917	85.7375	69.11658	52.82657	37.81231
8/24/2021	1:00:00 PM	66.84913	26.65633	86.99987	69.70566	54.73731	39.25639
8/24/2021	2:00:00 PM	64.99009	26.50275	85.22175	67.93022	50.0352	36.45996
8/24/2021	3:00:00 PM	68.88711	26.67432	91.57612	70.23391	53.15001	38.27609
8/24/2021	4:00:00 PM	68.77416	26.34858	89.08099	71.94017	56.91053	38.58669
8/24/2021	5:00:00 PM	63.32994	23.52963	84.23009	64.76154	45.83549	32.5698
8/24/2021	6:00:00 PM	61.41982	22.59516	83.13346	62.42579	41.25402	31.12748
8/24/2021	7:00:00 PM	65.45536	28.96235	85.12889	68.33498	53.41172	36.5298
8/24/2021	8:00:00 PM	60.84389	29.66749	80.03057	64.52343	51.40957	38.87426
8/24/2021	9:00:00 PM	60.00738	30.1492	77.64724	63.77373	53.61207	42.90658
8/24/2021	10:00:00 PM	54.85066	26.57843	74.86474	56.87233	43.25872	35.3924
8/24/2021	11:00:00 PM	39.67565	24.29243	60.56059	42.01464	36.88395	32.58208
8/25/2021	12:00:00 AM	57.26742	27.49009	75.09013	61.32376	47.46865	36.72172
8/25/2021	1:00:00 AM	56.37398	30.74384	73.85471	60.06668	49.77824	40.82574
8/25/2021	2:00:00 AM	61.27679	31.05614	77.2746	65.21267	55.92521	45.52853
8/25/2021	3:00:00 AM	61.68713	31.362	83.12857	64.97721	54.58965	43.60272
8/25/2021	4:00:00 AM	54.54775	28.13985	72.19437	58.53361	46.17936	36.2326
8/25/2021	5:00:00 AM	52.3135	30.77859	72.82332	55.32691	46.3543	39.90273
8/25/2021	6:00:00 AM	59.56673	34.32696	79.78958	62.96798	53.0775	43.3899
8/25/2021	7:00:00 AM	47.93757	28.50418	67.83022	50.49334	42.94074	36.41512

8/25/2021	8:00:00 AM	53.38804	29.1378	71.5814	57.14429	44.62321	36.99132
8/25/2021	9:00:00 AM	55.11261	28.62145	76.90299	57.38024	44.29417	36.58948
8/25/2021	10:00:00 AM	58.61668	27.49533	78.08064	61.79311	48.07906	37.05073
8/25/2021	11:00:00 AM	68.48557	29.97486	86.42413	72.14164	56.95691	41.66137
8/25/2021	12:00:00 PM	66.98953	27.40894	88.17603	69.10905	52.26096	37.94455
8/25/2021	1:00:00 PM	73.92386	31.95279	90.53199	78.01314	65.08798	49.04807
8/25/2021	2:00:00 PM	75.24677	32.57978	91.05681	79.63533	66.37771	48.10685
8/25/2021	3:00:00 PM	71.31194	32.44437	88.28803	75.63999	62.97492	48.23917
8/25/2021	4:00:00 PM	71.27869	31.97122	87.44848	75.54726	63.78867	49.48218
8/25/2021	5:00:00 PM	66.9811	27.20448	85.90272	70.07091	55.03051	39.8203
8/25/2021	6:00:00 PM	69.66671	35.72915	88.58661	72.8109	58.08741	46.25891
8/25/2021	7:00:00 PM	72.22093	33.75641	89.16638	76.09765	61.75212	46.54919
8/25/2021	8:00:00 PM	68.92957	31.00949	87.12549	72.51399	60.01763	44.13407
8/25/2021	9:00:00 PM	56.43912	24.76739	79.10962	56.84295	38.01114	32.73733
8/25/2021	10:00:00 PM	58.09387	27.0749	80.44262	60.29118	45.60489	35.93991
8/25/2021	11:00:00 PM	53.62741	27.9888	72.23004	57.3248	42.97381	36.20468
8/26/2021	12:00:00 AM	49.00192	28.46548	70.09506	51.02756	41.75781	36.56145
8/26/2021	1:00:00 AM	59.31989	28.99671	77.54443	63.17819	51.355	40.28243
8/26/2021	2:00:00 AM	60.18967	32.87685	77.67673	63.93277	54.30166	44.74651
8/26/2021	3:00:00 AM	58.99113	32.00282	77.63048	62.70619	52.85522	43.57148
8/26/2021	4:00:00 AM	58.47517	32.24718	76.11623	62.14846	52.22527	43.17796
8/26/2021	5:00:00 AM	50.72263	29.29661	70.196	53.76191	45.33927	38.44617
8/26/2021	6:00:00 AM	58.94902	28.74202	76.9761	62.50885	50.98125	40.27579
8/26/2021	7:00:00 AM	56.55243	33.48142	74.34959	60.13248	50.38587	42.34544
8/26/2021	8:00:00 AM	49.34916	30.7924	70.63697	51.85875	43.23979	38.47681
8/26/2021	9:00:00 AM	52.56343	27.89344	71.6557	56.16636	44.43955	37.25106
8/26/2021	10:00:00 AM	56.8075	30.0164	77.92036	59.56839	46.82807	38.65933
8/26/2021	11:00:00 AM	62.4148	30.59128	84.10499	65.12625	51.10586	40.2402
8/26/2021	12:00:00 PM	68.27376	31.22129	88.24309	71.84311	57.8547	43.41012
8/26/2021	1:00:00 PM	69.30946	29.43244	89.44382	71.84812	53.80217	39.80412
8/26/2021	2:00:00 PM	72.22371	28.99722	90.8537	75.02825	58.29243	42.1703
8/26/2021	3:00:00 PM	68.3968	29.99211	87.59424	71.29756	57.99033	43.44066
8/26/2021	4:00:00 PM	66.77096	29.47727	85.57977	69.82619	55.29193	41.0132
8/26/2021	5:00:00 PM	66.52491	28.22338	88.81559	68.28143	53.12776	39.76927
8/26/2021	6:00:00 PM	68.72786	27.07418	87.62607	71.57655	50.97548	36.48436
8/26/2021	7:00:00 PM	70.25039	29.75694	89.06984	73.9004	55.45198	39.81202
8/26/2021	8:00:00 PM	70.59492	31.99659	88.43413	74.26376	59.78969	44.74385
8/26/2021	9:00:00 PM	69.82404	29.89219	88.31603	73.64358	62.4352	45.78082
8/26/2021	10:00:00 PM	51.33108	25.13772	73.73693	52.86876	38.64828	33.62806
8/26/2021	11:00:00 PM	52.64311	26.74336	73.07612	55.43998	44.02282	36.82977
8/27/2021	12:00:00 AM	47.50081	23.86746	69.68574	48.04811	38.35829	33.01642
8/27/2021	1:00:00 AM	59.15122	31.17758	76.28168	62.85738	52.45149	42.2327
8/27/2021	2:00:00 AM	63.42189	33.75408	80.42403	67.17518	57.54336	46.62134

8/27/2021	3:00:00 AM	57.13296	32.1515	74.79248	60.93631	50.60421	41.68687
8/27/2021	4:00:00 AM	57.2362	32.88134	76.82771	60.64337	50.46691	42.45733
8/27/2021	5:00:00 AM	56.64289	35.04337	74.61445	60.26397	50.41891	43.61651
8/27/2021	6:00:00 AM	57.84616	36.25819	77.32565	60.04072	50.63121	44.10748
8/27/2021	7:00:00 AM	58.02474	36.59639	77.95557	61.43955	52.29012	45.13099
8/27/2021	8:00:00 AM	49.59608	34.74236	67.40225	52.5446	46.86564	42.37361
8/27/2021	9:00:00 AM	53.14748	33.50559	77.83511	55.46223	46.84787	41.75395
8/27/2021	10:00:00 AM	54.86507	28.16739	75.8164	57.44173	44.44864	36.54322
8/27/2021	11:00:00 AM	63.22101	27.98275	84.18514	65.84116	49.72111	37.40974
8/27/2021	12:00:00 PM	66.8962	27.61036	85.94809	70.43919	53.6897	37.45155
8/27/2021	1:00:00 PM	62.98607	27.0101	86.79317	64.52636	49.23467	36.82374
8/27/2021	2:00:00 PM	68.10346	30.87955	89.04803	70.65694	56.39469	42.8863
8/27/2021	3:00:00 PM	66.52701	28.92305	86.88571	68.77534	53.19925	39.73212
8/27/2021	4:00:00 PM	65.324	28.44251	86.99783	68.06473	53.27099	40.30285
8/27/2021	5:00:00 PM	68.5008	25.29121	88.23064	71.28539	54.04452	38.196
8/27/2021	6:00:00 PM	56.86746	22.25373	80.65631	57.54527	39.4763	30.74113
8/27/2021	7:00:00 PM	49.40559	22.31103	72.40502	51.45594	38.44095	31.49657
8/27/2021	8:00:00 PM	63.66447	25.56766	82.02988	67.47117	56.97164	43.34038
8/27/2021	9:00:00 PM	62.83861	24.00287	82.9601	66.589	49.57177	33.39123
8/27/2021	10:00:00 PM	70.19785	31.01401	88.60151	73.93445	56.60895	39.98802
8/27/2021	11:00:00 PM	67.73819	31.11227	86.73135	71.06323	55.05778	39.42016
8/28/2021	12:00:00 AM	56.34472	32.72722	78.9273	57.86702	47.24519	41.0168
8/28/2021	1:00:00 AM	61.50436	33.52797	80.8839	64.81321	47.00864	41.68643
8/28/2021	2:00:00 AM	52.40171	33.4144	75.58195	52.82948	45.32756	40.65369
8/28/2021	3:00:00 AM	57.28003	32.88902	77.21299	59.86903	47.27865	41.15537
8/28/2021	4:00:00 AM	60.28538	33.69766	83.98526	63.74596	52.79397	43.04778
8/28/2021	5:00:00 AM	58.51064	33.38569	74.6539	62.71376	52.67452	42.86024
8/28/2021	6:00:00 AM	61.52677	35.92552	78.44383	65.50206	55.89027	45.39834
8/28/2021	7:00:00 AM	61.65144	28.99895	80.92622	65.38674	51.99209	38.56799
8/28/2021	8:00:00 AM	49.43756	31.52635	71.44538	51.12663	42.97761	38.28238
8/28/2021	9:00:00 AM	51.8092	28.52451	75.15783	54.46928	42.69737	36.64902
8/28/2021	10:00:00 AM	61.22485	30.1139	81.70454	64.76603	50.18131	38.89045
8/28/2021	11:00:00 AM	68.24982	29.61235	85.61081	71.97005	60.30818	44.81006
8/28/2021	12:00:00 PM	68.96283	28.41866	87.81648	72.3502	58.68217	40.30434
8/28/2021	1:00:00 PM	68.34081	27.74368	87.57338	71.64488	55.58309	39.63982
8/28/2021	2:00:00 PM	67.45042	26.54435	87.17614	70.82856	55.21766	38.75542
8/28/2021	3:00:00 PM	69.34746	26.52034	86.49966	73.22785	59.08999	39.2203
8/28/2021	4:00:00 PM	64.97342	23.51462	84.05151	68.21844	55.96185	38.27558
8/28/2021	5:00:00 PM	57.96664	19.69798	79.41437	59.65617	38.50014	28.68029
8/28/2021	6:00:00 PM	49.19642	19.08999	71.88194	51.30587	33.53285	28.90428
8/28/2021	7:00:00 PM	43.58345	21.31453	70.18123	39.54162	31.94734	28.90744
8/28/2021	8:00:00 PM	60.40617	22.31434	80.68042	62.7086	37.90693	29.84371
8/28/2021	9:00:00 PM	54.77668	24.95159	78.80718	57.20733	42.99986	33.42621

8/28/2021	10:00:00 PM	49.13506	25.40257	72.01673	49.07507	37.04342	32.79688
8/28/2021	11:00:00 PM	62.89056	26.04952	82.83819	64.83779	49.41788	34.79647
8/29/2021	12:00:00 AM	58.47915	26.55935	82.73422	59.20361	41.6736	35.24516
8/29/2021	1:00:00 AM	55.26478	26.12645	75.45145	58.25843	45.76479	35.2384
8/29/2021	2:00:00 AM	56.98219	29.71914	75.88096	60.33828	47.87278	39.03376
8/29/2021	3:00:00 AM	58.70435	29.52672	77.60173	62.34298	51.18719	40.23252
8/29/2021	4:00:00 AM	59.9301	33.72169	79.62466	63.36731	51.57526	42.32932
8/29/2021	5:00:00 AM	59.96821	32.809	79.41445	63.23349	51.82746	43.45657
8/29/2021	6:00:00 AM	52.87774	29.51201	72.72966	56.32531	46.09648	38.26464
8/29/2021	7:00:00 AM	49.64686	32.36684	69.88296	51.50158	44.58436	40.14798
8/29/2021	8:00:00 AM	48.67852	35.02624	63.85453	51.30402	46.71086	42.34564
8/29/2021	9:00:00 AM	52.03672	34.19044	72.83622	54.20096	46.31009	41.62567
8/29/2021	10:00:00 AM	55.65192	33.09643	74.97687	58.59503	47.71321	41.18398
8/29/2021	11:00:00 AM	62.18958	30.90674	82.97882	65.53327	50.71147	39.13732
8/29/2021	12:00:00 PM	66.38068	27.84704	85.45071	69.45955	55.47777	39.25219
8/29/2021	1:00:00 PM	66.5767	26.27472	86.33055	69.86689	55.21929	39.24863
8/29/2021	2:00:00 PM	70.24539	27.39853	89.42809	73.91506	60.34304	42.68229
8/29/2021	3:00:00 PM	72.32354	27.27239	89.03467	76.59971	62.43697	42.43605
8/29/2021	4:00:00 PM	63.85529	24.05525	85.50373	66.44023	46.92875	32.81207
8/29/2021	5:00:00 PM	63.53495	22.38111	81.6344	67.10364	55.12376	36.97217
8/29/2021	6:00:00 PM	51.2917	20.90641	72.50916	52.83886	39.43429	31.9044
8/29/2021	7:00:00 PM	46.25152	18.14819	68.02508	49.30529	36.04335	28.15712
8/29/2021	8:00:00 PM	47.734	18.2571	65.17882	51.5625	37.38422	28.2777
8/29/2021	9:00:00 PM	58.65966	22.47798	78.29177	62.14024	47.22787	34.48684
8/29/2021	10:00:00 PM	60.57031	27.47538	82.04335	63.73717	52.64122	39.6548
8/29/2021	11:00:00 PM	55.1721	27.54339	74.0837	58.70823	47.25415	37.65245
8/30/2021	12:00:00 AM	56.86206	28.04521	75.111	60.63104	49.79251	39.394
8/30/2021	1:00:00 AM	63.1103	31.27683	81.56073	66.74711	56.60182	45.93421
8/30/2021	2:00:00 AM	57.36237	29.95498	77.17039	60.34211	48.77796	40.29725
8/30/2021	3:00:00 AM	58.74145	30.96739	78.41778	62.38538	52.28297	42.48883
8/30/2021	4:00:00 AM	60.6966	28.31429	79.50534	64.74475	53.64907	41.44657
8/30/2021	5:00:00 AM	60.11651	31.8268	77.09155	63.87972	54.25533	44.82902
8/30/2021	6:00:00 AM	61.79003	37.29515	78.66793	65.63202	56.8417	48.13007
8/30/2021	7:00:00 AM	58.0249	34.53692	77.67125	61.31214	50.85759	43.50377
8/30/2021	8:00:00 AM	48.52324	34.09937	63.00864	51.78865	46.01849	41.61319
8/30/2021	9:00:00 AM	49.61126	33.55847	70.36406	52.47445	45.6992	40.8771
8/30/2021	10:00:00 AM	58.92084	34.27259	84.22714	57.97032	47.30701	41.9443
8/30/2021	11:00:00 AM	63.6405	31.53552	84.07386	66.7555	52.82756	41.18231
8/30/2021	12:00:00 PM	68.07453	27.38276	88.67334	69.99563	50.39953	37.24352
8/30/2021	1:00:00 PM	63.6586	29.78194	84.36655	66.30806	52.18192	39.8974
8/30/2021	2:00:00 PM	64.71445	28.70376	90.14466	65.82646	51.99146	38.65376
8/30/2021	3:00:00 PM	66.46459	28.56768	85.55036	69.07205	52.86449	39.30655
8/30/2021	4:00:00 PM	68.97193	28.51978	87.52806	71.8471	53.02587	39.78956

8/30/2021	5:00:00 PM	59.87095	21.82133	83.83232	58.94216	37.73874	30.43233
8/30/2021	6:00:00 PM	58.5068	21.36493	82.32173	58.11217	37.29066	29.51025
8/30/2021	7:00:00 PM	52.17667	23.28408	78.54627	53.32031	38.23423	31.60099
8/30/2021	8:00:00 PM	59.31874	23.408	83.93117	57.43842	37.79368	31.3433
8/30/2021	9:00:00 PM	47.21191	25.72519	69.26323	49.67854	39.93351	34.6452
8/30/2021	10:00:00 PM	56.97676	28.03255	74.01805	60.77206	50.91145	41.3163
8/30/2021	11:00:00 PM	56.7643	26.46169	77.11236	60.4995	50.11319	39.91782
8/31/2021	12:00:00 AM	55.32951	27.73959	72.63034	58.87896	48.10507	39.40602
8/31/2021	1:00:00 AM	58.78855	31.1042	78.74898	62.16061	51.65002	42.75954
8/31/2021	2:00:00 AM	58.95635	32.32434	75.93931	62.82678	52.62066	42.79771
8/31/2021	3:00:00 AM	61.73689	32.6656	81.84696	65.28675	54.94182	44.04252
8/31/2021	4:00:00 AM	63.80188	32.90911	82.39748	67.55924	57.06326	46.27792
8/31/2021	5:00:00 AM	57.44254	30.37027	77.83744	60.54249	48.50668	38.64396
8/31/2021	6:00:00 AM	58.08868	34.77562	77.05251	61.06566	51.19927	43.7025
8/31/2021	7:00:00 AM	62.22649	35.54913	80.82132	65.79975	55.85507	46.71216
8/31/2021	8:00:00 AM	59.52173	33.54629	79.90044	62.59235	49.11304	41.89886
8/31/2021	9:00:00 AM	52.67295	35.01215	75.52838	54.8991	46.61892	42.09265
8/31/2021	10:00:00 AM	53.11089	32.9873	74.62972	55.11924	46.20412	40.89098
8/31/2021	11:00:00 AM	51.2177	31.55593	71.51674	54.40468	43.5695	38.46928
8/31/2021	12:00:00 PM	55.6532	32.2252	75.15623	58.48951	45.22887	39.54787
8/31/2021	1:00:00 PM	59.24691	30.05876	81.91949	60.87424	46.05957	37.99113
8/31/2021	2:00:00 PM	66.14921	25.40437	87.54798	67.89152	50.20955	35.7826
8/31/2021	3:00:00 PM	63.17206	26.64674	82.74593	65.51158	49.74575	36.64639
8/31/2021	4:00:00 PM	61.77667	24.34229	84.00469	62.30544	46.85606	34.81715
8/31/2021	5:00:00 PM	56.87784	23.15206	81.07502	57.02129	40.82512	32.405
8/31/2021	6:00:00 PM	70.82667	31.98493	87.01021	74.85787	64.19768	51.37322
8/31/2021	7:00:00 PM	72.13688	32.65458	88.3536	76.11101	66.12873	53.46544
8/31/2021	8:00:00 PM	66.67537	31.65484	87.40239	69.94385	59.54847	48.15987
8/31/2021	9:00:00 PM	58.77215	25.24638	81.6719	59.50901	42.3317	34.04428
8/31/2021	10:00:00 PM	54.6441	27.45281	76.30471	56.69123	43.10479	36.22369
8/31/2021	11:00:00 PM	57.86656	28.90541	75.98964	61.41086	49.96923	40.79641
9/1/2021	12:00:00 AM	50.28436	32.63328	70.93745	51.44636	45.55443	40.81542
9/1/2021	1:00:00 AM	47.37476	32.00999	65.58322	49.80105	44.56472	39.8175
9/1/2021	2:00:00 AM	47.01776	31.17295	65.86974	49.2768	43.15285	38.41801
9/1/2021	3:00:00 AM	49.858	36.10421	64.6558	52.77947	48.16146	43.71267
9/1/2021	4:00:00 AM	47.69631	33.93959	65.70869	50.47289	45.05339	40.68597
9/1/2021	5:00:00 AM	49.31497	33.25566	67.71971	52.21557	45.21127	40.34315
9/1/2021	6:00:00 AM	55.06083	34.62221	74.17693	58.26502	49.61585	42.97288
9/1/2021	7:00:00 AM	57.39217	35.90433	75.17415	60.50413	51.53924	44.68618
9/1/2021	8:00:00 AM	53.14058	37.11929	70.10155	56.59568	49.4199	44.42777
9/1/2021	9:00:00 AM	54.15881	36.04014	74.95193	56.63318	48.70731	43.54679
9/1/2021	10:00:00 AM	60.65833	34.86159	83.20087	61.85405	49.2835	42.55378
9/1/2021	11:00:00 AM	64.04278	33.3674	84.0248	66.55631	52.66131	43.10668

9/1/2021	12:00:00 PM	64.66324	30.94197	85.8038	66.84169	52.84788	41.11536
9/1/2021	1:00:00 PM	69.18704	27.24337	88.24025	72.58682	56.37547	40.02999
9/1/2021	2:00:00 PM	66.71809	26.92805	84.85125	70.17027	55.15634	39.47359
9/1/2021	3:00:00 PM	65.27971	28.4454	86.40127	67.58984	53.95678	40.1768
9/1/2021	4:00:00 PM	69.01283	26.28857	87.77029	72.0288	53.44653	37.19695
9/1/2021	5:00:00 PM	64.00708	24.84852	85.37421	66.15363	45.77731	33.61939
9/1/2021	6:00:00 PM	61.44103	23.85633	83.91909	61.89942	39.79563	31.79193
9/1/2021	7:00:00 PM	67.48353	29.04558	87.09253	71.17341	57.13053	40.00061
9/1/2021	8:00:00 PM	70.98873	32.08013	86.80766	75.07057	64.63554	51.32509
9/1/2021	9:00:00 PM	72.81525	26.86966	89.78943	76.8222	61.47862	44.78347
9/1/2021	10:00:00 PM	62.10278	20.31033	80.57361	65.66926	43.2072	29.41377
9/1/2021	11:00:00 PM	50.75939	20.70188	69.49371	53.88508	35.86363	30.24681
9/2/2021	12:00:00 AM	52.14202	26.26254	73.22397	54.458	40.75841	34.87636
9/2/2021	1:00:00 AM	45.9459	28.48491	64.80261	48.74214	41.8539	36.65645
9/2/2021	2:00:00 AM	59.33896	26.60837	79.95331	62.843	47.44555	37.16842
9/2/2021	3:00:00 AM	59.79118	31.7421	77.31824	63.54468	51.17437	41.27006
9/2/2021	4:00:00 AM	54.06211	32.59748	73.18992	57.28587	47.39037	41.07828
9/2/2021	5:00:00 AM	55.40694	32.10653	73.82813	59.0281	48.59135	41.17241
9/2/2021	6:00:00 AM	66.68699	35.2453	93.81146	59.50466	50.90923	44.43666
9/2/2021	7:00:00 AM	68.86116	35.62881	93.65304	57.62035	48.90995	43.22352
9/2/2021	8:00:00 AM	68.78544	36.98544	93.14153	58.8934	48.77148	43.68543
9/2/2021	9:00:00 AM	67.56658	35.25961	92.41021	55.3612	47.96708	43.24397
9/2/2021	10:00:00 AM	55.88827	28.26186	79.74233	57.07903	45.53746	38.09093
9/2/2021	11:00:00 AM	63.76609	28.94114	83.56008	67.03037	51.58819	38.50792
9/2/2021	12:00:00 PM	66.55247	29.40905	86.43032	69.8839	53.86277	39.67977
9/2/2021	1:00:00 PM	60.78937	27.92376	82.27801	62.94588	49.72836	37.82224
9/2/2021	2:00:00 PM	65.98216	28.69518	84.96853	69.0897	53.4552	38.66192
9/2/2021	3:00:00 PM	65.11821	28.62933	85.92416	67.7466	52.24456	38.4189
9/2/2021	4:00:00 PM	67.79797	29.89347	88.57874	70.69614	56.57244	42.04615
9/2/2021	5:00:00 PM	68.77712	30.79774	89.36237	69.45713	53.24908	41.30384
9/2/2021	6:00:00 PM	71.69053	31.47589	89.8504	75.63966	58.65778	43.01576
9/2/2021	7:00:00 PM	79.74312	42.9923	92.26392	84.05687	76.15732	62.5823
9/2/2021	8:00:00 PM	79.11629	40.99697	91.91722	83.6926	74.31385	59.73794
9/2/2021	9:00:00 PM	80.57589	47.78674	92.75325	84.77807	77.32742	67.74879
9/2/2021	10:00:00 PM	79.89959	46.98973	91.83835	83.99678	77.18286	67.53335
9/2/2021	11:00:00 PM	71.67377	31.73671	88.59102	75.64677	61.54541	40.98661
9/3/2021	12:00:00 AM	71.92924	33.10773	88.71125	76.26724	62.20472	41.69222
9/3/2021	1:00:00 AM	58.99606	33.74428	82.34368	60.63574	47.32076	41.17305
9/3/2021	2:00:00 AM	50.07669	38.01125	66.45666	52.82986	48.49077	44.72842
9/3/2021	3:00:00 AM	51.94517	33.82369	69.5956	54.51692	48.3952	41.91914
9/3/2021	4:00:00 AM	56.37288	30.83085	78.04522	59.29187	48.73658	40.36225
9/3/2021	5:00:00 AM	50.85545	31.59646	71.9269	53.30986	44.10758	38.82361
9/3/2021	6:00:00 AM	69.13288	34.56779	94.11982	64.44969	54.13038	44.83794

9/3/2021	7:00:00 AM	66.81042	35.09766	92.73895	65.2433	52.9284	44.25132
9/3/2021	8:00:00 AM	68.45348	33.14299	92.50158	64.14785	52.84216	42.39603
9/3/2021	9:00:00 AM	66.08416	31.97018	92.90621	59.582	46.60244	39.4528
9/3/2021	10:00:00 AM	62.86373	27.80096	91.47503	59.16439	46.41935	37.86438
9/3/2021	11:00:00 AM	65.56293	26.46075	90.79528	65.75025	50.26255	36.62271
9/3/2021	12:00:00 PM	69.41718	28.00801	87.26825	73.43858	61.08516	44.52155
9/3/2021	1:00:00 PM	68.92327	26.56332	87.26196	72.08705	55.65069	38.27168
9/3/2021	2:00:00 PM	68.75659	23.80948	88.37261	71.69973	53.09222	33.82146
9/3/2021	3:00:00 PM	59.27446	23.87302	81.6916	61.0285	46.73791	34.12115
9/3/2021	4:00:00 PM	62.86343	23.80093	87.74058	62.1884	47.42851	34.09953
9/3/2021	5:00:00 PM	60.45782	21.4724	83.79261	61.9916	41.43965	30.5046
9/3/2021	6:00:00 PM	58.79723	18.69667	81.86933	58.32664	40.53156	28.65076
9/3/2021	7:00:00 PM	47.53758	19.83536	72.47842	45.93995	35.17954	28.98783
9/3/2021	8:00:00 PM	52.68497	22.22501	73.87821	55.57302	38.67964	31.48819
9/3/2021	9:00:00 PM	56.15069	24.34649	74.97125	60.13666	48.64929	34.11219
9/3/2021	10:00:00 PM	56.87306	26.16241	76.83339	60.60564	48.10485	35.70752
9/3/2021	11:00:00 PM	57.12017	28.46067	77.82491	60.737	47.82456	38.20252
9/4/2021	12:00:00 AM	60.76142	30.402	79.51572	64.46683	54.49426	43.27524
9/4/2021	1:00:00 AM	61.96977	31.39956	79.00891	65.69775	54.84419	41.63294
9/4/2021	2:00:00 AM	59.09267	26.36698	80.1868	62.46629	43.71253	35.34866
9/4/2021	3:00:00 AM	55.71703	29.5637	72.83768	59.38544	49.95315	40.72233
9/4/2021	4:00:00 AM	55.38954	28.74296	75.19191	58.81191	48.10475	38.52
9/4/2021	5:00:00 AM	56.81938	27.58902	80.73971	58.24185	45.33569	36.7154
9/4/2021	6:00:00 AM	65.7601	30.32544	93.46931	57.05026	46.6816	39.2819
9/4/2021	7:00:00 AM	65.91978	32.91782	92.2373	57.32784	48.02328	42.41388
9/4/2021	8:00:00 AM	67.09107	35.78106	92.68217	58.0396	47.04371	42.4255
9/4/2021	9:00:00 AM	63.34282	35.11346	91.83742	59.33114	48.40624	42.54165
9/4/2021	10:00:00 AM	57.70751	31.24602	81.30815	60.25352	47.20042	39.93846
9/4/2021	11:00:00 AM	60.36558	24.0592	79.7286	63.69849	51.30718	37.7442
9/4/2021	12:00:00 PM	64.66187	22.20503	83.5062	68.2348	51.1996	33.79275
9/4/2021	1:00:00 PM	70.98246	26.11077	89.46829	74.43487	62.11568	43.00565
9/4/2021	2:00:00 PM	71.72039	26.21091	89.61187	75.08822	60.27775	41.4756
9/4/2021	3:00:00 PM	67.47784	24.13799	88.66183	68.14883	51.78637	36.4271
9/4/2021	4:00:00 PM	66.39304	20.28703	88.83074	66.39816	46.17627	31.89455
9/4/2021	5:00:00 PM	56.95769	17.82429	80.94259	57.01866	38.73076	27.75927
9/4/2021	6:00:00 PM	43.75666	15.00031	72.0281	39.3547	28.0768	25.84304
9/4/2021	7:00:00 PM	40.77631	17.57609	62.49543	43.19073	32.62475	27.48619
9/4/2021	8:00:00 PM	55.6832	24.59818	74.33378	59.12993	48.16813	37.15239
9/4/2021	9:00:00 PM	59.35951	30.6431	78.13085	63.35366	53.93578	42.76762
9/4/2021	10:00:00 PM	63.38855	29.80137	81.91885	66.91776	54.93569	43.97064
9/4/2021	11:00:00 PM	59.10366	21.96263	78.54913	62.19001	43.72628	31.67712
9/5/2021	12:00:00 AM	58.24303	27.49199	75.97451	61.98915	51.58418	41.28362
9/5/2021	1:00:00 AM	59.23032	27.77202	77.20284	63.06072	52.97782	42.51774

9/5/2021	2:00:00 AM	60.25677	32.24534	77.41962	64.11539	54.99808	45.66016
9/5/2021	3:00:00 AM	53.53846	30.04425	70.54927	57.06679	47.24451	39.48004
9/5/2021	4:00:00 AM	62.41296	34.54237	81.35297	65.92609	55.02859	45.4085
9/5/2021	5:00:00 AM	63.28496	32.88382	80.73995	67.2155	57.33586	46.69046
9/5/2021	6:00:00 AM	56.82933	32.3281	76.39682	59.94424	48.06367	41.00388
9/5/2021	7:00:00 AM	51.90589	33.28302	68.60821	55.46064	47.81919	41.5587
9/5/2021	8:00:00 AM	52.36045	35.59625	70.98738	55.0749	47.79154	43.18455
9/5/2021	9:00:00 AM	53.32011	35.51192	75.61702	55.7974	47.69408	43.00078
9/5/2021	10:00:00 AM	56.39637	29.29978	77.17362	58.92976	45.82857	37.86769
9/5/2021	11:00:00 AM	62.41059	25.63645	84.50234	65.39222	50.30164	36.23079
9/5/2021	12:00:00 PM	64.12437	23.48008	84.03414	67.01206	52.2589	34.85731

WM11: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
8/23/2021	4:52:29 PM	54	52.9	51.9	50.7	47.7	46.9	44.9	42.5	41.6	41	44	42.6	41.5	39.2	39.5	38.1	38.9	42.7	39.3	40.1	38	35.4	36.7	40.5	41.5	38.5	36.8	34.6	35.7	35.3	32.4	32.2	32.1	31	29.7	27.2
8/23/2021	5:00:00 PM	58.5	57	55.7	53.6	51.7	49.5	47.6	45.1	42.3	39.1	35.7	32.6	30.2	27.6	26.2	25.7	24.8	23.6	22.2	20.6	16.9	13	11.9	10.9	9	5.7	3	1	0	0.4	0.6	1.1	1.1	0.3	0.3	1.8
8/23/2021	6:00:00 PM	60	58.7	57.4	55.8	54.1	51.9	49.5	47.8	45	42	39	40.3	33.2	31.8	35.6	29	28.3	25.6	21.6	19.8	18.3	15.9	12.1	9.1	6.5	3.6	1.1	-0.6	-1.4	-1	-0.7	-0.3	-0.5	-1.2	-0.6	1.3
8/23/2021	7:00:00 PM	65.1	64.1	62.7	61	59.4	57.5	55.3	53.1	50.6	47.8	44.7	40.6	36.8	33	30	28	26.2	24.3	22.7	20.9	18.1	13.8	13	12.4	10.7	7.8	4.9	2.5	1	1.1	1.3	1.9	1.7	0.3	0.4	2
8/23/2021	8:00:00 PM	66.9	65.8	64.5	62.7	60.9	59.2	57.2	55	52.6	49.6	46.4	43.2	39.5	35.3	32.1	29.6	28	26.2	24.4	22.3	19.6	15.6	15	14	12.1	9.2	6.1	3.6	2.2	2.6	2.9	3.7	3.6	2	2	3.1
8/23/2021	9:00:00 PM	65.3	64.5	63.2	61.6	60.2	58.4	56.7	54.4	51.6	48.8	45.9	42.4	38.7	35	31.1	29.6	32.2	27.9	22.1	20.6	17.5	11.8	10	8.6	6.7	3.9	1.3	0	-0.8	-0.3	0.5	1	0.2	-0.9	0	2.3
8/23/2021	10:00:00 PM	35.5	32.6	31.4	28.7	27.1	25	23.3	24.5	23.6	24.8	24.7	23.3	21.5	21.2	20.2	17.1	12.6	7.3	2.6	0.5	-2.9	-7.2	-7.8	-7.3	-7.3	-7	-6.6	-6.2	-5.8	-5.5	-5.1	-4.8	-4.7	-4.2	-2.4	0.7
8/23/2021	11:00:00 PM	46.8	46	44.5	42.2	39.7	37.1	34	31.6	28.3	25.6	26.5	22.5	19.6	18.7	15.2	12.2	8.2	3.5	-1.2	-5.5	-6.8	-7.2	-6.7	-5.5	-6.4	-6.4	-6.5	-6.3	-5.9	-5.4	-5.1	-4.8	-4.7	-4.2	-2.4	0.6
8/24/2021	12:00:00 AM	33.2	29.8	29.9	28	31.5	26.1	29.4	27.6	23.7	23.8	24	21.3	18.8	19.8	16.6	11.6	8.5	5.5	0.6	-2.3	-4	-5.3	-6.1	-5.3	-5.7	-6.1	-6.4	-6.3	-5.9	-5.6	-5.2	-4.8	-4.7	-4.3	-2.4	0.7
8/24/2021	1:00:00 AM	50	48.4	47.5	45.8	43.6	42.2	41.3	37.8	34.6	31.9	32.3	28.4	26.1	25.6	23.3	21.4	16.8	11.1	8.1	9.8	6.5	-2.5	-7	-6.1	-6.8	-6.7	-6.7	-6.3	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.4	0.6
8/24/2021	2:00:00 AM	47.5	46	44.4	42.3	41.1	37	34.9	32	30.2	29.4	31.8	30.2	27.4	19.8	15.4	18.4	10.3	4.2	-2.2	-6.5	-7.6	-8.2	-7.9	-7.6	-7.5	-7.2	-6.8	-6.4	-6	-5.6	-5.2	-4.7	-4.7	-4.4	-2.5	0.6
8/24/2021	3:00:00 AM	51.5	50.3	48.5	46.7	44.5	41.8	39.1	37	32.7	31.9	32.2	29.5	25.7	23.1	19.6	19.5	16.7	11.7	10.2	11.8	10.2	8.5	10.9	13	11.1	8.1	5.1	-1.4	-5.1	-5.5	-5.2	-4.8	-4.7	-4.4	-2.5	0.6
8/24/2021	4:00:00 AM	54.7	53.5	51.9	49.9	47.8	45.2	42.4	39.6	35.7	33	33.5	30.1	23	20	17.3	22.3	10.9	5.7	1.8	7.7	15	13.4	6	-3.4	-3.6	-3	-1.4	2.8	4	6.5	12	18.9	13.6	6.4	7.7	20.8
8/24/2021	5:00:00 AM	50.3	49.1	47.4	45.6	43.5	40.9	37.9	35	31.3	29.3	31.5	27.6	20.7	17.9	13.5	21.2	7.5	2.8	0.5	3.4	3.6	2.4	9.1	17.8	14.6	6.8	4.4	8.6	7.1	5.4	2.4	1.3	3.8	4.5	2.5	0.6
8/24/2021	6:00:00 AM	51.4	49.9	48.2	45.9	43.8	41.1	37.9	34.9	30.9	28.6	28.8	25.2	20.3	18.1	14.2	16.4	9	4.5	0.3	0.7	3.5	4.9	1.2	1.2	0.3	3.6	4.6	3.6	4	4	4.9	4.8	4.7	4.5	2.5	0.6
8/24/2021	7:00:00 AM	39.2	36.7	36.2	34.8	35	33.4	33.7	32.1	30.5	29.8	31.3	29.1	28.8	25.2	22.3	20.8	17.1	11.3	7.1	3.7	0.4	1.5	0.3	5.1	2.1	3.6	5.5	5.2	5.3	4.6	4.8	4.6	4.6	4.1	2.2	0.7
8/24/2021	8:00:00 AM	44.2	43.3	42.7	40.7	40	39.1	35.9	33.3	35.7	30	32.8	30.2	29	30.6	31.1	28.1	19.2	14.7	12.4	9.9	7	0.4	3.6	0.4	0.6	3.6	4.3	5.1	3.8	0	4.3	4.3	4.4	3.5	1.9	0.7
8/24/2021	9:00:00 AM	46	47.3	48.1	41.9	43.4	46.7	41.9	41.8	39.2	35.3	32.9	32	30.1	28.8	27.3	25.5	22.1	17.9	16.4	15.3	12.8	5.2	0.4	3.2	4.5	4.8	5.2	5.2	4.9	4.5	4.4	2.7	3.9	3.2	1.7	0.8
8/24/2021	10:00:00 AM	52.4	51.1	49	47.8	46	44.6	41.9	39.2	36.4	32.8	30.4	29	26.4	24.6	23.3	21.9	18.3	14.3	11	6.3	4.9	3.4	2.3	2.2	0.6	1.4	2.6	3.2	3.1	3.2	3.4	3.3	3.6	2.3	1.2	1
8/24/2021	11:00:00 AM	59.6	58.8	57.8	56.9	55.4	53.7	51.4	49.9	47.2	44.4	40.9	37.8	36.7	33.6	29.7	27.1	23.7	19.7	17	14	11.4	9.6	5.1	3.1	1.1	0.7	1.4	2.2	1.1	1.7	2.4	2.3	2.4	1.5	0.7	1.1
8/24/2021	12:00:00 PM	60.5	59.5	58.1	56.3	54.7	53.1	51	48.9	46.2	43.1	39.3	36.4	32.1	29.1	27.1	24.4	22.4	20.5	18.3	16.1	13.4	10.4	8.6	6.8	5	2.1	0.2	-1.2	-1.8	-1.6	-1.3	0.9	1.3	-0.9	0.3	1.3
8/24/2021	1:00:00 PM	61.7	60.3	58.6	57.4	55.8	54	52.1	50.1	47.4	44.8	42	38.8	36.4	34.7	33.1	30.8	28.1	24.4	20	16.3	12.2	8.5	6.7	5.8	3.4	1	-0.9	-1.8	-2	-1.7	-1.4	-1.3	1.8	-1.2	-0.4	1.4
8/24/2021	2:00:00 PM	59.8	58.3	57.1	55.4	53.6	52.4	50.3	47.9	45.5	42.8	40.1	37.2	35.4	35.2	33.7	33.6	34.4	30.1	29.8	29.9	29.5	29	27.5	29.6	26.6	26.2	23.3	26.1	23.6	23.8	21.4	21.9	18.5	17.9	12.7	10.3
8/24/2021	3:00:00 PM	62.6	61.8	61.3	60	58.3	56.8	55.3	53.5	51.9	49.2	46.7	44	41.7	39.4	35.2	31.6	29	25.1	22.8	20.9	17.8	15.2	13.8	13.2	11	8.8	6.4	4.2	2.5	1.9	2	2.1	1.6	1.4	1.3	2.2
8/24/2021	4:00:00 PM	64.1	62.2	60.7	59.1	56.9	55.2	53.1	51.2	49	46.6	43.4	40.1	36.4	32.9	29.7	27.6	25.7	24.1	22.3	20.4	17.9	15	13.6	12.4	11.2	8	5.7	3.3	1.5	1.4	1.6	2	1.9	1.8	1.8	4
8/24/2021	5:00:00 PM	58.5	57.3	55.2	53.3	51.6	49.8	47.8	44.9	41.9	39.4	35.8	31.8	28.8	25.6	23.7	22.7	22	21.4	20.1	18.5	16.1	13.4	11.9	10.7	9.7	6.7	4.3	2.1	0.3	0.1	0.2	0.6	0.6	0.6	0.8	2.3
8/24/2021	6:00:00 PM	56.6	55.5	53.6	51.9	49.6	48.4	45.4	43	40.3	37	33.3	30.6	27.2	24.5	23.3	21.9	20.7	19	16.7	14.3	11.2	6.9	5.1	3.9	2.1	0.5	-2.3	-3.2	-3.2	-2.8	-2.5	-2.2	-2.3	-2.1	-1.1	1.1
8/24/2021	7:00:00 PM	60	59.1	57.9	56.2	54.2	52.4	50.4	47.9	44.8	41.9	38.2	34.7	30.5	27.1	24.6	21.5	18.1	15	12	9	5.5	1.2	0.1	-0.6	-2.7	4.2	-5.1	-5.3	4.9	4.5	4.1	3.9	3.9	3.4	1.9	0.8
8/24/2021	8:00:00 PM	55.5	54.5	53.6	51.5	49.5	47.3	44.8	42.2	39.2	36.4	33.3	30.6	28.9	26.3	23.9	23.6	21	16	9.5	7.6	8.5	6	6	7.9	6.7	3.5	0.4	3.6	5.4	5.3	5	4.6	4.6	4	2.2	0.7

8/24/2021	9:00:00 PM	55.1	53.9	52.2	50.5	48.4	46	43.2	40.4	37.4	34.4	32.1	30.3	29.1	27.9	26.2	25.8	25.4	18.9	12	8.2	4.2	-2	-7	-6.9	-7.1	-6.8	-6.6	-6.2	-5.8	-5.4	-5	-4.7	-4.6	-4.1	-2.3	0.7
8/24/2021	10:00:00 PM	50	48.6	47.3	45.4	43.4	40.2	38	35	31.2	28.7	26.3	23.5	20.1	16.4	11.3	11.7	5.1	2.4	-0.1	-3.6	-3.2	-1.8	-6.8	-5.8	-6.1	-6.8	-6.3	-6.3	-5.9	-5.5	-5.1	-4.8	-4.7	-4.3	-2.4	2.1
8/24/2021	11:00:00 PM	34	30.5	31.7	28.8	27.5	25.3	26	26	23.7	25.4	26.1	23.2	20.9	19.6	17.7	16.5	12.5	8.5	2.5	4.5	12.4	7.4	4	-0.1	-3.1	-0.1	-0.2	2.7	2.2	0.2	9.1	15.8	11.4	1.9	4.2	18.4
8/25/2021	12:00:00 AM	52.7	51	49.4	47.6	45.3	43	40.3	37.5	33.5	31.3	32	27.6	21.9	19.7	14	18	8.4	4.6	-0.1	-3.5	-4.9	-6.1	-5.9	-4.7	-5.3	-6.3	-6.5	-6.4	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	0.6
8/25/2021	1:00:00 AM	51.6	50.3	48.6	46.8	44.9	41.5	38.9	35.9	32.1	30.5	30.1	27.3	24.6	26.1	18.2	20.5	14.6	9.5	3.1	-0.1	-3.9	-6.7	-6.6	-6.5	-7	-7.1	-6.8	-6.5	-6.1	-5.6	-5.2	-4.9	-4.7	-4.5	-2.5	0.6
8/25/2021	2:00:00 AM	56.4	55.1	53.8	51.7	49.4	47.1	44.3	41.6	37.6	35.1	33.1	31.2	28	25.6	22.1	22.5	18.1	17.7	16.9	12.9	14.9	9.4	13.4	18.3	17.5	15.6	11	5.5	1.6	-5	-5.2	-4.8	-4.7	-4.5	-2.5	0.6
8/25/2021	3:00:00 AM	56.8	55.8	53.9	51.9	49.9	47.5	45	42.2	39	35.1	31.5	26.9	22	17.9	14	15.1	10.2	6.1	2	1.5	3.5	5.1	6.1	6.1	6.8	7.1	6.8	6.4	6	5.6	5.2	4.8	4.7	4.5	2.5	0.6
8/25/2021	4:00:00 AM	49.9	48.5	47	44.8	42.4	39.8	36.7	33.9	29.8	27.1	25.2	21.2	17.8	13.4	9.6	14	4.1	1.6	-2	4.8	5.5	5.8	5.3	6	6.5	7	6.7	6.5	6.1	5.7	5.3	4.9	4.7	4.5	2.5	0.6
8/25/2021	5:00:00 AM	47.5	46.1	44.4	42.2	42.3	37.5	35.5	32.2	27.9	25.4	22.6	20.5	19.2	16.1	13.5	11	6.6	3.7	2.5	5.4	6	7.2	7.2	7.2	7.2	7.4	7	6.6	6.1	5.7	5.3	4.5	4.7	4.6	2.6	0.6
8/25/2021	6:00:00 AM	54.5	52.9	51.5	49.7	50.9	45.4	42.9	39.7	36.3	32.1	28.2	24	21.4	18.4	15.6	13.3	10.1	5.7	0.5	0.9	1.9	1.7	6.9	13.7	2.8	3.8	5.2	5.8	5.9	5.6	5.3	4.9	4.7	4.5	2.6	0.6
8/25/2021	7:00:00 AM	40.4	39.4	37.4	35.6	37.3	35.1	33.6	33.6	35.3	35.2	35.6	36.3	32.3	31.5	31.2	30.1	27.1	22.7	20.3	17.1	14.8	12.3	7.8	6.6	4.1	1.6	0.7	3.6	5.3	5.1	4.8	4.8	4.2	2.3	0.6
8/25/2021	8:00:00 AM	47.8	46.7	45.1	43.7	42.1	40.5	38.3	35.7	35	35	35.9	34.2	32.2	30.9	28.9	26.6	23.7	20.9	17.3	14.5	11.1	3.7	4.5	5.2	6.1	6.3	6.2	5.9	4.2	2.1	4.8	4.6	4.7	3.8	2	0.7
8/25/2021	9:00:00 AM	50	48.6	47.3	45.3	43.6	41.2	39.4	36.6	34.7	33.1	33	33	32.5	34.6	29.1	25.7	23.2	17	12.5	9.6	6.6	1.5	0.5	3.4	0.1	3.3	4.2	4.4	4.7	4.7	4.5	4.4	4.5	3.5	1.8	0.7
8/25/2021	10:00:00 AM	53.5	52.1	50.9	48.8	47.2	45.2	42.9	40.8	38.3	36.2	36.1	34.9	34.4	33	30.9	28.3	23.5	19.8	16.7	13.6	11.6	7.7	3.3	3.1	2.8	0.2	-2.1	-3.2	-4	4.1	-4	3.9	4.1	-3	1.5	0.8
8/25/2021	11:00:00 AM	63.2	62.1	60.5	58.8	57.3	55.7	53.9	51.5	49.2	46.4	43.4	40.3	36.8	33.7	30.6	28.2	23.8	21.5	19.3	17.4	15.2	12.1	10.7	9.9	8.4	5.5	3.5	1.7	0.2	0.2	0	0.3	0.2	0.4	0.8	1.9
8/25/2021	12:00:00 PM	61.6	60.5	59.3	57.6	55.6	53.7	52.1	50.4	48	45.3	42.9	39.4	37.8	34.5	30.6	27.9	24.9	21.5	19	16.4	13.8	10.4	8.5	6.9	5.3	2.3	0.4	-1.1	0.6	1.4	-1.3	-1	1.2	-0.5	0.6	2.5
8/25/2021	1:00:00 PM	69.2	67.7	65.7	63.9	62	60.7	58.5	56.6	54.7	52.2	49.7	46.8	43.2	40.4	37	34.2	31.8	29.7	28.2	26.8	24.6	22.3	21.6	21.1	20.5	17.8	15.8	13	10.3	9	8.8	9.1	8.8	8.5	7.9	8.3
8/25/2021	2:00:00 PM	70	68.5	66.9	65.4	63.4	62.1	61.1	58.7	58.1	56.9	55.6	54.8	52.2	50.8	46.8	44.8	40.9	37.5	33.8	30.2	28	26.4	24.5	22.1	20.2	17.2	14.9	12	9.3	8.2	8.1	8.6	8.5	8.3	7.8	8.4
8/25/2021	3:00:00 PM	67.4	65.6	62.6	60.5	58.7	56.9	54.9	52.5	49.9	47.4	44.3	40.9	38	35	32.5	31.3	30.4	29.8	29	27.8	26	23.9	23.2	22.7	22.2	19.5	17.4	14.9	11.9	10.4	10	10.4	10.3	10	9	8.9
8/25/2021	4:00:00 PM	67	64.8	63	60.9	59.1	57.3	55.4	53.3	50.6	48	45.5	42.5	39.5	37.3	34	33	31.8	30.5	29.6	28.5	26.6	24.5	23.5	22.9	22.6	20	17.9	15.5	12.4	11.1	10.7	11.2	11.3	10.8	9.8	9.4
8/25/2021	5:00:00 PM	62.8	60.4	58.7	56.8	54.8	52.9	51	48.3	45.8	42.9	40	35.9	33.3	29.9	28.3	27.5	26.9	26.4	25.3	23.9	21.7	19.2	18.1	17.5	16.8	13.9	11.6	9.2	6.7	5.9	5.8	6.4	6.9	6	5.2	5.1
8/25/2021	6:00:00 PM	64.8	62.8	61.6	60	58.4	57	54.6	52.5	50.5	47.9	44.2	41.8	38.1	35.2	32.3	30.6	29.4	28.6	27.3	25.8	23.5	20.4	20.4	20.2	18.9	16.2	13.6	11	8.7	8.4	7.4	8.1	8.7	6.7	5.6	5.9
8/25/2021	7:00:00 PM	67	65.7	64.1	62.8	61.2	59.3	57.6	55.2	52.8	50.3	47.3	43.9	40.2	36.8	33.6	31.4	28.9	26.9	25.1	23.2	20.7	17	16.5	15.6	13.9	11	8	5.4	3.8	3.8	3.9	4.5	4.7	2.8	2.3	3.8
8/25/2021	8:00:00 PM	63.4	62.7	61.2	59.6	57.8	55.8	54.1	51.6	48.7	45.9	42.7	39.4	36.4	34.2	32.2	30.7	27.2	22.4	18.7	16.1	13.3	9.2	8.1	7.2	5.7	2.5	-0.6	-2.7	3.1	2.7	-2.2	1.7	1.4	-2	1.2	1.3
8/25/2021	9:00:00 PM	51.4	50.1	48.6	47	44.9	43.1	40.6	38	35.2	32.3	30.3	28.6	27.5	26.4	24.2	23.7	20	11.2	3.9	0.6	2.5	6.4	6.7	6.2	6.4	6.8	6.5	6.2	5.8	5.4	5.1	4.7	4.6	4.1	2.3	1
8/25/2021	10:00:00 PM	52.7	52	50.4	48.6	46.5	44.6	42.7	40.3	37.2	35	34.8	31.5	28.7	27.9	27	22.3	18.4	17.9	14.3	12.6	13.5	10.2	8.4	9.5	7.8	3.7	-0.1	-4.8	5.7	5.5	5.1	4.8	4.7	4.4	2.4	0.7
8/25/2021	11:00:00 PM	49.1	47.3	45.9	43.8	41.9	39.3	36	33	29.6	27.7	26.6	24.7	22.3	21	18.1	16.5	11.2	6.3	0.6	4.5	7.1	7.8	8	7.7	7.3	7.3	6.7	6.4	6	5.6	5.2	4.8	4.7	4.4	2.5	0.7
8/26/2021	12:00:00 AM	43.6	41.6	40.5	38.3	38.9	36.5	33.4	33.6	31.4	31.4	31.8	30.1	28.8	27.9	26	23.7	18.6	13.3	8.6	5.3	0.8	5.8	8.2	7.8	7.5	7.4	6.9	6.5	6.1	5.7	5.3	4.9	4.7	4.5	2.5	0.6
8/26/2021	1:00:00 AM	54.5	53.2	51.5	49.9	47.6	45.1	42.5	39.5	36.1	32.7	31.2	27.6	25.3	23.8	21.2	20.8	13.6	8.8	5.3	1.3	2	6	7.2	7.2	7.6	7.4	7	6.5	6.1	5.7	5.3	4.8	4.6	4.5	2.6	0.8
8/26/2021	2:00:00 AM	55.2	54.1	52.6	50.6	48.5	46	43.4	41	37.1	35.2	33.9	31.5	27.8	28.8	22.9	21.4	20.1	20	17.6	14.5	16.2	12.7	15.9	19.9	17.9	16.1	11.9	5.4	2.5	5.2	5.2	4.8	4.7	4.5	2.6	0.6
8/26/2021	3:00:00 AM	54.3	52.8	51.3	49.4	47.4	44.5	41.5	38.6	34.8	31.2	31.4	25.2	25.6	15.6	12.3	14.5	7.1	1.5	2.2	4.8	6.3	5.7	7.6	7.4	7.6	7.4	7	6.5	6.1	5.7	5.2	4.8	4.7	4.5	2.6	0.6

8/26/2021	4:00:00 AM	53.5	52.55	51	48.8	46.7	44.2	41.2	38.2	34.2	32.9	32.7	27.6	23.77	20.55	15	22.55	9.2	4.7	1.3	-2.5	-5.7	-6.2	-5.6	-2.7	-3.5	-5.52	-6.2	-6.4	-6.1	-5.7	-5.3	-4.8	-4.7	-4.5	-2.6	0.6
8/26/2021	5:00:00 AM	46	44.2	43.2	41.1	38.6	35.6	33.3	31.6	27.6	29.4	30	27.7	23.22	21.88	17.2	24.66	9.7	4.9	-0.6	-4.3	-5.8	-6.9	-5.53	-2.5	-2.4	-6.11	-6.6	-6.3	-6.1	-5.7	-5.3	-4.7	-4.7	-4.7	-2.7	0.6
8/26/2021	6:00:00 AM	54.1	52.99	51.3	49.4	47.2	44.5	42	39.1	35.6	31.6	29.2	23.8	19.99	17.11	14.55	15.99	11.1	5.4	0.7	-2.6	-4.9	-6	-4.99	-3.5	-3.2	-6.55	-6.6	-5.9	5.5	9.7	-4.4	-4.8	-4.5	-4.6	-2.6	0.6
8/26/2021	7:00:00 AM	51.6	50.11	48.4	46.8	44.9	41.9	39.9	37.9	36	36	35.5	39	32.11	34.55	29.4	27.77	24.5	18.9	17.8	14.77	12.8	10.6	7.9	7.7	7.2	4.77	2.4	-1	-4.33	-4.44	-5.1	-4.8	-4.7	-4.2	-2.4	0.6
8/26/2021	8:00:00 AM	42.9	41.66	40.3	38.8	37.6	35.1	34.4	34.8	35.5	36.5	36.2	35.3	30.55	30.22	28.88	25.66	21.11	16	11.8	7.1	5.9	3.2	0	-1.7	-5	-6.22	-6.2	-5.9	-5.56	-5.22	-4.9	-4.77	-4.7	-3.8	-2	0.7
8/26/2021	9:00:00 AM	47	45.88	44.6	43.4	41.8	40.2	38.1	34.7	32.2	32.3	31.3	29.6	26.33	24.66	21.2	19	11.55	6.1	2.2	0.7	-0.8	-2.3	-2.77	-3	-3.9	-4.77	-4.8	-5	-4.88	-4.66	-4.4	-4.33	-4.4	-3.3	-1.7	0.8
8/26/2021	10:00:00 AM	51.4	50.11	49	47.5	45.4	43.2	40.6	37.9	34.8	32.4	31.7	36.9	37.33	39.33	36	28.7	25.3	20	9.9	6.7	4.3	2	1.55	1.8	1.4	-1.16	-1.7	-1.5	-1.33	-1.66	-2	-2.55	-3.4	-2.4	-1.2	0.9
8/26/2021	11:00:00 AM	56.8	55.99	54.7	53.5	51.7	49.6	47.2	44.9	42.5	39.1	36.1	33.2	30.55	28.33	25.1	22.77	19.3	16.1	13.8	10.2	7.9	5.1	4.77	5	2.4	-0.11	-1.5	-1.7	-0.88	-2.22	-2.3	-2.33	-2.7	-1.7	-0.7	1.1
8/26/2021	12:00:00 PM	63.1	61.66	60.4	58.6	57.1	55.6	53.7	51.3	49.2	46.2	43.4	39.9	37.44	33.66	29.6	28.33	24.8	22.5	22.2	20	16.4	13.3	12.3	10.5	9.1	6.11	3.5	1.3	0.66	0.44	0.6	0.88	0.2	0.5	0.7	2.1
8/26/2021	1:00:00 PM	64.5	62.99	61.1	59.5	57.5	55.8	54.4	52.3	49.6	47	44.4	41.3	38	34	30.8	27.88	26.1	25.2	23.7	22.2	20.1	17.6	16.3	15.4	14.6	11.6	9.4	7.1	4.88	4	4.1	4.55	4.3	4.3	3.9	4.5
8/26/2021	2:00:00 PM	67	65.66	63.9	62.5	61	59.5	57.9	56.3	54.2	52.1	49.8	46.9	44	40.66	37	33.77	31.5	29.2	27.5	26.7	24.1	21.5	20.5	20.2	19.2	16.5	14.2	11.6	9.11	7.7	7.3	7.66	7.6	7	6.1	6.3
8/26/2021	3:00:00 PM	63.6	61.99	60	58.9	57	55.2	52.9	51	48.2	45.7	42.9	39.5	37.3	33.44	31	29.55	28.5	27.7	26.6	25.2	23	20.3	19.6	19.4	18.4	15.7	13.2	10.5	8.11	6.9	6.6	7.1	7.5	6.5	5.6	5.9
8/26/2021	4:00:00 PM	62.1	60.11	59	56.9	55.2	53.2	51.1	48.8	46.1	43.2	39.7	36.1	33	30.11	27.11	26.2	25.8	25.2	24.1	22.6	20.1	17.3	16.3	15.9	14.8	12	9.4	6.8	4.77	4.11	4	4.66	4.9	4	3.3	3.9
8/26/2021	5:00:00 PM	61.7	60.22	58.4	56.6	55.1	52.8	51.1	48.7	46.9	44.1	40.9	38.2	34.66	31.22	28.6	27	26.3	24.7	23.2	21.3	18.5	15	14.2	13.6	11.7	8.6	5.8	3.4	2	1.99	2.2	2.66	3.1	2.3	1.9	3.3
8/26/2021	6:00:00 PM	63.7	62.22	60.5	59.4	57.6	55.5	53.7	51.5	49	45.9	43.6	39.6	36	32.77	28.8	25.8	24	22.8	20.9	18.7	15.7	11.5	10.3	9.1	7.1	4.2	1.5	-0.5	-1	-0.66	-0.3	0.2	0.4	-0.4	-0.3	1.7
8/26/2021	7:00:00 PM	64.9	63.99	62.4	60.8	59	57.2	55.2	53.2	51	48.3	44.8	41.4	37.66	33.88	31.1	29.2	26.7	25.4	23.9	22	19.3	15.6	15.1	14.4	12.8	9.8	7	4.6	2.9	2.99	2.9	3.66	3.8	2.1	1.6	2.9
8/26/2021	8:00:00 PM	65.4	64.33	62.6	61	59.3	57.7	55.4	53.3	50.6	47.9	44.8	40.9	37.77	33.66	30.4	27.66	26	24.9	23.3	21.3	18.7	14.8	14.3	13.7	12	9.2	6.2	3.6	2	2.2	2.1	3	3	1.3	1.2	2.6
8/26/2021	9:00:00 PM	64.6	63.44	62.1	60.3	58.5	56.8	54.8	52.4	49.7	46.6	43.4	39.3	35.2	31.2	27.9	24.9	22.9	20.9	18.7	16	12.6	8.9	7.8	6.5	4.4	1.55	-1	-2.5	-2.99	-2.44	-1.9	-1.22	-1.3	-1.9	-1.2	1
8/26/2021	10:00:00 PM	46.6	45.44	43.3	41.7	39.2	36.6	34	31.1	28.8	27.4	27	25.7	22.27	21.66	18.5	13.77	8.4	4.1	0.6	-3.5	-2.1	-0.8	-6.1	-4.6	-6	-6.44	-6.4	-6.3	-5.99	-5.55	-5.1	-4.88	-4.7	-4.3	-2.4	0.7
8/26/2021	11:00:00 PM	48	46.66	44.8	42.6	40.2	37.8	35.4	33.4	30.5	29.8	29.3	27.8	25.55	23.4	21.2	21.88	15.5	5.3	-2.5	-5.3	-6.9	-7.5	-7.66	-7.5	-7.5	-7.33	-6.9	-6.5	-6	-5.66	-5.2	-4.88	-4.7	-4.4	-2.5	0.6
8/27/2021	12:00:00 AM	43.1	41.11	39.1	37.6	35.6	32.8	30.6	28.7	25.6	25.4	27.5	23.4	17.88	15.44	10.2	13.44	5.8	3.4	0	-2.8	0	3.8	-0.99	1.4	-2.3	-5.99	-6.5	-6.5	-6.11	-5.77	-5.3	-4.88	-4.7	-4.5	-2.5	1.3
8/27/2021	1:00:00 AM	54.2	53.11	51.5	49.6	47.3	45	42.3	39.4	36.3	33.9	34	30.8	28.11	25.9	22.4	20.2	15.4	8.9	3.7	-0.1	-1.9	-3	-5.44	-4.3	-5.9	-7	-6.9	-6.5	-6	-5.66	-5.2	-4.88	-4.7	-4.5	-2.5	0.6
8/27/2021	2:00:00 AM	58.4	57.33	55.7	53.8	51.8	49.7	47.3	44.8	41.3	38.6	35.8	33.8	28.44	29	23.8	22.44	21.6	21.1	19.3	16.2	18.5	14.7	19	23.5	21.3	20.5	16.8	11.2	2.2	3.55	-5	4.77	4.6	-4.4	-2.5	0.6
8/27/2021	3:00:00 AM	52.1	51.11	49.6	47.7	45.4	42.8	40	37.1	33.5	31.1	34.1	26.8	19.99	18.7	13	15.99	7.4	1.7	-0.7	-4.1	-5.9	-6.5	-5.66	-5.2	-5.9	-6.77	-6.7	-6.5	-6.11	-5.77	-5.3	-4.88	-4.7	-4.6	-2.6	0.6
8/27/2021	4:00:00 AM	51.9	50.55	49.1	47.1	44.9	43.4	41.8	40.7	39.8	39.1	40	41.1	35.44	31	27.9	30.8	28.9	26.3	25.7	22.4	22.5	21	21.4	23.2	22.6	20.3	17.8	13	6.66	0.66	-4.4	-4.88	-4.7	-4.6	-2.6	0.6
8/27/2021	5:00:00 AM	51.6	50.33	49	47.4	45.1	42	39.6	37.4	34.7	35	36.1	31.7	26.33	22.3	17.8	25.2	11.2	5.8	0.8	-3.2	-4.9	-6.3	-4.44	1.8	0.7	-3	-5.3	-5.9	-5.99	-5.66	-5.2	15.1	6.8	-4.6	-2.3	0.6
8/27/2021	6:00:00 AM	51.1	50.22	48.9	46.9	44.9	42.9	44.4	47.8	46.2	44.4	43.3	40.4	36.55	31.3	30.9	29.6	25.4	21.9	20	19.9	19.8	17.6	17.8	18.1	18.2	15.9	13.7	11	5.6	-1.1	-4.5	-4.22	4.3	-4.3	-2.5	0.6
8/27/2021	7:00:00 AM	52.6	50.99	50.3	48.7	46.7	45.9	43.7	40.7	37.3	37	39.4	36.2	31.3	30.3	29.3	28.1	22.2	15.3	11.5	7.8	4	2.6	-1.13	0.7	-3.4	-5.66	-5.7	-5.2	-4.77	-4	-3.7	5.2	1.8	-2.9	-1.8	0.7
8/27/2021	8:00:00 AM	41.2	39.88	42.6	42.3	38.6	35	34.5	35.6	33.8	34.8	34.5	34.1	31.1	31.7	33.1	27.7	19.8	15.3	8.5	3.4	-1.2	-4.7	-5.99	-5.8	-6.5	-6.77	-6.3	-5.9	-5.52	-4.7	-4.8	-1.44	-3.8	-3.8	-2	0.7
8/27/2021	9:00:00 AM	46.8	45.66	44.8	43.1	41.6	39.5	38.2	36.9	35.7	35.8	35.4	34.7	35	35.8	33.8	33.5	32.8	33.3	28.1	33.3	27	25.1	25	28	27.8	29.2	24.7	23.1	23.6	18.6	21.3	20.2	18.5	16.5	12.7	11.3
8/27/2021	10:00:00 AM	49.5	47.99	46.6	45.1	42.9	40.7	38	36.8	34.4	33.2	32.4	34.4	41.9	38	33.9	30.6	27.3	16.9	10.8	8.8	5.1	3	2	2.3	-0.2	-2	-2.9	-3.4	-3.55	-3.3	-3.2	-3.1	-3.2	-1.9	-0.8	1.1

8/27/2021	11:00:00 AM	58.1	56.7	55.4	53.8	52.2	50	47.8	45.4	42.5	39.1	36.5	33.7	32.8	32.3	32.2	25.2	19.8	16.8	14	11.4	7.5	5.9	6.3	6.4	4.3	0.8	-1	-1.6	-1.9	-0.8	-1.6	-1.6	-2.1	-1.2	-0.4	1.3
8/27/2021	12:00:00 PM	61.3	60.4	59.1	57.9	56	54	52.2	49.6	47.2	44.2	41.2	37.6	37	36.9	33.1	32.3	26.9	20.7	18	15.4	13.3	10.7	12	15.2	11.4	6.2	2.1	0.6	-0.6	-0.9	-1	-0.9	-1.4	-1.1	-0.4	1.2
8/27/2021	1:00:00 PM	57.9	56.5	54.8	53.5	51.4	49.7	48.5	45.8	43.4	41.9	39.3	36.7	35.6	33.7	31	28.5	25.4	23	20.9	19.5	19.3	14.9	12.6	11.7	10.3	7.5	5.1	3.4	2.9	3.1	8.1	16.8	8	3.8	8.5	16.9
8/27/2021	2:00:00 PM	62.8	61.5	60.1	58.6	57	55.4	53.2	51.7	49.2	46.6	43.7	40.8	40.2	38.9	34.7	33	32.2	29	26.3	24.5	22.1	19.2	18.4	18.1	16.7	13.9	11.1	8.5	6.4	5.5	5.4	6.5	6.8	5.3	4.2	4.2
8/27/2021	3:00:00 PM	61.6	60.1	58.4	56.9	55.2	53.2	51.1	48.8	46.2	44	40.8	39.9	35.7	33.7	32.4	30.9	28.7	26.3	24.5	23	20.5	17.3	16.7	16.5	14.9	12.1	9.3	6.7	4.8	4.1	4.1	4.8	5	4.1	3.1	3.8
8/27/2021	4:00:00 PM	60.3	59.2	57.3	55.9	53.5	51.7	49.4	47	44.6	42.1	39.2	37.2	35.7	33.6	32.3	30	27.6	25.4	23.6	21.9	19.2	15.9	14.8	14	12.2	9.1	6.4	4.1	2.6	2.5	2.6	3.3	4.2	2.6	1.9	2.4
8/27/2021	5:00:00 PM	63	61.9	60.6	59.2	57.6	55.9	54	52.1	49.3	46.8	43.6	40.6	37.3	34.4	30.8	29	27.1	25.1	23.4	21.5	19	15.6	15.1	14.7	13	10	7.3	4.8	3.1	2.7	2.7	5.9	5.5	2.3	1.6	2.4
8/27/2021	6:00:00 PM	52	50.8	49	47	45.1	42.8	40.5	38.3	35.4	32.4	30.6	28.5	27.1	25.6	24	21.7	18.4	14.2	10.2	6.7	3.8	0.3	0.5	0.8	-0.5	-3.8	-4.8	-4.8	-4.5	-4.2	-4	2.1	-0.5	-3.2	-1.7	0.8
8/27/2021	7:00:00 PM	44.2	42.7	40.6	39.1	37.5	34.9	32.6	32.1	32.1	32.4	32	32.5	31.5	30.4	28.3	25.4	21.2	15.3	13.3	12.8	12.5	8.8	7.6	9.9	9.5	5.3	1.7	-1.8	-4.7	-5	-4.8	-4.2	-4.4	-3.9	-2.2	0.7
8/27/2021	8:00:00 PM	58.4	57.6	55.9	54.4	52.4	50.1	47.6	44.9	41.8	38.3	34.8	31.1	28.6	26.9	25.9	27.8	25.1	16.6	9.6	10.2	8.6	8.2	7.7	7.2	5.6	2.7	-1	-4.4	-5.4	-5.3	-4.9	-4.6	-4.5	-4	-2.2	2
8/27/2021	9:00:00 PM	57.5	56.7	55.1	53.6	51.7	49.5	47.1	44.5	41	37.5	34	30	27.4	25.8	23.5	20.7	17.4	12.8	10.4	10.5	14	11.8	3.1	1.9	2.3	1.6	0.1	-0.1	0.9	0.6	6.9	13.6	10.2	1.3	4.4	14.7
8/27/2021	10:00:00 PM	64	63.5	62.7	61.5	59.7	57.9	55.9	53.7	51.3	48.6	45.5	41.6	37.8	33.7	29.9	26.5	23.4	20.5	18.1	16.2	13.4	9.9	8.2	6.6	4.4	3.8	1.2	-2	-2.8	-2.5	-2.2	-1.7	-1.7	-2.3	-1.3	1.2
8/27/2021	11:00:00 PM	62.2	61.1	60.1	58.7	56.9	55.1	52.7	50.4	47.9	45.1	41.7	37.8	33.7	29.7	25.5	22	18.4	15.7	12.5	9.4	5.9	3	1.8	0.1	-1.8	-3.8	-4.8	-5.3	-5	-4.5	-4.2	-3.8	-3.7	-3.6	-2.1	0.7
8/28/2021	12:00:00 AM	51	49.7	48.5	47.1	46.3	42.9	40.2	37.8	35.3	34.3	33.4	31.7	27.7	24.9	21.9	22.3	16.4	10	7.1	7.3	4.8	1.2	-5.2	-6.4	-6.8	-6.8	-6.5	-6.4	-6	-5.6	-5.2	-4.8	-4.7	-4.3	-2.4	0.6
8/28/2021	1:00:00 AM	55.8	55	53.9	52.4	50.9	48.6	46.6	44.4	41.5	38.7	36.4	33.1	29.7	26.2	21.8	18.7	13.3	10.8	5.4	2.5	-0.3	-3.2	-4.5	-1.2	-1.6	-2.6	-4.9	-6.1	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	1
8/28/2021	2:00:00 AM	46.6	45.4	44	42.4	42.5	39.4	38.6	37.9	34.1	34.6	32.8	31.5	31	28	22.1	19	14	12	8.7	7.2	11.3	11.1	9.8	10.7	7.7	7.1	4.1	3.5	0.7	1.8	7.1	11.9	7.6	0.5	0.1	11.8
8/28/2021	3:00:00 AM	51.9	51.1	49.5	47.9	46.2	43.9	41.8	39	35.9	33.5	34.2	30.3	26.4	23.9	20.1	20.7	11.4	9.1	0.8	3.2	2.4	3.3	5	1.6	2.6	6.9	6.8	6.5	6.1	5.7	5.3	4.9	4.7	4.6	2.5	0.7
8/28/2021	4:00:00 AM	55.1	54.1	52.7	50.8	49.1	46.3	44.3	41.1	37.7	35.3	36.9	31.3	27	25.4	20.5	27.4	15.2	10.3	6.8	3.1	3.1	0.7	0.7	1.2	0.7	1.4	1.7	0.5	0.4	2.8	5.5	4.2	2.7	5.1	0.5	1.1
8/28/2021	5:00:00 AM	53.5	52.3	50.6	49	46.9	44.8	43.2	39.3	35.8	34	35.3	32	28	26.1	22.6	24.9	19	16.5	17.9	14.8	14.3	13.4	11.5	13.1	13.1	6.9	2.2	3.8	4.5	-5.3	4.9	4.7	-4.6	2.6	0.6
8/28/2021	6:00:00 AM	56.4	55.4	53.8	52	50	48	46	42.5	38.8	35.6	36.5	30.9	30.2	26.2	20.6	25.5	15.8	12.4	9.7	9.5	7.9	7.7	7.3	8.5	7	2.8	1	-0.9	4.4	5.2	-5.2	4.8	4.7	4.5	2.6	0.6
8/28/2021	7:00:00 AM	56.3	55.4	54	52.5	50.4	48	46	43.4	40.7	37.9	34.4	33.8	30.8	28.1	25.4	24.1	21.6	18.9	17.3	16.1	13.6	10.8	9.1	6.4	5	0.4	-2.2	-2.7	1.1	3.8	-3.5	4.5	4.6	3.9	2.2	0.6
8/28/2021	8:00:00 AM	44.3	42.4	40.7	39.5	37.8	36.7	37.2	34.6	31.1	30.1	27.4	25.6	25.1	20.8	18.6	18.8	17	10.5	7.2	13.3	14.2	9	5	4	1.3	1.9	0	0.5	1.2	2.2	9.9	16	11.3	1.4	5.8	16.3
8/28/2021	9:00:00 AM	46.6	45.4	43.9	42.2	41.5	37.6	35.4	33.6	31.6	29.9	28.3	27.3	25.7	24	20.6	17.9	13.7	9.4	7.3	5.5	2.9	1.9	2.9	10.1	11.4	2.1	-1.2	-0.8	2.2	2.7	-3.5	3.6	4.1	-2.9	1.5	0.9
8/28/2021	10:00:00 AM	55.8	55.1	53.7	51.8	50.3	47.8	45.2	42.7	39.8	36.4	32.2	28.4	25.3	21.7	19.5	17	13.7	11.6	10.7	11.3	15.7	9.5	5.7	5	3.1	2	0.6	-0.3	0.8	1.2	10.4	15.6	9.1	3.2	7.8	15.6
8/28/2021	11:00:00 AM	62.6	62	60.7	59	57.2	55.4	53	50.7	48	44.9	41.6	37.8	34.8	32.2	28.9	27.6	21.3	18	14.6	10.9	8.6	6.6	5.8	4.8	3.3	0.9	-0.4	-1	1.1	0.8	-0.8	0.7	1.3	-0.9	0.2	1.2
8/28/2021	12:00:00 PM	63	62.2	61.1	59.9	58.7	56.9	54.9	52.9	50.4	47.7	44.5	41.1	37.8	34.4	29.8	26.2	22.7	19.8	16.8	13.8	11.2	8.7	7.9	6.7	4.8	2.1	0	-1.1	1.8	1.8	-1.5	1.5	1.8	-1.1	0.4	1.3
8/28/2021	1:00:00 PM	62.4	61.8	60.6	59.1	57.9	56.1	54.1	51.9	49.5	46.7	43.4	40.3	36.7	32.7	28.3	26	21.4	18.4	16.4	13.3	11.1	8.8	7.9	7.7	5.1	2.2	-0.3	-1.3	-2	-2	-1.6	1.5	1.8	-1.1	0.5	1.2
8/28/2021	2:00:00 PM	61.8	61.2	59.8	58.2	56.5	54.6	52.3	50.3	47.3	44.4	40.6	36.5	32.3	27.8	24.1	20.7	17.6	15.3	12.4	9.4	6.7	4.3	4.4	5.8	1.5	1.7	-3	-3.6	3.6	3.3	-3	3.1	3.3	-2.2	1.1	1.1
8/28/2021	3:00:00 PM	63.5	63	61.7	60.3	58.6	56.8	54.6	52	49.5	46.6	43.2	39.5	35.4	31	27	23.7	20.4	17.4	15	11.9	8.6	6	4.8	3.9	1.6	-1	-2.4	-3.2	3.3	3.1	-2.8	2.6	-3	-2.1	0.9	1.1
8/28/2021	4:00:00 PM	59.6	58.4	57.3	55.7	54.2	52	49.9	47.3	44.9	41.7	38.3	34.4	31.6	27.2	23.6	21	17.1	12.7	8.8	5.6	3.3	1.1	0.7	0.4	-0.7	2.2	-3.2	-4	3.9	3.8	-3.6	3.6	3.9	-2.8	1.4	0.9
8/28/2021	5:00:00 PM	52.6	51.9	50	48.6	46.7	44.7	42.4	39.2	36.1	32.7	35	29.3	35.7	27.7	26.4	19.9	15.8	10.1	5.3	2.8	1	0.1	0.4	1.2	0.1	1.6	3	3.6	3.6	3.6	3.5	3.6	3.8	2.8	1.5	0.9

8/28/2021	6:00:00 PM	44.2	43.1	41.6	39.2	37	34.9	31.5	30	27.4	23.5	25.6	26.5	30.5	21.2	20.2	20.7	12.3	5.4	3.6	2.8	2.3	2.5	3.1	4.9	3.5	-0.5	-2.7	-3.7	-3.8	-3	-3.8	-3.7	-3.9	-3.1	-1.6	0.8
8/28/2021	7:00:00 PM	26.6	25.2	25.4	25.1	26.8	27.9	27.2	27.5	28.8	27.8	27.1	26.8	36.5	40.2	30.1	26	25.7	18.4	9.8	4.4	7.6	4.2	-3	-3.9	-4.9	-3.9	-4	-4.8	-4.4	-3.9	-3.1	-1.4	-3.2	-3.8	-2.1	0.7
8/28/2021	8:00:00 PM	54.9	53.9	53	51	49.2	47.3	45.1	43	40.8	37.8	35.9	36.1	31.9	25.8	27.6	22.3	16.8	17.6	16.6	13.9	13.6	11	8.7	8.8	7.5	4.4	-0.1	-4.6	-5.7	-5.4	-5	-4.6	-4.6	-4	-2.2	0.7
8/28/2021	9:00:00 PM	49.9	48.7	46.8	45.1	43.1	40.5	38.4	36.7	32.4	31.1	27.8	29.5	23.9	23	14.7	13.3	10	11	10.3	7.5	5.7	3.1	0.5	-0.6	-0.6	-3.9	-5.5	-6.1	-5.9	-5.5	-5.1	-4.8	-4.7	-4.2	-2.3	0.7
8/28/2021	10:00:00 PM	44.3	42.6	41.8	39.5	37	34.8	32.3	30.3	28.1	25.9	25.2	24.2	22.6	18.8	16.4	14.1	8.4	6	2.2	1.9	3.5	2.2	-3.6	-3.8	-5.2	-5.9	-6.1	-5.8	-5.6	-5.5	-4.9	-3.9	-4.5	-4.3	-2.4	1.2
8/28/2021	11:00:00 PM	57.2	56.6	55.5	53.8	51.9	49.9	47.7	44.9	41.6	38.6	34.9	30.6	26.2	22.1	17.4	14.6	10.7	7	2.7	-1.5	-4.1	-5.8	-6.9	-6.2	-7	-6.9	-6.7	-6.4	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	0.6
8/29/2021	12:00:00 AM	53.1	52.4	50.5	49.5	47.4	45	42.4	40.2	37.3	34.5	32	28	23.3	21.5	15.9	14.5	9	6.5	3	0.5	-3.5	-4.6	-5.5	-5.3	-6	-6.5	-6.5	-6.4	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	0.6
8/29/2021	1:00:00 AM	50.5	49.2	47.5	45.6	43.6	40.9	38.1	35.4	31.5	28.1	27.9	23	18.2	17.6	11.1	14.7	6	2.2	-1.9	-5.5	-6.6	-7.1	-7.5	-7.2	-7.5	-7.4	-7	-6.5	-6.1	-5.7	-5.3	-4.9	-4.7	-4.5	-2.6	0.6
8/29/2021	2:00:00 AM	52.1	50.7	49.3	47.5	45.6	42.9	40.2	37.3	33.8	31.3	32.9	26.2	20.9	20.3	15	18.7	9.5	5.3	0.7	-3.4	-5.8	-5.9	-7.1	-7.2	-7.5	-7.3	-7	-6.5	-6.1	-5.7	-5.2	-4.8	-4.7	-4.5	-2.5	0.6
8/29/2021	3:00:00 AM	53.9	52.3	51.1	49.2	47	44.7	42.1	39	35.5	33.2	35.6	29.7	23.3	22.1	17.6	24.8	12	6.7	1.4	-2.7	-5	-4.7	-6.2	-6.6	-7.1	-7.4	-6.9	-6.3	-5.8	-5.4	-5.2	-4.8	-4.6	-4.5	-2.5	0.6
8/29/2021	4:00:00 AM	54.8	53.8	52.4	50.4	48.4	45.9	43.5	40.6	37.2	35	37.8	31	24.8	22.9	18.1	26.8	12.2	7.3	2.1	-2.3	3.5	5.7	-4	-4.8	-7.2	-7.4	-7	-6.5	-6.1	-5.6	-5.2	-4.8	-4.7	-4.5	-2.6	0.6
8/29/2021	5:00:00 AM	54.5	53.6	52	50.5	48.4	45.9	43.5	41.1	38.6	36.7	36.6	44.7	35.8	40.5	32.8	34.1	29.6	27	25.1	21.8	20	19.2	16.7	16.6	15.5	12.3	8.9	4.1	2.8	4.8	-5.2	-4.8	-4.7	-4.5	-2.6	0.6
8/29/2021	6:00:00 AM	48.2	46.3	44.6	42.8	40.7	37.9	36.6	36.2	32	31.6	33.7	33.1	32.1	27.4	23.4	25.7	20.2	19.2	17.6	18.9	17.4	15.1	13.8	15.3	14.8	12.6	9.1	5	0.3	1.5	-4.8	-4.9	-4.8	-4.6	-2.6	0.6
8/29/2021	7:00:00 AM	41.9	40.2	39.3	38.4	37	35.9	37.5	35.8	32.8	32.2	33.1	43	31.2	27.8	34	27.4	31.8	23	18.3	16.1	17.1	15.8	11.6	3.7	-5.7	-6.9	-6.7	-6.4	-5.9	-5.5	-5.2	-4.9	-4.8	-4.4	-2.5	0.6
8/29/2021	8:00:00 AM	38.4	36.9	40.7	42	39.4	37.1	35.1	34.8	32.4	33.8	37.3	35.2	27.3	25.2	23.4	24.6	16	10.4	5.9	1.7	0.8	-2	-3	-3.3	-4.9	-6.1	-6.1	-5.8	-5.4	-4.5	-4.7	-4.5	-4.5	-3.8	-2.1	0.7
8/29/2021	9:00:00 AM	46.3	44.4	44.4	42.8	41.3	38.7	36.9	35	32.2	32.4	34.2	30.5	29.9	29.7	30.7	24.6	14.9	11.5	4.8	7.2	14.6	9	2.6	-1.3	-3.1	0.6	-0.4	-2.2	0.1	0.3	7.1	14.9	9	1.4	6.5	16.4
8/29/2021	10:00:00 AM	50.4	49.2	47.9	45.9	44.5	42.2	40.4	37.9	34.8	34.4	35.7	31.3	27.9	25.2	20.7	21.2	16.7	10.5	8.8	12.9	4.6	4.9	5.5	5.6	5.7	1.7	-0.1	-1.7	2.3	2.1	-2.3	2.5	3.1	-2.1	-1	1
8/29/2021	11:00:00 AM	56.9	55.6	54.6	52.9	51.2	49.1	47.1	44.3	41.5	38.1	35	31.5	29.4	26.7	25.5	28.2	26.3	18	14.1	9.5	6	4.3	3.1	1.8	0.1	1.6	-2.5	-2.8	2.6	2.1	-2.2	2.3	2.6	-1.7	-0.7	1.1
8/29/2021	12:00:00 PM	60.7	60	58.5	57.2	55.6	53.9	52	49.4	46.6	43.7	39.6	35.6	30.8	27.2	22.2	19.5	16.3	14.2	12.2	9.7	6.2	4	2.8	1.4	-0.1	1.8	-2.9	-3.2	3.1	2.7	-2.9	2.9	3.2	-2.1	-1	1.1
8/29/2021	1:00:00 PM	61.2	60.9	58.9	57.3	55.8	53.6	51.7	49	46.1	43.1	40	35.6	31.9	31.3	25.4	20.6	17.4	14.5	11.4	8.2	5.7	3.3	2.9	2.4	0.5	1.7	-3	-3.5	3.5	3.3	-3.2	3.1	3.4	-2.3	-1	1.1
8/29/2021	2:00:00 PM	64.1	63.6	62.8	61.3	59.5	57.9	56.2	54	51.4	48.7	45.8	43.1	40	36.6	33.8	30.5	27.4	23.8	20.2	17.4	14.3	11.9	9.5	7.7	5.6	3.2	1.1	-0.4	1.4	1.7	-1.6	1.4	-2	-1.2	0.3	1.4
8/29/2021	3:00:00 PM	66.3	65.7	64.8	63.2	61.7	60	58.1	55.9	53.7	51	47.9	45	40.2	35.7	31.8	27.8	24.4	22	19.4	16.8	13.6	10.8	9.3	7.6	5.4	2.2	0.1	-1.3	1.9	1.7	-1.3	0.9	1.3	-0.8	0	1.8
8/29/2021	4:00:00 PM	58.3	57.5	56.1	54.9	52.6	50.6	48.8	47	44.1	41.1	38.1	35.4	32.3	29.6	26.1	23.5	20.1	16.6	13.4	10.9	8.5	5.4	5.6	10.5	5.8	0.8	-0.9	-1.8	2.2	1.9	-1.8	1.9	2.2	-1.7	0.9	1.1
8/29/2021	5:00:00 PM	58.3	57.2	55.9	54.1	52.6	50.2	47.7	45.5	42.2	38.7	34.7	30.3	26.1	22.6	18.9	16	12.8	9.2	6.2	4.2	0.8	-0.5	0.6	0.7	0.3	1.8	-3.3	-3.5	3.5	2.4	-3.3	3.4	3.6	-2.5	-1.1	1
8/29/2021	6:00:00 PM	46.5	44.7	43	41.1	38.4	36	33	31.3	30.1	30.2	30.4	29	35	36.7	28.2	27.1	24.1	18.2	15.8	14.2	9	1	0.6	-0.8	1.5	3.1	-4.2	-4.2	4.4	4.2	-4.1	-4	4.2	-3.3	-1.8	0.8
8/29/2021	7:00:00 PM	40.9	39.7	37.6	34.7	32.5	30.1	29	29.3	30.6	32	31.3	31.8	30	29.1	26.1	26.2	26.1	17.8	14.3	14.8	10.3	6.2	2.9	5.1	3.6	1	-2.3	-4.7	5.2	4.9	-4.7	4.4	4.5	-3.8	-2.1	0.7
8/29/2021	8:00:00 PM	43.3	41.6	39.7	37.5	34.9	32.1	28.9	28.3	26.2	28	26.5	24.4	24.3	22.7	19.7	16.7	12.3	5.3	1.6	2.9	5.4	6.5	6.3	5.4	6.4	6.6	6.4	6.2	5.8	5.4	5.1	4.7	4.7	4.2	2.3	1.3
8/29/2021	9:00:00 PM	53.7	52.5	51	49.1	47	44.9	42.3	39.4	36.5	32.9	29.7	26.2	23.9	21.7	19.3	16.7	11.5	4.7	0.7	3.6	4.9	6.5	6.3	5.6	6.5	6.7	6.5	6.3	5.8	5.4	5.1	4.7	4.7	4.2	2.2	0.6
8/29/2021	10:00:00 PM	55.2	54.6	53	51.2	48.8	46.5	44	41.3	38.2	35.2	33.6	30.5	36.8	40.1	31.2	24.5	24.2	18.2	10.5	10.1	6.3	0.6	5.9	5.7	6.5	6.7	6.6	6.3	5.9	5.5	5.1	4.7	4.7	4.2	2.3	1.4
8/29/2021	11:00:00 PM	50.4	49	47.1	45.3	43.7	40.5	37.8	35.2	32.8	32.2	33.6	31.7	31.4	30.5	27.7	23.7	18.2	11.8	8.6	5.7	2.3	4.3	7.4	7.4	7.3	7.1	6.8	6.3	5.9	5.6	5.2	4.8	4.7	4.3	0.5	1.3
8/30/2021	12:00:00 AM	52	50.9	49.3	47	45	42.2	39.4	36.5	32.9	31.7	32.1	29.3	27.1	26	24.2	22.3	17.5	11.7	8.9	6.4	10.6	7.1	0.5	4.1	6.5	3.8	1.2	1.4	1.5	2.5	4.1	9.8	6	1.7	0.5	8.1

8/30/2021	1:00:00 AM	57.9	57.1	55.5	53.7	51.7	49.3	46.8	44.2	40.8	37.1	33.6	28.7	23.9	20.8	17.4	18.1	12.2	8.2	4.1	0.2	-2.5	-2	-5.6	-5.7	-6.7	-6.9	-6.8	-6.4	-5.9	-5.5	-5.1	-4.7	-4.6	-4.3	-2.5	0.6
8/30/2021	2:00:00 AM	52.8	51.2	49.4	47.6	45.4	42.8	40.6	37.7	34.4	31.9	32.1	26.8	20.5	18	14	18.5	8.5	2.5	-2.3	-5.6	-6.9	-7.7	-7.5	-6.9	-7	-7.1	-6.8	-6.5	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	0.6
8/30/2021	3:00:00 AM	53.9	52.7	51.2	49.1	47.1	44.3	41.4	38.3	34.3	30.3	28.9	22.6	17.3	15.6	11.5	13.7	8.3	2.5	-1.3	-4.8	-6.7	-7	-7.3	-7.3	-7.5	-7.3	-6.9	-6.5	-6	-5.6	-5.2	-4.8	-4.7	-4.4	0.6	2.6
8/30/2021	4:00:00 AM	55.8	54.5	52.9	51.3	49.1	46.7	44.2	41.3	38.1	35.1	32.7	31.4	27.1	25.3	21.1	21.1	17.5	15.3	13.7	12.2	11.3	8.3	7.3	8.7	7.2	4.1	0.6	-2.8	-5.3	-5.5	-5.2	-4.8	-4.7	-4.5	-2.5	0.6
8/30/2021	5:00:00 AM	55.5	54	52.2	50.4	48.2	45.6	43.2	40.1	37.1	34.5	32.9	31.1	25.4	22.3	18.8	22.5	16.8	12	12.2	9.4	10.1	7.3	5.5	6	6	2.8	0.4	-2.8	-5.1	-5.2	-5.1	-4.7	-4.6	-4.5	-2.5	0.6
8/30/2021	6:00:00 AM	56.8	55.6	54.1	52.2	50.1	48.1	45.3	42.8	39.6	37.1	35.7	34.4	32.9	28.9	27.2	28.8	24.3	22.2	19.7	18.1	17.9	16.5	14.4	15.7	14.5	11.9	8.4	3.1	-2	0.1	-4.7	-4.8	-4.7	-4.5	-2.5	0.6
8/30/2021	7:00:00 AM	52.6	51.6	50	48.4	46.5	45.6	41.9	40.8	38.3	37.2	37.7	35.7	34.4	33.7	31.2	30.8	26.2	23.5	23.6	19.8	17.8	16.2	14.2	14.3	14.2	10.9	6.9	1.8	-2.9	-4.8	-5.1	-4.8	-4.7	-4.2	-2.4	0.6
8/30/2021	8:00:00 AM	41.3	39.4	40.4	40.1	39	34.6	34.1	33.1	32.5	33.1	34.9	33	31.1	29.6	27.5	26.3	21.2	16.3	12.9	12.5	7.4	1	2.3	5.5	9.2	0.3	-1.8	-2.6	-1.2	-3.8	-1.5	-3.8	-4	-3.5	-1.9	0.7
8/30/2021	9:00:00 AM	41.9	39.9	41.4	40.6	39.4	35.6	35	36.2	35.4	35.4	35.6	34.5	33.4	32.2	30.8	31.4	30.1	23.8	15	12.3	14.7	8.1	4.8	4.2	3.1	1.9	0.4	-1.2	0.2	0.3	6.3	11.8	7.6	1.4	1.6	12.5
8/30/2021	10:00:00 AM	53.4	52.8	50.5	48.6	47.1	45.9	43.9	42.7	41.1	40	40.2	38.1	36.6	35.1	33	32.6	30.1	21.7	14	9.5	5.9	3.4	2.6	1.2	-0.3	-2.2	-3.1	-3.8	-3.5	-0.5	-3.3	-3.5	-3.8	-2.6	-1.3	0.9
8/30/2021	11:00:00 AM	58.8	57.2	55.4	54	52.3	50.2	48.4	45.7	43.1	40.3	37.9	36.1	33.8	35.4	32.2	29	23.5	20.1	17.9	14.3	11.3	8.5	6.9	5.2	3.4	0.8	-0.7	-1.4	-1.7	-1.7	-1.4	-1.2	-1.2	-0.8	-0.2	1.3
8/30/2021	12:00:00 PM	62.6	61.5	59.9	58.4	57.2	55.6	54	51.9	50.2	47.5	44.6	41.4	39.6	38.9	32	28.7	25.4	20.3	17.5	15.9	16.2	11.9	10.2	11.1	9.8	5.3	1.9	1.2	1.1	1.6	7	14.7	7.8	2.5	4	14.1
8/30/2021	1:00:00 PM	58.8	57.4	55.6	53.9	52.2	49.9	47.8	45.7	42.6	40.8	37.4	34.8	32.6	30.7	28.9	27.2	25.4	24.2	23.1	21.4	19.1	16.4	15.2	14.7	13.4	10.5	7.9	5.5	3.6	3	2.9	3.3	3.5	3.3	2.5	2.8
8/30/2021	2:00:00 PM	58.7	58.1	56.3	55.3	54.3	52.7	50.7	49.5	48	44.8	42.9	41.4	39.3	37	34.7	32.3	28.9	27.1	23.7	21.7	18.8	15.8	14.6	14.2	13.7	11.6	9.8	7.8	5.7	4.3	3.5	3.1	2.9	2.8	2.1	2.8
8/30/2021	3:00:00 PM	61.7	59.9	58.3	56.8	55	53.5	51	48.6	45.9	43.1	39.9	36.9	34.1	32.1	29.4	27.7	26.3	25.2	23.8	22.2	19.6	16.5	15.5	15	13.6	10.6	7.9	5.5	3.6	3.2	3.2	3.5	3.3	3.1	2.8	3.4
8/30/2021	4:00:00 PM	63.4	62.1	61.3	59.9	58.3	56.4	54.6	52.2	49.7	47.1	43.8	40.5	36.9	33.3	29.9	27.4	25.3	24	22.1	20	17.2	13.5	12.5	11.8	10	7.1	4.5	2.5	1.2	1	1	1.2	1	0.9	0.8	2
8/30/2021	5:00:00 PM	53.9	53.7	52.6	50.4	49.4	46.7	44.4	42.8	39.4	36.8	33.5	31	28.1	26.2	25.2	23	19.4	15.3	10.8	8.3	5.2	2	2	2.1	2.3	1.3	-2.8	-3.4	-3.5	-3.3	-3.3	-3.1	-3.4	-2.6	-1.4	0.9
8/30/2021	6:00:00 PM	53.2	52.4	50.7	49.3	46.9	45.3	42.8	40.1	37.5	34.5	31.2	29	26.3	23.9	21.9	20.1	17.1	13.8	10.9	8.2	5.1	2.1	1.1	0.2	-1	-3	-4.2	-4.3	-4.1	-3.8	-3.4	-3.3	-3.3	-2.8	-1.5	1
8/30/2021	7:00:00 PM	47.6	45.5	43.8	42.7	39.8	38	36.2	34.2	32.4	31	29.9	29.7	28.7	27.1	25.5	22.1	17.9	12.9	8	4.8	0.8	-2.3	-3.6	-3.9	-5.1	-5.8	-6.1	-5.8	-5.2	-3.8	-4.7	-4.4	-4.4	-3.7	-2.1	0.7
8/30/2021	8:00:00 PM	53.3	52.7	51.8	50.8	48.4	46.7	44.5	42.5	39.8	37.2	34.5	32	29.4	28	24.5	21.9	17.5	11.7	10.8	11.9	13.3	9.4	4.8	2.6	0.5	0.7	0	-1.8	-2	-1.9	4	10.2	6.6	0	0.6	10.1
8/30/2021	9:00:00 PM	43.1	40.7	38.7	36.1	34.6	32	29.9	29.3	26.7	27.8	29.3	25.1	21.9	20.4	18.5	17.9	12.6	8.7	0.2	5.6	5.5	4.6	7.4	7.4	7.5	7.2	6.7	6.4	5.9	5.6	5.2	4.8	4.7	4.3	2.4	0.6
8/30/2021	10:00:00 PM	52.1	50.9	49.4	47.2	45.4	42.6	39.4	36.7	33	32.6	32.7	28.7	26.1	24.1	21.5	22.7	15.1	12.1	4	3.1	2.3	1.1	5.3	5.9	6.8	7.2	6.7	6.2	5.7	5.2	4.9	4.6	4.6	4.3	2.4	4.2
8/30/2021	11:00:00 PM	52	50.7	49.2	47	44.9	42.5	39.3	36.4	32.3	29.1	27.5	24.4	23.1	21.8	19.3	17.1	11.7	10	3.9	0.1	1.1	0.9	6.3	7	7.4	7.1	6.7	5.9	5.5	5.3	5.1	4.7	4.7	4.3	2.4	0.6
8/31/2021	12:00:00 AM	50.7	49.1	47.8	45.6	43.5	40.5	37.9	34.6	30.4	27.8	30.3	23.1	17.1	17.3	11.9	14.4	10.3	12.3	5.2	3.5	1.9	0.6	5.9	6.9	7.5	7.3	6.9	6.5	6	5.6	5.2	4.8	4.8	4.4	2.5	0.6
8/31/2021	1:00:00 AM	54	52.6	50.9	49.3	47.2	44.6	42	39	35.3	33.9	34.5	30	22.6	20	15.9	19.2	10.8	8.4	2.6	1.9	9.8	10.2	2.6	1.6	4.3	4.1	0.7	2.1	0.2	2.1	5.9	11.5	9.5	1.6	2.1	13.4
8/31/2021	2:00:00 AM	54.2	52.8	51.1	49.4	47.5	44.8	41.9	39	35.5	32.1	31.2	25.4	19.1	16.4	12.6	14	8.6	8.1	2.6	3.5	1.6	1.3	6.8	7.2	7.5	7.4	6.9	6.5	6	5.6	5.2	4.8	4.7	4.5	2.5	0.6
8/31/2021	3:00:00 AM	56.5	55.5	54.3	52.4	50.3	48.1	45.7	42.9	39.3	37.1	35.3	30.7	24.5	21.5	16.9	23.4	11.6	9.3	3.9	1.3	2.7	0.5	5.4	5.5	6.6	6.8	6.7	6.4	6	5.6	5.2	4.8	4.7	4.5	2.5	0.6
8/31/2021	4:00:00 AM	58.6	57.6	56.1	54.4	52.5	50.2	48	45.4	42.6	39.4	36.6	34.3	29.3	28.7	25.7	25.8	20	19.2	18.5	14.9	13.7	11.4	10.4	11.5	10.5	6.5	1.9	2.4	5.4	5.5	5.1	4.8	4.7	4.5	2.5	0.9
8/31/2021	5:00:00 AM	52.4	51.1	49.6	47.7	46.3	43.3	40.8	38.5	36.1	35.5	37.8	36.5	30.4	29.4	28.6	28.2	23.8	21.5	18.3	17.8	15	12.5	9.1	8.1	6.7	3.1	0.6	2.6	5.2	5.4	5.2	4.8	4.7	4.5	2.6	0.6
8/31/2021	6:00:00 AM	52.8	51.5	50.4	49.1	47.4	44.3	41.7	39.5	36.9	35.3	35.1	31.4	29.2	27.9	26.3	26.3	22.1	19	17.9	16.3	14.1	13.2	10.1	10.9	10.2	6.6	3.4	-1.2	5.3	13.1	7.3	2.5	3.6	-4.4	2.5	0.6
8/31/2021	7:00:00 AM	57	56.1	54.5	52.9	51	48.4	46.1	43.3	40	37.2	36.4	35.5	29.9	30.2	30.4	26.4	24.1	20.6	14	7.9	7.3	7.7	0.3	-1.7	-5.1	6.3	-6	-5.5	2.8	10.9	2.7	1.2	1.7	-4.1	2.3	0.6

8/31/2021	8:00:00 AM	54.4	53.1	51.9	49.9	48.1	45.9	43.7	41.3	38.5	36.6	35.9	34.5	33.2	31.1	28.4	26.5	21.6	15.4	10.2	7.8	11.6	6.7	2.3	-1.3	-2.6	-2.5	-2.9	-3.5	1.4	5.6	2.5	9.5	3.7	-1.8	-1.3	6.4
8/31/2021	9:00:00 AM	47	45.6	44.6	43.2	42.2	39.4	39	37.2	35.5	32.9	32.2	30.3	29.1	27.5	25.9	23.9	19.9	14.6	8.8	7.6	3.5	-1.4	-1.7	2.6	0.1	-4.9	-5.3	-5.1	-3.8	-2.2	-4.5	6.9	0.8	-3.2	-1.7	0.8
8/31/2021	10:00:00 AM	47.6	45.9	44.5	43	42.4	39.9	38.9	37.4	36	35.3	33.3	32.7	32	33.7	35.2	28.4	23.8	19.2	13.3	12.4	8.2	4.1	2.6	5.5	1.7	0.8	-1.9	-2.3	4.9	5.9	-2.7	-2	-3.1	-2.2	-1	1
8/31/2021	11:00:00 AM	45.6	44.4	43.2	41.7	39.8	38	35.9	34.6	33.3	32.7	32.2	31.1	30.2	29.2	28.1	26.6	22.1	16.5	10.4	7.9	6.3	4.3	6.9	11	9.5	2.5	0.2	0	-2.4	-3	-3	-2.9	-3.1	-2	-1	1
8/31/2021	12:00:00 PM	50.4	49.3	47.7	46.3	44.3	42.6	39.8	37.8	35.1	33.4	31.9	30.9	30.2	27.7	26	22.9	18	13.2	10	7.2	6	5	5.5	7	5.2	1	0.6	0.8	1.5	0.3	-0.5	-1.3	-2.3	-1.8	-0.8	1.1
8/31/2021	1:00:00 PM	54.3	52.7	51.2	49.5	48	46.1	43.6	41.2	39.2	36.5	35.8	34.7	33.4	31.3	29.1	26.4	21.4	16.5	12	9	7.3	4.2	4.4	7.8	6.6	0.7	-1.7	-2.1	-2.6	-2.6	-2.5	-2.4	-2.8	-1.7	-0.7	1.2
8/31/2021	2:00:00 PM	60.7	59.5	58.4	56.6	55.2	53.8	51.5	49.3	47.3	44.6	41.4	37.8	34.4	31.3	27.8	24.6	21.8	17.6	14.6	20.6	12.4	10.6	8	9.2	5.8	2.6	0.3	-0.4	-0.5	-0.8	-1.6	-1.4	-2	-1.1	-0.4	1.3
8/31/2021	3:00:00 PM	57.6	56.7	55.5	53.9	52	50.6	48.4	46.4	43.6	40.5	37.6	34.9	32.1	29.6	26.1	23.1	19.4	16.9	12.3	9.3	6.5	3.4	1.8	0.9	-0.5	-1.9	-3.1	-3.5	-3.5	-3.3	-3.1	0.7	-2.4	-2.2	-1	1
8/31/2021	4:00:00 PM	56.5	55.3	53.8	52.6	51.1	48.5	46.5	44	41.5	38.5	35.5	32.1	29.1	27.1	24.8	25.2	22.8	17.7	15	13	10	6	4.9	4.4	2.8	0.2	-1.5	-2.8	-2.8	-2.7	-2.4	0.5	-2.4	-1.7	-0.8	1.1
8/31/2021	5:00:00 PM	52.3	50.3	48.7	47.3	44.9	42.9	40.5	38.6	36.9	34.2	32.7	31.6	31.2	28.3	25.6	22.7	19.8	17.9	15	12.4	8.9	4.7	3.3	2.1	0.3	-2	-3.2	-3.6	-1.1	-1.5	-0.4	0.9	-2.6	-2.5	-1.3	0.9
8/31/2021	6:00:00 PM	65.4	64.3	63	61.5	60	58	56.2	53.7	51.1	48.1	45	41.2	37.1	34.1	30.3	25.5	22.7	20	18	16.6	13.1	8.9	6	4.2	2.1	0.7	-3.1	-4	3.7	3.2	-3.1	2.7	-2.8	-2.5	-1.3	1.3
8/31/2021	7:00:00 PM	66.4	65.6	64.3	63.1	61.4	59.6	57.9	55.4	52.8	50	46.8	43	38.9	34.9	30.8	27.1	24.1	21.4	18.8	16	12.9	8.7	6.9	5.2	3.2	0.3	-2	-3.4	-3	0.5	-1.9	2.2	-2.3	-2.3	-1.3	1.1
8/31/2021	8:00:00 PM	60.9	60.3	59	57.6	55.9	53.9	51.6	49.5	47.5	44.6	41.7	37.7	34.6	31	27.4	25.2	21	17.6	20.3	16.7	12.2	9.6	6	6.6	4.4	1.8	-1.9	-4.7	5.1	4.8	-4.4	-4	4.1	-3.7	-1.5	0.8
8/31/2021	9:00:00 PM	53.3	52.1	51.4	49.9	47.6	45.1	43.3	41.5	38.9	36.1	33.6	30.5	28.1	25.8	22.5	19.4	14.3	7.4	2.2	-3	5.6	6.8	6.8	6.6	7	7	6.6	6.3	5.8	5.4	5	4.7	4.6	4	2.2	0.8
8/31/2021	10:00:00 PM	49.6	48.3	46.9	45.5	43.4	40.2	38.3	35.6	32	30.8	32.1	27.2	22.3	20.3	16.1	17.1	9.7	10.6	9.1	3.2	5.1	4.6	6.6	6.9	7.1	7.1	6.8	6.4	6	5.6	5.2	4.8	4.7	4.3	2.4	0.8
8/31/2021	11:00:00 PM	52.7	51.7	50.2	48.5	46.6	44.1	41.7	38.7	35.2	33.1	32.4	29.1	24.6	23.3	20.3	19	11.2	7.5	6.1	0.9	3.5	5.2	6.8	7	7.2	7.1	6.8	6.4	6	5.6	5.2	4.8	4.7	4.3	2.4	0.6
9/1/2021	12:00:00 AM	43.9	42.7	42.9	41.4	40.5	36.2	36	34.3	32.2	32.5	34.4	30.3	26.7	23.3	20	21.1	12.7	6.2	2	1.4	8.9	9	3.3	2.8	6.1	4.3	1.9	0.8	3	3.5	1	6.3	2.4	3.3	3.2	7.3
9/1/2021	1:00:00 AM	39.5	38.2	40.1	38.7	37.8	33.6	33.8	33.1	30.8	32.3	35.2	31.5	26.3	24.7	21.4	23	12.7	6.1	0.1	3.4	4.8	6.3	7.1	6.4	6.7	6.9	6.8	6.5	6.1	5.7	5.3	4.9	4.7	4.5	2.5	0.7
9/1/2021	2:00:00 AM	39.8	39.1	39	38.1	36.9	33.7	34	32.3	29.7	32	33.7	30.2	25.8	21.4	17.5	24.2	12.7	8	2.3	3.5	3.8	4	6.4	5	7	6.9	6.8	6.5	6	5.7	5.3	4.9	4.8	4.5	1.4	11.8
9/1/2021	3:00:00 AM	38.3	37.6	42.8	43.3	40.8	36.2	36.4	35.6	32.8	35.9	39.3	34.4	28.8	25.2	20.8	31.2	15.9	10	2.8	3.8	5.2	5.9	6.3	5.1	5.8	6.5	6.8	6.6	6.2	5.8	5.3	4.9	4.8	4.6	2.6	0.6
9/1/2021	4:00:00 AM	40	38.5	39.4	38.5	37.2	33.6	34.2	34.8	31.2	33.9	37	33.4	27.2	25.8	20.7	28.1	16.5	14.6	11.9	10.8	9.7	7.1	5.9	7.5	6.3	3.2	1.3	4.7	6	5.8	5.4	4.9	4.8	4.7	2.7	0.6
9/1/2021	5:00:00 AM	43.5	41.8	40.4	38.8	37.4	36.5	38.2	35.4	33.3	32.7	32.7	31.8	27.1	26.3	25.5	25.6	19.4	16.7	15.1	13.7	12.9	11.1	9.1	10.1	10.1	7.9	4.5	0.1	4.7	4.9	5.1	1.5	4.6	4.7	2.7	0.6
9/1/2021	6:00:00 AM	49.4	47.9	46.4	44.8	43.2	40.7	41.1	39.5	40.2	38.2	38.2	39.5	35.2	33.7	31.1	32.4	28.3	27.6	24.7	22.6	21.4	19.8	18.2	19.3	19.5	18.3	17.6	13.9	7.8	5.5	3.6	4.8	4.7	4.6	2.6	0.6
9/1/2021	7:00:00 AM	51.9	50.8	49.1	47.6	45.9	43.1	41.4	38.8	36.5	35	37	44.4	37.5	31.5	35.5	30.6	29	22.6	21.8	25.5	24.4	21.4	17.7	12.9	9.3	1.7	-1.6	-3.6	4.1	4.2	-5.2	4.9	4.8	-4.4	2.5	0.6
9/1/2021	8:00:00 AM	46.2	44.9	44	42.3	44.1	41.3	40.7	38.9	38.6	38.4	38.7	36.3	34.5	32.8	29.5	29.9	21.1	19	15.1	7.4	3.5	3.1	0.5	-0.6	-1.7	2.8	-3.1	-3.9	1.7	3.7	-4.8	4.7	4.7	-3.9	2.1	0.6
9/1/2021	9:00:00 AM	48.1	46.7	45.9	44.2	43	42.5	43.1	39.7	36.5	35.8	34.7	33.5	31.4	29.2	25.3	25.1	17.9	16.6	13.5	7.1	11.6	6.3	1.8	-0.1	-2	2.7	-2.1	-2.2	0.7	4.6	2.6	8.7	3.4	-1.8	0.7	5.9
9/1/2021	10:00:00 AM	55.2	54.2	52.6	51.3	49.8	48	46.4	43.7	40.6	38.4	35.2	32.8	30.5	27.9	25.4	26.4	25.7	18.5	12.8	8.9	8.9	5.5	12.4	18	23.3	13.7	6.5	9.6	7.5	5.7	0.5	2.6	3.6	-2.6	1.3	0.9
9/1/2021	11:00:00 AM	58.3	57.5	56.3	54.8	53.3	51.5	49.8	47.7	44.7	41.5	39	35.7	34.5	31.1	26.8	24.1	19.6	16.1	12.5	9.3	7	5.1	3.8	2.3	1.1	0.8	-1.6	-2.6	1.3	0.3	-2.5	2.5	2.5	-1.5	0.7	1.1
9/1/2021	12:00:00 PM	59.2	57.8	57.2	55.4	53.9	51.8	49.9	47.6	45	42.2	39.1	36	33.2	31.5	31.3	33	29.6	23.2	15.7	11.3	8.2	5.3	5	6.2	2.9	1.1	-2.1	-2.7	-3	2.8	-2.7	2.6	2.9	-1.9	-1	1
9/1/2021	1:00:00 PM	63.4	62.5	61.4	60.2	58.5	56.8	54.8	52.6	50.3	47.3	44.3	44.3	38.6	35	32.9	29.7	24.9	22.8	19.6	16.1	18.2	11.9	9.4	12.8	6.6	5.7	2	0.1	0.4	0.7	3.7	10.1	3.5	0.1	1	7
9/1/2021	2:00:00 PM	62.1	60.2	58.4	56.7	55.2	53.3	51.4	49.2	46.8	44.1	41.1	38	35.2	32.9	30.9	29.2	27.9	26.7	25.5	24	21.7	19.1	18	17.5	16.3	13.4	10.8	8.2	6	5.1	4.9	5.3	5	5.1	4.7	5.2

9/1/2021	3:00:00 PM	60.4	58.8	57.2	55.5	53.8	51.7	50.1	48.3	45.3	43	40.6	36.8	35.6	34.4	31.2	30	27.5	25	23.3	21.6	18.7	15.3	13.8	13.1	11.8	9	6.5	4.5	2.7	2	1.9	2.3	2	2.1	2.1	2.6
9/1/2021	4:00:00 PM	63.1	62.2	61.3	60.2	58.7	56.5	54.7	52.6	50.1	47.3	44.4	40.9	37	32	29	26.4	23.8	21.6	19.2	16.8	13.8	10	8.6	7.9	5.4	2.4	0	-1.5	-2.1	-1.9	-1.5	-1.3	-1.5	-0.9	-0.2	1.8
9/1/2021	5:00:00 PM	58.7	57.5	56.1	54.8	53.2	50.9	49.1	46.4	43.7	41	37.5	33.4	29.8	26.7	24.8	23	21	18.7	16.2	13.8	10.5	6.6	5.4	4.4	2.7	0	-2	-3	-3.1	-2.7	-2.4	-2.2	-2.4	-1.9	-1	1
9/1/2021	6:00:00 PM	56.2	55.1	53.9	51.9	50.3	48	45.6	43.2	40.5	38.1	35	33.2	30.5	27.5	25	21.8	18.8	15.2	11.8	8.9	5	1.5	-0.2	-0.8	-2.1	-3.5	-5.2	-5.3	-5	-4.6	-4.2	-4	-4.1	-3.4	-1.9	0.7
9/1/2021	7:00:00 PM	62.4	61.2	59.6	57.9	56.1	54.3	52	49.7	46.7	43.4	39.9	36.7	32.6	32	31.7	27.9	23.7	21.1	18.5	16.3	12.7	7.5	6.1	4.7	2.7	0	-2.2	-3.4	-0.6	1.3	-2.2	-2	-2.2	-2.4	-1.4	1
9/1/2021	8:00:00 PM	65.7	64.6	63.1	61.5	59.9	58.1	56.2	53.5	51	48.2	44.4	40.8	36.5	32.1	28.8	25.9	23.6	21.7	19.6	17.2	14.1	9.6	8.5	7.1	5.1	2.2	-0.4	-1.9	-2.3	-1.7	-1.2	-0.7	-0.9	-1.5	-0.9	1.2
9/1/2021	9:00:00 PM	66.5	65.8	65.1	64.2	62.7	60.8	58.9	57	54.8	52.4	49.7	46.2	43	39.2	35.1	31.3	27.8	24.6	22.7	19.3	17.1	14.4	12	10.4	7.9	4.8	2.1	0	-0.9	-0.6	1.6	5.2	3.9	-0.5	0.4	3.3
9/1/2021	10:00:00 PM	56.9	55.7	54.5	52.9	50.9	48.8	46.1	43.9	40.6	36.8	33.3	29.6	26.2	24.9	23.6	22	18.7	12.4	8.9	6.8	2.6	-1	-5.4	-6.2	-6.8	-6.9	-6.4	-6.2	-5.7	-5.3	-4.9	-4.5	-4.4	-4.1	-2.3	0.7
9/1/2021	11:00:00 PM	46	44.5	43	41	38.9	36.1	33.6	30.8	28.6	27.8	27.2	25.9	25.2	25	22.8	20.1	16.1	9.8	4.4	2.3	-1.2	-3.5	-8	-7.4	-7.9	-7.5	-7	-6.5	-6.1	-5.7	-5.3	-4.9	-4.8	-4.5	-2.5	0.6
9/2/2021	12:00:00 AM	47.7	46.4	44.3	41.9	40.1	37.4	34.5	31.9	28.5	26.9	28.2	25.9	22.3	19	14.5	13.9	8	2.7	-1.5	-6.5	-7.4	-7.8	-8	-7.3	-7.7	-7.4	-6.9	-6.5	-6.1	-5.7	-5.3	-4.9	-4.7	-4.5	-2.5	0.7
9/2/2021	1:00:00 AM	41	38.8	37.5	35.9	34.5	30.3	29.3	29.2	25.9	28.1	33.7	25.8	21.1	19	13.9	16.8	7.3	1.3	-3.6	-4.1	2.2	2.7	-5	-5.3	-6.7	-6.5	-6.4	-5.7	-6	-5.7	-5.3	-4.8	-4.7	-4.6	-2.5	1.4
9/2/2021	2:00:00 AM	54.2	53.1	51.8	49.7	48.1	45.5	43	40.8	37.5	35.1	33.4	30.8	28.7	27.2	25.6	24.9	26.9	22.2	15.1	12.7	6.6	-2.6	-7.5	-7.3	-7.4	-7.3	-7	-6.6	-6.1	-5.7	-5.3	-4.8	-4.7	-4.6	-2.6	0.6
9/2/2021	3:00:00 AM	55	53.5	52.1	50.2	48.2	45.7	42.9	40.2	37.2	34.2	35.3	29.9	23	20.4	16.5	24	10.5	4.8	0.5	-4.3	-6.3	-7.3	-7.5	-6.6	-6.9	-7.1	-7	-6.6	-6.1	-5.7	-5.2	-3.8	-4.5	-4.6	-2.6	0.6
9/2/2021	4:00:00 AM	49.1	47.7	46	44.1	42.3	40.1	39.1	36.2	32.3	32.2	33	32.1	30.9	26.7	22.4	25.1	20.1	21.4	18	15.8	13.4	12	11.1	12.4	12.3	8.5	5.5	0.6	-3.8	-5.3	-5.3	-4.9	-4.8	-4.7	-2.7	0.6
9/2/2021	5:00:00 AM	50.2	49.1	47.4	45.5	43.3	40.7	39.8	37	37.7	35.8	37.5	34.9	32.2	29.7	28	28.5	24.4	22.3	21	18.9	18.2	14.7	12.7	13.8	12.6	9.5	5.2	-0.2	-3.6	-2.6	-4.9	10.5	-2.1	-4.6	-2.6	0.6
9/2/2021	6:00:00 AM	48.3	46.8	45.9	45.3	44.3	44.1	43.6	46.6	49	44	45.4	50.3	65.5	50.8	38.6	52.2	46	51.6	44.5	42.7	41.4	38.7	37.1	35.6	34	30.2	28.1	25.5	21.5	18.1	11.5	7.8	4.4	1.8	0.6	2
9/2/2021	7:00:00 AM	43.7	42.5	43.1	42.4	41.7	40.6	40.2	46.4	48.4	41	45.1	52.8	67.8	53.2	41	57.5	44.9	53	50.3	44.2	44.6	41	36.1	34.8	34.2	32.7	31.8	29.4	26.4	17.9	10.7	5.4	1.9	-0.4	-0.8	1.2
9/2/2021	8:00:00 AM	44.2	42.4	43.3	42.8	41.2	39.5	38.9	45.8	45.8	41.8	45.8	53.6	68.1	51.5	39.3	55.3	42.2	48.3	45.6	38.9	38.2	36.6	31.1	29.2	27.5	25.6	23.8	21.8	18.5	11	4.3	0.7	-1.5	-2.3	-1.5	0.8
9/2/2021	9:00:00 AM	45.4	43.9	44.4	43.2	41	38.3	37.7	43.1	42.4	38	42.7	48.7	66.4	46.8	38.9	58.7	41.8	52.2	47.9	43.1	40.4	34	29.1	26.1	24	21.9	19.8	16.2	12.1	5.7	1.5	2.7	-1.7	-2.8	-1.7	1
9/2/2021	10:00:00 AM	50.6	49.6	47.6	45.9	45	43	40.8	38.6	37.1	34.5	33.4	32	30.9	29	25.9	24.2	20.4	14.1	10.2	10.4	14.5	7.2	4.1	1	-1.4	0.8	0.8	-1.5	0.2	0.4	8.7	15.6	10.8	2	6.1	14.9
9/2/2021	11:00:00 AM	58.7	57.3	55.9	54.2	52.4	50.7	48.6	46.1	43.5	40.4	36.7	33.5	31.3	33.2	30.3	25.2	20.4	16.1	12.6	11	8.6	4.7	2.7	2.3	0.6	-1.2	-2.4	-2.9	-2.8	-2.8	-2.8	-2.7	-3	-2.1	-1	1
9/2/2021	12:00:00 PM	61.4	60.2	58.8	56.6	55.2	53.3	51.4	49.5	47.1	44.3	40.9	37.4	35.4	35	33.2	28.3	23.8	20.2	16.9	15	12.1	8.4	6.6	5.1	3.4	0.9	-0.5	-1.8	-2.3	-2.2	-1.9	-1.7	-2.2	-1.1	-0.4	1.3
9/2/2021	1:00:00 PM	55.8	54.5	53.1	51.1	49.4	47.2	45	42.1	39	35.8	32.8	31.1	28.5	26.4	24.4	23.3	20.7	18.5	16.5	14.8	11.9	8.7	7.1	6.2	4.4	1.7	-0.2	-1.3	-1.7	-1.6	-1.5	-1.4	-2	-1.2	-0.5	1.3
9/2/2021	2:00:00 PM	61.2	59.6	58	56.2	54.2	52.4	50.4	47.9	45.4	43.1	40	37.3	33.6	31	28.4	26.6	24.6	23.2	21.7	19.9	17.4	14.7	13.2	12.1	11	8	5.6	3.3	1.7	1.4	1.7	2.1	1.7	1.9	1.8	3.2
9/2/2021	3:00:00 PM	60.3	58.6	57.2	55.3	53.6	51.8	49.6	47.1	44.9	42.5	39.1	36.1	33	30.4	28.7	29.6	26.8	24.5	23.1	21.6	19.2	16.4	15.4	14.8	13.8	11	8.4	6.1	4.1	3.4	3.2	3.5	3.3	3.4	3.3	4.3
9/2/2021	4:00:00 PM	63.3	61	59.7	57.9	56	54.6	52	50.2	47.6	44.8	42	39.1	36.6	34.9	33.3	31.3	29.3	28.5	27.4	26.2	24	21.3	21.2	21.4	20.4	17.7	15.1	12.6	10.4	10.6	8.5	8.8	8.7	8.2	7.1	6.8
9/2/2021	5:00:00 PM	63.1	62	60.9	59.3	57.8	56.4	54.9	53.2	50.8	48.7	45.9	43.5	40.7	37.4	34.8	33.2	30.6	28	25.9	24.1	21.4	18.2	17.7	17.4	15.7	12.7	10	7.3	5.5	5.4	4.8	5.3	5.4	4.7	4.1	4.3
9/2/2021	6:00:00 PM	66.3	65	63.7	62.5	60.8	58.9	57	55	52.8	50.4	47.8	44.5	40.7	37.2	34	31.3	29.4	28.1	26.7	25	22.6	19.2	19.1	18.7	17.3	14.6	11.9	9.3	7.1	6.9	6.6	7.1	7.2	6.1	5.5	5.4
9/2/2021	7:00:00 PM	74.1	72.9	71.8	70.3	68.9	67.3	65.8	64.1	62	59.9	57.4	54.7	51.6	48.8	45.2	42.2	39.2	36.6	34.5	32.4	30.3	27.3	27.2	27.2	26.8	25.1	22.6	20	17.3	15.9	14.5	14.5	14.5	13.1	12.6	12.6
9/2/2021	8:00:00 PM	73.1	72.2	71.1	69.9	68.4	67.2	65.6	63.9	61.9	59.9	57.5	54.6	51.8	48.7	45.2	41.9	38.9	36.1	33.5	31	28.6	25.5	25	24.6	23.7	21.7	19.1	16.6	13.9	12.5	11.5	11.9	11.9	10.5	10	10.4
9/2/2021	9:00:00 PM	74	73.3	72.7	71.6	70.3	69.1	67.7	65.9	64	61.9	59.6	57.1	54.2	50.9	47.7	44.6	41.1	37.4	34.2	31.2	28.3	25.5	24.1	22.6	21	18.5	16	13.3	11.3	10.3	9.7	10.2	9.9	8.6	8.4	9.6

9/2/2021	10:00:00 PM	73.4	72.9	72.1		71	69.8	68.3	66.5	64.6	62.5	60.2	57.4	54.4	51	47.3	43.4	39.6	36.2	33.1	30.1	27.2	24.2	21.7	20.7	19.3	17.2	14	11.2	8.5	6.7	6.5	6.3	7.2	7	5.7	6	7.7
9/2/2021	11:00:00 PM	65.8	65	64	62.8	61.1	59.2	57.2	55	52.6	49.9	46.5	43	39.3	35.7	31.8	28.4	25.5	22.2	19.4	16.5	13.4	10.5	8.9	6.9	4.5	1.7	-0.6	-2.2	-2.6	-2.2	-1.9	-1.3	-1.5	-2.2	-1	1.5
9/3/2021	12:00:00 AM	66.2	65.2	64.1	62.8	61.4	59.6	57.8	55.4	53	50.1	46.7	43.2	40.8	39.6	34.5	29.2	27.1	23.3	19.7	16.7	13.3	10.3	9.3	7.6	5.2	2.4	-0.2	-2	-2.4	-1.9	-1.7	-1.2	-1.2	-1.9	-0.8	1.5
9/3/2021	1:00:00 AM	53.8	52.8	50.8	49.7	47.6	45.6	43.5	41.3	38.6	36.4	34.3	32.4	31	29.6	27.7	27.7	25.9	19.1	11.6	9.4	8.3	5.4	-1.5	-1.8	-3.8	-4	-3.5	-2.6	-4.6	-5.1	-3.7	-0.5	-3.3	-4.4	-2.5	0.7
9/3/2021	2:00:00 AM	37.8	36.6	38.3	38.5	42.5	41.1	42.9	39.5	36.3	36.5	35.9	33	31.9	30.8	27.2	24.1	18.2	14.2	10.5	6.7	2.7	-1.2	-2.6	-0.9	-2.2	-3.8	-5.3	-6	-6.1	-5.7	-5.3	-4.9	-4.7	-4.7	-2.7	0.6
9/3/2021	3:00:00 AM	43.6	42.6	41.6	40.6	46.8	40.7	41	38.9	34.5	33.7	32.5	30.5	28.1	26.1	21.7	20.1	15.1	10.3	9.6	8.8	6.5	6.5	9.3	13.8	12	7.9	3.3	-2.5	-5.7	-5.7	-5.4	-4.9	-4.7	-4.7	-2.7	0.6
9/3/2021	4:00:00 AM	51.1	50.2	48.4	47.2	46.2	42.6	39.8	36.7	33.5	30.2	27.3	24.8	22.7	19.7	16.4	13.3	8.2	4.3	-0.4	-4.7	-6.1	-6.2	-7.1	-6.6	-7	-7.3	-7	-6.6	-6.2	-5.8	-5.4	-4.9	-4.7	-4.7	-2.7	0.6
9/3/2021	5:00:00 AM	45.3	44.1	42.7	40.5	40.4	37.7	36.6	35.8	31.6	32.2	32.9	28.8	26.4	25.3	24.2	22.6	16.2	12.3	6.9	4.3	3.8	5.4	3.1	2.3	1.3	-1.3	-6	-6	-5.4	-4.9	-4.8	-4.2	-4.7	-4.7	-2.7	0.6
9/3/2021	6:00:00 AM	55	54	52.6	50.4	48.4	46.2	44.1	46.6	48.5	41.2	44.7	50.7	67	57.1	42.8	59	48.6	54.1	50.3	45.9	44.8	42.4	40.5	40.6	41.2	39.9	38.1	35.2	29.4	23.1	14.9	10.3	5.8	2.8	1.5	2.3
9/3/2021	7:00:00 AM	56	54.6	53.1	51.5	49.8	47.5	45.7	46.7	45.3	42.3	44.3	47	64.6	51.9	39.3	53.4	42.3	47.9	43.3	40.7	39.2	36.1	34.5	34.7	34.1	32.6	30.2	27.4	21.3	15	4.6	5	-0.7	-3.6	-2.2	0.7
9/3/2021	8:00:00 AM	54.7	53.3	51.8	50.1	47.9	45.7	43.6	45.9	43.9	40.3	43.7	51.6	67	52.3	39.7	56.9	43.4	50	45.9	41.6	39.6	36.2	32.2	31.6	32.7	31.1	30.1	28.2	23.7	16.5	4.9	1.2	-3	-3.1	-1.9	0.7
9/3/2021	9:00:00 AM	49.2	48.1	46.8	45.2	44.3	41.8	40	42.9	41.4	40.1	42.5	48.5	64.7	51.2	39.5	55.4	42.7	50.4	46	41.3	41	36.7	33.5	32.2	32.2	31.3	29.5	27.5	21.6	14.6	7.9	11.7	8	0.5	1.2	8.3
9/3/2021	10:00:00 AM	51	49.5	48.4	46.4	45.9	42.7	40	41.8	39.4	35.1	40.2	46.1	61.3	43.5	32.8	48.9	31.4	37.3	31.5	26	24.1	20.4	16.8	14.8	13.9	10.1	8	4.5	3.1	3.3	3.6	9.4	4.9	-0.6	0.2	9.1
9/3/2021	11:00:00 AM	59.3	58.2	57.2	56.4	55.7	54	53	51.3	48.8	47.4	44.1	42.1	39.9	37.4	35.2	36.4	34.2	28	22.3	20.7	18.4	13.9	10.7	9.5	7.6	4.9	2.3	0.2	-1.1	-1.7	-2	-1.9	-2.2	-1.4	-0.5	1.2
9/3/2021	12:00:00 PM	63.8	63.3	61.8	60.4	58.5	56.5	54.3	51.9	49.3	46.2	42.6	39.1	35.5	33	29.9	28.9	27.2	21.3	17.9	16.4	13.2	9.9	13.7	14.9	18.3	9.9	4	4.4	1.7	-0.6	-1.5	-1.5	-1.8	-1.1	-0.2	1.3
9/3/2021	1:00:00 PM	63	62.5	61	59.7	58	56.7	55	52.9	50.6	47.8	44.8	41.2	37.8	33.6	29.3	26.5	23	21.4	18	15.3	12.5	9.1	7.8	6.3	3.9	1	-1.1	-2.4	-2.6	-2.5	-2.1	-1.9	-2.3	-1.6	-0.6	1.3
9/3/2021	2:00:00 PM	63	62.1	60.9	59.6	58	56.3	54.6	52.7	50.3	47.4	44.5	41.3	38.8	37.5	29.3	26.7	24.5	20.4	17.4	14.2	10.8	8.3	7.6	7.6	4.7	1.2	-0.9	-2	-2.4	-2.3	-2	-1.6	-2	-1.4	-0.6	1.2
9/3/2021	3:00:00 PM	54.5	53.2	51.3	49.2	47.7	45.3	43.1	40	37	34.5	33.1	32.6	30.2	26.8	25.6	23.4	21.1	19.1	16.5	14.4	11.5	7.8	6.5	5.9	3.8	1.1	-1	-2.2	-2.7	-2.4	-2.4	-1.8	-2.2	-1.7	-0.8	1.2
9/3/2021	4:00:00 PM	57.2	56	54.8	53.4	51.7	50.2	49.1	46.6	44.7	42.2	40.6	41.9	44.1	33.8	31.8	37.5	28.1	29.5	22.6	18.6	15	11.2	10.1	9.4	7.5	4.6	2.1	0.3	-0.2	0.1	-0.4	0	0.3	-0.3	-0.1	1.3
9/3/2021	5:00:00 PM	55.3	54.3	52.3	51.5	49.1	47.4	44.9	42.3	39.6	40	33.8	31.6	31.5	28.6	26.2	23.4	20.5	16.6	12.6	10	6.9	3.5	1.7	1	-0.5	-3.3	-4.7	-4.7	-4.1	-3.4	-3.8	-3.6	-3.7	-2.9	-1.6	0.8
9/3/2021	6:00:00 PM	53.2	52.3	51.3	49.4	47.8	45.6	43.4	40.9	38.7	41.5	33.7	29.5	29.6	22.4	25.8	23.1	15.7	14.2	13.9	14	11.8	8.6	7.2	8.4	6.2	2.3	-0.9	-3.7	-4.4	-4	-4	-3.5	-3.5	-3.3	-1.9	0.8
9/3/2021	7:00:00 PM	33.8	31.9	31.2	30	29	30.6	32.4	29	30.8	32	42.9	39.9	40.7	32.7	21.4	17.9	15.9	13.5	11	10.7	10.6	6.8	2.9	1.9	-1	-2.7	-3.9	-4.6	-4.5	-4.2	-1.5	-1.7	-1.7	-3.9	-2.2	1.9
9/3/2021	8:00:00 PM	48	46.5	44.9	43	40.9	38.6	35.6	32.4	29.5	27.6	24.7	20.5	18.3	17.9	10.4	8	3.8	0.6	-2.9	-4.8	-6.3	-7.5	-7.6	-6.4	-7.3	-7.1	-6.9	-6.5	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	1
9/3/2021	9:00:00 PM	51.4	50	48.5	46.6	44.3	41.7	39	35.7	32	29.1	27.5	27.1	25.9	21.6	21.3	19	12.9	8	3.4	0.8	-2.8	-4.3	-5	-2.4	-4.1	-5.5	-6.5	-6.4	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	0.6
9/3/2021	10:00:00 PM	52	50.8	49	47.3	45	43	40.4	37.5	34.2	31.5	29.3	27.4	28.3	24.6	21.6	20.9	15.2	10.2	6.4	4.8	2	-0.8	-3.6	-1.4	-3.3	-5.2	-6.4	-6.4	-6	-5.6	-5.2	-4.8	-4.7	-4.5	-2.5	0.6
9/3/2021	11:00:00 PM	52.4	50.9	49.5	47.6	45.3	42.4	40	37	33.4	30.4	30.9	26.2	24	21.8	18.9	17.7	12.3	5.6	1.3	-0.3	-4.4	-7	-8.2	-8.1	-7.9	-7.4	-7	-6.5	-6.1	-5.7	-5.3	-4.8	-4.7	-4.5	-2.6	0.6
9/4/2021	12:00:00 AM	55.8	54.5	53.1	51.4	49.4	46.8	44.2	41.3	38.4	34.8	32.5	27.3	22.7	19.6	16.3	16.8	9.5	3.5	-0.7	-4.4	-6.6	-7.6	-8	-7.6	-7.6	-7.3	-7	-6.5	-6.1	-5.7	-5.3	-4.8	-4.7	-4.5	-2.6	0.6
9/4/2021	1:00:00 AM	56.9	55.7	54.4	52.7	50.4	48.2	45.8	42.7	39.6	36.5	35.5	29	24.9	22.2	18.7	19.8	11	5.7	1.2	-2.4	-5.6	-7.3	-7.8	-7.5	-7.7	-7.4	-7	-6.5	-6.1	-5.6	-5.2	-4.8	-4.6	-4.6	-2.6	0.6
9/4/2021	2:00:00 AM	54.1	53.3	51.3	49.7	47.6	45	42.9	39.7	36.7	33.2	30.9	25.5	22.3	19.1	14.2	14.9	8.2	3.1	-1	-4.3	-6.7	-7.9	-8.1	-8.1	-7.9	-7.5	-7	-6.6	-6.1	-5.7	-5.3	-4.8	-4.7	-4.6	-2.6	0.6
9/4/2021	3:00:00 AM	51	49.7	48	45.8	43.7	41.2	38.5	35	32.4	30.9	30.7	27.3	25.7	23.8	20.1	20.5	18.2	15.1	13.4	13.4	14.3	10.8	13.6	16.4	13.7	10.4	5.6	-0.8	-4.7	-5.5	-5.3	-4.9	-4.7	-4.7	-2.7	0.6
9/4/2021	4:00:00 AM	50.7	49.4	47.5	45.5	43.4	40.7	38.7	36	32.2	29.1	31.8	23.8	21	19.1	15.1	20	8.9	1.8	-3.9	-7	-8.2	-8.4	-8.5	-8.3	-8	-7.6	-7.1	-6.6	-6.2	-5.8	-5.4	-4.6	-4.7	-4.7	-2.7	0.6

9/4/2021	5:00:00 AM	52.1	50.8	48.9	47.1	44.9	42.1	40.2	37.2	34.2	31.9	31.5	26.1	23.5	21.8	19.5	20.9	11.7	5.3	0.8	-1.5	-5	-6.2	-7.5	-7.9	-7.9	-7.5	-7.1	-6.6	-6.1	-5.6	-5.1	-2.9	-3.9	-4.7	-2.7	0.6
9/4/2021	6:00:00 AM	47.4	45.8	44.4	42.5	40.1	38.5	38.4	44.2	47.4	41.7	43.3	47	64.6	52	41.4	51.6	45	49.7	44.4	44.4	44	40.3	38.7	37.6	35.7	32.8	29.8	25.3	20.6	18.9	12.7	8.6	5.1	7.8	3.8	1.1
9/4/2021	7:00:00 AM	46.5	45	44.1	43.1	40.8	38.6	38.7	44.4	44.8	40.2	43.7	47.8	64.6	54	40.5	54.1	44.6	49.4	46.2	42.9	40.2	37	36.2	34.8	33.3	30	26.5	22.1	18.9	19.8	7.7	2.4	0.7	-1.8	-1.4	0.8
9/4/2021	8:00:00 AM	43.8	42	42.2	42.2	40.8	37.4	37.3	44.3	43.5	38.9	44.1	50.8	66.3	51.6	38.1	54.6	41.6	47.9	43.2	38.3	37.7	33.4	28.6	26.6	26	23.2	23.8	17.3	13	8.7	3.5	6.8	3.9	-1	-1.2	5
9/4/2021	9:00:00 AM	50.7	49.1	47.9	46.6	45.1	42.5	40	42.6	41.1	36.7	41	46.1	61.8	44.1	33.9	51.2	34.3	42.4	37.5	32.9	31.5	27.9	22.7	21.1	21	17.5	14.9	11.7	7.9	2.7	1.4	6.2	0.9	-1.4	-1.1	3.6
9/4/2021	10:00:00 AM	52.5	50.8	49.8	48.3	47.5	45.3	42.5	39.8	37	34.2	32.7	28.6	26.9	23.7	20.7	20.6	14.1	10.3	8.9	5.5	3.6	1.9	3	3.5	3.9	-1.8	-3	-3.6	-3.5	-2.6	-3.4	-3.5	-3.8	-2.6	-1.3	0.9
9/4/2021	11:00:00 AM	55	53.6	52.5	50.9	49.5	47.3	44.6	41.7	38.5	34.8	31.9	35.2	45.3	29.9	24.8	35.9	25	28.7	19.1	10.6	7.6	5.4	3.7	3.5	2.3	-0.8	-1.9	-2.5	2.1	7.2	-2.3	-0.2	-1.2	-2.1	-0.9	1
9/4/2021	12:00:00 PM	59.3	58.2	56.8	55.3	53.8	51.8	50	47.5	44.4	41.2	37.1	32.6	27.4	23	19.3	16.7	14.3	12.5	9.7	7.4	5.6	3.6	2.2	1.8	0.6	-1.7	-2.6	-3.1	-3.2	-3.2	-2.9	-0.9	-2.1	-2.1	-1	1
9/4/2021	1:00:00 PM	65	64.3	63.1	62.1	60.5	58.6	56.9	54.8	52.6	50	46.9	43.8	40.7	41.3	31.6	28.1	25.6	21.2	18.1	15.2	12.5	10.1	9.3	9.4	6.4	2.1	-0.2	-1.3	-1.9	-1.8	-1.5	-1.3	-1.7	-1	-0.2	1.5
9/4/2021	2:00:00 PM	65.7	65	63.8	62.5	61.4	59.7	57.9	55.7	53.7	51.3	48.3	45.3	42.8	39.1	34.9	31.7	28.8	25.6	23.4	20.9	18.1	14.7	13.1	11.9	9.8	6.9	4.2	2	0.7	0.9	0.5	1	0.9	0.8	1.1	2.4
9/4/2021	3:00:00 PM	61.7	60.7	59.7	57.9	57.2	55	53.8	51.8	48.8	46	43.5	40.3	37	33.8	29.7	27.2	25.3	24	22.4	20.4	17.7	14.3	13	12.1	10.4	7.3	4.6	2.3	1.3	1.7	1.3	1.8	1.7	1.3	1.5	3.1
9/4/2021	4:00:00 PM	60.5	59.4	58.7	57.2	55.6	54.6	52.7	50.6	48.2	45.8	43.4	40.8	36.5	33.3	30.2	25.6	23.8	21.5	19	16.3	13.3	9.7	8	6.8	4.5	1.8	-0.4	-1.8	-2.1	-1.8	-1.6	-1.2	-1.5	-1.2	-0.4	1.5
9/4/2021	5:00:00 PM	52.3	50.6	48.6	47.4	45.1	42.9	40.6	37.7	34.8	32.7	30.1	29.1	37.3	30.6	30.5	25.4	22.7	20.1	16	11.1	7.9	5	0.2	-1.7	-3.4	-4.6	-5.2	-5.1	-4.6	-4.2	-4.1	-3.8	-4	-3.1	-1.7	0.8
9/4/2021	6:00:00 PM	38.2	37.9	36.3	34.9	32	29.6	28	22.9	20.1	18.7	17.2	14.3	11.6	11.2	6.6	2.6	-1.1	-0.8	-4	-4.9	-4.6	-5.3	-5.7	-5.8	-5.9	-6.1	-6.1	-5.7	-5.3	-4.7	-4.7	-4.5	-4.5	-3.8	-2.1	0.7
9/4/2021	7:00:00 PM	34.6	32.3	30	27.6	25.6	24.9	26.4	26.8	26.4	26.3	24.9	23.7	31.2	31.2	19.6	15.6	13.4	2.4	-4.7	-6.8	-8	-8.1	-7.9	-7.6	-7.3	-7.1	-6.7	-6.3	1.1	10.6	-3	-4.7	-4.7	-4.2	-2.3	0.6
9/4/2021	8:00:00 PM	51	49.8	47.9	45.7	43.5	40.8	37.8	35.6	33.2	30.7	28.9	27.7	25.6	22.7	20.6	19.8	18.2	17.4	21.1	15.3	15	11.4	14.2	15.7	13.5	11.6	7.9	0.5	-4.9	-5.5	-5.2	-4.8	-4.7	-4.3	-2.4	0.6
9/4/2021	9:00:00 PM	54.5	53.4	51.6	49.6	47.7	45.2	42.6	39.3	35.8	32.6	31.2	27.7	21	19	16.5	12.7	8.7	4.9	0.3	-2.5	-4.8	-5.8	-6.1	-4.3	-5.7	-6.3	-6.6	-6.3	-5.9	-5.5	-5.1	-4.7	-4.7	-4.3	-2.4	0.6
9/4/2021	10:00:00 PM	57.9	57.1	55.6	54.2	52.5	50.4	48.1	45.7	42.8	40	37	32.9	28.5	24.5	21.1	16.7	13.1	9.1	5	2.5	7.5	7.5	0	-2.8	-4.5	-4.2	-3.3	-3.9	-3	-4.1	2.4	-6.4	3.5	-3.1	-0.7	6.6
9/4/2021	11:00:00 PM	53.8	52.9	51.3	49.8	48	45.8	43.5	40.9	38.1	34.7	32.3	28	24.8	24	20.1	15.2	10.2	5.7	1.4	-0.9	-2.3	-2.5	-4.8	-3.8	-4.8	-6.1	-6.5	-6.4	-6	-5.6	-5.2	-4.8	-4.7	-4.4	-2.5	0.9
9/5/2021	12:00:00 AM	53.6	52.1	50.3	48.6	46.5	44.2	41.4	38.1	34.6	31	28.5	22.2	18.6	16.4	11.8	12	7.1	2.1	-2	-4.7	-5.7	-6.5	-7.7	-7.7	-7.7	-7.4	-7	-6.5	-6.1	-5.6	-5.2	-4.8	-4.7	-4.5	-2.5	0.6
9/5/2021	1:00:00 AM	54.5	53.1	51.5	49.7	47.4	44.9	42.2	39.1	35.5	31.7	30	22.6	19.8	17.8	13.9	11.2	8.1	2.8	-1.1	-3.6	-5.1	-5.4	-7.3	-7.4	-7.5	-7.4	-7	-6.5	-6.1	-5.6	-5.2	-4.8	-4.7	-4.5	-2.6	3.1
9/5/2021	2:00:00 AM	55.4	54.2	52.7	50.6	48.5	45.9	43.1	40.1	36.3	33.5	34	25.8	21.8	20.3	16.2	16.8	9.3	3.5	0.4	-2.8	4.8	3.6	-4.1	-5.7	-6.8	-6	-4.5	-3.5	-4.6	-4.7	-3.8	-2.8	-3.8	-4.1	-2.4	0.7
9/5/2021	3:00:00 AM	48.7	47.5	45.9	43.6	41.4	38	36.1	34.4	30.7	31.5	34.3	27.4	24.3	23.5	19.1	20.8	18.2	12.4	9.8	10.7	11.1	9.6	12.3	15.5	13.4	10.6	5.7	-0.4	-5	-5.6	-5.3	-4.9	-4.7	-4.7	-2.7	0.6
9/5/2021	4:00:00 AM	57.3	56.1	54.8	53.2	50.8	48.7	46.1	43.7	40.9	38.1	38.6	32.2	28.7	24.8	20.3	24.3	13.7	8	2.4	-2.2	-5.2	-6.8	-7.4	-7.6	-7.7	-7.4	-7	-6.5	-6.1	-5.7	-3.7	-3.5	-4.6	-4.6	-2.6	0.6
9/5/2021	5:00:00 AM	58.4	57.1	55.5	53.7	51.9	49.4	46.8	44	40.5	37.2	35.6	29.4	24.6	21.8	18.1	22.3	13.5	8.8	4.4	0.3	3.3	5.4	6.5	6.9	7.3	7.3	6.9	6.5	6	5.5	5.1	4.7	4.5	4.5	2.6	0.6
9/5/2021	6:00:00 AM	52	50.5	49	46.9	45.2	42.6	40.3	38	34.4	33.8	37.3	32.7	30	26.6	22.5	22.9	18.8	15.3	12.2	12.1	11.5	10.3	8	8.9	8.3	5.2	2	-1.5	6.1	12.8	2.7	4.6	3.9	-4.6	-2.5	0.6
9/5/2021	7:00:00 AM	46.3	44.6	43.8	41.7	40.2	37	36.7	35.2	32.2	37.3	37.9	36.8	32.1	28.6	25.5	26.7	19.4	15.3	9.5	5.6	2.8	-0.2	4.9	-5.4	-5.5	-6.2	-5.5	-3.9	2.7	16.3	7.5	3.2	3.6	-4.3	-2.4	0.6
9/5/2021	8:00:00 AM	46.4	44.8	43.8	43	42.2	39	38.1	36.5	35	34.8	38.1	36	29.1	27.7	26.4	25.4	17.9	13.2	9.3	7.2	11.5	6.9	2.7	-1.4	-2.6	-1	-1.9	-2	1.7	5.5	4.6	8.8	5.4	-1.4	-1.2	6.3
9/5/2021	9:00:00 AM	47.7	46.1	45.9	44.1	42.5	40.4	38.8	37	33.8	33.1	33.9	30.5	26.5	25.4	21.7	21.8	13.1	7.5	3.5	6.5	12.9	8.7	3.5	2.9	2.4	0.7	-0.3	-2.4	0.4	2.7	3.9	12.1	4.4	-0.9	0.2	9.2
9/5/2021	10:00:00 AM	51.3	50.4	48.4	46.7	45	42.5	40.5	38.2	35.1	32.7	31.3	28	26.6	24.6	22.3	23.6	19.4	17.7	12.5	9.8	7.2	6.2	3.2	1.8	0.5	1.3	-2.3	-2.5	2.6	2.3	-2.3	2.5	2.9	-1.5	0.3	1.6
9/5/2021	11:00:00 AM	57	56	54.6	53.1	51.6	49.6	47.3	45.1	42	38.7	34.6	29.7	28.3	24.1	19.3	17.8	15.4	13.1	11.6	11.3	14.5	7.4	6.1	5.1	3.1	3.7	0.3	0.7	2.8	7.3	7.4	14.3	8.2	2.5	5.8	14

9/5/2021	12:00:00 PM	58.7	57.7	56.3	54.7	53.5	51.3	49.2	46.7	43.9	40.6	36.8	32.3	28.4	28.4	24	17.1	14.9	13	10.3	7.7	6.4	4	3.9	3.9	3.4	-0.4	-1.9	-2.3	-2.3	-1.8	-2.4	-2.4	-2.9	-1.8	-0.8	1.1

WM12: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	5:33:13 PM	38.82799	7.264299	68.99501	24.42383	22.5746	22.36963
8/23/2021	6:00:00 PM	21.9425	0	40.37372	27.01369	22.4313	22.25262
8/23/2021	7:00:00 PM	37.55224	0	52.56327	39.53159	22.26655	22.24589
8/23/2021	8:00:00 PM	39.98205	34.019	50.29796	42.05514	37.73847	36.26082
8/23/2021	9:00:00 PM	36.52875	17.5903	43.88036	39.61474	36.23637	27.49419
8/23/2021	10:00:00 PM	31.50217	18.6578	39.7783	34.423	30.99198	27.29006
8/23/2021	11:00:00 PM	28.46321	1.51147	45.57708	33.2578	25.14431	22.36705
8/24/2021	12:00:00 AM	26.54078	13.58185	38.4083	30.49164	25.91565	23.596
8/24/2021	1:00:00 AM	22.84391	9.961299	34.37487	27.36332	24.0152	22.74319
8/24/2021	2:00:00 AM	22.14379	9.476527	35.7957	26.24467	24.28899	22.81761
8/24/2021	3:00:00 AM	26.21774	11.11539	39.62545	30.12377	25.79675	23.29985
8/24/2021	4:00:00 AM	24.91239	14.43308	39.65667	28.69482	25.37236	23.73801
8/24/2021	5:00:00 AM	22.06545	0	40.59715	26.72761	23.57915	22.29612
8/24/2021	6:00:00 AM	14.9961	0	32.48415	23.1336	22.39101	22.26605
8/24/2021	7:00:00 AM	19.30328	4.919626	32.32612	25.03335	23.16523	22.42979
8/24/2021	8:00:00 AM	20.95975	2.333411	44.61051	24.0022	22.49578	22.28944
8/24/2021	9:00:00 AM	16.62327	6.824625	37.83489	23.10545	22.50849	22.33347
8/24/2021	10:00:00 AM	17.57043	8.449735	38.57358	23.48568	22.60831	22.41657
8/24/2021	11:00:00 AM	24.31759	10.52753	53.83026	23.86809	22.84389	22.56699
8/24/2021	12:00:00 PM	24.26889	10.28759	46.28346	26.21396	22.94071	22.54698
8/24/2021	1:00:00 PM	32.26365	10.55362	55.95972	26.02925	22.85535	22.5469
8/24/2021	2:00:00 PM	36.45372	11.64521	69.83051	27.42444	23.31722	22.74716
8/24/2021	3:00:00 PM	21.17072	10.61574	40.55346	24.74901	22.85802	22.56624
8/24/2021	4:00:00 PM	22.77284	10.0024	41.55866	26.6426	22.84875	22.51637
8/24/2021	5:00:00 PM	16.72409	6.390346	37.82014	22.95087	22.48243	22.33946
8/24/2021	6:00:00 PM	14.67973	0	38.19716	22.47044	22.30027	22.24073
8/24/2021	7:00:00 PM	30.39136	0	45.25463	34.72805	22.2684	22.24334
8/24/2021	8:00:00 PM	43.33868	32.52411	49.43108	45.83735	42.43425	39.67705
8/24/2021	9:00:00 PM	40.35032	24.64859	50.05257	45.41263	36.73467	28.83905
8/24/2021	10:00:00 PM	43.37982	18.68298	49.32772	45.96353	43.32888	33.36481
8/24/2021	11:00:00 PM	38.85613	13.19339	47.58056	44.82822	29.1142	24.10973
8/25/2021	12:00:00 AM	21.65336	8.985917	36.24837	26.44615	23.66605	22.71815
8/25/2021	1:00:00 AM	17.8901	2.394582	35.60028	24.1182	22.58929	22.30988
8/25/2021	2:00:00 AM	19.09041	1.83656	50.96269	23.35251	22.57264	22.31934
8/25/2021	3:00:00 AM	24.21452	0	38.42952	28.60709	24.55206	22.27776
8/25/2021	4:00:00 AM	21.12291	0	34.62632	26.17728	23.56183	22.24194
8/25/2021	5:00:00 AM	27.52578	9.641472	51.68625	28.42455	24.29026	22.76656
8/25/2021	6:00:00 AM	30.39475	1.207311	56.88804	26.2592	22.65242	22.29765
8/25/2021	7:00:00 AM	23.17373	0.902434	47.13462	26.08339	23.02135	22.3175
8/25/2021	8:00:00 AM	21.53152	0	45.67285	24.71659	22.3313	22.24867

8/25/2021	9:00:00 AM	17.05871	3.825292	37.99182	23.22408	22.37013	22.27073
8/25/2021	10:00:00 AM	26.17362	8.486827	50.25982	27.84835	22.75444	22.41196
8/25/2021	11:00:00 AM	23.54165	10.51377	44.20455	26.53675	22.97902	22.55428
8/25/2021	12:00:00 PM	28.26073	11.596	48.85031	29.67741	23.50277	22.74609
8/25/2021	1:00:00 PM	25.95975	12.66129	51.17579	25.09	23.12747	22.726
8/25/2021	2:00:00 PM	29.26623	13.23262	50.94427	32.31512	24.07341	22.92628
8/25/2021	3:00:00 PM	29.93108	12.03889	56.09495	31.01939	23.73801	22.85236
8/25/2021	4:00:00 PM	25.16855	8.587368	46.78405	27.88194	23.10528	22.49087
8/25/2021	5:00:00 PM	24.69763	6.272839	45.74431	28.14745	22.90038	22.40377
8/25/2021	6:00:00 PM	24.26338	0	45.44475	27.45746	22.64465	22.24885
8/25/2021	7:00:00 PM	33.52564	0	46.90925	32.15673	22.26778	22.23877
8/25/2021	8:00:00 PM	39.27894	22.66895	50.8763	44.7911	32.91549	29.38168
8/25/2021	9:00:00 PM	24.09791	0	47.08095	27.21279	23.20123	22.23959
8/25/2021	10:00:00 PM	34.86094	9.741093	43.73125	40.23047	26.71989	23.04615
8/25/2021	11:00:00 PM	29.56515	9.208726	40.25495	34.37949	26.28946	22.78778
8/26/2021	12:00:00 AM	21.31268	0	34.46108	26.576	23.50551	22.30767
8/26/2021	1:00:00 AM	14.77507	0	42.43804	22.51174	22.29113	22.24626
8/26/2021	2:00:00 AM	18.04655	0	37.65564	23.97971	22.51958	22.29111
8/26/2021	3:00:00 AM	19.19647	1.515997	38.92586	24.44335	22.6143	22.3019
8/26/2021	4:00:00 AM	17.75381	0	33.00421	24.13796	22.78679	22.33372
8/26/2021	5:00:00 AM	15.26087	0	33.68848	23.43375	22.36554	22.25785
8/26/2021	6:00:00 AM	18.12877	4.297522	32.98542	24.50348	22.74329	22.37602
8/26/2021	7:00:00 AM	20.66796	2.306126	38.60497	25.81461	22.96707	22.3142
8/26/2021	8:00:00 AM	12.23407	0	36.82812	22.39392	22.2519	22.23922
8/26/2021	9:00:00 AM	16.62229	1.294663	43.41027	22.7516	22.32123	22.25813
8/26/2021	10:00:00 AM	21.30927	8.832866	44.38508	23.71147	22.56765	22.38421
8/26/2021	11:00:00 AM	23.11027	11.01999	45.45952	25.6344	22.95317	22.55979
8/26/2021	12:00:00 PM	23.39703	12.09181	40.33902	27.07808	23.36391	22.72229
8/26/2021	1:00:00 PM	28.40896	12.89348	47.57378	31.5692	23.55643	22.87864
8/26/2021	2:00:00 PM	31.86366	11.2902	51.11007	35.91828	25.35272	22.78468
8/26/2021	3:00:00 PM	26.9883	9.581561	45.65692	30.53386	23.21477	22.53041
8/26/2021	4:00:00 PM	25.40055	9.101103	47.66442	28.56186	23.03861	22.51337
8/26/2021	5:00:00 PM	21.96229	6.60268	43.49464	25.86755	22.59001	22.34945
8/26/2021	6:00:00 PM	18.8144	0	35.49214	24.08027	22.53328	22.30152
8/26/2021	7:00:00 PM	33.90368	0	50.0553	37.80784	22.24259	22.23682
8/26/2021	8:00:00 PM	37.10031	29.23362	45.20725	41.15203	34.75626	32.40017
8/26/2021	9:00:00 PM	31.54785	5.920828	46.79586	35.36293	30.0316	24.35534
8/26/2021	10:00:00 PM	21.53401	2.146467	35.77256	26.52728	22.89314	22.33038
8/26/2021	11:00:00 PM	21.24249	0	38.86136	26.6201	22.67498	22.27056
8/27/2021	12:00:00 AM	20.54689	0.980372	34.74912	26.03755	22.84081	22.27758
8/27/2021	1:00:00 AM	20.02871	0	33.12933	25.62403	22.57477	22.23972
8/27/2021	2:00:00 AM	24.40861	10.58303	40.01353	28.61498	24.32908	22.7415
8/27/2021	3:00:00 AM	17.52092	6.936928	29.98461	23.99329	22.85077	22.44962

8/27/2021	4:00:00 AM	21.93941	6.103535	41.47512	25.61522	23.05418	22.4357
8/27/2021	5:00:00 AM	20.37763	5.79206	40.79086	23.62961	22.71345	22.38703
8/27/2021	6:00:00 AM	18.33964	7.984188	35.62473	24.08794	22.97323	22.49599
8/27/2021	7:00:00 AM	21.58232	7.378865	37.27907	26.35346	23.41357	22.55645
8/27/2021	8:00:00 AM	20.18263	4.404631	35.32844	26.05646	22.58898	22.34312
8/27/2021	9:00:00 AM	21.82548	5.278317	45.2956	23.45226	22.39251	22.29231
8/27/2021	10:00:00 AM	34.99732	9.505761	69.43497	25.58802	22.73469	22.48574
8/27/2021	11:00:00 AM	29.76072	12.08223	53.52201	25.32016	22.93333	22.62001
8/27/2021	12:00:00 PM	22.26713	12.51719	40.54257	25.80327	23.02657	22.63657
8/27/2021	1:00:00 PM	27.29345	12.24074	50.36304	29.97947	23.74149	22.89956
8/27/2021	2:00:00 PM	28.86178	13.0055	52.84264	30.42597	23.81907	22.87625
8/27/2021	3:00:00 PM	26.7527	11.65206	48.13102	29.10368	23.79798	22.77609
8/27/2021	4:00:00 PM	22.4852	10.8532	42.26331	25.63243	22.90336	22.53892
8/27/2021	5:00:00 PM	22.7867	8.024721	45.21446	25.8469	22.77369	22.42924
8/27/2021	6:00:00 PM	17.9331	0	38.02484	23.09473	22.3595	22.24001
8/27/2021	7:00:00 PM	31.03863	0	45.02652	38.01647	22.33418	22.23701
8/27/2021	8:00:00 PM	44.52136	28.87416	52.20114	48.0179	43.94946	35.31713
8/27/2021	9:00:00 PM	45.56848	27.5035	51.67032	50.12041	43.8856	32.87491
8/27/2021	10:00:00 PM	35.35403	28.85051	46.34511	38.23993	34.10199	32.19046
8/27/2021	11:00:00 PM	35.09794	19.68699	46.98308	37.76386	33.12095	28.40339
8/28/2021	12:00:00 AM	29.51672	21.82681	49.10566	32.12462	29.19837	26.95716
8/28/2021	1:00:00 AM	30.15892	15.80266	42.72845	34.42248	27.88434	24.15348
8/28/2021	2:00:00 AM	29.8904	15.15767	45.21141	34.48786	26.0441	23.69843
8/28/2021	3:00:00 AM	19.75089	2.870106	36.85043	25.01323	22.84162	22.32634
8/28/2021	4:00:00 AM	20.9639	0	34.33199	26.35435	22.96879	22.25903
8/28/2021	5:00:00 AM	23.72211	12.25622	36.49891	27.57855	25.01221	23.38075
8/28/2021	6:00:00 AM	23.86532	9.809723	36.32216	28.55951	24.3378	22.71792
8/28/2021	7:00:00 AM	24.1852	11.01448	37.35878	28.6818	24.42356	23.00853
8/28/2021	8:00:00 AM	19.24541	9.929257	33.42062	24.95759	22.9443	22.5014
8/28/2021	9:00:00 AM	17.3543	9.124857	36.7025	23.66448	22.53308	22.36327
8/28/2021	10:00:00 AM	17.52705	11.68868	32.67774	23.40864	22.77073	22.54058
8/28/2021	11:00:00 AM	20.78518	12.10495	43.2452	23.57471	22.94861	22.67183
8/28/2021	12:00:00 PM	20.20392	12.25446	50.36834	23.58986	22.91743	22.64083
8/28/2021	1:00:00 PM	19.22414	12.549	37.32828	23.80517	23.01143	22.70374
8/28/2021	2:00:00 PM	19.31846	11.62655	46.52223	23.43048	22.81526	22.58798
8/28/2021	3:00:00 PM	19.97067	10.70552	43.32912	23.30045	22.72101	22.51378
8/28/2021	4:00:00 PM	18.1456	9.255649	36.93681	23.34092	22.62481	22.44184
8/28/2021	5:00:00 PM	13.72028	4.63633	32.80286	22.59634	22.35921	22.2823
8/28/2021	6:00:00 PM	8.231414	0	31.71829	22.29732	22.24186	22.2365
8/28/2021	7:00:00 PM	36.35472	0	50.56666	41.48985	22.24014	22.23572
8/28/2021	8:00:00 PM	43.55961	28.63424	52.4361	46.06799	43.05823	34.72997
8/28/2021	9:00:00 PM	41.45621	25.37542	46.03568	44.2948	41.21208	32.44147
8/28/2021	10:00:00 PM	38.05063	12.53638	46.37999	43.06117	34.55218	24.7806

8/28/2021	11:00:00 PM	25.42661	2.867245	38.47073	29.98558	24.61133	22.48167
8/29/2021	12:00:00 AM	21.7456	0	39.05738	26.58476	22.97555	22.27239
8/29/2021	1:00:00 AM	24.48262	13.14456	38.78834	28.34228	25.08329	23.58379
8/29/2021	2:00:00 AM	19.04741	8.264532	32.32065	24.81185	23.14725	22.56852
8/29/2021	3:00:00 AM	23.4696	13.52982	37.88295	27.66922	24.59163	23.32279
8/29/2021	4:00:00 AM	22.7029	9.493448	44.56762	26.26401	24.12682	22.89774
8/29/2021	5:00:00 AM	20.28244	9.962433	32.5728	25.36878	23.52908	22.71866
8/29/2021	6:00:00 AM	24.24743	11.08273	39.79614	27.97031	24.96282	23.2592
8/29/2021	7:00:00 AM	26.15664	7.926342	46.23472	29.24172	25.562	22.61086
8/29/2021	8:00:00 AM	27.0167	17.61341	43.9899	30.18393	26.86133	24.69791
8/29/2021	9:00:00 AM	27.73674	18.74505	43.46162	30.71148	27.43954	25.12484
8/29/2021	10:00:00 AM	24.75774	12.14033	40.00243	29.14543	24.29584	22.79425
8/29/2021	11:00:00 AM	20.11673	10.69983	41.64695	23.67392	22.70636	22.48946
8/29/2021	12:00:00 PM	18.04649	10.42337	35.57947	23.57917	22.69826	22.48095
8/29/2021	1:00:00 PM	21.03875	10.45839	45.01493	23.2939	22.68135	22.48456
8/29/2021	2:00:00 PM	20.92042	10.09496	49.33813	23.60628	22.66731	22.46851
8/29/2021	3:00:00 PM	24.3218	10.67939	52.59757	23.6463	22.80043	22.53406
8/29/2021	4:00:00 PM	21.23652	9.069983	43.45749	25.47714	22.6391	22.40635
8/29/2021	5:00:00 PM	12.43021	4.309102	30.23764	22.56878	22.34818	22.26485
8/29/2021	6:00:00 PM	18.8261	0	43.26578	22.49212	22.25106	22.23709
8/29/2021	7:00:00 PM	35.64062	0	48.39007	41.34468	22.24486	22.23586
8/29/2021	8:00:00 PM	44.19283	27.33707	53.01179	48.82657	40.09149	32.29734
8/29/2021	9:00:00 PM	40.95551	26.97366	47.46843	44.96695	40.12331	33.46037
8/29/2021	10:00:00 PM	35.78772	14.9389	53.85144	41.77939	29.49056	24.97544
8/29/2021	11:00:00 PM	24.73322	11.90064	40.061	28.71074	25.05591	22.98541
8/30/2021	12:00:00 AM	32.43529	14.56883	44.03601	37.60126	28.33828	24.67792
8/30/2021	1:00:00 AM	31.37707	10.47193	41.95356	37.10438	25.04921	23.32911
8/30/2021	2:00:00 AM	20.71833	0	33.45507	25.74988	23.3878	22.24714
8/30/2021	3:00:00 AM	18.3034	0	35.5343	24.23389	22.37657	22.25375
8/30/2021	4:00:00 AM	14.04735	0	29.23974	23.18558	22.40858	22.27206
8/30/2021	5:00:00 AM	15.69709	0	34.40211	23.58295	22.48862	22.29465
8/30/2021	6:00:00 AM	18.54636	3.104279	37.56108	24.49695	22.76814	22.345
8/30/2021	7:00:00 AM	23.94609	5.025172	44.08068	26.92078	23.17119	22.43493
8/30/2021	8:00:00 AM	18.59812	4.220539	34.17205	24.81993	22.7188	22.37824
8/30/2021	9:00:00 AM	20.74813	2.660303	46.2817	24.64783	22.32235	22.25794
8/30/2021	10:00:00 AM	21.68169	7.332715	43.67537	25.09446	22.52591	22.34903
8/30/2021	11:00:00 AM	22.46931	9.257063	46.60962	25.69578	22.73297	22.42393
8/30/2021	12:00:00 PM	24.523	9.518926	50.34114	25.46343	22.79177	22.46471
8/30/2021	1:00:00 PM	29.01374	12.06745	45.37769	32.6686	24.70299	22.77107
8/30/2021	2:00:00 PM	24.96372	10.0955	43.27726	28.80204	23.24678	22.55596
8/30/2021	3:00:00 PM	26.95917	9.22012	44.64929	30.53078	23.62997	22.56269
8/30/2021	4:00:00 PM	23.10081	7.660873	41.1388	27.00148	22.94807	22.42382
8/30/2021	5:00:00 PM	17.12695	1.498299	37.44217	23.45487	22.30949	22.24838

8/30/2021	6:00:00 PM	14.1931	0	34.56386	22.48307	22.23834	22.23567
8/30/2021	7:00:00 PM	41.42513	0	49.73615	47.24288	22.23656	22.23553
8/30/2021	8:00:00 PM	40.25834	27.40752	48.94042	43.50162	38.29941	30.81906
8/30/2021	9:00:00 PM	32.06021	22.54047	41.28106	35.40406	30.78937	27.72515
8/30/2021	10:00:00 PM	24.55658	12.98104	30.07837	28.79391	25.16771	23.50569

WM12: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
8/23/2021	5:33:13 PM	43.89654	26.23757	71.41915	41.56697	34.02855	30.94553
8/23/2021	6:00:00 PM	40.10954	22.52569	59.13559	43.42378	33.81816	29.73284
8/23/2021	7:00:00 PM	38.51164	22.32624	55.61	40.84369	32.54897	29.37061
8/23/2021	8:00:00 PM	40.69474	32.70451	59.41043	41.81354	37.13326	35.33278
8/23/2021	9:00:00 PM	41.69085	26.23927	60.81514	43.63172	38.38781	32.69945
8/23/2021	10:00:00 PM	39.98399	27.35868	52.28273	42.92401	38.79903	33.96916
8/23/2021	11:00:00 PM	38.67389	24.26305	51.50207	42.29933	36.35952	31.44574
8/24/2021	12:00:00 AM	43.16295	30.97133	54.73098	46.68839	41.05583	36.93207
8/24/2021	1:00:00 AM	40.52282	29.33545	52.21252	43.67267	38.80396	35.02546
8/24/2021	2:00:00 AM	34.27269	18.81487	52.32486	37.46675	31.36675	27.26679
8/24/2021	3:00:00 AM	43.00135	29.98352	54.49025	46.39477	41.51674	35.87394
8/24/2021	4:00:00 AM	41.54873	32.6346	51.85927	44.09058	40.72166	37.55527
8/24/2021	5:00:00 AM	38.31291	22.56031	52.13823	41.68023	36.42648	29.60208
8/24/2021	6:00:00 AM	32.48457	22.25297	45.91486	34.96447	31.2488	28.47589
8/24/2021	7:00:00 AM	38.20311	25.51296	50.687	41.43573	36.58832	31.99184
8/24/2021	8:00:00 AM	38.79744	25.35736	58.04389	41.02077	36.17885	31.89478
8/24/2021	9:00:00 AM	35.45131	24.92209	50.55132	37.7073	34.0797	31.12121
8/24/2021	10:00:00 AM	36.91408	25.68458	59.09944	38.74212	33.94033	31.14533
8/24/2021	11:00:00 AM	42.10754	26.55291	65.39166	41.91288	35.04166	31.95177
8/24/2021	12:00:00 PM	44.62873	26.64726	68.12815	45.23026	35.49291	31.95843
8/24/2021	1:00:00 PM	49.2106	26.71356	72.3939	47.81166	35.39261	31.88501
8/24/2021	2:00:00 PM	49.41531	28.15182	75.90165	50.15261	37.6203	33.22776
8/24/2021	3:00:00 PM	45.62404	26.97351	69.97605	45.18289	35.19244	31.99317
8/24/2021	4:00:00 PM	46.73975	26.30452	68.74904	48.08841	35.10696	31.37944
8/24/2021	5:00:00 PM	41.15823	24.27757	68.11688	37.56006	32.55413	29.73468
8/24/2021	6:00:00 PM	33.02205	20.51284	54.57548	33.7849	29.96505	27.30495
8/24/2021	7:00:00 PM	35.83211	21.50623	53.49226	39.28592	31.14941	28.19092
8/24/2021	8:00:00 PM	42.93356	31.48257	57.98147	45.10548	41.37874	38.5242
8/24/2021	9:00:00 PM	43.13805	30.32147	56.98321	46.85886	40.36445	35.70588
8/24/2021	10:00:00 PM	45.04346	30.77501	53.68128	47.89585	44.36409	38.01538
8/24/2021	11:00:00 PM	42.81477	29.82256	53.98844	46.86602	40.24655	36.09982
8/25/2021	12:00:00 AM	39.81461	27.29307	53.61307	43.15262	37.87717	33.62094
8/25/2021	1:00:00 AM	34.37666	23.42206	50.38238	37.16583	32.68857	29.54398
8/25/2021	2:00:00 AM	33.60319	23.33605	51.81121	36.26045	32.6742	29.59542
8/25/2021	3:00:00 AM	40.22792	21.49913	53.34769	43.85041	38.20635	30.23192
8/25/2021	4:00:00 AM	36.50435	19.83067	49.51565	40.36878	34.68934	27.17169
8/25/2021	5:00:00 AM	39.64155	26.89469	54.45117	42.90482	37.76463	33.41733
8/25/2021	6:00:00 AM	37.43557	22.81221	57.56913	40.88546	32.97537	29.04713
8/25/2021	7:00:00 AM	39.09858	24.84948	52.98246	42.00845	36.86368	31.78053
8/25/2021	8:00:00 AM	38.43288	22.86935	54.5186	41.79247	33.43318	29.50875

8/25/2021	9:00:00 AM	37.99999	23.09345	57.87719	40.46241	32.98609	29.48286
8/25/2021	10:00:00 AM	44.28606	24.92291	68.95674	45.49499	35.49282	31.06913
8/25/2021	11:00:00 AM	47.10534	27.04955	69.7486	48.26923	36.21309	32.26324
8/25/2021	12:00:00 PM	50.4463	28.26783	71.33699	53.00231	40.35254	33.67524
8/25/2021	1:00:00 PM	46.75266	28.01522	70.56927	47.33197	36.48978	32.84747
8/25/2021	2:00:00 PM	54.13201	29.42315	76.07355	55.30391	40.23326	34.56881
8/25/2021	3:00:00 PM	54.82034	29.18457	81.13668	54.84672	40.55908	34.2138
8/25/2021	4:00:00 PM	50.18169	26.49096	74.00528	51.72462	37.82379	31.97155
8/25/2021	5:00:00 PM	50.62079	25.40575	73.34444	52.68308	38.60619	31.22876
8/25/2021	6:00:00 PM	44.86851	20.70141	71.63753	44.61454	33.60828	27.96417
8/25/2021	7:00:00 PM	40.28687	19.97173	56.77178	43.40713	31.38851	27.53441
8/25/2021	8:00:00 PM	45.05994	23.45668	62.18017	48.49875	33.79452	30.10703
8/25/2021	9:00:00 PM	36.34417	19.96495	56.29022	37.04828	29.99914	27.27193
8/25/2021	10:00:00 PM	40.97505	23.70728	54.55679	44.87331	37.96622	31.55292
8/25/2021	11:00:00 PM	39.63735	27.31955	50.21655	43.01874	37.76471	33.58324
8/26/2021	12:00:00 AM	39.15524	22.62154	51.22886	42.54625	37.31475	30.46772
8/26/2021	1:00:00 AM	32.17836	20.00159	50.37214	33.74065	29.81233	27.0736
8/26/2021	2:00:00 AM	35.74512	22.34778	55.97927	37.6085	32.34936	29.06989
8/26/2021	3:00:00 AM	35.82523	23.64528	52.32002	38.26819	32.81351	29.52233
8/26/2021	4:00:00 AM	35.34985	23.57214	46.92213	38.28268	34.23386	30.31597
8/26/2021	5:00:00 AM	33.58178	21.65614	50.87935	36.28308	30.82163	28.06655
8/26/2021	6:00:00 AM	34.94	23.8915	48.15035	38.13782	33.3349	29.87569
8/26/2021	7:00:00 AM	38.92045	25.23664	53.23059	42.30302	36.26691	31.55503
8/26/2021	8:00:00 AM	33.14825	21.37944	49.58733	35.86961	31.02281	28.26773
8/26/2021	9:00:00 AM	35.82472	23.66332	53.91606	37.8468	32.77189	29.81796
8/26/2021	10:00:00 AM	42.08178	26.23246	65.40017	42.2857	34.43428	31.30143
8/26/2021	11:00:00 AM	46.27543	26.66632	69.51872	46.4729	35.57548	32.10868
8/26/2021	12:00:00 PM	46.44177	27.9852	68.05525	47.84879	36.96378	32.96353
8/26/2021	1:00:00 PM	52.54569	28.62665	74.51904	53.23256	38.98034	33.61708
8/26/2021	2:00:00 PM	55.03403	27.81763	75.72632	57.08831	42.36632	33.71032
8/26/2021	3:00:00 PM	51.54436	26.24041	72.834	53.49299	38.68214	32.13243
8/26/2021	4:00:00 PM	50.22227	26.48137	72.13842	51.72683	37.62795	31.86608
8/26/2021	5:00:00 PM	45.99471	24.29438	69.38698	46.03117	33.90515	29.85185
8/26/2021	6:00:00 PM	41.04881	22.22012	63.27141	42.39865	32.93477	29.00797
8/26/2021	7:00:00 PM	35.47729	17.6516	55.97401	38.32066	27.80054	25.54426
8/26/2021	8:00:00 PM	38.65624	28.09509	55.55472	41.64729	34.33334	31.79019
8/26/2021	9:00:00 PM	34.66225	19.27549	50.49269	38.36382	31.91081	27.08158
8/26/2021	10:00:00 PM	36.04864	22.79672	51.8499	38.97668	32.9687	29.44708
8/26/2021	11:00:00 PM	39.51062	20.82394	53.58861	43.85288	35.10133	29.01075
8/27/2021	12:00:00 AM	35.31459	22.65311	50.94192	38.44027	33.7758	29.85453
8/27/2021	1:00:00 AM	37.07283	20.64719	50.38009	40.93204	33.02367	28.15272
8/27/2021	2:00:00 AM	40.66924	26.09155	51.88897	44.30244	38.39735	31.95513
8/27/2021	3:00:00 AM	35.22681	25.8887	48.62643	38.01479	34.13877	31.03686

8/27/2021	4:00:00 AM	39.00656	26.39845	57.40943	41.19049	35.89367	32.08802
8/27/2021	5:00:00 AM	43.17581	25.63204	66.91922	39.07656	35.00336	31.75526
8/27/2021	6:00:00 AM	36.28947	26.99684	47.04024	38.86845	35.61044	32.31882
8/27/2021	7:00:00 AM	39.17719	27.63836	59.74321	42.19788	37.07308	33.27146
8/27/2021	8:00:00 AM	40.03466	28.24307	53.17746	43.81319	37.3337	33.57866
8/27/2021	9:00:00 AM	38.70919	24.83768	59.05942	40.23561	34.42683	31.07677
8/27/2021	10:00:00 AM	46.56425	26.23018	75.27748	42.85212	34.6618	31.50025
8/27/2021	11:00:00 AM	41.4511	27.49876	65.05356	41.85675	35.1389	32.22983
8/27/2021	12:00:00 PM	42.37104	27.99812	64.97367	43.77122	35.72834	32.50494
8/27/2021	1:00:00 PM	47.94777	28.23135	69.98515	49.60923	37.83921	33.56099
8/27/2021	2:00:00 PM	48.84284	28.59765	70.97412	50.03417	38.21198	33.64667
8/27/2021	3:00:00 PM	49.86873	27.97124	73.0017	51.96556	38.99623	33.51561
8/27/2021	4:00:00 PM	45.37536	27.07777	67.54585	47.35761	35.75596	31.8446
8/27/2021	5:00:00 PM	44.87687	25.49451	68.52304	46.14949	35.217	30.92589
8/27/2021	6:00:00 PM	37.72679	19.86993	59.82584	39.22841	31.11353	27.44592
8/27/2021	7:00:00 PM	37.7803	19.24322	53.54313	42.11434	33.09725	27.57246
8/27/2021	8:00:00 PM	45.11702	28.59939	58.27597	48.69192	43.69118	34.94864
8/27/2021	9:00:00 PM	45.89817	31.52446	55.73866	49.97148	44.18094	36.85079
8/27/2021	10:00:00 PM	49.29269	36.16554	67.5463	52.04705	46.50234	42.25233
8/27/2021	11:00:00 PM	48.51234	36.00088	62.67119	51.44496	47.04811	42.255
8/28/2021	12:00:00 AM	46.91366	37.42186	57.29131	49.43895	46.09679	42.75413
8/28/2021	1:00:00 AM	47.07406	32.31675	58.23627	51.24633	43.66443	38.20712
8/28/2021	2:00:00 AM	47.94831	30.75157	60.4087	52.65716	41.6513	36.0909
8/28/2021	3:00:00 AM	36.81894	24.6275	53.20985	39.89623	34.82165	30.84461
8/28/2021	4:00:00 AM	37.14085	21.97973	48.65298	41.40039	33.3983	28.70042
8/28/2021	5:00:00 AM	39.76932	29.61648	52.02598	42.62332	38.59815	35.25316
8/28/2021	6:00:00 AM	39.33249	27.9566	49.43779	42.68416	37.81384	33.78959
8/28/2021	7:00:00 AM	42.11933	30.35283	53.71856	45.0964	40.74982	36.72431
8/28/2021	8:00:00 AM	40.25773	28.4455	55.27555	43.47644	38.08893	34.4129
8/28/2021	9:00:00 AM	39.76921	26.17217	56.12419	43.10621	35.6118	32.02628
8/28/2021	10:00:00 AM	40.69771	27.2013	63.25741	43.12118	35.90568	32.62066
8/28/2021	11:00:00 AM	40.51678	27.74273	66.8767	40.0834	35.17421	32.55113
8/28/2021	12:00:00 PM	41.77245	27.91812	65.11974	43.28776	35.76973	32.69513
8/28/2021	1:00:00 PM	41.74745	27.69848	66.09164	42.76726	35.65836	32.69471
8/28/2021	2:00:00 PM	39.75521	27.52948	59.72335	41.35055	35.29788	32.30721
8/28/2021	3:00:00 PM	39.80031	26.65995	62.74062	40.64035	34.24478	31.45677
8/28/2021	4:00:00 PM	40.90493	25.76464	62.67286	42.37925	34.17966	30.94145
8/28/2021	5:00:00 PM	36.38297	23.12015	61.41016	36.61389	31.87585	29.12982
8/28/2021	6:00:00 PM	30.29396	19.47156	47.27422	32.98918	29.6834	27.24695
8/28/2021	7:00:00 PM	37.51713	15.87424	56.80608	41.73881	27.81525	25.12044
8/28/2021	8:00:00 PM	42.52262	27.65454	53.96305	45.06188	41.88962	33.94537
8/28/2021	9:00:00 PM	42.67531	26.48848	53.88609	45.71019	41.31687	33.92945
8/28/2021	10:00:00 PM	42.60386	29.65629	55.42366	46.16282	40.63107	36.02113

8/28/2021	11:00:00 PM	42.29712	26.17162	55.42081	45.9156	40.22398	33.17471
8/29/2021	12:00:00 AM	39.80355	24.20772	58.22275	43.2877	36.08798	30.30714
8/29/2021	1:00:00 AM	43.1127	32.26568	59.39011	45.61484	41.43675	37.92328
8/29/2021	2:00:00 AM	39.25359	28.55716	52.86429	42.10508	38.03	34.09592
8/29/2021	3:00:00 AM	42.53924	31.96035	54.42231	45.52845	40.86339	37.31554
8/29/2021	4:00:00 AM	38.92041	28.6166	52.00096	41.67198	37.81027	34.33895
8/29/2021	5:00:00 AM	38.91908	28.41157	51.47283	42.01755	37.3906	33.75511
8/29/2021	6:00:00 AM	41.53005	30.72529	57.19434	43.84282	40.28383	36.63239
8/29/2021	7:00:00 AM	44.48376	30.06834	55.58354	47.72256	43.31576	36.33729
8/29/2021	8:00:00 AM	47.18801	36.07726	57.42169	49.94973	46.27346	42.34728
8/29/2021	9:00:00 AM	47.33077	36.74626	59.19363	49.96604	46.28891	42.69495
8/29/2021	10:00:00 AM	44.64914	30.01313	59.6414	48.37518	41.55804	36.00588
8/29/2021	11:00:00 AM	39.53261	27.30511	57.95014	41.51506	35.5738	32.45037
8/29/2021	12:00:00 PM	39.54253	26.70633	61.27073	41.36755	34.88682	31.79743
8/29/2021	1:00:00 PM	41.19505	26.5502	64.30957	41.57995	34.2727	31.40742
8/29/2021	2:00:00 PM	42.20067	25.88898	64.31407	42.84506	34.49873	31.30144
8/29/2021	3:00:00 PM	48.5941	26.68355	77.46963	43.96739	35.1045	31.92211
8/29/2021	4:00:00 PM	43.97002	25.37556	72.32382	43.34629	34.12325	30.73546
8/29/2021	5:00:00 PM	35.21024	22.80967	58.29996	35.57618	31.55106	28.8142
8/29/2021	6:00:00 PM	36.73149	20.92701	59.31199	35.29769	30.59422	27.91299
8/29/2021	7:00:00 PM	37.2639	17.50799	53.11751	41.97143	29.33173	26.46306
8/29/2021	8:00:00 PM	43.3278	27.35081	53.06257	47.77212	39.68278	32.89535
8/29/2021	9:00:00 PM	42.39622	29.37724	55.10196	45.76866	41.37316	35.53982
8/29/2021	10:00:00 PM	44.46933	28.24355	70.83563	45.12755	39.64498	35.75683
8/29/2021	11:00:00 PM	36.51369	20.86786	53.96014	40.4946	31.36789	27.77838
8/30/2021	12:00:00 AM	37.97763	23.76054	51.18748	41.45852	35.31005	30.90216
8/30/2021	1:00:00 AM	33.7583	20.39951	47.9439	38.24516	30.42382	27.31365
8/30/2021	2:00:00 AM	31.93526	20.59435	50.05189	34.85988	30.90566	27.70528
8/30/2021	3:00:00 AM	32.90506	20.1632	49.53487	35.58523	31.44211	27.72441
8/30/2021	4:00:00 AM	33.73967	22.26709	47.76407	36.77966	32.36398	29.10389
8/30/2021	5:00:00 AM	34.27171	23.02974	50.83887	37.16654	32.10897	28.89276
8/30/2021	6:00:00 AM	37.12633	25.62135	53.01868	39.89482	35.09832	31.55079
8/30/2021	7:00:00 AM	39.49809	25.21589	57.14775	42.02943	36.23059	31.89555
8/30/2021	8:00:00 AM	39.9738	26.31276	51.28318	43.21439	38.5016	33.4397
8/30/2021	9:00:00 AM	38.53045	24.19592	56.05843	41.04803	33.51029	30.29029
8/30/2021	10:00:00 AM	41.02689	24.81846	62.23029	43.56918	34.11156	30.66265
8/30/2021	11:00:00 AM	43.03939	25.48519	64.99396	45.15854	35.08002	31.12018
8/30/2021	12:00:00 PM	45.09309	25.62464	70.06808	45.48288	34.94861	31.17208
8/30/2021	1:00:00 PM	52.89394	28.37649	72.47765	56.21847	42.43565	34.2684
8/30/2021	2:00:00 PM	49.41291	27.30079	71.20147	50.70444	37.97061	32.63072
8/30/2021	3:00:00 PM	50.18221	26.35119	74.12646	51.79925	39.16035	32.76801
8/30/2021	4:00:00 PM	45.237	25.62464	65.19454	47.59807	36.25945	31.59508
8/30/2021	5:00:00 PM	36.40632	21.2179	63.43873	37.73701	31.02915	27.91743

8/30/2021	6:00:00 PM	33.07865	15.95791	50.91224	35.43058	28.09676	25.83696
8/30/2021	7:00:00 PM	40.1881	13.48662	50.26398	45.88915	26.07721	24.62038
8/30/2021	8:00:00 PM	39.79277	26.11695	58.81101	42.38896	36.96582	30.03621
8/30/2021	9:00:00 PM	37.24548	22.30637	52.00378	41.49731	32.92833	28.30539
8/30/2021	10:00:00 PM	33.8801	22.57364	43.78138	37.26061	32.32072	29.17175

WM12: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lma	L10	L50	L90
8/23/2021	5:33:13 PM	54.99496	30.11667	79.14603	55.54691	43.5098	36.89544
8/23/2021	6:00:00 PM	49.70478	28.56506	72.12638	50.86736	40.85579	36.19082
8/23/2021	7:00:00 PM	44.23044	27.84078	66.29986	45.7889	40.07484	36.11419
8/23/2021	8:00:00 PM	44.82503	33.93383	63.82755	46.30262	41.04754	38.0123
8/23/2021	9:00:00 PM	52.19636	30.65059	73.14424	53.47013	43.14997	38.10818
8/23/2021	10:00:00 PM	44.27299	30.64856	55.63601	47.22969	43.14662	38.46312
8/23/2021	11:00:00 PM	43.96712	30.78323	56.86739	47.07927	42.57147	38.24192
8/24/2021	12:00:00 AM	48.13862	35.08857	59.40114	51.64169	46.17512	41.84544
8/24/2021	1:00:00 AM	46.65086	33.68781	57.50747	49.96394	44.98835	40.70243
8/24/2021	2:00:00 AM	41.55737	26.09	58.52932	44.31328	39.72832	35.34279
8/24/2021	3:00:00 AM	46.3007	33.14302	58.072	49.44012	45.05269	40.09847
8/24/2021	4:00:00 AM	45.52759	35.53424	59.39652	47.99643	44.75462	41.40312
8/24/2021	5:00:00 AM	42.67521	27.45184	58.1582	45.86288	40.78336	35.43356
8/24/2021	6:00:00 AM	39.5929	27.2796	51.90407	42.5827	38.22283	34.57276
8/24/2021	7:00:00 AM	43.72619	29.87633	59.28221	46.67109	42.40372	37.6629
8/24/2021	8:00:00 AM	45.27252	31.5806	60.95846	48.07062	43.67211	38.91821
8/24/2021	9:00:00 AM	45.40396	30.34281	62.48225	47.7983	42.98128	39.22475
8/24/2021	10:00:00 AM	48.60241	30.44129	72.09145	50.73749	42.45474	37.94771
8/24/2021	11:00:00 AM	53.21416	29.98668	75.56464	55.31669	43.1436	37.66722
8/24/2021	12:00:00 PM	57.66958	30.09464	81.36346	58.76254	44.05841	37.55265
8/24/2021	1:00:00 PM	59.53657	29.84582	79.99165	61.39854	44.91427	37.62467
8/24/2021	2:00:00 PM	61.82582	31.77679	85.4355	64.33796	48.87897	38.89257
8/24/2021	3:00:00 PM	58.53634	30.25316	80.7457	59.31435	43.7909	37.53781
8/24/2021	4:00:00 PM	60.42771	29.64399	83.12543	62.46311	44.37441	36.81991
8/24/2021	5:00:00 PM	54.68642	28.85608	82.31917	49.92272	39.9354	35.79971
8/24/2021	6:00:00 PM	43.99222	25.95631	65.53633	45.21976	38.09031	33.99775
8/24/2021	7:00:00 PM	41.12966	27.21074	59.35041	43.92194	38.72059	34.83594
8/24/2021	8:00:00 PM	45.01794	32.73873	62.84145	47.17048	43.26063	40.0615
8/24/2021	9:00:00 PM	46.56389	33.27725	59.85973	49.96999	44.56442	39.98143
8/24/2021	10:00:00 PM	48.84493	34.98825	62.26642	51.60746	47.94468	42.87986
8/24/2021	11:00:00 PM	46.47399	33.25087	60.07919	49.8471	44.76139	40.5477
8/25/2021	12:00:00 AM	44.14541	30.73751	57.12092	47.41514	42.51573	38.00804
8/25/2021	1:00:00 AM	41.62744	28.32371	60.00596	44.518	40.16067	36.24383
8/25/2021	2:00:00 AM	41.72155	28.87902	59.10759	44.42325	40.52484	36.57316
8/25/2021	3:00:00 AM	44.41724	28.33369	58.04809	47.78145	42.83424	37.20603
8/25/2021	4:00:00 AM	41.31288	25.74251	53.93707	44.79243	39.67269	33.8233
8/25/2021	5:00:00 AM	43.77271	31.33517	61.11889	46.56409	42.39893	38.36176
8/25/2021	6:00:00 AM	42.53377	27.77331	64.08867	45.32859	39.67298	35.54447
8/25/2021	7:00:00 AM	44.2972	30.42963	59.93822	47.02196	42.76366	38.30101
8/25/2021	8:00:00 AM	44.20931	28.86551	63.49602	46.66326	40.91127	36.7736

8/25/2021	9:00:00 AM	50.38653	28.71034	70.41471	52.82202	41.86564	36.97906
8/25/2021	10:00:00 AM	55.09117	29.76724	79.47861	55.86126	43.43163	37.65632
8/25/2021	11:00:00 AM	60.28583	30.767	81.72507	62.41225	46.21389	38.15581
8/25/2021	12:00:00 PM	63.72721	31.33959	82.65021	67.21405	53.97088	40.53564
8/25/2021	1:00:00 PM	58.67475	31.20448	80.25772	61.10801	46.65111	38.35405
8/25/2021	2:00:00 PM	66.80329	32.78767	87.43681	68.98551	52.64281	40.23438
8/25/2021	3:00:00 PM	66.45433	32.08403	88.83884	68.73593	53.6366	40.38745
8/25/2021	4:00:00 PM	63.40081	30.33727	86.14192	66.05032	50.70328	38.73932
8/25/2021	5:00:00 PM	63.96399	29.70045	84.77947	66.87563	52.74097	39.14836
8/25/2021	6:00:00 PM	58.01011	26.76431	83.29243	58.61291	43.72159	35.4047
8/25/2021	7:00:00 PM	43.51887	25.67581	60.4821	46.693	38.55818	34.19238
8/25/2021	8:00:00 PM	46.70186	26.80288	63.6692	50.21913	38.78048	34.59015
8/25/2021	9:00:00 PM	40.1851	25.65273	57.37094	42.14688	37.2726	33.6737
8/25/2021	10:00:00 PM	46.20251	28.89173	64.79237	49.09399	43.30275	37.60594
8/25/2021	11:00:00 PM	45.34781	32.56302	54.68048	48.45199	44.18236	39.96189
8/26/2021	12:00:00 AM	44.69677	28.38791	55.12195	47.78062	43.56546	38.05652
8/26/2021	1:00:00 AM	39.66889	25.9522	57.80327	41.85716	37.75172	33.84522
8/26/2021	2:00:00 AM	40.91071	27.47664	60.09809	43.16699	38.99455	35.22206
8/26/2021	3:00:00 AM	41.34844	29.05408	56.45869	43.91215	39.75983	35.98318
8/26/2021	4:00:00 AM	41.55204	29.04961	55.65961	44.27008	40.46069	36.39992
8/26/2021	5:00:00 AM	39.8126	26.64615	55.61391	42.45103	38.30932	34.56758
8/26/2021	6:00:00 AM	41.83142	28.91241	56.33492	44.6442	40.61578	36.52774
8/26/2021	7:00:00 AM	43.83316	30.16575	59.85849	46.73248	41.79411	37.42489
8/26/2021	8:00:00 AM	40.06835	27.79049	55.70103	42.80662	38.56311	34.90987
8/26/2021	9:00:00 AM	45.22444	29.47557	65.61425	47.30361	41.39244	37.40711
8/26/2021	10:00:00 AM	53.74577	30.93109	77.35689	55.64997	43.72016	38.31639
8/26/2021	11:00:00 AM	59.04602	30.43968	82.20631	60.40863	44.58183	38.19728
8/26/2021	12:00:00 PM	59.70404	31.29595	80.83777	62.00071	47.44224	38.76687
8/26/2021	1:00:00 PM	65.33678	31.39294	86.68148	67.30529	51.74122	39.15413
8/26/2021	2:00:00 PM	67.70973	31.15542	86.55136	70.70774	55.88096	40.51925
8/26/2021	3:00:00 PM	64.98872	29.73514	85.00502	67.79428	51.86867	39.17344
8/26/2021	4:00:00 PM	63.5126	30.10846	84.45036	65.77731	50.39586	38.43925
8/26/2021	5:00:00 PM	59.56994	28.78562	82.32182	60.65081	44.65026	36.74718
8/26/2021	6:00:00 PM	55.14125	26.88401	77.1219	56.5002	42.95543	35.64816
8/26/2021	7:00:00 PM	43.27056	23.49309	69.09034	43.04915	36.36774	31.97478
8/26/2021	8:00:00 PM	42.26287	29.9329	64.03883	44.66037	38.76225	35.32995
8/26/2021	9:00:00 PM	39.74959	24.5528	58.56798	42.7871	37.37364	32.858
8/26/2021	10:00:00 PM	41.51611	27.80279	59.37645	43.83278	39.06194	35.18063
8/26/2021	11:00:00 PM	45.12118	27.30447	59.14218	48.82388	42.42605	36.13789
8/27/2021	12:00:00 AM	44.30726	29.398	64.21002	46.6675	42.18022	37.7923
8/27/2021	1:00:00 AM	42.66991	27.91068	56.20444	45.98609	40.56485	35.96731
8/27/2021	2:00:00 AM	45.13376	30.5275	54.9607	48.52871	43.54953	38.05533
8/27/2021	3:00:00 AM	41.22346	29.55058	60.723	43.51826	39.56182	35.94468

8/27/2021	4:00:00 AM	43.54835	30.57857	63.064	45.6162	41.27324	37.4512
8/27/2021	5:00:00 AM	47.37699	30.10635	70.46942	45.98992	42.08585	38.15029
8/27/2021	6:00:00 AM	42.99385	31.30183	57.69231	45.52026	42.06661	38.4001
8/27/2021	7:00:00 AM	46.33119	32.10352	73.14505	47.59448	43.23671	39.29664
8/27/2021	8:00:00 AM	46.31617	33.4353	61.77579	49.44453	44.58664	40.40111
8/27/2021	9:00:00 AM	46.74174	30.62073	66.73666	48.57555	42.81026	38.66588
8/27/2021	10:00:00 AM	52.13949	31.12563	78.39871	52.2948	42.75079	38.26082
8/27/2021	11:00:00 AM	51.83272	31.24577	74.33758	53.19577	42.91114	38.35099
8/27/2021	12:00:00 PM	53.98337	31.83588	76.40083	55.3133	43.83266	38.65641
8/27/2021	1:00:00 PM	60.78927	31.27429	82.27777	62.38603	46.83716	39.03561
8/27/2021	2:00:00 PM	61.43056	31.55109	83.52838	63.10227	47.2651	39.14848
8/27/2021	3:00:00 PM	62.98281	30.99184	84.97282	65.903	50.61249	39.38184
8/27/2021	4:00:00 PM	58.63743	30.0469	79.79661	61.43775	46.24053	37.83462
8/27/2021	5:00:00 PM	58.05722	29.95005	79.56894	59.93406	46.06273	37.95536
8/27/2021	6:00:00 PM	49.56167	26.55338	74.23944	50.98154	40.16111	35.2404
8/27/2021	7:00:00 PM	43.46903	26.13018	57.53916	46.92625	41.30392	35.90964
8/27/2021	8:00:00 PM	47.73168	31.37559	65.59373	50.79584	45.87079	39.08879
8/27/2021	9:00:00 PM	47.97021	33.593	62.5879	51.55792	46.23492	40.11965
8/27/2021	10:00:00 PM	59.62425	39.92147	78.5244	62.61877	52.77437	47.23429
8/27/2021	11:00:00 PM	54.07519	39.75873	75.93975	55.88499	51.03917	46.64755
8/28/2021	12:00:00 AM	51.41836	40.6111	61.81248	53.9839	50.58344	47.01033
8/28/2021	1:00:00 AM	51.29011	36.84778	61.44996	55.10429	48.93901	44.03016
8/28/2021	2:00:00 AM	51.85546	33.93026	63.50664	56.35619	47.02836	40.94829
8/28/2021	3:00:00 AM	42.8005	30.25166	55.40446	45.73204	41.56268	37.55023
8/28/2021	4:00:00 AM	42.92257	28.42107	53.14602	46.31115	41.32292	36.96122
8/28/2021	5:00:00 AM	44.54203	32.60054	62.40548	47.06458	43.07142	39.27435
8/28/2021	6:00:00 AM	44.35173	32.39137	53.91674	47.26815	43.35001	39.49431
8/28/2021	7:00:00 AM	47.03153	34.96273	59.89369	49.80629	45.7498	41.81565
8/28/2021	8:00:00 AM	47.14267	33.46745	63.58283	50.02172	44.71709	40.65472
8/28/2021	9:00:00 AM	51.85065	32.31555	69.78431	55.47916	45.54179	40.05358
8/28/2021	10:00:00 AM	53.61427	32.14889	78.43411	56.60223	45.33878	40.00875
8/28/2021	11:00:00 AM	52.27094	31.68228	80.21539	53.16391	43.43508	38.89142
8/28/2021	12:00:00 PM	55.02112	31.97436	78.75043	57.39706	44.62081	38.93225
8/28/2021	1:00:00 PM	54.80848	31.45598	79.26102	56.28799	43.35851	38.47543
8/28/2021	2:00:00 PM	52.17968	31.68992	73.50019	54.23066	43.32439	38.57454
8/28/2021	3:00:00 PM	52.22702	30.56062	75.48875	53.14193	41.95002	37.43005
8/28/2021	4:00:00 PM	53.72038	29.65258	75.292	55.88421	42.58748	37.21784
8/28/2021	5:00:00 PM	48.65446	28.95084	73.26004	48.62408	40.52296	36.36789
8/28/2021	6:00:00 PM	40.17701	26.89552	56.86944	42.68615	38.9352	35.20669
8/28/2021	7:00:00 PM	40.90231	22.24515	61.61566	44.66721	36.35158	31.4262
8/28/2021	8:00:00 PM	45.52644	29.31782	63.89375	48.21748	44.43004	37.24098
8/28/2021	9:00:00 PM	45.93341	30.06621	59.31008	48.98109	44.26483	38.28946
8/28/2021	10:00:00 PM	47.68469	33.9734	62.1746	50.71453	46.16053	41.95401

8/28/2021	11:00:00 PM	47.19004	32.53189	61.40793	50.29624	45.62735	40.32005
8/29/2021	12:00:00 AM	45.75918	30.72317	61.15001	48.99293	43.12306	37.84572
8/29/2021	1:00:00 AM	48.84161	36.56906	62.57041	51.51579	47.63573	43.76781
8/29/2021	2:00:00 AM	45.69624	33.04814	60.20742	48.46403	44.26436	39.99012
8/29/2021	3:00:00 AM	46.76758	35.16114	58.01753	49.5786	45.54607	41.80372
8/29/2021	4:00:00 AM	45.05717	33.5482	62.15496	47.55671	44.04889	40.4236
8/29/2021	5:00:00 AM	45.10872	32.06577	60.79272	47.66815	43.49376	39.46623
8/29/2021	6:00:00 AM	45.94306	34.33741	59.31947	48.48167	44.97662	41.22761
8/29/2021	7:00:00 AM	49.97923	35.53917	61.73089	53.07122	48.93376	43.23623
8/29/2021	8:00:00 AM	53.03124	40.53172	61.51312	55.7369	52.29897	48.05649
8/29/2021	9:00:00 AM	52.72516	40.62584	63.30697	55.47685	51.76564	47.90528
8/29/2021	10:00:00 AM	50.20775	34.79954	66.13442	53.48016	47.57272	42.4721
8/29/2021	11:00:00 AM	50.35233	32.09947	70.2168	53.23559	43.74436	39.18063
8/29/2021	12:00:00 PM	52.15812	31.16435	75.08717	54.45787	43.20159	38.21477
8/29/2021	1:00:00 PM	53.44814	30.23393	75.56029	55.44064	42.99484	37.36107
8/29/2021	2:00:00 PM	54.02102	30.68651	75.80326	55.22495	43.19568	38.73685
8/29/2021	3:00:00 PM	59.95095	31.89869	86.72877	58.20505	44.04728	39.05106
8/29/2021	4:00:00 PM	55.73625	30.24186	82.05602	54.77813	42.41012	37.68548
8/29/2021	5:00:00 PM	48.64366	29.94365	73.23793	47.27229	40.76039	37.0405
8/29/2021	6:00:00 PM	42.70666	30.24765	60.83603	44.24887	40.76946	37.26863
8/29/2021	7:00:00 PM	42.4223	27.18005	56.17868	45.99144	40.08118	35.98629
8/29/2021	8:00:00 PM	46.01849	29.54071	58.0754	50.22848	42.86049	36.65696
8/29/2021	9:00:00 PM	47.51139	33.21476	66.61554	50.50997	45.8824	40.68682
8/29/2021	10:00:00 PM	53.78606	33.45125	80.6795	49.68423	45.58435	41.94369
8/29/2021	11:00:00 PM	43.40082	27.79194	64.08978	46.03813	40.47774	36.70357
8/30/2021	12:00:00 AM	43.87225	29.16489	56.8097	46.6745	42.62638	38.78109
8/30/2021	1:00:00 AM	42.14907	28.15056	60.80808	45.21299	40.44766	36.52348
8/30/2021	2:00:00 AM	42.02183	27.58582	62.75309	44.18217	40.88672	36.58487
8/30/2021	3:00:00 AM	41.7424	26.99456	57.91709	44.14136	40.7214	36.52881
8/30/2021	4:00:00 AM	42.4552	28.08813	58.4181	44.99856	41.41544	37.4209
8/30/2021	5:00:00 AM	40.76843	27.57183	58.47376	43.15994	38.69282	34.78123
8/30/2021	6:00:00 AM	44.34779	31.78586	62.26753	46.90405	42.96714	38.89416
8/30/2021	7:00:00 AM	45.42934	31.61299	62.78952	47.74702	43.65559	39.25748
8/30/2021	8:00:00 AM	46.95087	32.50809	58.14657	49.85428	45.97379	40.96025
8/30/2021	9:00:00 AM	45.96331	31.61342	65.00745	47.67575	42.40261	38.68673
8/30/2021	10:00:00 AM	52.16792	30.22084	75.19103	54.24241	43.0967	38.19635
8/30/2021	11:00:00 AM	55.7347	29.96849	77.5014	58.11068	44.26992	38.00479
8/30/2021	12:00:00 PM	57.27696	30.14697	79.24001	59.10009	43.99685	37.28214
8/30/2021	1:00:00 PM	66.18371	33.21771	84.13337	69.94474	56.57025	43.41343
8/30/2021	2:00:00 PM	62.61172	31.10574	83.51525	64.68839	49.64307	39.28496
8/30/2021	3:00:00 PM	63.08778	30.89273	84.08604	65.55807	51.48814	40.58948
8/30/2021	4:00:00 PM	58.54365	31.13341	78.7558	61.18375	47.48539	39.72217
8/30/2021	5:00:00 PM	47.89949	28.93991	76.83516	47.37549	40.7625	36.83381

8/30/2021	6:00:00 PM	40.51621	26.74827	60.54384	42.70365	38.4243	35.01779
8/30/2021	7:00:00 PM	41.57578	19.98726	52.82347	46.87013	33.99336	29.56118
8/30/2021	8:00:00 PM	41.28397	27.20984	61.58167	43.69675	38.47444	32.33995
8/30/2021	9:00:00 PM	41.71954	25.40163	56.80803	46.28892	37.93438	32.98762
8/30/2021	10:00:00 PM	44.06045	32.92128	51.67568	46.78237	43.22202	39.52666

WM12: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
8/23/2021	5:33:13 PM	51.4	48.6	46.3	44.2	40.4	37.9	33.7	31.5	29.5	29.4	30.3	28	28	29.1	26	24.1	28.1	28.2	26.8	30.1	33	32.2	24.6	26.2	25.6	24.1	27.1	25.9	24.8	26.5	23.2	19	17.9	19.2	17.7	15.6
8/23/2021	6:00:00 PM	45.5	43.4	40.8	38.6	36	33.6	32.2	31.8	31	31	31.1	29.9	29.2	28.5	27	24.6	20.5	16.3	14.8	14.7	12.1	6.9	3	0.8	-1.3	-3.3	-4.8	-5.3	-5.5	-5.6	-5.6	-5.9	-6.6	-1.8	-1.3	0.5
8/23/2021	7:00:00 PM	37.6	35.2	35.1	34	33.5	31.1	31.3	29.3	26.6	24.9	24.1	22.6	21.7	20.7	19.1	17	14.1	9.3	4.5	4.4	2.1	-3.3	-5.1	-6.9	-6	-2.3	9.4	36.3	13.3	-4.8	4.3	-5.6	-4.6	-2.4	-1.6	0.4
8/23/2021	8:00:00 PM	37.5	35.6	34.6	33	32.1	30.7	29.8	29.9	29.3	28.5	27.5	26.1	25.2	24.5	23.6	24.6	23.9	18.4	13.8	15.7	13.1	4.5	-5.2	-6.9	-7.4	-6	21.6	38.6	16.9	2.4	9.5	-2.8	-1.4	-0.9	-1.4	0.4
8/23/2021	9:00:00 PM	47.4	46.2	44.4	42.2	39.3	36.2	33.1	31.8	28.8	28.6	30.5	29.9	27.9	26.6	23.6	22.6	24.3	20.8	16.1	11.5	5.4	2.1	-3.1	-6	-7.4	-3.5	29.4	33.8	8.9	3.7	5.6	-2.3	-2.1	-1.4	-1.5	1.4
8/23/2021	10:00:00 PM	35.6	33.1	33.8	35.9	34.1	29.9	29.2	29.5	29.7	31.1	33.1	31.5	29.8	28.9	25.6	23.7	23.8	24	18.8	15.9	11.6	8	1.6	-4.4	-8.3	8.5	29	18.7	-4.7	4.9	-2.9	-0.2	-6.4	-2.6	-2	0.5
8/23/2021	11:00:00 PM	34.6	32.4	31.5	36.2	36.6	33.6	31.2	29.8	27.8	29.1	30.9	29.2	27.4	26.3	24	22.1	21	19.9	16.2	10.8	5.3	3	-2.5	-4.5	-3.3	18.2	25.6	5.1	-1.3	2.6	0.9	2.2	-6.5	-2.8	-2	0.5
8/24/2021	12:00:00 AM	36.3	35.6	35.9	39.8	40.9	39.4	36.8	34.7	32.5	34	35.6	34	31.9	31.6	27.1	25.7	24.4	22.8	19.9	14.5	6.8	2.8	-4	-8.2	-8.8	14.8	20.3	-4.4	-4.9	-3.1	-6.2	-6.8	-7.6	-3.4	-1.5	6.4
8/24/2021	1:00:00 AM	37.2	36.9	37.1	37.9	38.3	37.2	35	34.3	30.3	31.1	31.6	28.7	30.3	27.3	24.3	23.7	19.9	19.1	15.7	8.5	0.8	5.2	-8.7	-9.3	-8.8	17.1	7.6	-7.3	3.5	6.6	-5.2	-7.4	-7.7	-3.5	-2.2	0.3
8/24/2021	2:00:00 AM	34.3	34.6	33.7	31.6	32.2	27.2	24.8	27	23.4	23.7	25.1	24.7	25.5	23.6	19.9	16.2	15	12.9	10.3	3.9	3.6	6.2	-8.6	-9.1	-8.5	19.5	8.4	-7.4	-3	6.1	-4.4	-7.3	-7.8	-3.5	-2.2	0.3
8/24/2021	3:00:00 AM	34.7	33.9	33.2	36.3	37	33.3	32.2	34.7	31.8	34.8	37.8	34.8	32.3	32.7	28.1	25.7	26.1	24.9	22.5	16.1	9.8	8.1	-1.4	-6.6	-8.4	14.3	6.3	-7.4	-5.8	-6.7	-6.5	-7.4	-7.7	-3.5	-2.3	0.3
8/24/2021	4:00:00 AM	35.3	34.2	32.3	36.2	37.3	33.4	31.2	32.2	31.4	33.5	35.4	33.2	31.1	31	26.8	23.8	25.9	22.8	23	16.2	8.6	7.5	5.1	1.5	-3	2.5	-1.6	-7.9	-7.4	-7.3	-7.3	-7.6	-7.8	-3.5	-2.3	0.2
8/24/2021	5:00:00 AM	33.9	33	30.2	32.4	34.8	29.1	26.2	28.5	28.2	29.5	31.4	28.6	30	29.4	23.5	21.7	22.8	21.7	17.2	11.8	6.4	5.6	-5.4	-8.5	-8.8	-8.5	-8.2	-7.2	-3.4	-4.6	-6.8	-6.4	-7.7	-3.5	-2.3	0.2
8/24/2021	6:00:00 AM	31.9	31.2	32.3	28.6	32	26.1	23.1	26.2	22.4	23.3	23.1	20.8	20.9	21.8	19.1	16.7	16.4	13.2	10.5	7.2	1.1	1.9	-8.6	-9	-8.8	-8.3	-7.8	-7.5	-2.6	-1.3	-6.9	-7.5	-7.8	-3.6	-2.4	0.2
8/24/2021	7:00:00 AM	34.4	33.8	37.7	31.7	31.8	30.7	31.6	32	30.1	29.6	29.6	28.7	29.5	25.8	23.3	20.6	17.9	16.9	14.3	10.6	2.9	1.5	-4.3	-7.5	-8.3	-8.1	-7.8	-7.6	-7.4	-7.2	-5.9	-7.3	-7.6	-3.2	-2.1	0.2
8/24/2021	8:00:00 AM	36.2	35.9	38.1	36.7	35.8	33	32.6	32.9	29	28.3	27	26	26.5	27.7	30.5	24.6	16.2	14.2	11.3	7.9	0.9	3.4	-4.7	-3.2	-4	-5	-6.3	-4.4	-6.6	-5.7	-2.3	-6.4	-7.1	-2.4	-1.7	0.4
8/24/2021	9:00:00 AM	39.8	37.7	39.4	35.7	33.7	31	29.2	28	25	24.8	24.5	23.1	22.9	22.5	20.8	19.5	16.4	13.2	10	7.3	2	0.9	-4	-4.5	-5.1	-5.3	-5.1	-6	-6.1	-5.8	2.8	-3.7	-7	-2	-1.5	0.4
8/24/2021	10:00:00 AM	44.4	42.6	40.6	37.8	35.5	32.3	30.4	28.4	25.4	25.2	25.4	24.7	24.2	23.8	22	20.4	17.6	14.3	9.8	7.4	2.9	0.4	-2	-2.6	-3	-3.1	-3.1	-3.5	-3.8	-3.2	-0.5	-2	-4.7	0.6	0.2	1.1
8/24/2021	11:00:00 AM	48.9	47.4	45.1	42.6	39.6	36.5	33.7	30.9	28.4	27.4	27	32.2	35.9	30.2	27.2	22.3	20.9	15.6	12.7	11.1	7.3	4.6	1.8	0.6	0.4	11.9	17.1	8	-0.5	-4	-3	-4.1	-6	-0.9	-0.8	0.7
8/24/2021	12:00:00 PM	53.3	52.1	50	47.3	44.3	40.6	37.8	34.2	31.4	30.1	29.6	29.3	29.1	29.8	31.2	25.6	22.3	18.8	15.3	14.7	12.8	11.9	10.6	9.7	8.1	6.2	3.3	0.7	-1.7	-3.2	-3.6	-4	-4.9	0.5	0.2	1.2
8/24/2021	1:00:00 PM	55	53.6	51.7	49	45.8	42.7	39.5	37.1	35.5	36.1	37.7	39.4	39.5	39.4	39	37	32.7	27	20.3	19.1	17.3	13.1	9.4	6.6	4.4	2.7	0.3	-1.4	-2.8	-3.7	-3.9	-4.4	-5.3	-0.2	-0.2	1
8/24/2021	2:00:00 PM	57.5	55.6	54.3	51.9	49.2	45.7	42.3	39.4	36.3	33.6	32.5	32.4	34.5	35.5	35	31.3	29.6	25.7	28	31.1	27.9	25.7	25.5	21.2	18.7	22.9	23.9	25.5	24.6	20.6	17.1	18.1	15.2	14.5	12.4	11.2
8/24/2021	3:00:00 PM	54.1	52.6	50.7	48.5	46.5	43.4	40.2	35.9	32.5	30.3	28.9	27.7	26.9	25.6	23.8	22	19.6	16.1	13.1	12.1	11.1	11.4	9.7	7.5	5.3	3.3	0.8	-1.3	-2.9	-3.9	-4.2	-4.6	-5.5	-0.2	1.5	6.9
8/24/2021	4:00:00 PM	56.2	54.9	52.7	49.7	47.1	43.8	40.5	37.1	33.3	31	29	27.9	26.9	25.9	24.2	22.5	20.1	17.3	14.8	14.1	13.7	14.1	12.6	10.9	8.5	6.1	2.9	0.2	-1.7	-2.8	-3.1	-3.1	-4.7	0.4	0.1	1.1
8/24/2021	5:00:00 PM	50.7	48.8	46.7	44.3	41.6	37.5	35.1	32.5	28.3	25.9	24.4	23.2	22.1	21.5	18.9	17.2	15.2	13.2	9.4	7.8	6.4	6.4	4.2	2.3	0.2	-1.9	-3.7	-4.8	-5.2	-5.3	-5.4	-5.8	-6.4	-1.3	-0.9	0.6
8/24/2021	6:00:00 PM	40.2	37.6	35.4	32.8	30.5	27.4	25.1	25	22.2	22	22.8	22.5	21.9	20.8	19.3	17.4	13.7	10.5	7.4	7.1	2.8	0.5	-2.7	-2	-2.5	-3.8	-4.7	-1.9	-0.1	-2.4	-5.2	-6.2	-6.8	-1.9	-1.3	0.5
8/24/2021	7:00:00 PM	32.7	31.9	32.9	31.4	30	29	27.6	27.9	26.4	26.4	26.3	25.4	24.7	23.2	22	19.5	15.6	10.2	4.4	2.6	0.7	1.1	-2.6	-4	-5.9	-5.4	27.4	23.7	-0.5	1.7	0.3	-2.5	-6.3	-2.8	-1.9	0.4
8/24/2021	8:00:00 PM	33.2	32.9	32.7	32.2	31.8	30	29	29.3	28	28	29.1	27.2	27.1	25.6	23.8	21.9	19.6	17.4	12.8	10.6	6.9	2	-1.5	-5.4	-6.2	17.2	41.7	30.3	1.3	14.7	5.9	9.8	-2.2	0.4	5.2	11.7
8/24/2021	9:00:00 PM	35.8	34.3	35	37.5	36.9	33.5	31.8	32.8	31.2	31.9	33.9	32.9	31.6	30.2	27.7	26	26.5	24.3	20	16.8	12.4	7.7	2.6	-2.6	-6.1	28	38	29.4	5.6	11.9	6.3	3.4	-3.5	-0.9	4.5	11.4

8/24/2021	10:00:00 PM	37.3	36.6	37.5	40.3	40.2	37.4	35.5	33.1	31.2	33.3	36.2	32.5	30.4	29.9	25.8	23.8	25.2	23	21.2	15.6	8	7.2	-1.5	-5.9	-3.9	31.7	41.6	12.1	6.2	14.5	6.5	9.5	-3.4	-0.4	1	5.5
8/24/2021	11:00:00 PM	36.3	35.5	34.1	37.4	36.9	33.3	31.3	32.8	32.1	34.4	34.4	32.1	31.4	30.6	26.5	25.1	24.9	22.4	20.6	12.4	7	6	0.5	0.1	-2.2	31.9	36	2.4	6	10.5	3.9	0.1	-5.6	-2.3	-0.4	3
8/25/2021	12:00:00 AM	33	32.8	31.7	35.3	36.3	32	30.1	33.2	31	32.2	31.9	31	30.7	27.8	24.6	21.8	21.4	19.3	16.5	10.2	3.8	2.9	1.2	-1.3	-5.2	9.5	1.7	-7.7	-4.6	-6.8	-6.7	-7.5	-7.7	-3.5	-1.8	1.2
8/25/2021	1:00:00 AM	33.7	33.8	32.3	31.6	35.4	28	24.2	27.4	24.2	24.2	24.5	23.4	23.3	23.1	20.4	18	16.6	16	12.7	10.6	4.1	1.2	-4.7	-7.6	-8.9	8.2	-0.8	-7.8	-6.2	-7.2	-6.2	-7.6	-7.8	-3.6	-2.1	0.7
8/25/2021	2:00:00 AM	35.3	34.3	33.4	32.6	32.6	28.4	25	27	22.9	23.7	23.3	22	22.2	23.3	18.4	15.7	15.9	14.5	13	8.4	4.1	8	6.9	2.5	0.1	-0.4	-6.1	-1.6	0.1	-1.9	8.9	12.8	-1.7	1.3	1.4	12.1
8/25/2021	3:00:00 AM	35.3	34.9	32.6	33.5	35.2	31.8	30.3	32.5	30.2	31.8	31.8	30.5	31.3	31.4	26.2	26.7	24.6	22.4	20.5	15.7	9	7.2	0.6	-4.9	-8.5	-8.4	-7.6	-8	-7.7	-7.5	-7.5	-7.7	-7.8	-3.7	-2.3	0.3
8/25/2021	4:00:00 AM	32.9	31.7	29.2	32.1	33.4	28	24.7	27.7	24.7	27.1	29.6	28.1	27.4	26	21.4	20.7	21.8	21.4	16.6	12.8	9.5	7.9	3.2	-1.3	-7.2	-8.5	-8.1	-8	-7.7	-7.5	-7.5	-7.5	-7.8	-3.7	-2.4	0.3
8/25/2021	5:00:00 AM	34.8	33.4	30.6	33.8	36	30.9	25.8	28.8	28.4	30.8	33	30.5	30.3	30.4	25.8	24.5	23.6	22.4	19.8	14.8	16.8	19.7	18.9	19.1	17	9.1	1.3	-3.1	-5.4	-7.1	-7.3	-7.5	-7.7	-3.6	-2.4	0.3
8/25/2021	6:00:00 AM	34.4	33.4	32.5	32.1	33.6	29.6	24.8	27.3	25.6	27.6	30.2	27.4	27.1	27.4	22.5	20.1	21	19.7	16.4	15.1	12.3	16.1	17.8	20.7	24.8	16.2	14.9	15.9	15.7	10.1	21.6	8.4	-5.2	9.5	-0.2	4.6
8/25/2021	7:00:00 AM	35.3	35.7	36.4	32.2	33.9	31.9	30.7	32.3	30.8	30.5	30.8	29.8	28.8	27.8	26.6	24.3	21	17.4	16.2	15.8	10.7	5.4	2.8	-1.7	4.4	7	12.3	10.6	2.6	6.5	-2.3	6.9	-7.4	-3.1	-1.4	3.4
8/25/2021	8:00:00 AM	37.1	35.7	35.2	34	33.3	31.1	30.1	31.3	29.9	29.9	29.9	29.5	28.6	27.7	25.7	22.4	18.7	17.7	13.2	12.7	7.3	0.8	5.4	-4.3	1.1	2.7	10.3	9.7	1.5	1.1	-0.6	2.1	-7.2	-2.5	-0.1	6.3
8/25/2021	9:00:00 AM	46.4	44.5	42.2	39.7	36.4	33.9	31.3	29.7	27.2	26.3	25.6	25.1	24.5	23.4	21.1	19.2	16.6	11.7	9.1	8.3	4.5	1.1	2.4	-3.6	-4.6	3.7	-5.3	-6	6.1	5.5	4.7	3.7	-6.8	-1.3	0.4	5.9
8/25/2021	10:00:00 AM	50.5	49.4	46.9	44.4	41.8	39.8	36.6	34.5	33.4	32.4	31.7	31.4	34	33.6	32.4	30.6	25.1	20.8	16.5	14.9	12.9	9.7	6.6	5.2	3.5	2	-0.3	-1.7	2.9	4.4	2.5	2.3	-6.1	-0.9	0.3	4.6
8/25/2021	11:00:00 AM	56.2	54.2	52.4	50.2	47.4	44.4	40.8	37.4	34.4	31.7	30	29.1	29.9	31	28.7	24	22.4	17.6	14.6	12.6	12	12.3	10.8	9.2	6.8	4.8	2.5	0.1	1.9	2.9	-0.8	3.1	-4.8	0.1	0.3	3.5
8/25/2021	12:00:00 PM	59.3	57.8	56.2	53.8	51.2	48	44.4	40.9	37.2	34.3	31.9	30	29.4	28.1	25.3	23.5	21.3	19	24.5	24.8	20.8	22	15.8	14	11.7	9.4	6.3	3.3	0.9	0.5	-1.2	1.7	-2.8	2.3	1.9	4.1
8/25/2021	1:00:00 PM	54.1	52.8	51	48.6	45.8	43.1	40.1	36.7	33.3	30.5	29.1	27.7	39.3	34.7	27	25.5	27.2	19.6	17.6	13.2	10.3	9.8	8.3	6.2	4.2	2.7	0.5	-1.2	2.6	3.5	-3.5	3.9	-4.9	0.6	5.1	14.1
8/25/2021	2:00:00 PM	62	61	59.1	57.1	54.9	51.9	49	46.1	42.3	38.7	36.1	33.8	32.1	30.4	28.3	27.5	27.2	23.2	19.9	18.6	18.5	19.7	19.4	18.7	17.3	15.8	12.9	9.8	6.6	3.7	8.9	5.7	1.4	6.4	11.4	21
8/25/2021	3:00:00 PM	61.6	60.2	58.6	57	54.6	52.2	50.1	47.9	45.6	43.1	40.6	38.4	35.8	32.6	30	27.6	25	21.7	19.2	18.2	18.5	19.7	19.3	19	17.9	16.9	15.2	13.2	10.3	7.3	4.8	2.8	0.5	5.7	11.2	20
8/25/2021	4:00:00 PM	59	57.7	55.6	53.4	50.5	47.5	44.2	40.4	37.6	34.7	32.9	30.8	33.7	33.3	25	23.8	21.8	17.3	14.8	14.3	14.5	15.2	13.8	12.3	10.1	7.7	4.6	1.8	0.4	1.6	-1.7	0.3	-2.8	4.4	12.3	21.3
8/25/2021	5:00:00 PM	59.6	58.1	56.2	54.1	51.5	48	44.6	41.1	38.1	34.3	31.5	29.4	28	26.4	24.9	23.8	21.4	17.9	15.5	15	16	16.8	15.3	13.8	11.4	8.9	5.5	2.4	0.1	1.3	-1.3	0.1	-3.3	1.8	1.3	2.9
8/25/2021	6:00:00 PM	53.8	52.1	50.3	47.6	45.5	41	38.6	35.9	32.8	31.4	29.2	28	26.7	25.2	23.7	23.6	22.3	17.6	14.7	14.2	15.1	16.1	14.9	13.7	12.1	9.6	6.4	3.2	0.4	1.3	-0.6	2.4	-3.8	1.1	1.1	2.9
8/25/2021	7:00:00 PM	31.7	31.7	32.8	31.8	30.9	31.1	31.9	32.9	32.4	32.1	31.4	30.7	30.3	29	26.6	22.4	16.6	11.4	8.2	4.6	1.8	-0.9	-3	-4.9	-6.3	-0.7	32	9.4	5.9	4.1	-5.5	0.4	-7.2	-2.5	2.5	7.2
8/25/2021	8:00:00 PM	31.6	31.9	32.6	31.5	31.6	32.1	32.3	33.5	34.8	36	36	36	35.7	35.3	34.2	33	29.2	21.1	16.6	12.5	4.9	2.6	3.5	-3.9	-5.7	28.3	37.1	11.6	3.6	10	4.5	1.8	-5.4	-1.1	0.9	5.3
8/25/2021	9:00:00 PM	29.5	30.1	31.1	29	28.8	28.1	26.9	27.1	26.7	27.4	28.3	27.5	26.3	25	23.7	25.2	24.7	16.1	10.3	5	1.3	5.3	3.1	-1.5	-4.3	17.6	16.3	-5.2	2.3	3.3	0.8	5.8	-6	-2.9	1.5	2.4
8/25/2021	10:00:00 PM	38.5	36.4	36	37.6	36.7	32.9	31.7	32.2	29.7	31.1	33.6	30.6	29.4	29.5	26.1	23.5	24	22.9	20.3	13.9	8.9	6	0.8	-6.6	-7.8	21.8	32.9	6.3	1.2	7.4	-1.4	2.2	-5.7	-2.8	0.8	5.5
8/25/2021	11:00:00 PM	35.9	35.9	35.3	36.9	37.1	35.2	31.7	32.1	29.7	28.8	30	29.9	28.4	28.6	25.1	23.2	23.4	22.2	18.6	13.5	7.8	3.5	2.2	-7.7	-8.5	22.6	25.5	-4	1.7	2.1	0.3	5.1	-7.3	-3.2	1.2	2.6
8/26/2021	12:00:00 AM	35.3	35.5	33.6	34.9	37.7	34.3	29.8	31.2	29.5	30.3	30.6	29.1	28.7	29.2	25.1	22.7	21.8	20.1	15.8	11.2	4.5	0.3	6.2	-8.9	-9.2	8.3	-8.3	-8	7.7	7.5	-7.5	7.6	-7.8	-3.7	2.3	0.5
8/26/2021	1:00:00 AM	32.3	32.6	30.8	29.7	31.9	26.6	22.7	24.3	22.7	23.3	22.6	22.6	21.2	20.8	17.8	14.3	12	9.6	5.3	1.6	0.7	3.7	3.3	9.1	-1.7	6.4	-6.7	-8	7.6	7.5	-7.4	7.6	-7.7	-3.6	2.1	0.9
8/26/2021	2:00:00 AM	32.7	32.3	32.1	30.2	31.3	27.8	24.9	26.6	25.2	27.1	28.3	27.5	27.8	25.4	21.8	18.5	18.4	15.8	11.4	5.8	1	1.5	3.7	-5.8	-7.5	0.8	-3	-8	7.5	7.3	-7.4	7.6	-7.8	-3.6	2.1	0.9
8/26/2021	3:00:00 AM	33.1	33.4	31.8	30.4	33.3	28.7	24	26.9	23.9	24.4	25.8	28.3	28.7	25.4	23	20.8	20	18.2	12.6	7.5	0.8	2.2	5.7	-7.5	-8.8	3.3	-7.8	-8	7.5	7.5	-7.4	7.6	-7.8	-3.6	2.2	0.8
8/26/2021	4:00:00 AM	33.7	33	32.5	31	34	29.4	24.7	27.8	24.6	25.9	27.9	26.8	24.3	24.4	19.6	18.7	18.6	17	13.4	7.2	0.6	0.3	5.9	-8.4	-9.1	8.1	-8.2	-8	7.7	7.5	-7.4	7.6	-7.8	-3.7	2.4	0.3

8/26/2021	5:00:00 AM	32.7	32	31.5	29.9	29.3	25.7	23.6	25.7	23.4	25.1	25.1	24.3	25.9	23.3	16.8	16.7	16.2	14.3	9.3	4	-1.5	-3.5	-7.5	-8.3	-8.2	-6.7	-6.8	-4.7	-6.4	-7.4	-7.3	-7.2	-7.7	-3.7	-2.4	0.2
8/26/2021	6:00:00 AM	34.9	34.4	32.6	31.8	33.4	28.4	24.9	27.1	24.1	25.7	26.7	25	24.5	24.3	22.2	18.9	18.2	17.3	13.8	8.9	2.3	2.4	-5.8	-7.4	-8.2	-7.5	-6.8	-7.3	-7.2	-7.2	-7	-7.1	-7.7	-3.7	-2.4	0.2
8/26/2021	7:00:00 AM	35.5	35	33.4	32.7	34.1	32.4	30.4	30.9	29.6	29.6	32.8	29.7	28.1	28.4	26.2	22.1	19.9	16.3	14.4	12.8	4.4	2.2	-5.1	-7.2	-6.2	-4.6	-4.3	-4.9	-5.5	-5	-2.6	-6.2	-7.6	-3.2	-1.2	2.4
8/26/2021	8:00:00 AM	31.6	30.8	31.6	31.8	31.3	28.4	27.9	28.4	25	24.1	23.3	22	20	18.3	16.1	12.9	9.7	5.3	1.6	-0.6	-3.7	-5.3	-6.8	-5.9	-3.7	-2.1	3.7	1.4	-4.4	-2.8	-5.8	-6.8	-7.4	-2.6	1.2	6.9
8/26/2021	9:00:00 AM	40.1	38.6	37	35.4	32.9	31.4	30.1	29.1	26.5	25.5	25.3	25.1	24.2	22.9	20.9	18	14.5	10	8.3	6.8	1.9	-1	-4.2	-4.9	-3.8	-1.3	4.1	1.7	-2.8	0.6	-4.6	-6.2	-7.2	-2.3	1.9	8.1
8/26/2021	10:00:00 AM	49.6	48	45.5	42.8	40.1	37.1	34.8	32.1	30	29.5	29.1	31.5	33.6	29.9	25.5	22.2	19.4	14.9	11.2	9.6	6.6	4.7	-2.2	0.1	-1.6	-2.9	-4.2	-4.9	-5.2	-4.9	3.2	-3.5	-6.2	-0.5	2	8.2
8/26/2021	11:00:00 AM	54.4	53.4	51.2	49.4	46.3	43.5	40.4	37	33.4	30.6	29.4	28	30.2	32.6	26.5	23.1	21.1	17.5	14.2	13	11.7	11.6	9.8	8	6	4.3	2	0.1	-1.8	-3	-3.5	-4	-5	0	0.1	3.1
8/26/2021	12:00:00 PM	55.4	53.9	52.1	49.3	46.9	43.5	40.3	37.1	33.8	31.2	29.8	28.9	27.8	26.8	24.9	23.1	21	18	15.8	15.1	14.3	14.3	12.7	11.1	9.2	7	4.2	1.5	-0.9	-2.2	-2.7	-3.2	-4.2	0.9	0.7	2.8
8/26/2021	1:00:00 PM	60.6	59.3	57.8	55.8	53.5	50.5	47.3	43.9	39.8	36.8	33.6	31	29.2	27.6	25.7	24.1	22.8	20.8	18.7	18.2	19.1	20.3	19.5	18.8	17.6	15.9	13.2	10.1	6.6	3.4	1.5	0.2	-1.2	4.1	6.4	13.2
8/26/2021	2:00:00 PM	62.9	61.7	60.1	58.3	56	52.9	49.9	46.3	42.3	39.6	36.6	33.5	31.3	29.5	29.2	28.1	25.2	23.2	21.6	21.2	22.3	23.8	23.1	22.5	21.4	19.8	17	13.8	10.2	7.3	8.7	6.8	2.6	7.4	7.7	16.6
8/26/2021	3:00:00 PM	60.8	59.2	56.9	54.9	52.3	49	45.9	42.4	38.8	35	32.1	29.9	27.9	27	24.6	22.7	21.4	19.5	17.7	17.2	18	19.1	18.1	16.8	14.9	12.7	9.5	6.5	3.9	2.4	2.7	4.9	8.6	17.1	14.4	7.3	
8/26/2021	4:00:00 PM	59.2	57.6	55.8	53.4	50.9	47.9	44.6	41.4	37.1	34	31.6	29.1	27.4	25.7	23.7	22	20.7	18.3	16.3	16	16.8	17.7	16.4	14.9	13	10.5	7.1	3.9	1	-0.6	11.6	0.3	-3	5.1	1.5	3.2	
8/26/2021	5:00:00 PM	55.5	53.7	51.5	49.3	46.9	43.5	40	36.2	32.9	29.5	27.3	25.4	23.4	22.6	20.8	19.4	18	15.8	13.5	12.9	13.4	14.2	12.9	11.4	9.4	6.8	3.4	0.4	-1.8	-2.9	-3.2	4.6	2.3	0.3	0.1	1.1
8/26/2021	6:00:00 PM	51.5	49.4	47	44	40.8	36.9	33.7	30.7	28.4	27	25.8	25.2	24.6	22.5	20	17.6	15.9	13.6	11.2	10.2	10.2	10.3	8.2	6.1	3.7	1.3	-1.4	-3	-3.9	-4.3	-4.4	-4.7	-5.6	-0.9	-0.8	0.7	
8/26/2021	7:00:00 PM	38.3	36.6	35.3	31.9	29.1	26.7	25.2	25.1	24.2	23.6	23.2	22	20.8	18.5	19.5	16.6	8.6	4	0.2	-1.7	-2.8	-3.5	-5	-5.6	-6.1	-3.8	29.7	29.5	1	1.5	1.7	-2	-6	-2.5	-1.8	0.3	
8/26/2021	8:00:00 PM	33.2	32.9	32.2	30.3	28.9	27.9	28.3	29.2	28.6	28.6	27.9	26.6	25.5	23.5	20.5	20.4	15	7.9	3.4	0.6	-1.2	-2.7	-3.7	-5.4	-6.8	24.4	34.5	28.4	2.4	8.6	3	1.3	-5.6	-2.6	-2	0.3
8/26/2021	9:00:00 PM	32.2	32.3	30.1	27.8	27.9	26.3	25.5	26.3	25.2	24.8	24.7	23.8	21.7	20.7	17.5	13.9	13	13.5	11.4	8	3.8	5.7	1.6	-2.8	-4.8	23.9	28.9	9.9	0.6	3.4	3	6.9	-5	-1.1	-1.4	4.4	
8/26/2021	10:00:00 PM	32.7	32.5	32.6	31.3	32.7	29.2	28.2	28.9	27.2	26.9	27.7	27.1	25.8	24.6	21.6	17.7	18.2	18.8	14.9	11.7	8.3	7.2	4.6	0.2	-4	15	10.3	-7.3	4.8	5.6	-6.6	7.5	7.7	-3.6	2.3	0.2
8/26/2021	11:00:00 PM	34.6	33.6	33.7	37.7	37.4	36.2	32.7	30.9	30.3	30.5	31.1	29.2	28.7	27.5	24	22.6	21.3	19.1	17.6	11.8	5.2	5.2	1.2	-3.1	-7.8	3.5	-3.9	-7.9	7.3	7.4	-7.3	7.6	7.8	-3.7	2.4	0.2
8/27/2021	12:00:00 AM	37.3	36.7	36.3	36.5	35.4	33	27.9	27.1	24.6	24	24.8	22.5	21.4	21.9	17.7	16.3	16.7	15.6	14	8.1	3	1.5	2.4	-5.7	-8.3	15.9	10.9	-6.5	3.1	3.7	-5.4	7.2	7.6	-3.5	2.3	0.2
8/27/2021	1:00:00 AM	34.3	33.4	31.4	34	34.8	30.8	27.2	28.8	28.1	28.8	29.5	27.6	26.4	26.9	21.9	18.8	18.3	17.7	13.9	9.4	6	4.3	0.5	-4.3	-7.8	11.2	3.9	-7.6	4.2	4.5	-5.4	7.4	7.6	-3.4	2.3	0.4
8/27/2021	2:00:00 AM	34.9	35.1	34.3	36	36.4	33	30.7	31.8	31.6	32.2	33.5	31.6	30.7	30.8	25.9	24.2	25.3	23.6	19.9	16.8	10.5	10.5	6	2.4	-4.2	6.3	-5.4	-7.5	7.4	7.3	-7	6.6	7.7	-3.7	2.4	0.3
8/27/2021	3:00:00 AM	33.8	33.5	31.8	30.3	32	26.8	26.1	29.9	26.3	26.6	26.4	25	25.8	24.2	20.3	18.3	17.1	16.6	12.7	7.1	2.3	1.2	1.3	-2.4	-6.8	6.1	-7.6	-7.9	7.6	7.4	-7.4	7.6	7.7	-3.7	2.4	0.2
8/27/2021	4:00:00 AM	34	33.9	33.4	31.6	33.9	32.1	31.8	32.5	31.5	30.7	28.8	30.4	30	27.2	23.2	22.8	19.9	20.1	16.4	12.2	9.8	10	9.5	7.9	5.5	0	-5	-7.6	7.7	7.5	-7.4	7.6	7.8	-3.7	2.4	0.2
8/27/2021	5:00:00 AM	35.6	35.5	34.9	32.9	35.4	33.4	37.3	43.6	37.3	31.4	27.2	24.8	24.4	23.9	20.6	19.4	18.9	17.3	13.2	10	9.3	10.1	10.5	9.2	6.3	2.4	-2.5	-7	7.6	7.4	-7.3	7.4	7.7	-3.7	2.4	0.2
8/27/2021	6:00:00 AM	35.4	35.2	34.1	33.1	35	29.2	26.6	29.5	27.4	27.7	28	26.1	24.8	25.6	21.7	18	17.4	16.1	13.1	9.6	4.1	4.2	2.2	-4.6	-3.3	1.8	0.9	0.8	5.9	5.4	-4.5	5.8	7.5	-3.4	2.3	0.2
8/27/2021	7:00:00 AM	40.4	38.4	37.6	36.2	36.6	32.5	30.1	31.3	29.7	30.4	30.4	30.1	28.4	28.4	26.8	22.2	19.6	18.6	16.2	15.1	10.6	6.7	1.2	-2.4	-7.1	7.9	-6.4	-7.4	7.4	7.3	-5.9	2.1	7.6	-3.3	2.2	0.2
8/27/2021	8:00:00 AM	37.4	37.1	38.3	37.3	37.7	34.2	33.3	33.3	31.4	31.4	30.7	30.2	29.1	28.6	26.9	21.5	17.4	13.8	11	10.5	7.4	3.7	1.4	-2.6	-4.7	6.2	-6.9	-6.9	6.8	6.7	-6.6	-7	7.3	-2.7	1.8	0.3
8/27/2021	9:00:00 AM	41.3	39.3	38.3	36.7	36.7	32.3	30.3	30.3	28.6	28.3	28.6	27.4	26.8	25.9	29	28.8	21.3	13	7.6	5.9	1.5	0.4	3.2	-4.2	-5.3	5.8	-6	-6.3	-6	5.9	-5.4	-6	6.8	-2.3	1.6	0.4
8/27/2021	10:00:00 AM	45.6	43.8	41.8	39.4	40	37.3	34	45.7	35.5	35.2	29.9	34.9	35.6	33.3	31.9	32.7	29.7	25.7	27	27.2	24.2	21.2	21.5	22	19.5	20.9	23.1	23.8	21.5	25.1	20.7	16.8	14.5	13.1	11.1	7.3
8/27/2021	11:00:00 AM	47.5	45.9	43.7	41.3	37.6	34.3	32	30.3	28.6	28.8	28.8	28.9	30.9	31.5	32.3	28	20.3	16.1	23.4	24.8	20.6	26.9	11.1	4.4	2	0.9	-1.5	-1.7	2.7	1.3	7.5	5.2	0.9	3.3	3.6	14.7	

8/27/2021	12:00:00 PM	49.5	48.1	46.3	43.5	40.8	37.7	35.1	33.4	31.4	31	31	30.4	30.3	29.8	27.7	24.8	21	16.9	13.9	11.9	9.2	8.7	5.7	3.7	1.4	0.2	-1.5	-2.4	-2.9	-3.5	-3.6	-4.3	-5.1	-0.2	0.2	1.7
8/27/2021	1:00:00 PM	56.6	54.9	53	50.4	47.6	44.6	41.2	38.1	35.4	34.5	34.7	34.1	33.4	32.1	30.2	27.5	24.1	20.4	18	16.6	16.5	17.6	16.7	15.7	14	11.6	8.4	5.7	3.2	1	8.3	5.2	-0.4	3.6	4	13.9
8/27/2021	2:00:00 PM	57.1	55.3	53.9	51.4	48.5	45.8	42.1	39	36.4	35.1	34.4	33.7	33.3	33.2	31.5	32.5	31	23.9	18.7	17.2	16.3	16.8	15.5	14	12.2	9.9	6.9	4	1.2	0.8	-1.5	-2.2	-3.4	1.7	1.2	1.8
8/27/2021	3:00:00 PM	58.5	57.3	55.3	52.9	50.3	46.8	44	40.3	37.4	34.8	33.6	32.3	31.5	30.6	29.2	29.4	27.5	21.6	16.8	16.1	15.4	15.6	14.2	13	11.1	8.7	5.7	3.2	1.1	5.2	8.6	0.6	-3.4	1.6	0.9	1.4
8/27/2021	4:00:00 PM	54.5	53.3	50.6	48.3	45.1	42.1	38.1	35.1	32.5	31.3	31.3	31.3	30.5	28.8	26.6	23.7	20.3	16.7	13.4	12.4	11.7	11.8	9.7	7.4	4.9	3.2	2.9	-1.3	-3.1	-3.5	-3.3	-3.6	-5.2	-0.1	-0.2	0.9
8/27/2021	5:00:00 PM	54.1	52.2	49.9	47.5	44.9	41.6	37.9	34.9	32.6	30.7	29.9	29.7	30	28.8	26	24.6	24.2	17.5	12.9	11.6	11.2	11.2	9.4	7.9	5.3	2.5	-0.4	-2.4	-3.5	-3.7	-3.9	-4.3	-5.2	-0.2	-0.4	0.9
8/27/2021	6:00:00 PM	45.7	43.8	41.4	37.7	34.9	32	29.5	28.3	27.6	27.2	27.1	26.8	26.3	25.4	23.9	21.2	16.7	11.3	7.3	5.5	4	2.4	0.4	-0.7	-2.6	-4.1	-5.3	-5.5	-5.6	-5.7	-5.8	-6.1	-6.7	-1.9	-1.3	0.5
8/27/2021	7:00:00 PM	34.6	35.4	34.6	34	32.7	32.3	30.7	30	28.9	27.9	27.6	27.7	26.9	25.5	23.8	20.3	16.8	13.3	11.3	8.7	6.4	4.9	3.4	1.8	-1	-0.4	29.2	17.1	-1.9	8	-5.3	0.2	-6.7	-2.7	-1.7	0.3
8/27/2021	8:00:00 PM	38.2	38.2	35.3	35.5	33.7	31	29.7	31.3	31.5	30.3	32.2	32.2	33.3	31	26.9	29.3	28.8	29.2	25.4	20.4	18.4	16.1	12.9	7.6	-0.8	22.9	42.3	35.2	3.3	16.8	6.3	10	3.8	-1.6	-1.3	0.3
8/27/2021	9:00:00 PM	36.6	36.7	33.7	33.7	35.2	33.4	32.4	33.6	31	30.4	34.3	33	32.5	32	29.2	26.9	25.5	24.9	23.3	20.7	14.4	12.4	8.9	4.1	-2.8	20.9	44.1	27.2	1.7	16.8	4.2	11.9	-5.4	-0.7	-1.4	0.4
8/27/2021	10:00:00 PM	55	53.5	51	48.9	47.5	45.5	43.7	41.8	39.4	37.9	38.9	38.2	36.7	35.2	32	29.8	27.4	26.1	24.5	20.8	15.1	12.3	8	4.7	0.8	0.4	32.9	17.3	3.7	7.3	-3.4	1	-5.8	-1.6	-1.3	0.5
8/27/2021	11:00:00 PM	47.2	45.3	44	44	43.1	41.5	40.6	41.7	38.7	38.4	41.1	40.8	38.9	36.2	32.7	30.5	29.8	28.8	26.7	21.3	15	13.3	6.2	0.5	-5.1	24.1	31.3	10.8	6.1	6.9	-3.7	2.4	-7	-2.7	-2	0.4
8/28/2021	12:00:00 AM	38.7	40	39.4	43.1	42.8	42.7	39.9	37.1	35.9	37	40.5	38.3	37	35	30.7	29.5	30.6	28.4	25.3	19.4	14.7	13	6.8	0.8	-3.8	13.3	7.5	-5.2	2.7	2.4	4.8	10.3	-3.7	1.3	0.1	12.1
8/28/2021	1:00:00 AM	38.2	39.9	41.2	42.8	41.7	40.4	39.2	38.7	37.9	38.5	40.7	36.9	36.7	36.4	31	31.3	31.4	29.8	26.6	19.2	15.4	13.7	6.6	1.5	-4.1	5.7	-7.4	-8	7.7	7.5	-7.4	7.6	-7.8	-3.7	-2.4	0.2
8/28/2021	2:00:00 AM	38.2	40	41.2	42.7	41.5	41.1	41.3	39.1	39.8	40.6	41.1	38.2	37.8	36.7	30.2	31.4	31	29.7	24.9	18	14.5	11.2	3.7	-3.1	-7.1	7.9	-7.7	-5.9	6.2	6.5	-4.3	1.2	-7.3	-3.5	-2.4	0.4
8/28/2021	3:00:00 AM	33.6	35	34.8	33.5	32.6	30.4	29.3	28.6	26.6	28.4	28.9	26.1	27.2	26.2	21.5	23.1	20.7	18.9	13.8	8.1	3.8	0.9	2.8	-4	-7.9	8.7	-8.4	-8.1	7.8	7.6	-7.5	7.7	-7.8	-3.8	-2.5	0.2
8/28/2021	4:00:00 AM	35.5	34.8	35.1	31	33.7	27.6	24.6	28.7	26.1	27.4	31.1	28.3	27.4	27	21.9	20.3	22	20.1	17.9	12.4	7.1	6.2	1	-5.2	-8.3	8.7	-8.4	-8.1	7.8	7.6	-7.5	7.7	-7.8	-3.8	-2.5	0.2
8/28/2021	5:00:00 AM	36.9	35.6	33.6	34.5	34.7	29.5	27.9	31.8	30.1	31.3	34	30.5	29.6	29	24	23	24.5	23.5	20.8	14.3	10.9	10.3	4.8	0.3	-5	7	-6.9	-7.1	7.4	7.4	-7.3	2.4	-6.4	-3.7	-2.4	0.2
8/28/2021	6:00:00 AM	36	35.4	33.2	32.6	36.9	31.7	28.5	32.3	28.8	30.6	31.3	28.5	29.3	30.2	25.2	22.9	25.2	22.9	20.2	17	10.2	10.5	3	-2.1	-7.1	5.8	-4.6	-7.1	7.5	7.4	-5.7	6.1	-7.6	-3.7	-2.5	0.2
8/28/2021	7:00:00 AM	36.6	36.9	36.8	35.8	37.5	37.5	34.3	39	33.8	33.1	32	30.5	30.9	29.2	26.9	25	22.2	20.7	19.9	19.7	15.4	10.4	5.6	1.7	-3	7.1	-6.7	-5.9	4.6	6.6	-5.3	5.8	-7.6	-3.1	-2.1	0.2
8/28/2021	8:00:00 AM	39.8	38.7	37.7	37.3	38.9	34.9	33.5	36.1	32.8	31.4	28.9	28.9	28.2	25.8	24.7	20	17	15.3	13.6	11.1	6.1	2.6	2.8	-5.1	-6.1	3.6	-5.1	-6.5	6.7	6.6	-6.5	6.4	-7.3	-2.7	-1.8	0.3
8/28/2021	9:00:00 AM	47.4	46	44.2	41.3	38.8	35.8	33	31.9	29.2	28.5	28.2	27.2	25.8	23.6	21.3	19.2	16.3	12.6	10.3	8.6	4.9	1.9	1.7	-3.4	-4.5	5.1	-5.8	-6.1	1.9	1.2	-6.2	6.1	-7.1	-2.3	-1.6	0.4
8/28/2021	10:00:00 AM	49.3	47.9	45.7	43.2	40.8	37.7	34.5	32	28.6	27.2	26.3	25.2	24.1	21.8	20.2	18.4	16.7	14.5	11.9	10.2	6.8	4.9	1.5	-0.2	-1.6	2.1	-3.3	-4.4	-5	5.2	-5.3	5.7	-6.3	-1.5	-1.1	0.6
8/28/2021	11:00:00 AM	48.6	45.8	43.8	41.4	38.8	35.6	34.7	30.5	27.6	26.7	26.2	24.6	30.9	32.5	21.4	19.9	18.6	15.3	12.5	10.5	7	5.8	2.6	1.3	-0.4	0.7	-2.4	-3.4	3.8	4.1	-4.7	4.9	-6	-1.1	-0.7	0.9
8/28/2021	12:00:00 PM	50.7	49.3	47.3	44.8	42	38.6	35.3	32.7	28.9	27.1	26.5	24.4	24	23.5	20.7	19.2	17.8	15.8	14.4	11	8	8.8	6.6	5.2	1.8	1.2	-0.6	0	1.5	1.3	8.9	8.1	0.6	4.9	2.6	16.5
8/28/2021	1:00:00 PM	50.6	49.3	46.9	44	41.3	37.5	34.8	33.1	31.2	29.3	28.6	26.8	25.5	23.7	22.1	20	18.2	15.7	12.6	10.8	8.5	7.2	5.5	3.5	1.4	0.5	-1.2	-2.7	3.7	4.3	-4.5	4.7	-4.8	1	0.6	1.5
8/28/2021	2:00:00 PM	47.9	46.3	44.3	41.7	39.3	36	33.4	31.5	28.2	27.5	27.4	26.1	25	22.7	21.3	19.1	17.5	14.7	12.8	9.9	6.6	6.3	6.7	8.5	4.4	0.8	-1	-1.7	1.7	3.3	3.2	2.5	-2.2	0.8	2	13
8/28/2021	3:00:00 PM	48.5	46	44	41.3	38.6	35.1	33.1	31.4	29.1	29	28.4	27	25.8	23.5	21.6	21.1	20.5	14.9	11	9	6.6	5.5	8.1	10.8	5.5	0.7	-1.3	-2.7	-4	4.7	-4.9	5.4	-6.1	-0.8	-0.7	0.8
8/28/2021	4:00:00 PM	49.7	47.9	45.6	43.4	39.7	36.7	34	32.1	29.9	29	28.7	28.2	26.4	23.8	22	19.8	17.2	13.4	10.2	7.9	5.4	5	3.1	1	-0.5	1.3	-2.7	-3.8	4.5	4.9	-5.1	5.4	-6.3	-1	-0.7	0.8
8/28/2021	5:00:00 PM	44.5	42.8	40.6	38.2	34.7	32.3	30.4	28	25.2	24.7	24.6	24.1	23.1	20.9	18.6	15.9	13.2	9.4	5.8	3.1	0.1	1.4	2.8	2.6	2.5	3.4	4.6	5.3	5.5	5.8	6	6.4	7	1.8	1.2	0.6
8/28/2021	6:00:00 PM	33.1	33.2	33.3	31.6	30.6	27.8	25.8	23.7	19.1	18.3	17.8	15.3	13.9	12.6	12.1	11.9	7.8	5.1	2.2	0.9	2.7	3	3.3	2.8	3.3	4.3	5.2	5.6	5.8	5.9	6.2	6.6	7.1	2.3	1.5	0.4

8/28/2021	7:00:00 PM		31	30.7	30.6	29.1	28.3	28.6	27.7	27.5	26.4	25.8	25.1	24.4	26	21.5	19.9	19.8	11.4	5.5	4.1	2	0.9	-0.3	-3	-4.2	-5.8	-0.9	34.9	18.2	0.4	12.6	8.1	5.8	-5.1	-1.4	-1.5	0.5
8/28/2021	8:00:00 PM	35.8		35.8	35	34.2	33.5	31.5	27.4	25.7	22.2	21.2	22	21.2	19.7	18	15.9	14.1	14	12.1	10.5	4.5	-2	2.8	1.4	-4.1	-4.4	27	42	26.3	4.3	14.1	11.6	14	-1.8	2.4	1.3	10.7
8/28/2021	9:00:00 PM	35.4		33.6	36.2	36.3	32.5	29.5	30.3	27.6	28.5	32.2	32.5	29.7	29	25.2	23.3	23.9	22.8	20.1	14.4	7.9	4.6	-2.5	-7.6	-6.3	22.5	40	9.4	0.5	10.8	9.7	12.4	-5.8	1.7	1.6	6.8
8/28/2021	10:00:00 PM	38.5		37.5	38.8	38.9	35	32.7	35.1	30.7	33	34.1	32.4	30.5	29	25.5	23.3	24	21.7	20.6	12.4	4.9	1.5	-5.8	-8.4	-5.8	29.8	35.6	2.1	3.5	8.3	8.6	3.9	-6.1	-1.1	3.9	10.8
8/28/2021	11:00:00 PM	37.5		36.1	38.4	38.4	34.9	31.9	35.7	33	34.4	35.5	33.3	31.6	29.3	25.6	25.4	27.2	23.9	22.4	12.9	6	2	-6.1	-8.7	-8.9	13.9	7.9	-7.3	-6	-6.4	-6.7	-7.4	-7.7	-3.4	-1.2	2.7
8/29/2021	12:00:00 AM	35.9		36.2	38.6	37.9	32.6	28.8	33.2	30.6	32.4	31.9	29.6	29.9	27.1	23.1	21.6	20.4	18.7	15.8	8.6	-0.5	-1.5	-8.5	-9.2	-8.9	14.1	7.8	-7	-4.7	-5.9	-4.8	-7.3	-7.7	-3.5	-1.6	1.6
8/29/2021	1:00:00 AM	39.2		40.1	41	39.7	35.3	32.9	36.1	35.3	36	35.6	32.7	33.1	30.1	26	25.2	25.5	22	22.2	13.4	3.8	2.8	-7.5	-9.1	-9.1	5.6	1.9	-7.8	-7.4	-7.3	-7.3	-7.6	-7.7	-3.6	-1.9	0.5
8/29/2021	2:00:00 AM	37.4		36.6	36.3	36.9	31.7	29.1	34.4	30.5	32	31.1	29.3	27.8	25.8	21.8	19.3	18.8	17	15.7	6.2	-0.9	-2.7	-8.1	-9.2	-9.1	-3.4	-8.2	-7.9	-7.5	-7.3	-7.3	-7.5	-7.7	-3.6	-2.2	0.4
8/29/2021	3:00:00 AM	36.1		35.6	37.6	38.3	33.4	31.4	37.2	32.9	35.3	35.2	33.1	33.2	31	27	25.5	22.7	21.4	18.2	11	4.3	3.7	0.5	-4.8	-4.8	-7.1	-8	-8	-7.6	-7.5	-7.4	-7.6	-7.7	-3.7	-2.3	0.4
8/29/2021	4:00:00 AM	36.4		35.6	35.9	37.2	29.9	29.5	34.4	29.1	29.1	30.2	28.6	28.2	26.7	23.4	21.8	23.3	21.2	19	12.2	8.5	11.7	9.7	11.4	-0.7	-5.2	-7.8	-8	-7.7	-7.5	-7.4	-7.6	-7.8	-3.7	-2.4	0.2
8/29/2021	5:00:00 AM	37.7		35.5	35.4	36	30	29.2	33.4	29.7	30.5	32.8	29.1	26.7	25.7	21.7	19.4	21.7	19.4	16.2	11.1	6	5.3	-1.5	-4.1	-7.4	-7.4	-8.1	-7.8	-7.5	-7.4	-7.2	-7.5	-7.7	-3.6	-2.4	0.2
8/29/2021	6:00:00 AM	36.5		34.1	36.1	37.1	33.6	31.9	35.2	30.9	32.8	34.7	34	30.8	29.5	25.8	24.7	25.6	22.8	21	14.9	9.1	8.1	1.9	-2.1	-5.3	-6.9	-0.3	-4.8	-6.1	-6	-7.4	-7.6	-7.8	-3.7	-2.4	0.2
8/29/2021	7:00:00 AM	39.2		40.9	41.5	41.6	39.2	37.3	37.7	34.9	35.7	37.3	35.7	33.1	30.6	28.6	26	25	22.4	20.2	17.6	13.5	13.6	14.5	14.7	9	2.5	-2.3	-1.8	-4.9	-5.3	-5.3	-5.4	-5.9	-1.7	-1.4	0.5
8/29/2021	8:00:00 AM	39.6		41.1	43.8	45.4	44.9	44.3	42.9	41.3	37.8	37.6	38	35.9	35	32.4	30	27.7	26.4	23.6	22.6	20.7	13.7	9	0.1	-5.3	-5.5	-1.5	0.6	8.1	11	6.9	-3.6	-6	-7.4	-3	-2	0.3
8/29/2021	9:00:00 AM	40.6		41	43.2	44.5	44.1	43.5	42.3	41.7	38.2	38	37.7	36.5	36.9	34	32	29.8	26.4	24.2	22.7	20.9	14.7	10.9	1.7	-3.7	-5.5	-6.1	-6.6	-6.7	-6.6	-6.6	-6.5	-6.6	-6.9	-7.3	-2.6	-1.7	0.3
8/29/2021	10:00:00 AM	42		40.9	40.4	38.8	42.1	37.5	37.3	39.9	35.3	36.4	36.3	35	35	30.6	29.5	25.4	22.2	21.7	20.1	16.5	10.3	6.8	0.6	-2	-3.2	-3.9	-4.8	-4.7	-5.7	-5.7	-6.1	-6.4	-7	-2.2	-1.3	0.8
8/29/2021	11:00:00 AM	46.2		41.9	39.5	37.8	34	32	31.6	30	29.3	29.1	28.6	27.8	25.8	24.1	24.5	20.5	14.8	11.5	9.6	5.4	4.6	1.5	0.4	-0.4	-1	-2.5	-3.7	-4.4	-4.8	-5.2	-5.5	-6.3	-1.3	-0.7	1
8/29/2021	12:00:00 PM	47.9		44.2	41.3	38.8	35.4	32.6	30.8	28.3	27.5	27.1	26.4	25.4	23.7	22	19.7	16.8	13.6	11	9.4	5.8	4.5	2.5	0.7	-0.3	-0.9	-2.3	-3.4	-4.1	-4.6	-1.6	-5.2	-6	-0.9	-0.6	0.9
8/29/2021	1:00:00 PM	49.2		45.6	43.3	39.6	36.9	33.6	31	27.7	26	25.2	24.4	31.9	30.9	28.4	18.3	16.5	13.5	10.6	8.7	5.6	4.7	4	4.5	2.5	0.1	-1.4	-2.3	-3.2	-3.7	-3.1	-4	-5.4	-0.3	0	1.3
8/29/2021	2:00:00 PM	49.5		46.4	44	41.5	39	35.9	33.5	31	30.1	29.9	29.1	29.1	27	25	22.1	18.3	14.3	13.1	10.4	6.8	7.2	6.3	4.5	4.5	1.7	-1	-1	-1.2	-1.6	7.9	5.3	-1.2	2.7	1.9	14.7
8/29/2021	3:00:00 PM	54.2		52.9	51	48.9	46	44.3	41.8	38.7	36.2	33.4	30.4	27	24.5	22.5	20.6	19.1	16.9	14.5	13	13	14.6	14.2	14.1	13.4	12.5	11	8.7	5.3	1.8	-0.7	-1.6	-3	1.9	1.2	2.3
8/29/2021	4:00:00 PM	50.7		48.4	45.3	43.7	41.5	39	35.3	33.2	31	30.3	29.3	29.2	28.1	25.6	22.6	18.9	14.8	12	10.6	9.1	9.1	8.2	6.9	5.4	3.7	1.3	-0.9	-2.8	-3.9	-4.3	-3.9	-5.7	-0.5	-0.4	0.9
8/29/2021	5:00:00 PM	44.8		40.8	37.1	34.6	31.4	28.7	26.8	23.2	22	21.5	20	19.1	16.8	15.7	13.7	12.6	9.4	6.2	4.1	1.5	0.5	-1.3	-1.4	-1.8	-2.7	-3.9	-4.7	-5.2	-5.5	-5.4	-5	-6.8	-1.7	-1.1	0.6
8/29/2021	6:00:00 PM	34.6		35.9	32.9	31	29.8	28	28.2	27.1	27.2	28	28.5	28	26.3	24	21.2	19.9	15.4	6.9	3.8	0.2	-2.1	-3	-2.1	-2.5	-3.7	-4.8	-5.4	-5.8	-5.9	-6.2	-6.6	-7.1	-2.2	-1.4	0.5
8/29/2021	7:00:00 PM	35		35.5	31.5	29	27.2	24.7	25.2	24.7	25.3	25.2	25.4	25.5	24.3	22.2	19.9	19.6	16.2	13.8	7	2.6	1.2	-4	-6.3	-7.3	-5.1	32.8	28.9	-2.2	3.8	-0.1	0.2	-6.1	-2.4	-1.8	0.3
8/29/2021	8:00:00 PM	37.4		35.6	33.6	32.7	27.7	24.5	25.4	22.9	23.4	25.4	24.8	25.7	26.8	22.4	21.5	24.2	23	20.3	12.8	10	8.7	4.6	0.6	-4.2	7.5	40.4	39.3	4	11.7	14.1	11.9	-0.5	0.8	1.1	10.7
8/29/2021	9:00:00 PM	39.9		37.7	37.1	36.4	34.6	32.2	30.8	30.1	29.9	31.6	29.8	28.6	28.2	24.1	22.4	22.4	19.6	17.7	11.1	5.7	3.9	-2.1	-5.6	-7	5.8	39.5	23.3	-3.2	8.4	-1.1	8.2	-4.8	-0.5	-1.1	0.6
8/29/2021	10:00:00 PM	49.2		45.8	42.4	39.4	37	37.5	37.4	34.2	34.6	35.6	33.7	32.9	31.7	29	26.1	25.6	23.3	20.5	17.7	13.1	11.5	9.8	5.4	2.7	11.9	34	10.4	-2.2	4.9	-1	5.4	-6.5	-2.2	-1.4	2.1
8/29/2021	11:00:00 PM	36.5		37.1	32.2	32.8	28.2	25.9	28.4	26.2	26.8	27.8	27.5	26.7	26.9	23.9	19.5	18.4	15.7	13.3	10.3	3.8	9.1	6.6	1	1.5	18.8	19	-4.3	-3.6	-2.4	-4.4	-6.9	-7.6	-3.4	-2.2	0.8
8/30/2021	12:00:00 AM	35.8		38.5	31	33.1	28.4	25.3	28.7	26.5	28	28.5	28	27.9	28	24.3	21.2	20.7	18.6	16.1	10.7	5.9	4.8	-1.8	-5.8	-6.1	28.3	27.4	0.8	2.1	1.5	5	3.9	6.9	-3	0.5	3.2
8/30/2021	1:00:00 AM	36		37	30.4	31.1	26	20.9	23.8	20	21.5	21.2	19.1	19	17.9	14.5	13.8	15.7	13.7	11.5	5.5	1.2	0.2	-4.7	-7.4	-5.8	29.6	20.1	-4.9	3.5	-2.6	4.1	-6.6	-7.3	-3.3	-2.1	1

8/30/2021	2:00:00 AM	35.8	34.5	37.1	29.2	32.5	25.9	21.3	23.5	19.8	19	20.6	19.2	19.1	21.2	15.6	13.7	17	14.9	12.9	8.2	3.4	2.8	-1.9	-6	-8.6	17.2	8.9	-5.8	-2.7	-5.5	-6.1	-7.5	-7.7	-3.5	-2.3	0.2
8/30/2021	3:00:00 AM	35.2	33.6	36.5	28.4	33.3	25.5	21.2	24.2	22.6	22	22.6	23.2	24.3	19.6	17.6	14.5	15.5	14.2	10.9	5.1	0.7	0.8	-4.3	-7.2	-8.7	13.7	4.9	-7.5	-5.7	-6.7	-6.1	-7.5	-7.6	-3.5	-2.3	0.2
8/30/2021	4:00:00 AM	36.6	34.2	36.9	30.2	32	27.6	23.4	25.9	25.2	24.5	24.6	24.7	23.4	21	16.7	15.5	14.2	12.6	9.7	4.4	-0.2	-0.9	-5.6	-7.6	-8.7	-4.3	-6.7	-7.8	-7.5	-7.3	-7.3	-7.5	-7.7	-3.5	-2.3	0.2
8/30/2021	5:00:00 AM	34.6	33.9	31.8		30.1	24.8	23.3	26	24.8	25.7	24.1	26.8	27.4	23.1	18.5	16.8	14.5	13.1	10.6	3.9	1.2	0.1	-2	-3.6	-5.5	-5.4	-5.9	-4.6	-6.1	-7.2	-7.3	-7.5	-7.7	-3.5	-2.3	0.2
8/30/2021	6:00:00 AM	37.7	36.1	36.8	34.1	35.7	30.2	27.1	27.8	26.7	28.2	28.6	28.1	28.9	25.6	20.9	20.9	17.7	16	13.6	6.4	-1.1	-2.5	-6.4	-8.1	-8.7	-7.7	-0.5	-4.5	-6.7	-4.7	-7.2	-7.4	-7.6	-3.5	-2.3	0.2
8/30/2021	7:00:00 AM	37.5	35.9	39.7	33.6	33.5	32.2	28.4	31.7	30.5	30	30.3	31.1	31	29.5	25.5	24.1	21.9	20.6	17.8	15.6	13.1	15.4	13.6	9.7	-0.6	-5.1	-4.4	-7.3	-7.4	-7.2	-7.2	-7.4	-7.6	-3.3	-2.2	0.2
8/30/2021	8:00:00 AM	36.5	36.8	41	38	37.5	36.4	34.4	35.1	30.8	30.1	29.5	28.5	28.6	26	24.1	20.8	17.2	13.2	10.8	8.3	3	-2.6	-5.1	-3.8	-5.2	-6.1	-6.7	-6.9	-6.8	-6.7	-6.7	-7	-7.4	-2.7	-1.8	0.3
8/30/2021	9:00:00 AM	39.8	38.7	38.6	35.6	33.5	31.9	29.8	31	29.8	29.7	29.4	28.9	28.6	27.7	26	23.7	19.3	12.9	9.8	7.4	2.3	-1.3	-3.9	-3	-3.4	-4.8	-5.9	-6.2	-6.3	-6.1	9.8	12.4	-6.3	-1.3	-0.1	1.1
8/30/2021	10:00:00 AM	48	46.3	43.9	41.3	38.2	35.3	32.9	31.5	30.8	30.9	31	30.8	29.7	28.2	26.6	25.3	23.4	17.5	10.2	7.5	4.4	3.2	1.2	0.5	-0.5	-1.9	-3	-4	-4.9	-5	-4.8	-4.7	-6.1	-0.3	-0.3	1.7
8/30/2021	11:00:00 AM	51.7	50.1	47.9	44.7	41.3	38	34.9	32.6	30.5	30.3	30.2	29.6	29.7	33.2	29.1	24.2	18.4	14.6	10.9	9	6.8	6.4	4.8	4.6	5.6	-0.4	-2.3	-3.4	-4.1	-4.3	-4.5	-4.1	-5.4	-0.3	-0.1	1.3
8/30/2021	12:00:00 PM	53.1	51.6	49.2	46.8	43.3	40.3	37.2	34.4	31.6	30.3	29.5	28.4	38.3	33.8	25.5	25.4	23.6	18.5	14.3	11.1	9.1	8.8	6.9	5.4	3.6	1.9	-0.2	-1.8	-3	-3.6	-3.8	-4	-4.9	0.1	0.1	1.2
8/30/2021	1:00:00 PM	61.7	60.2	58.8	56.3	53.7	50.5	47.2	43.6	39.6	36.2	33.1	30.6	29.1	27.6	26.2	24.4	23	21.2	19.3	19.1	20.1	23.1	20.3	19	17.3	15	11.8	8.4	5	2.7	1.6	0.6	-0.7	5	4.6	5.8
8/30/2021	2:00:00 PM	58.3	56.8	54.7	52.6	49.9	46.9	43.6	39.7	36.8	34.4	32.6	31.1	30.4	29.5	27.3	24	21.2	18.6	16.1	15.4	15.7	16.4	15	13.1	10.8	8.3	5	2.1	-0.2	-1.3	-1.9	-2.4	-3.5	2.9	3.2	5
8/30/2021	3:00:00 PM	58.8	57	55.4	52.8	51	47.2	44.4	41.1	38.2	35.8	34.6	33	32.2	31.8	28.4	25.4	22.6	19.6	17.3	16.7	17.5	18.5	17.3	16	14.2	11.8	8.5	5.1	2	0.1	-0.8	-1.4	-2.6	2.6	1.8	2
8/30/2021	4:00:00 PM	54.5	52.6	50.6	48.6	44.7	41.9	39	35.7	33.8	31.8	29.9	28.6	27.7	26.2	24.3	22	19.8	17.5	14.9	14.1	14.3	14.9	13.2	11.4	9.2	6.4	3.1	0.3	-1.7	-2.5	-2.9	-3.2	-4.3	0.6	0.3	1.1
8/30/2021	5:00:00 PM	44	41.7	40	36.3	33.5	31.6	29.5	27.7	25.5	25.1	25.3	25	25	24.3	23.2	20.5	16.2	11.1	6.7	5	2.3	1.1	-1	-1.5	-2.4	-3.6	-4.6	-5.4	-5.6	-5.8	-5.9	-6.3	-6.9	-2	-1.3	0.5
8/30/2021	6:00:00 PM	34.6	32.1	34.5	28.6	27.3	25.4	24.8	25.7	24.8	24.8	24.5	24	22.7	20.8	19.7	18.8	14.1	7.2	4.9	2.9	0	-1.6	-2.7	-2.1	-3.7	-4.8	-6	-6.2	-6.3	-6.3	-6.4	-6.8	-7.2	-2.4	-1.6	0.4
8/30/2021	7:00:00 PM	29.7	27.8	29.1	24.9	23.6	21.9	22.1	22.2	22	21.5	21.2	20.5	19	16.3	13.3	9.5	6.1	0.8	-2.9	-5.6	-6.7	-5.8	-7.8	-8.2	-7.7	6.2	40	24.3	-1.1	12.6	-1.8	7	-5.2	-1	-1.1	0.8
8/30/2021	8:00:00 PM	28.3	27.4	27	24.9	24.2	24	26.3	27.5	28.3	24.8	24.2	24.1	23.3	21.7	19.7	16.9	12.4	5.5	2.3	-0.1	-4.6	-6	-7.7	-8.6	-7.5	24.4	38.7	20.3	4.7	18.3	2.4	5	-4.4	-1.1	-1.3	0.4
8/30/2021	9:00:00 PM	33.3	31.8	34.2	28.9	31.4	27.3	25.1	28	25.1	26.7	29.1	27.8	27.2	27.6	22.6	20.7	19.4	17.6	14.7	8.7	2.6	2.3	-6.4	-8.4	-8.1	20.6	30	3	3.2	10.7	1	1.3	-6.5	-2.7	-1.9	0.3
8/30/2021	10:00:00 PM	37.4	35.8	38.7	35.8	33.4	29.7	26.1	25.6	22.2	21.2	22.8	20.9	19.4	17.8	15.6	13.9	13.4	11.5	7.1	1.3	-3.5	-4.3	-8.1	-8.8	-8.5	20.4	19.5	-2.9	-2.9	-0.5	-4.2	-3.3	-7.5	-3.2	-2.2	0.3

WM13: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	12:45:30 PM	46.29951	23.0233	71.05706	43.67655	34.19344	27.50404262
4/5/2022	1:00:00 PM	36.2404	18.31706	53.46843	39.97859	30.42548	23.56116516
4/5/2022	2:00:00 PM	34.69319	17.45093	54.21942	38.224	28.80144	22.27023313
4/5/2022	3:00:00 PM	38.5287	18.84227	54.88154	42.56791	32.99389	24.68160509
4/5/2022	4:00:00 PM	34.34018	16.12178	54.04638	37.53885	27.49722	21.58270692
4/5/2022	5:00:00 PM	30.42794	14.3491	49.96477	33.5198	24.98761	19.56483038
4/5/2022	6:00:00 PM	27.12512	13.01784	49.56367	28.55512	22.40695	18.16784954
4/5/2022	7:00:00 PM	24.46509	12.1915	46.31989	26.26671	20.56428	17.31981117
4/5/2022	8:00:00 PM	23.35537	13.35786	37.88262	26.43032	21.17771	17.79216388
4/5/2022	9:00:00 PM	25.50558	14.10387	42.92711	28.69703	22.58692	18.68807043
4/5/2022	10:00:00 PM	24.28711	13.06463	40.9232	27.16025	21.89131	17.67460629
4/5/2022	11:00:00 PM	22.0761	11.24144	41.33132	24.82597	19.11147	15.74259288
4/6/2022	12:00:00 AM	22.98943	13.01175	38.21093	25.67613	20.94536	17.6429186
4/6/2022	1:00:00 AM	21.16524	11.78923	39.74402	23.44771	19.24061	16.0621911
4/6/2022	2:00:00 AM	27.90649	15.2788	47.58372	27.93527	22.44383	19.44165967
4/6/2022	3:00:00 AM	22.18265	15.07599	34.66811	24.50804	21.26756	18.7316839
4/6/2022	4:00:00 AM	27.18025	15.65846	52.17575	27.55191	22.842	19.63239716
4/6/2022	5:00:00 AM	41.48095	18.28608	71.13421	30.39808	25.35237	21.84320273
4/6/2022	6:00:00 AM	44.68789	18.13308	69.72654	30.9316	24.97855	21.86313418
4/6/2022	7:00:00 AM	44.91336	18.4402	71.71488	33.96239	28.79378	24.48070408
4/6/2022	8:00:00 AM	34.14039	19.90915	66.46494	33.54248	27.79422	23.64538032
4/6/2022	9:00:00 AM	25.5473	15.39891	43.87006	28.03499	22.41684	19.34935437
4/6/2022	10:00:00 AM	23.43825	16.27943	40.23242	25.94429	21.72539	19.29186707
4/6/2022	11:00:00 AM	26.77519	15.33941	45.52845	30.08601	21.93011	18.65934819
4/6/2022	12:00:00 PM	25.24727	14.40048	51.7639	25.19341	20.80515	18.0643239
4/6/2022	1:00:00 PM	34.37624	14.15241	62.17983	26.8905	19.97434	17.35153516
4/6/2022	2:00:00 PM	32.8227	14.11058	63.55598	29.88317	21.96275	17.8836922
4/6/2022	3:00:00 PM	27.18335	13.98124	49.98287	29.0292	21.01619	17.89119196
4/6/2022	4:00:00 PM	20.81074	12.35303	41.1762	21.81904	17.75406	15.75538877
4/6/2022	5:00:00 PM	41.34042	10.28139	69.32152	26.80294	17.34197	13.78310047
4/6/2022	6:00:00 PM	32.37495	6.781612	64.19457	23.12309	14.35342	10.33185955
4/6/2022	7:00:00 PM	40.18779	1.237464	69.14307	25.60929	12.46172	6.476498346
4/6/2022	8:00:00 PM	19.54368	3.314959	36.94123	22.09221	13.05278	8.21764159
4/6/2022	9:00:00 PM	19.81191	3.869176	38.73342	21.56382	15.38507	10.0711145
4/6/2022	10:00:00 PM	21.32378	7.000556	39.41576	22.31588	17.19374	13.01455821
4/6/2022	11:00:00 PM	22.00338	6.387689	37.26165	25.78871	17.72157	12.04247964
4/7/2022	12:00:00 AM	22.78451	7.40567	42.73056	24.74591	19.38744	14.0989353
4/7/2022	1:00:00 AM	20.14745	7.118423	36.30085	23.26048	17.35195	12.51978245
4/7/2022	2:00:00 AM	26.32917	9.725066	42.30015	30.43585	21.93449	15.31360453
4/7/2022	3:00:00 AM	29.59247	10.18565	47.03525	31.17865	19.6753	15.43893573

4/7/2022	4:00:00 AM	22.25669	10.16609	37.40347	25.71882	19.71173	15.50448403
4/7/2022	5:00:00 AM	35.80818	16.14817	53.05761	40.1078	24.5605	19.88836107
4/7/2022	6:00:00 AM	52.88337	14.32557	73.52659	37.4521	23.36819	19.07909866
4/7/2022	7:00:00 AM	44.94362	17.96955	68.78785	33.33524	26.50117	22.64746972
4/7/2022	8:00:00 AM	39.14368	18.64009	65.67961	31.79403	26.65002	23.22392786
4/7/2022	9:00:00 AM	33.74767	13.9641	57.27796	31.62494	23.60238	18.32512309
4/7/2022	10:00:00 AM	39.553	10.61228	67.06007	30.67684	20.39197	15.53197026
4/7/2022	11:00:00 AM	25.11308	8.94678	44.68876	29.2172	17.77853	12.58410065
4/7/2022	12:00:00 PM	23.39065	10.51466	50.52137	25.87199	17.56156	13.90501097
4/7/2022	1:00:00 PM	23.86632	11.58759	47.40539	26.45339	18.25464	15.25589739
4/7/2022	2:00:00 PM	37.70849	11.18981	64.85587	28.9644	20.28707	15.40097665
4/7/2022	3:00:00 PM	25.59116	9.805439	48.10062	27.76566	17.31825	13.30120181
4/7/2022	4:00:00 PM	39.67419	8.258973	66.63402	26.90493	16.23605	11.68067961
4/7/2022	5:00:00 PM	28.5503	4.097913	56.84125	27.29746	15.13524	8.911401728
4/7/2022	6:00:00 PM	28.3725	0	53.38875	26.023	7.118852	1.888823752
4/7/2022	7:00:00 PM	40.21672	0	70.36099	27.044	9.672263	1.060328815
4/7/2022	8:00:00 PM	13.62136	0	37.1985	16.54185	8.038599	2.14828603
4/7/2022	9:00:00 PM	16.89712	0	34.18665	20.14429	10.94887	4.023361661
4/7/2022	10:00:00 PM	21.60695	2.962498	46.97629	23.20391	15.18677	9.891125207
4/7/2022	11:00:00 PM	18.5017	0	45.22711	20.62142	14.06956	8.969092283
4/8/2022	12:00:00 AM	21.8233	1.575721	38.27782	25.34764	18.04873	11.80236905
4/8/2022	1:00:00 AM	27.8416	3.925186	52.04083	29.20169	18.13972	10.5882361
4/8/2022	2:00:00 AM	29.67539	2.52394	56.12679	23.57842	17.30132	8.754570381
4/8/2022	3:00:00 AM	30.22522	11.47729	56.12206	29.03725	20.73264	16.49668386
4/8/2022	4:00:00 AM	32.83331	9.586961	58.577	33.82079	20.69001	15.06822954
4/8/2022	5:00:00 AM	40.63856	16.25899	65.83464	43.38338	31.42576	22.08120615
4/8/2022	6:00:00 AM	42.17371	16.80464	68.33093	42.55033	28.36866	21.89323559
4/8/2022	7:00:00 AM	48.24521	21.21686	72.12474	33.87049	29.15093	25.51568175
4/8/2022	8:00:00 AM	36.61837	17.61069	65.63928	31.29546	25.56054	22.09534933
4/8/2022	9:00:00 AM	33.63077	18.25921	51.36908	37.50571	27.301	22.76617655
4/8/2022	10:00:00 AM	38.92844	17.74214	66.44911	31.17973	25.81537	21.97730542
4/8/2022	11:00:00 AM	27.5055	14.10907	49.72692	31.15713	23.02381	18.84277692
4/8/2022	12:00:00 PM	30.17591	11.89797	53.31215	32.29066	21.7784	16.31863409
4/8/2022	1:00:00 PM	30.26616	12.94108	48.07046	33.97725	25.08892	18.36657282
4/8/2022	2:00:00 PM	44.45996	15.45102	68.16415	44.19014	32.42103	22.64431657
4/8/2022	3:00:00 PM	48.05972	28.99368	69.05756	50.20602	43.56287	36.87334665
4/8/2022	4:00:00 PM	47.42596	27.14336	61.0093	51.33088	44.44383	36.77901005
4/8/2022	5:00:00 PM	44.00301	22.69983	56.74624	48.14578	39.9174	29.6599756
4/8/2022	6:00:00 PM	34.98171	16.44697	55.74987	36.913	26.81541	21.22817165
4/8/2022	7:00:00 PM	36.45204	15.60688	66.68581	34.63259	25.33612	20.3629713
4/8/2022	8:00:00 PM	28.39122	17.15099	50.30546	31.1535	24.80504	20.91258835
4/8/2022	9:00:00 PM	26.42459	16.13717	45.48992	29.18182	23.83038	20.1009186
4/8/2022	10:00:00 PM	30.4464	17.59567	51.37947	33.17598	26.26672	22.3772

4/8/2022	11:00:00 PM	28.6988	16.3902	45.39437	31.60818	25.95636	21.78971163
4/9/2022	12:00:00 AM	26.65774	12.59503	45.4581	29.18681	23.33708	17.71969748
4/9/2022	1:00:00 AM	24.49893	13.67074	41.50382	27.38118	22.66698	18.49992522
4/9/2022	2:00:00 AM	22.68813	13.37163	41.00815	25.45978	20.99845	17.48438856
4/9/2022	3:00:00 AM	24.11849	13.2902	47.24581	25.5301	20.30933	17.11284241
4/9/2022	4:00:00 AM	27.13776	17.57916	42.29836	29.74374	25.65643	22.134037
4/9/2022	5:00:00 AM	45.62562	18.49675	70.93302	45.01489	35.76583	23.51527979
4/9/2022	6:00:00 AM	45.00426	18.29613	71.00764	40.2448	27.43696	23.49662461
4/9/2022	7:00:00 AM	33.03836	19.06795	56.09985	32.90229	27.00181	23.24254903
4/9/2022	8:00:00 AM	38.08068	17.1836	65.23738	29.11893	22.97998	20.43829432
4/9/2022	9:00:00 AM	29.08705	16.73518	54.04122	29.45902	22.96354	20.20911929
4/9/2022	10:00:00 AM	34.98552	13.82789	63.38898	31.10635	22.4075	17.96097196
4/9/2022	11:00:00 AM	35.00353	16.45492	54.29378	38.27751	29.30772	21.97576892
4/9/2022	12:00:00 PM	37.49912	17.76375	54.48421	41.21709	32.24084	24.40308862
4/9/2022	1:00:00 PM	36.85539	17.43835	56.40309	40.54347	30.16055	23.23590167
4/9/2022	2:00:00 PM	45.77687	16.38478	70.23052	40.63517	29.66613	20.9456119
4/9/2022	3:00:00 PM	38.93502	15.99438	56.25356	43.07855	31.91197	22.35070851
4/9/2022	4:00:00 PM	40.29249	16.41097	57.22731	44.35143	35.08824	25.44943402
4/9/2022	5:00:00 PM	45.60848	18.97955	62.19336	49.78389	41.53116	29.37471554
4/9/2022	6:00:00 PM	46.08392	24.20326	59.378	50.04584	43.1465	34.66581929
4/9/2022	7:00:00 PM	41.63117	18.92796	65.24123	43.25321	34.42517	25.96476259
4/9/2022	8:00:00 PM	30.17372	13.95328	48.58062	33.68802	23.26211	18.63119286
4/9/2022	9:00:00 PM	28.34659	12.09425	50.50994	29.83247	20.63284	17.07876489
4/9/2022	10:00:00 PM	27.5924	12.63122	50.43643	29.0623	21.35134	17.60485397
4/9/2022	11:00:00 PM	21.31823	9.834581	43.70154	23.54317	18.87311	15.44359839
4/10/2022	12:00:00 AM	22.35577	12.0615	40.91881	25.367	20.24697	16.53630282
4/10/2022	1:00:00 AM	24.55403	13.60861	45.66589	27.03466	21.47433	18.12992105
4/10/2022	2:00:00 AM	20.89842	10.66954	36.84728	23.81091	18.94737	15.67399468
4/10/2022	3:00:00 AM	23.19788	10.52236	49.2619	22.16573	18.29612	15.22034474
4/10/2022	4:00:00 AM	20.90383	10.64513	45.83667	22.48462	19.32585	16.31154123
4/10/2022	5:00:00 AM	39.93777	9.814592	67.81826	42.46285	30.59526	15.97135732
4/10/2022	6:00:00 AM	27.7666	13.24044	49.29397	27.81987	20.70588	17.64794886
4/10/2022	7:00:00 AM	29.42884	13.95896	50.99572	30.69984	22.65306	18.71186709
4/10/2022	8:00:00 AM	22.95377	11.97314	42.60061	24.76385	19.54308	16.29136299
4/10/2022	9:00:00 AM	25.13217	13.97751	44.84666	27.41184	20.54806	17.91102273
4/10/2022	10:00:00 AM	36.32862	14.00491	65.06931	29.20926	22.38449	18.6499071
4/10/2022	11:00:00 AM	31.33032	11.71314	51.79619	34.10438	23.53807	17.19134889
4/10/2022	12:00:00 PM	30.61334	12.97029	49.90984	33.79076	24.63936	18.55243256
4/10/2022	1:00:00 PM	29.40075	13.87304	47.86011	32.79011	24.52114	18.82797693
4/10/2022	2:00:00 PM	29.19766	11.96072	48.11008	32.24838	22.66499	17.4811179
4/10/2022	3:00:00 PM	32.29924	13.24921	58.56793	31.45552	23.19223	18.5407805
4/10/2022	4:00:00 PM	32.80219	10.23832	59.5711	29.7665	18.82516	14.08003022
4/10/2022	5:00:00 PM	26.01927	6.91908	49.6113	27.56123	17.24625	11.89577702

4/10/2022	6:00:00 PM	28.8674	5.839603	51.74953	28.04921	14.05874	10.23162116
4/10/2022	7:00:00 PM	34.66769	6.184442	57.4656	37.9067	19.71953	11.50574052
4/10/2022	8:00:00 PM	25.33964	11.01293	52.93981	26.10919	19.60867	16.08540662
4/10/2022	9:00:00 PM	25.05639	10.46515	47.10078	27.13425	20.41161	16.41157374
4/10/2022	10:00:00 PM	25.26028	7.363336	45.1043	27.74143	17.97841	13.25497452
4/10/2022	11:00:00 PM	21.06828	3.687836	41.55076	22.6501	13.23899	8.946374354
4/11/2022	12:00:00 AM	22.62624	5.190757	47.60941	25.53416	17.55939	12.50184055
4/11/2022	1:00:00 AM	24.34542	7.726304	45.16261	28.09903	18.84994	13.40850347
4/11/2022	2:00:00 AM	30.98525	8.47001	48.65566	35.98552	20.31897	14.26256214
4/11/2022	3:00:00 AM	24.29565	9.284223	54.31752	23.17489	18.19629	14.10053674
4/11/2022	4:00:00 AM	32.09641	12.8226	52.89732	35.57907	27.17912	19.24127317
4/11/2022	5:00:00 AM	31.75992	18.52942	56.96424	34.47832	27.96296	23.29216759
4/11/2022	6:00:00 AM	40.2409	20.15439	58.88561	44.02166	35.40057	26.92064815
4/11/2022	7:00:00 AM	39.91612	19.91761	57.84275	43.5495	34.34076	26.80963194
4/11/2022	8:00:00 AM	43.32541	26.90799	57.96533	47.25301	39.96658	33.16538791
4/11/2022	9:00:00 AM	34.48392	19.63012	53.41225	37.38694	29.12915	24.12284763
4/11/2022	10:00:00 AM	48.17035	19.42685	63.72927	52.45447	42.8937	25.85108607
4/11/2022	11:00:00 AM	47.6943	26.46485	65.02756	51.47026	43.45801	34.92956905
4/11/2022	12:00:00 PM	49.4128	29.61578	63.82914	53.44943	45.45492	37.94004819
4/11/2022	1:00:00 PM	56.81108	30.04461	69.41136	60.5929	54.16517	46.47999824
4/11/2022	2:00:00 PM	47.41393	25.25944	61.93865	51.52136	43.62813	33.67145765
4/11/2022	3:00:00 PM	46.02579	25.55204	59.344	50.03077	42.2777	34.16806501
4/11/2022	4:00:00 PM	51.30809	28.2598	64.08568	55.11603	48.84211	40.97015318
4/11/2022	5:00:00 PM	44.34283	18.93069	65.49721	49.02065	34.5599	25.79043469
4/11/2022	6:00:00 PM	34.061	18.46754	51.01628	37.48952	29.53516	24.01778151
4/11/2022	7:00:00 PM	34.63294	17.60059	52.2786	37.3366	28.55888	22.49513462
4/11/2022	8:00:00 PM	31.75546	15.60606	50.3575	35.35468	26.12717	20.66837931
4/11/2022	9:00:00 PM	40.57198	17.19079	56.07103	44.46807	35.28581	26.06335477
4/11/2022	10:00:00 PM	31.43582	17.70555	45.77956	35.10606	27.77439	22.63837119
4/11/2022	11:00:00 PM	30.06267	13.96334	45.44295	33.86143	25.41255	20.44697671
4/12/2022	12:00:00 AM	37.56717	19.10368	51.60865	41.64882	33.6367	25.70768957
4/12/2022	1:00:00 AM	27.07832	15.24491	44.48316	29.84449	23.12779	19.3915268
4/12/2022	2:00:00 AM	30.36676	16.19609	45.95634	34.17976	26.08752	21.3933424
4/12/2022	3:00:00 AM	28.31565	13.75661	46.42541	31.38195	24.59072	19.64915101
4/12/2022	4:00:00 AM	31.21438	17.8063	46.81318	34.69344	28.38536	23.16469097
4/12/2022	5:00:00 AM	32.96764	19.51547	48.86097	36.59335	29.56689	24.16884988
4/12/2022	6:00:00 AM	43.886	24.77763	60.01678	47.79202	39.80612	32.60848908
4/12/2022	7:00:00 AM	44.79189	27.26258	57.45073	48.66395	41.99644	34.71381765
4/12/2022	8:00:00 AM	41.61697	22.32884	55.76055	45.64028	38.03137	30.09974659
4/12/2022	9:00:00 AM	41.11918	21.78265	54.41274	44.92356	37.78003	30.4119267
4/12/2022	10:00:00 AM	40.12619	20.01095	53.13355	44.06514	36.69028	28.81584503
4/12/2022	11:00:00 AM	39.6834	16.60337	61.18175	42.73073	34.64951	26.17147375
4/12/2022	12:00:00 PM	33.64533	15.21421	55.88978	36.73549	27.32934	20.70871255

4/12/2022	1:00:00 PM	39.80502	17.58356	60.76808	42.25806	35.06098	28.17747848
4/12/2022	2:00:00 PM	38.1369	19.26266	58.09768	41.34239	33.31169	25.59637508
4/12/2022	3:00:00 PM	40.02722	22.75287	53.64279	43.94589	36.66374	29.97196158
4/12/2022	4:00:00 PM	36.46026	19.48845	54.61059	40.11899	32.35977	25.9585813
4/12/2022	5:00:00 PM	37.08777	18.47298	57.65645	39.67929	31.95236	25.3625509
4/12/2022	6:00:00 PM	31.77755	11.9861	48.71711	35.63836	26.16159	17.84818306
4/12/2022	7:00:00 PM	29.72739	9.126887	52.3834	30.04656	20.90838	15.32774214
4/12/2022	8:00:00 PM	23.28579	8.454023	41.42261	25.25442	19.20666	14.99376666
4/12/2022	9:00:00 PM	25.88849	11.53398	43.98979	27.97268	22.0811	17.96013482
4/12/2022	10:00:00 PM	26.54536	11.04083	43.64115	28.27349	21.71443	16.33571094
4/12/2022	11:00:00 PM	27.60661	11.36606	48.50376	29.77248	21.77734	16.99888611
4/13/2022	12:00:00 AM	28.28327	10.78484	44.75947	31.44554	23.89808	17.03266558
4/13/2022	1:00:00 AM	24.20633	12.88396	38.98702	26.98664	22.82288	18.66072497
4/13/2022	2:00:00 AM	25.34028	12.30979	47.05651	28.09913	22.99631	18.38887373
4/13/2022	3:00:00 AM	28.33596	13.52242	44.63557	31.53677	24.84157	19.93397501
4/13/2022	4:00:00 AM	30.70039	18.42126	47.34792	33.83543	27.60189	23.45258166
4/13/2022	5:00:00 AM	30.85524	18.24873	49.86306	33.99772	27.52503	23.08970249
4/13/2022	6:00:00 AM	32.8015	18.99883	52.14063	35.90672	28.46587	23.53470675
4/13/2022	7:00:00 AM	33.45402	18.55588	58.35502	35.56078	28.88457	23.9674106
4/13/2022	8:00:00 AM	37.52443	17.16412	66.50938	33.78924	25.71113	21.29444222
4/13/2022	9:00:00 AM	33.04768	16.1065	57.60572	34.26488	26.06882	20.93965233
4/13/2022	10:00:00 AM	34.13881	15.70338	57.36134	35.09414	26.18295	20.53079023
4/13/2022	11:00:00 AM	39.01733	18.10737	54.93094	43.06633	34.27262	26.43348772
4/13/2022	12:00:00 PM	33.77692	17.90308	51.74694	37.11627	28.9664	23.3829055
4/13/2022	1:00:00 PM	38.2375	18.45067	54.02319	42.01993	33.02394	25.35246686
4/13/2022	2:00:00 PM	40.43968	20.92869	57.04776	44.52628	35.79025	27.77116947
4/13/2022	3:00:00 PM	38.15728	20.07064	55.21646	41.79483	33.94885	26.80063999
4/13/2022	4:00:00 PM	36.85142	17.87643	53.5666	40.39087	31.9414	25.06576878
4/13/2022	5:00:00 PM	37.06316	18.2605	54.80806	40.65802	32.38239	24.68507941
4/13/2022	6:00:00 PM	36.42953	16.76857	58.99822	38.53525	29.79426	22.85136477
4/13/2022	7:00:00 PM	29.42558	15.0011	54.49715	31.03108	25.06903	21.03634319
4/13/2022	8:00:00 PM	29.4177	15.5304	48.03013	31.55136	25.87703	21.61575734
4/13/2022	9:00:00 PM	27.26981	13.6607	43.41257	30.16537	23.01273	18.8271375
4/13/2022	10:00:00 PM	29.57906	15.66244	48.07179	32.33924	25.32296	20.68440849
4/13/2022	11:00:00 PM	30.76433	15.03022	47.26389	34.10765	26.49469	20.82405695
4/14/2022	12:00:00 AM	32.38282	13.08071	49.25105	35.99271	26.75243	19.30933168
4/14/2022	1:00:00 AM	37.23175	18.52051	51.37189	41.0985	33.41162	26.51892224
4/14/2022	2:00:00 AM	38.51393	23.59446	51.6692	42.31636	35.5105	29.77124749
4/14/2022	3:00:00 AM	39.18851	25.26988	55.94216	42.50677	36.22226	30.80577754
4/14/2022	4:00:00 AM	33.13704	21.27593	48.34593	36.34028	30.64326	26.20888562
4/14/2022	5:00:00 AM	38.40929	23.94318	54.17385	41.93579	35.35223	30.26862332
4/14/2022	6:00:00 AM	39.3122	25.51339	58.10336	42.78245	35.84181	30.36621434
4/14/2022	7:00:00 AM	33.93824	19.1527	54.38538	36.75349	29.16021	23.90452679

4/14/2022	8:00:00 AM	32.74567	19.28171	55.85647	35.0075	27.93033	23.15436255
4/14/2022	9:00:00 AM	42.48376	22.95189	69.45145	45.36616	37.42122	30.38167512
4/14/2022	10:00:00 AM	44.00691	23.48491	67.41702	45.76624	37.90001	30.71198191
4/14/2022	11:00:00 AM	42.6194	23.07637	65.12715	45.5874	37.41355	29.48922292
4/14/2022	12:00:00 PM	39.2746	21.61454	58.49919	42.8378	34.5543	27.63908097
4/14/2022	1:00:00 PM	38.24532	19.10222	55.63283	42.03355	33.13615	26.19852337
4/14/2022	2:00:00 PM	44.01334	18.52239	59.79813	48.09506	39.7539	30.1318883
4/14/2022	3:00:00 PM	46.45739	21.22331	63.09279	50.57863	41.31084	29.31909611
4/14/2022	4:00:00 PM	44.73405	25.29843	61.47316	48.35679	41.29971	33.45830533
4/14/2022	5:00:00 PM	41.06598	23.4943	59.75825	44.40726	35.6274	29.29818569
4/14/2022	6:00:00 PM	42.4393	21.83844	58.54874	46.5885	36.10782	27.50497293
4/14/2022	7:00:00 PM	35.06422	21.35102	56.58247	37.10905	30.43264	25.95345134
4/14/2022	8:00:00 PM	32.60733	20.60849	48.54383	35.9117	29.49555	25.16755998
4/14/2022	9:00:00 PM	35.13609	21.05111	54.82215	37.87946	32.09197	27.08377853
4/14/2022	10:00:00 PM	37.73891	20.97752	52.38782	41.33623	33.67825	27.54791582
4/14/2022	11:00:00 PM	35.50286	19.56863	51.51724	38.92868	32.08133	25.67509749
4/15/2022	12:00:00 AM	38.35251	22.25354	52.6362	41.97712	35.11902	29.40386501
4/15/2022	1:00:00 AM	38.52237	21.12356	53.4171	42.35473	34.90279	28.57439911
4/15/2022	2:00:00 AM	30.85275	17.48976	49.10095	33.57491	26.92686	22.32240852
4/15/2022	3:00:00 AM	30.89111	18.59862	46.96947	33.98889	28.47951	23.75024179
4/15/2022	4:00:00 AM	30.19642	12.94829	55.39753	29.92082	23.67403	19.02409913
4/15/2022	5:00:00 AM	28.06433	15.95422	52.63738	30.26149	24.57282	20.33204709
4/15/2022	6:00:00 AM	35.60665	16.97668	57.93182	35.16647	26.65963	21.85895619
4/15/2022	7:00:00 AM	31.71767	16.96641	52.41067	34.19549	25.7694	21.40326378
4/15/2022	8:00:00 AM	28.74251	13.46743	48.7962	30.50795	21.61277	17.82165432
4/15/2022	9:00:00 AM	34.96039	14.20887	60.75253	33.48813	24.22627	19.40039925
4/15/2022	10:00:00 AM	32.24661	16.36055	52.44009	35.50448	26.96572	21.0578444
4/15/2022	11:00:00 AM	34.80166	15.87668	52.49919	38.11239	28.86442	22.00242857
4/15/2022	12:00:00 PM	35.32759	15.98156	56.66431	37.64497	29.37928	22.87310359
4/15/2022	1:00:00 PM	36.81369	18.6667	52.70407	40.68272	32.65443	25.15478485
4/15/2022	2:00:00 PM	35.41505	15.51413	57.05062	38.10728	29.94159	23.02187414
4/15/2022	3:00:00 PM	31.39195	14.97828	50.04609	34.90421	26.5492	21.57290841
4/15/2022	4:00:00 PM	35.00612	16.81195	55.1901	37.95694	30.44967	23.20988953
4/15/2022	5:00:00 PM	35.83821	17.2291	54.29621	39.18931	30.74411	23.55264264
4/15/2022	6:00:00 PM	31.63588	14.1826	52.59398	34.44059	26.84328	21.10451799
4/15/2022	7:00:00 PM	27.96122	13.45084	53.35953	29.71454	22.83575	18.95845569
4/15/2022	8:00:00 PM	26.47977	11.77112	48.0982	26.73945	20.68741	16.81753536
4/15/2022	9:00:00 PM	32.52423	12.74618	57.35609	29.26409	21.69192	17.96229508
4/15/2022	10:00:00 PM	28.41669	13.47444	49.23296	29.43711	22.39526	18.17080556
4/15/2022	11:00:00 PM	26.92687	4.717141	54.84396	27.92666	20.2509	13.96712605
4/16/2022	12:00:00 AM	22.39252	4.654888	45.38547	25.74468	15.46631	9.695365031
4/16/2022	1:00:00 AM	29.62832	11.15051	57.86534	29.14626	22.08475	16.90978558
4/16/2022	2:00:00 AM	33.72118	8.224102	55.03966	38.36044	24.98459	15.93211365

4/16/2022	3:00:00 AM	30.14992	11.83104	51.45767	29.60226	22.27321	17.48067928
4/16/2022	4:00:00 AM	29.13025	12.46283	52.43007	30.09323	22.29492	17.80391609
4/16/2022	5:00:00 AM	36.92718	16.06094	54.64796	38.72613	27.59759	21.59851693
4/16/2022	6:00:00 AM	39.50426	14.10847	68.71045	32.45001	23.9477	19.89940404
4/16/2022	7:00:00 AM	40.75439	16.49033	66.80564	37.46645	26.78589	21.66227614
4/16/2022	8:00:00 AM	32.16905	15.64532	57.51434	32.01943	24.46952	20.03453451
4/16/2022	9:00:00 AM	30.50827	12.24896	54.3662	30.09067	21.46789	17.30900493
4/16/2022	10:00:00 AM	31.37338	9.988508	56.05336	33.86823	22.03364	15.43791166
4/16/2022	11:00:00 AM	41.56026	23.2085	58.2098	45.26858	37.68983	30.91465317
4/16/2022	12:00:00 PM	43.23325	20.52919	61.31453	46.98301	38.72615	31.19188532
4/16/2022	1:00:00 PM	42.4913	23.54679	59.2687	46.47887	38.40964	30.62366785
4/16/2022	2:00:00 PM	50.44931	24.87737	72.56745	53.86845	46.63591	36.30016407
4/16/2022	3:00:00 PM	52.52456	34.75464	65.51219	56.29386	50.04616	43.58930421
4/16/2022	4:00:00 PM	49.07857	28.23533	64.49044	52.88694	45.81436	37.82115583
4/16/2022	5:00:00 PM	46.77799	27.32848	62.76759	50.4783	43.56503	35.78302501
4/16/2022	6:00:00 PM	46.17865	19.39963	61.9	49.93924	41.71384	32.52389899
4/16/2022	7:00:00 PM	34.85022	19.617	53.14793	38.43818	29.81293	23.96174048
4/16/2022	8:00:00 PM	32.27825	17.42269	57.81352	33.42971	26.99642	22.75553085
4/16/2022	9:00:00 PM	33.50353	16.7656	52.10395	36.77729	29.08804	22.84075119
4/16/2022	10:00:00 PM	27.80139	12.72315	47.83273	29.13535	21.85288	17.76187676
4/16/2022	11:00:00 PM	30.50446	16.46027	53.04258	33.1748	26.22079	21.69097155
4/17/2022	12:00:00 AM	29.72183	16.41657	47.66841	32.49655	25.78119	21.2237428
4/17/2022	1:00:00 AM	24.56439	14.33348	46.39068	27.01601	22.54277	18.93008441
4/17/2022	2:00:00 AM	22.13843	10.59184	37.1122	24.83206	20.24639	16.36275324
4/17/2022	3:00:00 AM	26.75453	11.0195	47.66606	28.10095	20.88405	16.54145311
4/17/2022	4:00:00 AM	27.3632	11.60098	47.68355	29.82746	23.15497	16.55499299
4/17/2022	5:00:00 AM	30.12634	12.14696	52.76724	31.01231	25.17339	19.34218524
4/17/2022	6:00:00 AM	47.09956	15.39504	71.4063	33.61535	26.71105	21.21106959
4/17/2022	7:00:00 AM	32.70954	16.56078	51.73869	35.75911	28.18558	22.44429247
4/17/2022	8:00:00 AM	39.52785	15.45927	67.07348	29.15326	22.5716	19.03236846
4/17/2022	9:00:00 AM	30.89549	12.68523	56.10779	27.60692	19.76125	16.6488972
4/17/2022	10:00:00 AM	32.71602	13.11456	51.54345	36.02625	25.58457	17.58796456
4/17/2022	11:00:00 AM	32.36606	15.11227	54.84565	35.56866	25.90837	19.35447923
4/17/2022	12:00:00 PM	29.90594	14.10604	49.25852	33.41323	24.60671	19.10379425
4/17/2022	1:00:00 PM	28.45435	12.6697	47.54841	31.69791	22.55957	16.93800079
4/17/2022	2:00:00 PM	29.11488	13.80294	49.24744	32.1915	23.48059	18.17808056
4/17/2022	3:00:00 PM	26.38868	10.7633	45.57877	29.41893	19.90236	14.40945762
4/17/2022	4:00:00 PM	27.20028	9.077304	44.35117	30.62611	21.81605	13.98775337
4/17/2022	5:00:00 PM	23.68159	7.104025	44.87294	26.61183	17.87189	12.22242143
4/17/2022	6:00:00 PM	25.54874	4.324577	54.07187	25.58474	16.42166	10.67050355
4/17/2022	7:00:00 PM	34.98071	8.634015	58.32978	31.50029	19.38883	13.67360812
4/17/2022	8:00:00 PM	22.46953	10.26887	43.40604	25.11306	19.74335	15.85785018
4/17/2022	9:00:00 PM	22.46805	9.187048	45.21074	25.34032	19.26058	15.13503941

4/17/2022	10:00:00 PM	26.02974	2.739883	48.79653	27.39081	17.71622	11.30722107
4/17/2022	11:00:00 PM	23.31099	4.637524	53.9871	21.50007	15.98703	10.85106226
4/18/2022	12:00:00 AM	26.43572	6.865697	42.76427	30.02855	22.39868	15.8492253
4/18/2022	1:00:00 AM	23.40472	6.799953	50.39996	23.55294	18.42058	12.6933999
4/18/2022	2:00:00 AM	31.56275	10.0426	47.16	36.49273	19.06117	15.03452402
4/18/2022	3:00:00 AM	32.87377	10.30131	51.39559	37.44073	19.7167	15.2005127
4/18/2022	4:00:00 AM	37.75016	12.59098	54.46879	42.78006	27.47297	18.24115951
4/18/2022	5:00:00 AM	48.85459	16.83425	73.00698	45.53171	34.82062	21.8433716
4/18/2022	6:00:00 AM	35.03443	16.00045	57.09988	36.38997	24.42298	20.0639759
4/18/2022	7:00:00 AM	41.59997	17.70281	71.09286	36.26807	28.58616	23.41984176
4/18/2022	8:00:00 AM	30.45095	14.91116	49.49949	33.40964	26.81591	19.9366085
4/18/2022	9:00:00 AM	30.09347	13.76427	50.49946	33.02042	24.07994	18.77478903
4/18/2022	10:00:00 AM	26.8175	13.09528	46.56455	29.88384	21.714	17.64011151
4/18/2022	11:00:00 AM	27.58964	13.01375	50.8463	30.02666	21.96412	17.62393751
4/18/2022	12:00:00 PM	34.16945	12.55402	53.92214	37.44408	26.79492	17.82815731
4/18/2022	1:00:00 PM	37.76008	15.15899	53.96852	41.66533	32.83677	23.50140287
4/18/2022	2:00:00 PM	36.77437	17.13337	53.20148	40.4993	32.27583	25.15052954
4/18/2022	3:00:00 PM	35.34445	14.20901	52.00393	38.95771	30.75301	23.36853779
4/18/2022	4:00:00 PM	35.12415	12.62279	57.78474	36.05731	27.48823	19.48313405
4/18/2022	5:00:00 PM	31.14748	12.79369	52.94291	34.1843	25.51505	18.99879603
4/18/2022	6:00:00 PM	31.04528	12.72982	48.80909	34.7536	24.66983	18.24370773
4/18/2022	7:00:00 PM	39.82598	23.38033	58.86109	43.02837	35.69645	29.50268952
4/18/2022	8:00:00 PM	44.40623	26.53202	60.19723	48.19696	41.12988	34.00948175
4/18/2022	9:00:00 PM	40.97299	21.30737	55.64704	44.86557	37.26045	29.96419448
4/18/2022	10:00:00 PM	37.2309	19.61633	51.91006	40.87145	33.69603	27.10603014
4/18/2022	11:00:00 PM	29.30144	13.82522	47.4639	32.7057	25.61068	19.97388584
4/19/2022	12:00:00 AM	28.3133	13.49396	46.70994	31.59347	24.54614	18.98545781
4/19/2022	1:00:00 AM	23.9474	12.22997	39.24792	27.06751	21.12411	17.07706921
4/19/2022	2:00:00 AM	23.27322	12.13289	41.8685	25.71392	21.06227	17.38139077
4/19/2022	3:00:00 AM	21.96192	11.39209	39.79949	24.62402	20.20886	16.45984286
4/19/2022	4:00:00 AM	29.35699	16.80291	46.41143	32.49908	26.33444	21.42128859
4/19/2022	5:00:00 AM	40.61919	22.5473	63.1529	43.15974	35.5898	29.14554117
4/19/2022	6:00:00 AM	40.23874	24.07214	56.86912	43.81949	36.5456	30.60315669
4/19/2022	7:00:00 AM	38.07087	23.02306	60.12841	40.44131	33.50735	28.25993496
4/19/2022	8:00:00 AM	41.09948	23.5168	68.99467	37.83845	31.40133	27.50223149

WM13: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	12:45:30 PM	69.36935	41.32162	82.33661	73.80047	64.75722	52.95591
4/5/2022	1:00:00 PM	66.88253	36.4205	82.0854	71.43542	59.86865	46.56354
4/5/2022	2:00:00 PM	65.50322	35.49275	81.80514	69.95501	57.86525	44.24175
4/5/2022	3:00:00 PM	68.77075	35.56727	82.35531	73.21341	63.65545	48.89283
4/5/2022	4:00:00 PM	65.04698	34.3326	81.40048	69.29092	56.84929	44.04797
4/5/2022	5:00:00 PM	61.02616	32.75275	77.43653	65.02158	53.40907	42.00813
4/5/2022	6:00:00 PM	55.80616	32.2336	74.0678	59.71268	48.30089	39.6028
4/5/2022	7:00:00 PM	51.56129	32.75636	71.17614	54.65962	45.8551	39.77514
4/5/2022	8:00:00 PM	48.0513	34.7676	66.38196	50.6443	44.18663	40.04868
4/5/2022	9:00:00 PM	48.67927	34.81847	69.0345	50.89122	43.55368	39.87573
4/5/2022	10:00:00 PM	43.45896	33.48687	56.72377	46.13192	42.09102	38.69544
4/5/2022	11:00:00 PM	42.21378	32.33234	53.1084	45.15647	40.80202	37.50525
4/6/2022	12:00:00 AM	42.89141	33.37648	54.2162	45.70975	41.46123	38.41018
4/6/2022	1:00:00 AM	41.3388	32.26319	53.36136	43.77866	40.31353	37.28747
4/6/2022	2:00:00 AM	46.86528	36.18014	63.52867	49.05174	45.01082	41.48175
4/6/2022	3:00:00 AM	45.67247	36.4659	55.80196	48.36525	44.58053	41.3844
4/6/2022	4:00:00 AM	45.77706	35.78904	68.29827	47.14358	43.31939	40.44287
4/6/2022	5:00:00 AM	47.13432	37.07381	69.74168	48.85626	44.97974	41.91844
4/6/2022	6:00:00 AM	48.37769	37.94727	68.32918	49.52199	45.91807	42.75597
4/6/2022	7:00:00 AM	51.1046	38.82206	71.12527	53.08692	48.80837	44.96787
4/6/2022	8:00:00 AM	51.24126	40.19865	68.32563	54.13216	49.32451	45.35887
4/6/2022	9:00:00 AM	49.7171	38.72612	65.79687	52.51243	47.60305	43.98562
4/6/2022	10:00:00 AM	49.92807	37.77746	68.27091	52.75397	47.07456	43.27641
4/6/2022	11:00:00 AM	50.80527	35.5518	68.91398	54.14696	45.90853	41.38036
4/6/2022	12:00:00 PM	48.75262	34.79049	71.00651	51.02407	44.13318	40.21984
4/6/2022	1:00:00 PM	48.10207	33.31746	69.67381	50.39633	41.93009	38.2801
4/6/2022	2:00:00 PM	50.52053	34.33769	74.09889	51.20884	43.59132	39.54788
4/6/2022	3:00:00 PM	47.86826	33.61185	69.86035	50.16916	43.34951	39.52169
4/6/2022	4:00:00 PM	43.366	32.15294	63.14075	45.38977	40.13779	37.06791
4/6/2022	5:00:00 PM	52.65871	31.49591	79.63741	46.56884	39.86213	36.3592
4/6/2022	6:00:00 PM	42.30626	29.48115	64.6307	43.53879	38.22825	34.6718
4/6/2022	7:00:00 PM	42.35477	26.01696	67.63826	43.08043	36.37408	32.03165
4/6/2022	8:00:00 PM	40.71219	27.39939	57.87056	43.67954	38.0461	33.69696
4/6/2022	9:00:00 PM	39.18154	27.28961	53.90061	41.88122	37.06121	33.29103
4/6/2022	10:00:00 PM	41.2615	29.96086	54.58024	43.66	39.41909	35.74311
4/6/2022	11:00:00 PM	41.66457	29.74384	52.77454	44.83258	39.95902	35.57586
4/7/2022	12:00:00 AM	40.22772	29.50903	56.31258	42.58782	38.5011	34.93159
4/7/2022	1:00:00 AM	42.44754	28.70856	61.70798	45.11003	38.16761	34.38402
4/7/2022	2:00:00 AM	44.76825	31.62215	58.60603	48.49926	41.40094	37.09125
4/7/2022	3:00:00 AM	48.07941	33.15808	64.26553	50.28773	42.7073	38.81386

4/7/2022	4:00:00 AM	43.00427	32.20067	56.06194	46.08018	41.0423	37.59482
4/7/2022	5:00:00 AM	43.12623	33.51526	57.0767	46.00475	41.05639	38.05773
4/7/2022	6:00:00 AM	53.01607	34.20564	72.53751	52.12311	43.33674	39.5154
4/7/2022	7:00:00 AM	48.9375	36.68743	68.54237	50.23376	45.34692	41.82699
4/7/2022	8:00:00 AM	48.64971	37.23556	66.663	50.87559	45.91216	42.5478
4/7/2022	9:00:00 AM	51.7646	34.88551	73.51649	52.51147	45.6579	40.54607
4/7/2022	10:00:00 AM	50.5105	32.19614	72.52464	49.44783	42.64096	37.94539
4/7/2022	11:00:00 AM	44.95934	27.8535	69.75719	48.28297	40.40991	34.40535
4/7/2022	12:00:00 PM	43.39038	28.51048	64.45937	46.45492	38.71836	34.21244
4/7/2022	1:00:00 PM	44.51601	28.07974	68.47418	47.24979	38.46455	33.3969
4/7/2022	2:00:00 PM	48.13961	27.58098	71.68753	50.59128	40.54179	33.62495
4/7/2022	3:00:00 PM	44.96591	26.22008	66.57864	47.60666	37.37613	31.88646
4/7/2022	4:00:00 PM	45.0656	25.87238	67.7994	46.81874	37.02353	31.98198
4/7/2022	5:00:00 PM	46.0875	23.64138	70.62449	45.60707	36.02364	30.6078
4/7/2022	6:00:00 PM	40.90827	21.75403	58.27362	44.14466	32.00911	27.67807
4/7/2022	7:00:00 PM	40.73828	17.84708	69.13312	40.72953	31.10167	24.66736
4/7/2022	8:00:00 PM	33.52562	18.85366	48.81337	36.62725	29.98381	25.27467
4/7/2022	9:00:00 PM	38.39205	19.88706	56.99716	41.61909	32.27398	26.29636
4/7/2022	10:00:00 PM	39.33305	22.1754	58.09566	41.74554	33.69742	28.8437
4/7/2022	11:00:00 PM	36.24336	20.19321	53.04419	39.88795	31.65632	27.11342
4/8/2022	12:00:00 AM	41.39603	19.60736	59.1082	44.99778	35.65627	28.94917
4/8/2022	1:00:00 AM	45.88986	25.48367	64.69378	48.4839	38.33928	32.08005
4/8/2022	2:00:00 AM	38.79052	24.67149	57.96667	41.04308	36.10558	31.63383
4/8/2022	3:00:00 AM	48.21124	28.17275	67.49023	50.50149	39.19473	33.58618
4/8/2022	4:00:00 AM	50.34485	27.34984	73.41521	51.86714	38.63055	33.29938
4/8/2022	5:00:00 AM	51.35777	34.35418	72.74133	53.9221	46.1187	40.15712
4/8/2022	6:00:00 AM	53.11762	33.90835	72.71709	56.4031	46.02494	39.90464
4/8/2022	7:00:00 AM	49.55813	35.85231	70.69715	49.44669	45.43307	41.7374
4/8/2022	8:00:00 AM	49.61761	33.92085	73.50085	48.1373	42.85948	39.05755
4/8/2022	9:00:00 AM	51.66202	34.50405	70.10816	55.51186	45.08618	40.08078
4/8/2022	10:00:00 AM	50.98795	33.71998	70.07993	54.14248	46.11776	40.24278
4/8/2022	11:00:00 AM	48.58543	29.40854	67.19844	52.13395	42.90392	36.73518
4/8/2022	12:00:00 PM	59.74249	26.20871	80.28339	61.81897	47.735	34.56925
4/8/2022	1:00:00 PM	61.25536	28.91379	78.83461	65.38264	53.10157	39.98405
4/8/2022	2:00:00 PM	69.26063	32.84476	83.6849	73.85242	62.00794	45.85278
4/8/2022	3:00:00 PM	74.73797	49.69371	85.09608	78.35784	72.95275	65.77398
4/8/2022	4:00:00 PM	75.21438	47.30295	84.97296	78.83811	73.50479	65.74643
4/8/2022	5:00:00 PM	72.65031	42.46522	83.83849	76.86662	69.61138	58.21828
4/8/2022	6:00:00 PM	63.75151	32.33382	80.89578	67.66896	54.32474	40.22992
4/8/2022	7:00:00 PM	60.28615	32.07805	78.21096	64.41729	52.52522	41.02915
4/8/2022	8:00:00 PM	57.25839	34.61833	73.53462	60.90596	52.33173	44.1787
4/8/2022	9:00:00 PM	57.51773	32.94852	74.51378	61.41104	53.13218	44.36505
4/8/2022	10:00:00 PM	57.71218	34.27193	75.13783	61.27706	52.1549	43.67091

4/8/2022	11:00:00 PM	59.08599	29.72165	76.75171	63.00005	51.15197	38.1353
4/9/2022	12:00:00 AM	50.12836	30.23788	69.60734	53.671	42.33839	36.29375
4/9/2022	1:00:00 AM	41.10954	30.1829	56.72988	43.76964	39.4728	35.57574
4/9/2022	2:00:00 AM	46.34644	30.33849	67.53042	48.28941	40.44069	36.2265
4/9/2022	3:00:00 AM	45.83336	30.96177	64.31489	48.75909	40.48157	36.13516
4/9/2022	4:00:00 AM	48.70154	33.42344	66.83616	51.86545	44.36874	39.29682
4/9/2022	5:00:00 AM	53.56134	36.01116	73.35904	56.31274	47.06031	41.31696
4/9/2022	6:00:00 AM	52.97049	34.82966	73.07586	55.94728	47.52439	41.66433
4/9/2022	7:00:00 AM	56.11495	36.34313	72.20368	59.87014	51.0623	43.33263
4/9/2022	8:00:00 AM	50.55426	34.19398	71.72733	53.35265	44.23026	39.32578
4/9/2022	9:00:00 AM	48.21977	34.59311	67.53665	51.06883	43.8464	39.71383
4/9/2022	10:00:00 AM	55.32494	32.16755	75.45461	58.0932	44.9429	38.02876
4/9/2022	11:00:00 AM	65.2983	33.71728	81.17309	69.48708	59.19789	46.76907
4/9/2022	12:00:00 PM	67.97446	34.56447	81.79975	72.34222	62.96313	49.8572
4/9/2022	1:00:00 PM	67.06488	33.5714	82.38517	71.62782	59.41641	44.96929
4/9/2022	2:00:00 PM	66.99796	32.6639	82.51197	71.37783	58.90842	42.11272
4/9/2022	3:00:00 PM	68.84782	33.71652	82.51608	73.38345	62.9561	48.7193
4/9/2022	4:00:00 PM	70.16358	34.73928	83.27527	74.52318	65.93922	52.56205
4/9/2022	5:00:00 PM	74.01917	36.87998	85.36662	78.12459	71.50354	59.51624
4/9/2022	6:00:00 PM	74.51751	46.36385	84.572	78.24961	72.69977	64.06525
4/9/2022	7:00:00 PM	69.25429	37.45896	82.42722	73.47656	65.11358	54.34356
4/9/2022	8:00:00 PM	61.01251	32.97944	79.15551	64.82344	49.25076	39.16501
4/9/2022	9:00:00 PM	48.9276	32.22987	68.65743	51.72092	42.00186	37.62066
4/9/2022	10:00:00 PM	52.3533	31.90744	71.64048	55.73458	45.74184	38.63802
4/9/2022	11:00:00 PM	49.30691	30.82451	69.88	51.75461	41.25777	36.64707
4/10/2022	12:00:00 AM	50.52496	32.64319	70.11543	53.51536	43.59683	38.25344
4/10/2022	1:00:00 AM	46.57019	33.11314	66.38136	48.98351	42.10883	38.50133
4/10/2022	2:00:00 AM	42.73627	30.06988	61.87882	45.14026	39.87317	35.92129
4/10/2022	3:00:00 AM	47.88271	31.71172	70.33309	50.32941	40.71849	36.78898
4/10/2022	4:00:00 AM	43.40511	32.73737	54.99584	46.40574	41.93647	38.25929
4/10/2022	5:00:00 AM	43.96404	32.48986	66.49203	46.6348	41.60393	37.95536
4/10/2022	6:00:00 AM	44.388	34.62478	56.4036	46.89178	43.28856	39.74248
4/10/2022	7:00:00 AM	46.17652	34.64122	61.75146	49.10404	43.34951	39.6165
4/10/2022	8:00:00 AM	45.06292	33.47993	63.35174	48.1008	42.51107	38.66769
4/10/2022	9:00:00 AM	48.79712	34.80158	65.95439	51.88424	44.78147	40.52532
4/10/2022	10:00:00 AM	54.04729	35.15235	73.61719	57.26097	47.2204	40.92343
4/10/2022	11:00:00 AM	58.66748	32.38679	77.9048	62.22419	50.54607	40.05387
4/10/2022	12:00:00 PM	60.96059	31.0548	78.35313	65.08801	52.72372	39.72621
4/10/2022	1:00:00 PM	59.73345	31.14592	77.48507	63.64426	51.87606	38.57715
4/10/2022	2:00:00 PM	58.96486	30.14147	77.65841	62.40083	47.62566	36.60594
4/10/2022	3:00:00 PM	55.99326	31.2257	77.13645	58.60414	45.93384	37.97698
4/10/2022	4:00:00 PM	60.17284	28.86416	83.35021	58.64726	42.48099	34.09913
4/10/2022	5:00:00 PM	49.14482	27.56045	70.55925	51.88831	40.22917	33.33379

4/10/2022	6:00:00 PM	42.10408	26.32073	63.14239	43.89098	35.65292	31.68901
4/10/2022	7:00:00 PM	37.90115	25.31989	57.79049	40.12672	34.23383	30.70966
4/10/2022	8:00:00 PM	41.1797	29.25991	58.71416	44.03027	37.9683	34.38676
4/10/2022	9:00:00 PM	42.38183	29.40764	59.99355	45.0663	38.73185	34.64891
4/10/2022	10:00:00 PM	42.8233	28.90253	59.8553	46.04584	38.25981	34.77625
4/10/2022	11:00:00 PM	40.0894	26.26609	57.6583	42.913	35.62574	31.74161
4/11/2022	12:00:00 AM	41.28565	27.26256	56.79198	44.72023	37.97154	33.54699
4/11/2022	1:00:00 AM	45.46716	29.01658	61.41271	48.91493	40.17183	35.37757
4/11/2022	2:00:00 AM	50.26671	30.19143	65.39452	55.29985	41.63092	36.55874
4/11/2022	3:00:00 AM	40.70331	29.6127	59.72627	43.02472	38.88069	35.33393
4/11/2022	4:00:00 AM	60.438	32.9782	77.8901	64.58835	52.41813	39.25167
4/11/2022	5:00:00 AM	62.15579	34.22247	78.47251	66.30096	56.84952	46.27768
4/11/2022	6:00:00 AM	69.63864	36.15591	82.70799	73.97457	65.46448	53.60427
4/11/2022	7:00:00 AM	69.15796	35.41105	83.09343	73.44011	64.28554	53.17499
4/11/2022	8:00:00 AM	72.35328	47.41182	83.68701	76.35556	69.8208	61.64425
4/11/2022	9:00:00 AM	64.17604	35.41081	80.42262	68.28765	57.36297	45.00472
4/11/2022	10:00:00 AM	73.79423	34.64154	85.26941	78.23123	70.10639	49.01491
4/11/2022	11:00:00 AM	74.00835	41.26418	86.3445	77.98092	71.43388	60.55648
4/11/2022	12:00:00 PM	75.62543	52.2424	85.6238	79.41336	73.69715	66.23379
4/11/2022	1:00:00 PM	79.9228	52.41771	88.07092	82.92555	79.04596	73.51398
4/11/2022	2:00:00 PM	74.96137	40.69917	85.27088	78.81455	72.97952	61.80698
4/11/2022	3:00:00 PM	74.30791	48.73412	84.75663	78.14148	72.18479	63.85937
4/11/2022	4:00:00 PM	77.66017	52.53018	86.29528	80.79051	76.61744	70.68314
4/11/2022	5:00:00 PM	72.31973	43.57063	85.09211	77.29865	65.95012	56.03471
4/11/2022	6:00:00 PM	64.0705	37.07345	79.66131	68.11376	58.37489	48.15896
4/11/2022	7:00:00 PM	64.35018	33.66092	81.21659	68.06465	56.99574	43.63811
4/11/2022	8:00:00 PM	60.85572	32.50178	77.97646	64.95383	54.10265	40.14616
4/11/2022	9:00:00 PM	70.06475	38.93809	83.70505	74.32698	65.66524	54.64203
4/11/2022	10:00:00 PM	62.09524	35.61497	77.78124	66.09716	57.30927	48.04731
4/11/2022	11:00:00 PM	59.96361	31.92774	75.40709	64.20823	53.3321	41.63325
4/12/2022	12:00:00 AM	67.75679	40.20959	80.24679	71.97797	64.02358	54.10303
4/12/2022	1:00:00 AM	56.57066	33.44508	74.45489	59.81302	46.28275	39.23857
4/12/2022	2:00:00 AM	61.62437	34.87056	77.36443	66.13446	54.26161	41.33103
4/12/2022	3:00:00 AM	59.74274	34.50068	77.30171	63.4308	54.16248	44.62923
4/12/2022	4:00:00 AM	62.56015	38.62241	76.97111	66.46754	59.02555	50.88357
4/12/2022	5:00:00 AM	64.36375	37.862	77.64033	68.4151	60.64453	51.46562
4/12/2022	6:00:00 AM	73.08111	51.24901	84.67353	77.01079	70.49296	62.82085
4/12/2022	7:00:00 AM	73.784	51.96627	84.48492	77.58176	71.73928	64.09234
4/12/2022	8:00:00 AM	71.33868	45.59422	82.64717	75.33414	68.6498	60.22377
4/12/2022	9:00:00 AM	71.02881	46.71982	82.91821	74.87952	68.44744	60.26022
4/12/2022	10:00:00 AM	70.39978	43.84602	82.39154	74.34019	67.56582	59.10415
4/12/2022	11:00:00 AM	68.65517	39.84568	82.20781	72.78823	64.97242	55.85866
4/12/2022	12:00:00 PM	63.51325	34.64693	80.36296	67.52185	57.32656	47.42025

4/12/2022	1:00:00 PM	68.68607	40.20321	81.73665	72.70667	65.2225	56.38172
4/12/2022	2:00:00 PM	67.83953	34.29752	82.06654	72.1088	63.22166	50.49902
4/12/2022	3:00:00 PM	70.24006	44.29838	82.27567	74.25265	67.28287	58.84327
4/12/2022	4:00:00 PM	66.3492	37.90514	81.10401	70.44469	61.90331	51.98248
4/12/2022	5:00:00 PM	65.70435	37.11583	80.01948	69.84704	61.0005	50.96598
4/12/2022	6:00:00 PM	62.17626	27.95404	78.20097	66.57799	52.57144	36.31386
4/12/2022	7:00:00 PM	40.7769	25.85744	58.05628	44.12375	37.03446	31.95932
4/12/2022	8:00:00 PM	42.00438	25.92892	59.59833	44.94246	37.85968	32.50989
4/12/2022	9:00:00 PM	49.96506	31.23077	66.47528	53.63356	45.65874	38.93678
4/12/2022	10:00:00 PM	46.11395	30.45695	62.49097	49.24421	42.43658	37.18511
4/12/2022	11:00:00 PM	53.97285	31.3954	75.8776	54.68148	44.87133	39.09762
4/13/2022	12:00:00 AM	58.29039	32.78043	74.48021	62.31598	52.97983	42.06344
4/13/2022	1:00:00 AM	53.4928	33.73305	69.9125	57.21639	48.25682	41.07135
4/13/2022	2:00:00 AM	55.89991	32.53878	72.03241	59.92766	50.44788	41.19324
4/13/2022	3:00:00 AM	59.93816	34.78818	75.94365	64.01153	53.7219	43.20723
4/13/2022	4:00:00 AM	61.11409	38.74721	75.0299	65.01818	57.50467	49.95236
4/13/2022	5:00:00 AM	61.74201	38.08289	75.97128	65.67007	57.6798	48.9379
4/13/2022	6:00:00 AM	63.06139	39.23252	78.32213	67.02469	58.63926	50.12162
4/13/2022	7:00:00 AM	59.20323	37.7467	75.23989	63.11514	54.41204	46.04569
4/13/2022	8:00:00 AM	51.05133	35.58615	76.67369	52.25141	45.03356	41.00071
4/13/2022	9:00:00 AM	58.71812	35.94269	75.76311	62.72556	52.29565	43.02721
4/13/2022	10:00:00 AM	61.34806	35.0417	78.03608	65.20708	54.59764	44.78161
4/13/2022	11:00:00 AM	68.3069	38.13932	81.23747	72.66429	63.62909	52.48073
4/13/2022	12:00:00 PM	64.04105	35.11316	79.50527	67.93707	57.9976	46.62699
4/13/2022	1:00:00 PM	68.29802	37.76409	81.77769	72.65274	63.31544	52.31528
4/13/2022	2:00:00 PM	70.08386	40.89688	82.42519	74.34972	66.28922	56.09075
4/13/2022	3:00:00 PM	68.25925	38.85199	81.38506	72.44476	64.28986	53.91703
4/13/2022	4:00:00 PM	66.65462	37.32013	81.51405	70.88416	61.49811	50.74214
4/13/2022	5:00:00 PM	66.94669	36.42727	81.63607	71.11548	61.58715	50.53152
4/13/2022	6:00:00 PM	64.49851	34.07833	81.30969	68.41477	59.04195	48.33226
4/13/2022	7:00:00 PM	55.97385	31.97975	73.32465	59.41435	49.97318	41.70739
4/13/2022	8:00:00 PM	58.83011	33.50468	78.30248	61.73214	52.41321	43.44344
4/13/2022	9:00:00 PM	51.00275	30.19733	68.07036	54.61183	46.06044	38.61477
4/13/2022	10:00:00 PM	58.17719	31.40606	75.23162	61.80139	51.23364	41.60378
4/13/2022	11:00:00 PM	60.76176	32.17871	77.5008	64.57267	54.38944	44.43798
4/14/2022	12:00:00 AM	63.16791	30.7061	78.70091	67.36617	56.19889	43.64442
4/14/2022	1:00:00 AM	67.80167	35.70951	81.12537	71.85519	64.23898	55.0627
4/14/2022	2:00:00 AM	68.63281	41.5077	80.62527	72.76507	65.54891	56.75714
4/14/2022	3:00:00 AM	68.74942	43.10888	81.25046	72.75728	65.77931	57.32432
4/14/2022	4:00:00 AM	63.94783	38.03089	78.50264	67.90172	60.14965	51.4754
4/14/2022	5:00:00 AM	68.75292	43.45219	80.89742	72.83521	65.47894	56.6949
4/14/2022	6:00:00 AM	69.51927	43.71465	81.76114	73.52274	66.35378	57.97163
4/14/2022	7:00:00 AM	63.5373	35.13137	78.87571	67.69672	57.27312	46.41999

4/14/2022	8:00:00 AM	61.93617	34.37826	79.12226	65.73565	54.76712	43.90158
4/14/2022	9:00:00 AM	70.66039	37.99091	82.63357	74.89411	67.25884	56.31089
4/14/2022	10:00:00 AM	71.09355	40.78475	83.33455	75.2095	67.86758	57.92279
4/14/2022	11:00:00 AM	70.4966	39.87648	82.66523	74.65085	67.04155	56.58108
4/14/2022	12:00:00 PM	68.80597	38.23066	81.97626	73.04304	64.69622	54.74879
4/14/2022	1:00:00 PM	68.19466	35.52954	81.44034	72.58399	63.28642	51.72472
4/14/2022	2:00:00 PM	72.49834	38.32268	84.44268	76.71577	69.36847	58.2006
4/14/2022	3:00:00 PM	73.87214	39.29705	85.31164	78.20566	70.58314	56.9031
4/14/2022	4:00:00 PM	73.21595	46.49219	84.31903	77.10642	70.91621	61.80773
4/14/2022	5:00:00 PM	69.94591	40.574	83.54542	74.162	65.7366	55.54053
4/14/2022	6:00:00 PM	71.10066	37.04828	84.25104	75.76282	65.65909	51.82828
4/14/2022	7:00:00 PM	63.49373	38.2696	79.9175	67.28061	58.55724	49.83209
4/14/2022	8:00:00 PM	61.3937	36.37376	77.06245	65.36093	56.44363	47.25713
4/14/2022	9:00:00 PM	62.0609	35.8344	78.52437	66.00703	57.67147	48.66392
4/14/2022	10:00:00 PM	66.18775	35.67471	80.91582	70.50115	60.72207	49.75457
4/14/2022	11:00:00 PM	64.11134	37.14197	78.65886	68.20158	59.79515	50.2214
4/15/2022	12:00:00 AM	67.27167	39.3711	80.24786	71.33266	63.35814	54.018
4/15/2022	1:00:00 AM	67.51231	37.8906	80.92131	71.68056	63.35602	53.70714
4/15/2022	2:00:00 AM	59.65956	33.48666	77.77847	62.93134	52.70139	42.98651
4/15/2022	3:00:00 AM	58.81179	33.93819	74.23909	62.7413	53.44309	43.85638
4/15/2022	4:00:00 AM	53.18687	29.59571	73.60137	56.39137	46.85142	38.66791
4/15/2022	5:00:00 AM	51.71305	31.68314	68.65255	55.33737	47.28457	39.96249
4/15/2022	6:00:00 AM	51.39512	31.44275	70.76077	54.52625	44.35159	38.53234
4/15/2022	7:00:00 AM	43.84063	30.9081	61.18283	46.91097	39.96578	36.00833
4/15/2022	8:00:00 AM	51.32307	29.68018	73.45601	52.7255	39.94618	35.16842
4/15/2022	9:00:00 AM	56.32691	31.78937	74.9213	59.85856	49.80048	40.31026
4/15/2022	10:00:00 AM	62.46476	32.50739	79.71572	66.50777	56.25046	44.35668
4/15/2022	11:00:00 AM	62.95854	32.5996	79.67751	66.63524	55.63978	45.01476
4/15/2022	12:00:00 PM	64.20652	31.37186	80.19672	68.36906	57.81251	44.43675
4/15/2022	1:00:00 PM	67.13815	33.84722	80.64168	71.48403	62.1748	50.12158
4/15/2022	2:00:00 PM	64.71485	32.67157	78.81896	68.94178	59.30732	48.33184
4/15/2022	3:00:00 PM	59.61485	30.95205	75.81693	63.6218	52.75372	42.26435
4/15/2022	4:00:00 PM	64.93808	32.60569	81.39865	69.11027	59.70742	45.47231
4/15/2022	5:00:00 PM	66.01444	32.92987	81.17864	70.12549	60.65912	48.92643
4/15/2022	6:00:00 PM	61.01074	30.78481	76.92245	65.01373	54.89851	44.29986
4/15/2022	7:00:00 PM	52.33156	28.7396	71.3804	55.52334	44.35928	35.6211
4/15/2022	8:00:00 PM	44.64175	28.11518	64.73162	47.37239	38.54607	33.89777
4/15/2022	9:00:00 PM	48.9594	29.35777	73.72352	46.07601	38.58198	34.75359
4/15/2022	10:00:00 PM	43.02268	30.60972	60.08155	45.15667	39.61684	35.96496
4/15/2022	11:00:00 PM	44.43083	25.01249	62.26576	47.4374	39.98447	33.4259
4/16/2022	12:00:00 AM	39.50933	25.10793	54.58621	43.67976	34.05946	30.23785
4/16/2022	1:00:00 AM	47.22741	31.31158	68.02434	49.4217	42.346	37.12404
4/16/2022	2:00:00 AM	51.10106	27.40789	67.40106	55.75738	44.12481	34.60859

4/16/2022	3:00:00 AM	49.92201	30.19621	71.03799	49.66448	41.70173	36.54748
4/16/2022	4:00:00 AM	47.66086	31.04331	68.44475	49.48471	41.17223	36.60192
4/16/2022	5:00:00 AM	52.72173	31.91648	72.66214	54.9018	43.77092	37.53661
4/16/2022	6:00:00 AM	45.34081	29.853	68.37284	46.41042	39.4277	35.79443
4/16/2022	7:00:00 AM	52.10038	34.41495	69.93574	55.64323	46.87368	41.59706
4/16/2022	8:00:00 AM	50.41189	33.86317	70.67096	53.63363	45.43107	39.78209
4/16/2022	9:00:00 AM	48.26541	29.75766	70.16413	49.46866	41.18723	35.71523
4/16/2022	10:00:00 AM	59.68989	26.43772	79.98141	60.36089	38.9106	32.6017
4/16/2022	11:00:00 AM	70.5962	36.99229	83.15843	74.74716	67.21491	56.60602
4/16/2022	12:00:00 PM	71.97726	39.31364	84.68231	76.09867	68.78435	59.11174
4/16/2022	1:00:00 PM	71.68925	42.54208	83.30793	75.84468	68.56126	58.78216
4/16/2022	2:00:00 PM	76.22352	43.16833	86.00131	79.96167	74.5164	64.879
4/16/2022	3:00:00 PM	78.08557	56.47072	86.80542	81.22152	76.98449	71.37088
4/16/2022	4:00:00 PM	76.04302	50.7309	86.28557	79.63242	74.38181	66.93599
4/16/2022	5:00:00 PM	74.73282	47.63642	85.76168	78.39396	72.82212	64.61338
4/16/2022	6:00:00 PM	74.09517	37.22391	85.29688	78.10795	71.4385	61.5232
4/16/2022	7:00:00 PM	65.2435	34.62656	79.5244	69.699	59.06591	47.10168
4/16/2022	8:00:00 PM	59.44531	33.10591	79.89919	62.89379	53.439	43.4512
4/16/2022	9:00:00 PM	64.029	32.14118	80.34841	68.05865	58.03462	45.04786
4/16/2022	10:00:00 PM	56.93181	28.49675	76.56948	58.9803	43.84436	34.11689
4/16/2022	11:00:00 PM	61.36055	32.80221	79.73346	65.0486	55.89627	46.3793
4/17/2022	12:00:00 AM	60.58454	32.64177	77.67403	64.29861	54.51259	43.98061
4/17/2022	1:00:00 AM	52.72718	33.87751	69.67248	56.14066	47.45672	41.01081
4/17/2022	2:00:00 AM	47.92544	31.39973	63.5929	51.42699	44.43355	38.41542
4/17/2022	3:00:00 AM	46.87419	30.60377	63.5858	50.2663	42.68253	37.08949
4/17/2022	4:00:00 AM	43.37352	30.94662	59.46018	46.32613	41.07253	36.65554
4/17/2022	5:00:00 AM	41.55527	30.19209	58.20267	43.99082	39.24542	35.61646
4/17/2022	6:00:00 AM	49.7331	32.99871	70.39111	50.7029	46.14256	39.68364
4/17/2022	7:00:00 AM	49.51794	34.40123	66.63512	52.88211	45.0813	40.0372
4/17/2022	8:00:00 AM	47.42512	34.00648	67.11888	50.27114	43.73318	39.507
4/17/2022	9:00:00 AM	48.8715	32.22637	72.57349	48.73778	41.89667	38.00248
4/17/2022	10:00:00 AM	62.4535	32.01097	79.22257	66.61472	52.58675	39.24322
4/17/2022	11:00:00 AM	61.95294	32.32119	80.4475	65.99259	52.48695	39.6514
4/17/2022	12:00:00 PM	60.29519	32.12146	79.5764	64.04983	50.52442	38.7732
4/17/2022	1:00:00 PM	58.62821	30.06082	77.37668	62.16898	47.63164	36.0879
4/17/2022	2:00:00 PM	59.42396	31.74517	76.96687	63.15285	50.97411	38.4176
4/17/2022	3:00:00 PM	55.4916	28.28701	76.60088	57.58806	43.88722	33.71882
4/17/2022	4:00:00 PM	58.78604	27.52744	76.3876	62.55563	50.92557	35.3355
4/17/2022	5:00:00 PM	54.23431	26.64157	73.08346	58.02094	46.64661	33.85504
4/17/2022	6:00:00 PM	46.97656	24.63753	65.48427	50.64091	40.95653	33.01852
4/17/2022	7:00:00 PM	39.92239	25.52502	59.97872	42.09173	35.66586	31.22361
4/17/2022	8:00:00 PM	40.43234	26.97909	55.95883	43.34174	37.97151	33.3909
4/17/2022	9:00:00 PM	39.55991	25.97259	56.36026	42.83473	36.4688	31.98877

4/17/2022	10:00:00 PM	41.12911	23.26099	61.87807	44.70484	35.37459	30.63249
4/17/2022	11:00:00 PM	36.86462	24.44575	55.01668	39.70195	34.26881	30.04288
4/18/2022	12:00:00 AM	44.01366	27.49719	61.01807	47.2259	39.77097	34.11744
4/18/2022	1:00:00 AM	41.3422	27.23058	59.72234	44.03417	38.06675	33.47234
4/18/2022	2:00:00 AM	40.87219	29.00512	55.75144	44.05409	38.4164	34.52427
4/18/2022	3:00:00 AM	39.59415	29.06151	54.95419	42.4847	37.41984	34.28769
4/18/2022	4:00:00 AM	53.03991	32.03776	68.07103	58.04016	44.57244	38.35865
4/18/2022	5:00:00 AM	54.33485	32.92922	74.11866	57.19644	46.788	38.87757
4/18/2022	6:00:00 AM	48.1309	31.69199	63.62234	51.86881	41.70774	36.57173
4/18/2022	7:00:00 AM	50.83685	34.95383	71.09989	54.24817	45.80563	40.7704
4/18/2022	8:00:00 AM	47.05948	32.14054	66.72452	49.58043	43.22679	37.86587
4/18/2022	9:00:00 AM	48.34378	33.06715	66.16216	51.78476	43.0174	38.34466
4/18/2022	10:00:00 AM	50.22846	33.61328	67.2448	53.91539	44.48185	39.08315
4/18/2022	11:00:00 AM	48.79577	30.4954	68.74106	51.75041	43.01923	36.77796
4/18/2022	12:00:00 PM	63.99158	30.18571	80.18624	68.30193	54.20303	38.26086
4/18/2022	1:00:00 PM	67.96354	32.62213	80.71774	72.39942	63.03022	49.89056
4/18/2022	2:00:00 PM	67.51259	34.03777	81.50288	71.79706	62.87752	51.99822
4/18/2022	3:00:00 PM	66.13732	33.62156	80.71492	70.2999	61.41571	50.92178
4/18/2022	4:00:00 PM	63.43539	31.11786	79.56914	67.45346	57.53374	45.66619
4/18/2022	5:00:00 PM	62.20214	29.036	79.13885	66.04893	55.32149	43.64993
4/18/2022	6:00:00 PM	61.31262	30.39962	77.68871	65.53706	52.0801	39.64312
4/18/2022	7:00:00 PM	69.6297	44.16542	82.31954	73.69439	66.40091	58.10184
4/18/2022	8:00:00 PM	73.33342	48.44246	84.29515	77.11957	71.11602	63.10347
4/18/2022	9:00:00 PM	70.84669	39.10689	82.72134	74.91725	67.72847	58.38133
4/18/2022	10:00:00 PM	67.9145	39.47532	80.70351	72.01036	64.16223	55.11131
4/18/2022	11:00:00 PM	60.99667	32.48765	77.7776	64.97027	55.62759	45.84435
4/19/2022	12:00:00 AM	59.87352	31.40828	77.61917	63.71798	54.56779	45.14642
4/19/2022	1:00:00 AM	56.16579	30.9014	73.21793	59.88799	51.29764	42.62803
4/19/2022	2:00:00 AM	51.15498	31.51316	68.61586	54.64694	46.48193	39.40577
4/19/2022	3:00:00 AM	49.4703	30.90252	67.03135	52.86745	45.87419	39.40216
4/19/2022	4:00:00 AM	60.26218	35.70182	76.11316	64.14208	55.37452	46.81229
4/19/2022	5:00:00 AM	69.36738	39.65447	82.05954	73.57792	65.67531	55.96227
4/19/2022	6:00:00 AM	70.14219	40.9659	82.92727	74.2327	66.84401	58.00232
4/19/2022	7:00:00 AM	67.32968	40.41736	81.26601	71.46375	63.45113	54.37809
4/19/2022	8:00:00 AM	64.70412	39.34971	83.99528	68.26249	58.42033	48.51333

WM13: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	12:45:30 PM	80.70907	52.2478	91.84958	84.97752	77.52044	67.29482
4/5/2022	1:00:00 PM	78.55024	42.818	91.62638	83.11782	73.33889	60.38889
4/5/2022	2:00:00 PM	77.54511	41.10849	92.02894	82.01325	71.76258	57.78959
4/5/2022	3:00:00 PM	80.17864	41.14381	92.54444	84.57849	76.29059	63.18627
4/5/2022	4:00:00 PM	76.94159	40.30899	92.29878	81.35788	70.69949	57.81746
4/5/2022	5:00:00 PM	73.67854	39.04383	88.93763	77.93733	67.567	54.97849
4/5/2022	6:00:00 PM	69.48228	38.47584	85.59151	73.65641	63.07517	51.04756
4/5/2022	7:00:00 PM	65.38832	38.33599	84.02072	68.76788	59.15414	48.64443
4/5/2022	8:00:00 PM	60.62514	39.39105	79.86068	63.64961	53.84189	46.65657
4/5/2022	9:00:00 PM	61.51078	38.9847	83.05275	64.31478	50.76042	45.3819
4/5/2022	10:00:00 PM	49.32943	37.11763	66.58552	51.71354	47.43607	43.66432
4/5/2022	11:00:00 PM	47.23897	35.98037	57.75885	50.18339	45.87851	42.18781
4/6/2022	12:00:00 AM	47.51039	36.73264	58.93456	50.32979	46.30051	42.87286
4/6/2022	1:00:00 AM	46.23492	35.56795	57.14575	48.81953	45.29925	41.8869
4/6/2022	2:00:00 AM	50.08495	38.85641	65.28018	52.52958	48.49572	44.84426
4/6/2022	3:00:00 AM	49.48666	39.39516	59.38111	52.26368	48.46194	45.03761
4/6/2022	4:00:00 AM	49.08618	38.71844	68.76666	51.16206	47.45471	44.1996
4/6/2022	5:00:00 AM	50.14201	39.65893	70.5347	52.33431	48.55875	45.31891
4/6/2022	6:00:00 AM	51.4125	40.62262	69.26149	53.26899	49.67594	46.37043
4/6/2022	7:00:00 AM	57.63489	42.08531	76.50138	60.72615	53.72463	48.99604
4/6/2022	8:00:00 AM	61.47895	43.42628	78.7194	65.18166	57.39382	50.76493
4/6/2022	9:00:00 AM	59.81217	43.0091	77.20836	63.26597	54.92857	49.60113
4/6/2022	10:00:00 AM	61.33323	41.16711	81.56788	64.48019	54.24524	48.31585
4/6/2022	11:00:00 AM	63.42666	39.17972	81.02744	67.29788	55.52607	46.68584
4/6/2022	12:00:00 PM	61.36488	38.66043	83.8265	64.25137	52.00647	45.65048
4/6/2022	1:00:00 PM	60.74622	37.12699	81.74428	63.50432	49.86924	43.67967
4/6/2022	2:00:00 PM	62.09468	37.98125	84.9172	63.71712	51.41163	44.94745
4/6/2022	3:00:00 PM	59.77877	37.34891	85.05463	61.30727	50.48399	44.57193
4/6/2022	4:00:00 PM	55.34542	35.54866	76.7232	57.7489	47.06671	42.26749
4/6/2022	5:00:00 PM	54.49301	35.33193	80.21059	53.35092	45.78757	41.51904
4/6/2022	6:00:00 PM	47.59127	33.48221	67.63592	49.67438	44.24613	40.29752
4/6/2022	7:00:00 PM	47.29672	31.42884	68.68743	50.10981	43.83066	39.09302
4/6/2022	8:00:00 PM	46.29462	32.4554	60.87384	49.39132	44.48321	40.1149
4/6/2022	9:00:00 PM	45.02983	32.05933	57.18635	48.03942	43.4628	39.40129
4/6/2022	10:00:00 PM	46.23317	34.31472	58.12276	48.98767	44.92438	41.09351
4/6/2022	11:00:00 PM	46.46466	33.6154	57.21955	49.40724	45.14323	40.98734
4/7/2022	12:00:00 AM	44.97328	33.36791	58.27305	47.69194	43.62806	39.79061
4/7/2022	1:00:00 AM	54.8794	33.25187	75.61976	57.6632	45.32971	40.13545
4/7/2022	2:00:00 AM	50.33488	35.41698	69.36541	53.27451	46.37582	41.96258
4/7/2022	3:00:00 AM	52.15533	36.91721	67.48706	55.05389	48.02699	43.78362

4/7/2022	4:00:00 AM	48.29523	35.75365	63.39993	51.21223	46.34961	42.49583
4/7/2022	5:00:00 AM	46.7602	36.63974	59.78986	49.5451	45.29729	41.98319
4/7/2022	6:00:00 AM	54.57393	37.53394	73.59277	54.81718	47.67548	43.75881
4/7/2022	7:00:00 AM	54.42309	39.92939	72.38211	57.21861	50.28282	46.00463
4/7/2022	8:00:00 AM	57.3042	40.82583	73.0449	60.83519	53.12692	47.53398
4/7/2022	9:00:00 AM	59.45277	38.71819	77.61068	62.99301	54.03665	46.28934
4/7/2022	10:00:00 AM	56.18878	35.9374	76.60951	58.83648	48.83912	42.64311
4/7/2022	11:00:00 AM	54.80215	32.26973	80.47165	57.49546	46.85638	40.13855
4/7/2022	12:00:00 PM	54.96034	32.42927	75.59664	57.93552	46.29508	39.7459
4/7/2022	1:00:00 PM	57.1382	32.0997	80.69835	59.7756	47.26045	39.24991
4/7/2022	2:00:00 PM	60.82316	32.54644	82.72822	63.66447	50.10194	40.70436
4/7/2022	3:00:00 PM	57.15032	31.64067	78.30234	60.42538	47.80504	39.28235
4/7/2022	4:00:00 PM	56.25014	31.49828	77.94895	58.6261	45.67335	38.83946
4/7/2022	5:00:00 PM	52.88778	29.80664	74.48693	55.21027	44.3361	38.03197
4/7/2022	6:00:00 PM	44.86001	28.28376	62.36128	47.78549	40.00945	35.6137
4/7/2022	7:00:00 PM	43.73764	24.77576	72.08686	44.82004	38.32102	33.15221
4/7/2022	8:00:00 PM	39.70187	25.37475	54.08373	42.89586	37.33693	32.77354
4/7/2022	9:00:00 PM	42.81833	25.52955	59.27277	46.50395	38.29452	33.0904
4/7/2022	10:00:00 PM	42.1985	26.27894	59.35478	44.90112	38.55313	34.0304
4/7/2022	11:00:00 PM	39.83535	24.44119	54.98453	43.33679	36.82544	32.12448
4/8/2022	12:00:00 AM	44.29296	23.51946	60.85216	47.83305	39.81066	33.35849
4/8/2022	1:00:00 AM	48.7131	29.71755	66.47614	51.66295	42.6726	36.9047
4/8/2022	2:00:00 AM	42.42709	27.99555	59.60191	45.06429	40.24592	35.68917
4/8/2022	3:00:00 AM	49.51375	30.65021	68.31988	51.92585	42.14832	37.05424
4/8/2022	4:00:00 AM	52.05335	30.18224	74.20224	54.21571	41.94954	36.90981
4/8/2022	5:00:00 AM	53.63459	36.94258	73.21035	56.77628	49.31628	43.4785
4/8/2022	6:00:00 AM	55.4259	36.69319	73.86652	59.11406	49.11376	43.31995
4/8/2022	7:00:00 AM	51.73719	37.77837	72.17974	52.39666	48.21627	44.4488
4/8/2022	8:00:00 AM	51.79392	36.26414	74.70372	52.42077	46.22939	42.15214
4/8/2022	9:00:00 AM	56.09198	36.81515	77.20383	58.87016	48.8172	43.42373
4/8/2022	10:00:00 AM	63.68318	37.44346	81.34156	67.48938	57.97742	48.20356
4/8/2022	11:00:00 AM	61.169	32.81451	79.87689	64.88553	53.75718	42.96894
4/8/2022	12:00:00 PM	72.14941	31.5565	90.49608	75.42428	62.29922	47.08998
4/8/2022	1:00:00 PM	73.93486	35.47359	89.9065	78.22169	67.30712	53.62544
4/8/2022	2:00:00 PM	80.3119	40.99037	92.89275	84.88852	75.08561	59.60075
4/8/2022	3:00:00 PM	85.03084	62.09956	94.57873	88.43007	83.70274	77.60832
4/8/2022	4:00:00 PM	85.27994	60.37373	94.09781	88.68415	84.073	77.62218
4/8/2022	5:00:00 PM	83.25403	56.66969	93.52826	87.19687	81.0863	71.58476
4/8/2022	6:00:00 PM	75.70829	38.27	90.85297	80.01538	68.25955	52.13883
4/8/2022	7:00:00 PM	73.06112	37.4543	89.23903	77.27413	66.60208	54.32866
4/8/2022	8:00:00 PM	70.73081	44.86241	85.39412	74.52659	66.42687	58.34035
4/8/2022	9:00:00 PM	71.10219	44.0867	86.23942	75.05144	67.39899	58.95094
4/8/2022	10:00:00 PM	71.09518	41.84909	87.19686	74.78758	66.28383	57.36637

4/8/2022	11:00:00 PM	72.0027	33.09067	88.93691	76.10373	65.34372	43.93931
4/9/2022	12:00:00 AM	64.14568	33.81725	83.71833	68.00699	54.31512	42.23115
4/9/2022	1:00:00 AM	47.07481	33.27004	67.47604	48.89891	44.10023	40.01219
4/9/2022	2:00:00 AM	59.65284	34.19676	81.90058	61.74514	48.17462	41.97469
4/9/2022	3:00:00 AM	60.009	34.6939	77.82187	63.67161	52.31158	42.53586
4/9/2022	4:00:00 AM	62.3035	36.56465	80.50322	66.13064	56.09701	45.19659
4/9/2022	5:00:00 AM	66.42846	39.17655	83.92942	69.9891	59.03383	47.83772
4/9/2022	6:00:00 AM	65.99159	39.24318	83.8109	69.78332	60.28014	50.90488
4/9/2022	7:00:00 AM	70.01991	42.03807	84.97396	73.92615	65.48956	55.3541
4/9/2022	8:00:00 AM	63.6143	37.58878	81.42901	67.49353	56.12776	45.27837
4/9/2022	9:00:00 AM	59.77206	37.7673	79.29885	62.93429	51.07592	44.40571
4/9/2022	10:00:00 AM	68.18635	36.02554	87.33283	71.69976	55.0161	43.82427
4/9/2022	11:00:00 AM	77.25392	40.67202	91.39387	81.49464	72.72062	61.53442
4/9/2022	12:00:00 PM	79.54292	43.7771	92.25981	83.84497	75.8794	64.69913
4/9/2022	1:00:00 PM	78.83764	39.60631	92.45525	83.4635	73.34927	59.69717
4/9/2022	2:00:00 PM	78.45039	38.86862	92.23058	82.97921	72.56309	56.36487
4/9/2022	3:00:00 PM	80.0419	39.93083	92.09223	84.50004	75.74578	63.40094
4/9/2022	4:00:00 PM	81.28643	42.0163	93.14568	85.50358	78.22616	66.80919
4/9/2022	5:00:00 PM	84.22409	47.77763	94.49439	88.03563	82.39352	72.57936
4/9/2022	6:00:00 PM	84.74912	59.58895	94.0932	88.23476	83.377	76.11607
4/9/2022	7:00:00 PM	80.51536	48.88955	92.50493	84.64881	77.42549	68.01242
4/9/2022	8:00:00 PM	73.3188	37.89995	89.87276	77.62965	63.54241	49.4306
4/9/2022	9:00:00 PM	61.82213	35.91966	81.50274	65.33248	51.5518	42.85927
4/9/2022	10:00:00 PM	65.89578	36.35424	83.15571	69.73851	59.42842	47.83587
4/9/2022	11:00:00 PM	63.54307	34.79051	82.52553	66.71799	52.70003	42.64298
4/10/2022	12:00:00 AM	64.59662	36.44283	83.31068	68.147	56.30134	45.80487
4/10/2022	1:00:00 AM	59.23775	36.14981	81.00663	61.64075	47.38575	42.66315
4/10/2022	2:00:00 AM	53.75344	33.95591	74.98058	55.739	46.48372	41.29203
4/10/2022	3:00:00 AM	62.19604	35.18475	84.57444	65.09461	49.70467	41.69646
4/10/2022	4:00:00 AM	47.37265	35.82689	59.12114	50.27955	45.93474	42.15227
4/10/2022	5:00:00 AM	47.8525	36.23294	67.42212	50.6407	46.12895	42.43826
4/10/2022	6:00:00 AM	48.4231	37.5915	59.30065	51.08514	47.40108	43.71723
4/10/2022	7:00:00 AM	51.35946	38.0026	67.6883	54.4302	47.76696	43.76445
4/10/2022	8:00:00 AM	55.92266	37.38829	73.27891	59.64044	50.93104	44.12321
4/10/2022	9:00:00 AM	61.29069	38.40389	80.07451	64.6737	54.59396	46.40468
4/10/2022	10:00:00 AM	67.44436	38.81711	85.55792	71.26325	59.93359	47.316
4/10/2022	11:00:00 AM	71.37623	36.75178	88.49193	75.33407	64.53762	51.55307
4/10/2022	12:00:00 PM	73.66974	35.04753	91.01668	77.88472	66.75188	51.66378
4/10/2022	1:00:00 PM	72.44076	35.6534	88.05652	76.61302	65.84203	49.55706
4/10/2022	2:00:00 PM	71.60279	34.16591	88.43959	75.50115	61.65793	43.26096
4/10/2022	3:00:00 PM	68.50766	34.9947	86.41917	72.11834	59.00715	44.84538
4/10/2022	4:00:00 PM	71.0881	33.11697	91.92284	72.36016	56.08302	41.51814
4/10/2022	5:00:00 PM	62.89937	32.21346	84.71005	66.08227	52.92658	40.55337

4/10/2022	6:00:00 PM	54.1559	30.9719	76.46521	55.20801	42.88199	37.88678
4/10/2022	7:00:00 PM	43.22625	29.83355	60.86303	45.81232	40.69214	36.70781
4/10/2022	8:00:00 PM	47.05173	32.49968	67.60728	49.94555	43.06711	38.84352
4/10/2022	9:00:00 PM	45.68743	32.99536	61.96215	48.45515	43.17171	39.12097
4/10/2022	10:00:00 PM	46.36675	32.4825	64.99711	49.12001	43.08915	39.39228
4/10/2022	11:00:00 PM	45.8259	30.40717	64.99849	48.28845	40.91516	36.85895
4/11/2022	12:00:00 AM	46.32599	31.13984	64.27179	49.28669	42.76722	38.25836
4/11/2022	1:00:00 AM	48.99017	32.27789	65.96597	52.35698	44.81789	39.84815
4/11/2022	2:00:00 AM	52.85584	33.668	69.80247	57.37165	46.45078	41.15306
4/11/2022	3:00:00 AM	47.24342	32.69433	69.36867	49.4577	44.00517	39.97112
4/11/2022	4:00:00 AM	73.20443	36.14696	89.48703	77.49258	65.74485	43.82566
4/11/2022	5:00:00 AM	75.33705	41.38584	89.65169	79.50657	71.04379	61.28288
4/11/2022	6:00:00 AM	81.09188	48.24835	92.77265	85.22362	78.1696	67.98643
4/11/2022	7:00:00 AM	80.54536	43.28039	92.2892	84.79384	77.05353	67.14978
4/11/2022	8:00:00 AM	83.27708	60.53086	93.36132	86.99235	81.44194	74.18218
4/11/2022	9:00:00 AM	76.55393	42.0192	91.16943	80.88389	71.48534	59.34448
4/11/2022	10:00:00 AM	83.79758	41.389	94.36088	87.95309	81.43357	64.01744
4/11/2022	11:00:00 AM	84.34272	53.47381	94.40533	87.9522	82.77372	74.23019
4/11/2022	12:00:00 PM	85.39071	64.67937	94.33395	88.78451	84.12737	78.00878
4/11/2022	1:00:00 PM	87.96435	65.45511	95.98485	90.84486	87.22756	82.49898
4/11/2022	2:00:00 PM	84.55531	49.92033	94.26896	88.1504	83.14747	73.97834
4/11/2022	3:00:00 PM	83.99462	59.77522	93.78995	87.61899	82.37651	74.97767
4/11/2022	4:00:00 PM	86.44057	63.12794	94.90385	89.41612	85.58433	80.4121
4/11/2022	5:00:00 PM	81.88879	54.89859	93.67854	86.54556	77.31927	68.31401
4/11/2022	6:00:00 PM	75.69648	46.76967	90.29504	79.74557	71.10839	61.2901
4/11/2022	7:00:00 PM	75.62741	39.67	91.24753	79.6942	69.69791	56.03214
4/11/2022	8:00:00 PM	72.97848	36.75559	88.60995	77.2136	67.08501	51.08369
4/11/2022	9:00:00 PM	80.64029	51.30488	92.44189	84.85404	77.24824	67.38238
4/11/2022	10:00:00 PM	74.44624	46.1954	89.88395	78.43601	70.43858	61.60759
4/11/2022	11:00:00 PM	72.64345	38.54459	86.77595	76.98164	67.37019	55.43912
4/12/2022	12:00:00 AM	79.27035	52.92883	91.14524	83.34556	76.25309	67.22402
4/12/2022	1:00:00 AM	69.31595	36.43026	86.70179	72.95991	59.40936	46.24702
4/12/2022	2:00:00 AM	73.92319	37.54821	88.53396	78.50106	67.6736	46.52242
4/12/2022	3:00:00 AM	72.51972	44.78353	89.25276	76.40907	67.83209	58.30638
4/12/2022	4:00:00 AM	74.59136	51.22499	89.69171	78.43722	71.49758	63.92912
4/12/2022	5:00:00 AM	76.07011	45.81084	88.64423	80.03897	72.86143	64.21622
4/12/2022	6:00:00 AM	83.27115	62.74759	93.85198	87.01958	81.32828	74.34687
4/12/2022	7:00:00 AM	83.94003	62.90814	93.95185	87.50844	82.42024	75.59214
4/12/2022	8:00:00 AM	82.11971	58.65857	92.87491	85.92349	79.99484	72.5006
4/12/2022	9:00:00 AM	81.95511	58.63155	93.22116	85.66765	79.89264	72.5535
4/12/2022	10:00:00 AM	81.42458	56.2304	92.43058	85.24558	79.15533	71.53536
4/12/2022	11:00:00 AM	79.96499	53.28554	92.22901	83.96827	77.04194	68.81948
4/12/2022	12:00:00 PM	75.48627	45.81239	90.52626	79.58877	70.71005	61.44239

4/12/2022	1:00:00 PM	80.16665	53.57542	91.18817	84.08832	77.4962	69.43684
4/12/2022	2:00:00 PM	79.47718	43.1676	91.76768	83.69394	75.95881	64.73196
4/12/2022	3:00:00 PM	81.58231	57.45499	92.82869	85.39203	79.27546	71.78869
4/12/2022	4:00:00 PM	78.33833	50.19849	91.36732	82.4231	74.82868	65.77752
4/12/2022	5:00:00 PM	77.79534	49.62469	90.74067	81.90067	74.11938	64.83289
4/12/2022	6:00:00 PM	74.56962	34.03898	90.18025	79.06634	66.51543	47.51095
4/12/2022	7:00:00 PM	49.07154	30.1871	67.26484	52.67766	43.36449	37.83373
4/12/2022	8:00:00 PM	54.07916	32.20366	71.56844	57.54792	49.19071	41.78268
4/12/2022	9:00:00 PM	63.77983	39.46111	79.72995	67.6656	59.57701	51.29398
4/12/2022	10:00:00 PM	58.73965	36.32665	76.49041	62.34547	53.93631	46.44314
4/12/2022	11:00:00 PM	66.82637	37.23404	87.94857	68.42915	57.81197	49.30043
4/13/2022	12:00:00 AM	70.87672	38.80775	86.1169	74.96017	66.38804	54.92807
4/13/2022	1:00:00 AM	66.97819	38.32356	82.90106	70.96023	62.03446	52.13423
4/13/2022	2:00:00 AM	69.27221	38.36406	84.49109	73.32287	64.46966	53.38576
4/13/2022	3:00:00 AM	72.26752	40.62158	87.76561	76.40156	67.06483	55.4303
4/13/2022	4:00:00 AM	73.59823	48.09025	87.00028	77.49363	70.35157	62.96173
4/13/2022	5:00:00 AM	73.92911	47.42002	87.62023	77.80254	70.34899	61.72867
4/13/2022	6:00:00 AM	75.18306	48.25124	89.12718	79.16722	71.23448	62.87455
4/13/2022	7:00:00 AM	71.75883	43.62892	86.71647	75.67378	67.13809	57.20072
4/13/2022	8:00:00 AM	61.96902	39.20949	82.07194	64.76529	54.46932	46.9414
4/13/2022	9:00:00 AM	71.83462	40.65178	88.62318	75.93733	65.97102	52.22496
4/13/2022	10:00:00 AM	74.20945	40.79855	89.1987	78.26146	68.70949	58.01442
4/13/2022	11:00:00 AM	79.83733	46.79147	91.68264	84.07955	76.41616	66.51583
4/13/2022	12:00:00 PM	76.49501	42.55335	91.47698	80.70382	71.78629	61.02015
4/13/2022	1:00:00 PM	79.81235	47.99032	92.14725	84.10394	76.16062	66.33225
4/13/2022	2:00:00 PM	81.2903	54.9479	92.55062	85.40479	78.38782	69.33939
4/13/2022	3:00:00 PM	79.91259	47.85007	92.09331	83.97647	76.8791	67.58379
4/13/2022	4:00:00 PM	78.47089	47.18841	91.50143	82.65942	74.45493	64.60547
4/13/2022	5:00:00 PM	78.77598	48.59968	92.0157	82.91933	74.80142	64.6376
4/13/2022	6:00:00 PM	76.73315	45.78902	90.77725	80.75709	72.5057	62.81983
4/13/2022	7:00:00 PM	69.45329	40.77556	86.98423	73.10694	64.18256	54.93192
4/13/2022	8:00:00 PM	71.68611	40.84464	90.09992	75.12668	66.41596	56.82896
4/13/2022	9:00:00 PM	64.76812	37.8285	80.81692	68.56237	60.17965	51.4451
4/13/2022	10:00:00 PM	71.43643	37.97956	88.07109	75.26375	65.59686	55.39665
4/13/2022	11:00:00 PM	73.63387	41.97645	88.61353	77.6151	68.60228	58.87782
4/14/2022	12:00:00 AM	75.63156	35.74596	90.28295	80.00682	70.0683	58.18229
4/14/2022	1:00:00 AM	79.63076	47.43178	91.70354	83.5881	76.79142	68.37365
4/14/2022	2:00:00 AM	80.32119	53.86433	90.87852	84.27779	77.83757	69.96106
4/14/2022	3:00:00 AM	80.65811	55.851	92.07829	84.54209	78.28844	70.69535
4/14/2022	4:00:00 AM	76.70585	48.36006	90.40258	80.59657	73.68402	65.6224
4/14/2022	5:00:00 AM	80.4372	57.62592	91.98501	84.33863	77.97105	70.12619
4/14/2022	6:00:00 AM	81.18086	57.12688	92.33321	84.9944	78.84583	71.4763
4/14/2022	7:00:00 AM	76.22976	43.04914	91.2108	80.57492	71.29058	60.81528

4/14/2022	8:00:00 AM	74.98418	40.79809	90.05611	79.21182	69.3211	58.11846
4/14/2022	9:00:00 AM	82.0894	44.80835	92.4572	86.01377	79.78572	70.43067
4/14/2022	10:00:00 AM	82.36697	53.8086	92.7069	86.24723	80.17489	71.66964
4/14/2022	11:00:00 AM	81.96343	52.89225	92.915	85.93964	79.56137	70.30725
4/14/2022	12:00:00 PM	80.4626	51.67105	92.59378	84.55346	77.49122	68.79659
4/14/2022	1:00:00 PM	79.93332	43.7651	92.20484	84.26126	76.34797	66.13021
4/14/2022	2:00:00 PM	83.14029	50.9056	93.81267	87.07231	80.95763	71.56481
4/14/2022	3:00:00 PM	83.95058	51.19669	94.78653	87.96835	81.73439	70.42006
4/14/2022	4:00:00 PM	83.78125	59.05135	93.73821	87.44357	82.09004	74.35602
4/14/2022	5:00:00 PM	81.15588	53.6134	93.46593	85.2504	78.15322	69.16404
4/14/2022	6:00:00 PM	81.77	48.69212	93.7096	86.23705	77.86765	65.61961
4/14/2022	7:00:00 PM	75.69306	48.77545	90.12283	79.59125	71.76429	63.32012
4/14/2022	8:00:00 PM	74.00121	45.39638	89.22875	77.99862	69.80097	60.81496
4/14/2022	9:00:00 PM	74.61632	46.91675	89.58349	78.61386	70.98349	62.34018
4/14/2022	10:00:00 PM	78.18064	46.97059	91.9245	82.40933	73.96501	63.77628
4/14/2022	11:00:00 PM	76.59163	49.89006	89.93239	80.64055	73.18834	64.59101
4/15/2022	12:00:00 AM	79.34575	52.68901	91.45211	83.32422	76.32906	68.01122
4/15/2022	1:00:00 AM	79.42724	51.70038	92.06918	83.47802	76.34222	67.80153
4/15/2022	2:00:00 AM	72.83458	40.03581	89.90793	76.60442	67.33088	57.11192
4/15/2022	3:00:00 AM	72.28448	42.0528	87.03663	76.46588	67.62961	57.17481
4/15/2022	4:00:00 AM	66.80886	39.12332	84.95153	70.41077	61.27511	51.98411
4/15/2022	5:00:00 AM	65.90369	39.65744	81.99865	69.59329	61.75819	53.10319
4/15/2022	6:00:00 AM	64.45854	34.88216	84.05098	68.25776	53.32841	43.54094
4/15/2022	7:00:00 AM	49.17154	34.48061	66.34739	52.43317	45.14693	40.69386
4/15/2022	8:00:00 AM	64.66215	33.89269	86.20433	66.90802	49.46686	40.949
4/15/2022	9:00:00 AM	69.20838	37.51012	85.6188	73.26119	63.75965	52.48891
4/15/2022	10:00:00 AM	75.02126	39.79077	90.31366	79.18917	70.06084	58.55663
4/15/2022	11:00:00 AM	75.33028	43.64405	90.80217	79.45343	69.44062	58.69334
4/15/2022	12:00:00 PM	76.57272	37.21617	90.57022	80.88498	71.67523	59.09839
4/15/2022	1:00:00 PM	79.02633	41.34791	91.83051	83.24805	75.3041	64.38082
4/15/2022	2:00:00 PM	76.9555	43.40429	90.18114	81.22001	72.67684	62.63049
4/15/2022	3:00:00 PM	72.56945	36.80518	87.88688	76.64703	66.92538	55.68296
4/15/2022	4:00:00 PM	77.00736	36.81426	91.39181	81.26811	72.99754	59.31517
4/15/2022	5:00:00 PM	77.90593	39.80053	92.37198	82.01108	73.8706	63.0771
4/15/2022	6:00:00 PM	73.76661	41.85243	88.29676	77.82761	68.82985	58.82838
4/15/2022	7:00:00 PM	65.83573	33.08366	84.83383	69.56065	58.3985	43.79547
4/15/2022	8:00:00 PM	56.7451	32.18382	76.24111	60.31685	47.30188	39.39418
4/15/2022	9:00:00 PM	56.26183	32.55245	81.5972	55.77471	43.71422	39.25062
4/15/2022	10:00:00 PM	46.67264	33.70702	64.61703	48.87227	43.75206	39.92845
4/15/2022	11:00:00 PM	48.39745	29.50216	65.73857	51.38595	44.39654	38.47146
4/16/2022	12:00:00 AM	43.17988	29.22981	57.68752	46.90806	39.55185	35.41435
4/16/2022	1:00:00 AM	52.4993	34.43849	70.76981	55.80014	47.14766	41.32499
4/16/2022	2:00:00 AM	55.31366	31.69715	71.6231	59.49488	50.03532	41.13881

4/16/2022	3:00:00 AM	52.76109	32.90436	72.6733	54.47245	46.32847	40.51183
4/16/2022	4:00:00 AM	52.77144	34.4098	72.15664	55.6759	47.39116	41.50404
4/16/2022	5:00:00 AM	54.49561	34.40471	74.00917	56.9493	47.06955	41.12009
4/16/2022	6:00:00 AM	48.92601	32.55755	73.23255	50.65133	43.78323	39.58726
4/16/2022	7:00:00 AM	60.15064	38.23259	77.52781	63.81374	55.04871	47.55284
4/16/2022	8:00:00 AM	61.97744	37.70211	78.90755	65.66188	56.96463	47.48274
4/16/2022	9:00:00 AM	57.19295	33.90915	75.92542	60.9202	50.82661	42.33142
4/16/2022	10:00:00 AM	71.79792	30.63683	91.70752	73.64907	48.91756	38.89296
4/16/2022	11:00:00 AM	82.02603	49.28566	92.8973	85.96512	79.66871	70.7615
4/16/2022	12:00:00 PM	82.77083	53.74449	93.93863	86.69271	80.49133	72.18553
4/16/2022	1:00:00 PM	82.7001	57.51956	93.3756	86.59581	80.42068	72.07901
4/16/2022	2:00:00 PM	85.79627	56.88411	95.28614	89.23018	84.56987	77.10742
4/16/2022	3:00:00 PM	87.07338	68.6678	95.14851	90.03502	86.20583	81.41823
4/16/2022	4:00:00 PM	85.76609	63.62219	94.71403	89.11332	84.54766	78.36739
4/16/2022	5:00:00 PM	84.90558	61.53438	94.53829	88.29021	83.55102	76.73587
4/16/2022	6:00:00 PM	84.18517	50.88923	94.06071	87.97365	82.43174	74.03161
4/16/2022	7:00:00 PM	77.22047	43.3237	90.67067	81.74256	72.28283	61.23044
4/16/2022	8:00:00 PM	72.07647	40.6667	89.50818	75.93383	67.23495	56.9718
4/16/2022	9:00:00 PM	76.07864	39.55929	91.08384	80.2752	71.2631	59.0572
4/16/2022	10:00:00 PM	69.44634	31.65366	88.28781	72.38157	57.94099	39.62432
4/16/2022	11:00:00 PM	73.87683	44.23022	89.40403	77.78344	69.51003	60.63585
4/17/2022	12:00:00 AM	73.37649	38.99979	88.89189	77.31256	68.39005	58.2137
4/17/2022	1:00:00 AM	66.27449	39.90078	84.08872	70.0249	60.78925	51.73234
4/17/2022	2:00:00 AM	62.19492	38.12548	77.65881	65.90679	58.48205	50.4254
4/17/2022	3:00:00 AM	60.26868	35.64468	76.61391	63.95586	55.99026	47.85308
4/17/2022	4:00:00 AM	47.33173	33.98717	64.01258	50.38339	44.87396	40.49159
4/17/2022	5:00:00 AM	45.01405	33.50337	61.30144	47.44363	43.18652	39.58024
4/17/2022	6:00:00 AM	52.47923	36.31361	71.79406	54.27663	49.79472	43.91546
4/17/2022	7:00:00 AM	53.7006	37.79381	71.03985	56.83364	49.44389	44.39995
4/17/2022	8:00:00 AM	59.48278	38.13952	76.66293	63.32952	54.6805	46.45866
4/17/2022	9:00:00 AM	59.17619	36.36402	82.55042	61.2367	50.6654	43.7778
4/17/2022	10:00:00 AM	74.65821	36.40693	89.62451	79.19087	66.65677	49.26243
4/17/2022	11:00:00 AM	74.07987	35.96102	90.81763	78.54103	66.41665	48.52572
4/17/2022	12:00:00 PM	73.00224	36.63171	90.00667	77.30382	64.85852	48.28117
4/17/2022	1:00:00 PM	71.56137	33.82255	87.99271	75.75969	62.21492	44.99618
4/17/2022	2:00:00 PM	72.32612	35.28972	88.27452	76.35355	65.29796	48.44487
4/17/2022	3:00:00 PM	68.5705	32.54771	88.55699	71.72556	58.16547	41.3148
4/17/2022	4:00:00 PM	71.67298	32.46762	87.60798	75.72319	65.21946	46.86551
4/17/2022	5:00:00 PM	67.73729	31.72989	84.25974	71.84949	61.22853	44.80014
4/17/2022	6:00:00 PM	60.54924	32.20629	77.89705	64.47048	54.47093	44.66683
4/17/2022	7:00:00 PM	46.20536	29.35122	67.55758	48.40342	41.37766	36.61652
4/17/2022	8:00:00 PM	45.08228	30.18564	59.28705	48.29096	42.63628	37.79027
4/17/2022	9:00:00 PM	45.45509	29.10708	68.64981	46.51683	40.53667	36.13765

4/17/2022	10:00:00 PM	43.78641	26.93965	65.06356	46.96205	39.45636	34.98537
4/17/2022	11:00:00 PM	45.04098	28.3387	62.814	48.38993	40.4208	35.22599
4/18/2022	12:00:00 AM	52.39643	31.297	71.70943	55.74563	46.35305	39.19407
4/18/2022	1:00:00 AM	51.64076	31.44226	69.47598	55.16697	45.98322	39.18956
4/18/2022	2:00:00 AM	51.88539	32.05424	69.42758	55.60543	45.87259	39.22078
4/18/2022	3:00:00 AM	48.02412	31.93239	65.36946	51.18229	43.33755	38.54905
4/18/2022	4:00:00 AM	55.55399	35.31549	70.67386	60.14302	49.43475	43.39293
4/18/2022	5:00:00 AM	55.88233	35.94042	74.99193	58.99999	49.72424	42.78894
4/18/2022	6:00:00 AM	51.58064	34.36112	67.19861	55.61838	46.01796	40.3842
4/18/2022	7:00:00 AM	55.19396	37.91351	74.30812	58.63936	50.5289	44.99497
4/18/2022	8:00:00 AM	54.67018	35.46448	73.27618	58.0844	49.67579	42.901
4/18/2022	9:00:00 AM	52.83158	36.02963	71.77414	55.93999	47.48062	42.30613
4/18/2022	10:00:00 AM	62.30961	36.72949	79.30649	66.36055	55.19461	44.77598
4/18/2022	11:00:00 AM	61.11007	34.21183	81.89294	63.95342	52.38791	43.26315
4/18/2022	12:00:00 PM	76.40034	33.91247	90.91927	80.97844	68.68651	49.94119
4/18/2022	1:00:00 PM	79.84427	43.38182	91.88116	84.20285	76.19574	64.5628
4/18/2022	2:00:00 PM	79.49698	47.31829	91.90568	83.735	76.18235	66.50848
4/18/2022	3:00:00 PM	78.22075	45.08427	91.27708	82.40181	74.5555	65.02867
4/18/2022	4:00:00 PM	75.89128	40.65748	89.95888	80.03856	71.39593	60.41916
4/18/2022	5:00:00 PM	75.03182	35.26702	90.58896	79.09624	69.39536	58.63832
4/18/2022	6:00:00 PM	73.85518	35.60052	89.25216	78.26064	66.34554	52.73756
4/18/2022	7:00:00 PM	81.00168	57.50948	92.17521	84.90806	78.57695	71.17103
4/18/2022	8:00:00 PM	83.88927	62.24579	93.70728	87.45552	82.26341	75.37001
4/18/2022	9:00:00 PM	82.04118	52.23538	93.32756	85.93868	79.80897	71.70613
4/18/2022	10:00:00 PM	79.73054	52.7392	91.14738	83.76626	76.77975	68.86988
4/18/2022	11:00:00 PM	73.96454	42.70396	89.07305	78.1213	69.65192	60.32772
4/19/2022	12:00:00 AM	73.1559	39.18298	88.42356	77.14916	68.84753	59.91243
4/19/2022	1:00:00 AM	70.0933	41.24091	86.11283	73.88701	66.03425	57.71845
4/19/2022	2:00:00 AM	65.13477	40.64563	81.65763	68.86805	60.52311	51.78264
4/19/2022	3:00:00 AM	63.79914	40.60325	81.85161	67.32355	60.20991	52.97798
4/19/2022	4:00:00 AM	73.30874	48.76402	87.57037	77.18755	69.33959	61.29696
4/19/2022	5:00:00 AM	80.86827	51.82545	92.52498	84.92516	78.08895	69.48782
4/19/2022	6:00:00 AM	81.51145	52.82835	92.66217	85.43256	79.06398	71.17742
4/19/2022	7:00:00 AM	79.37301	53.52505	91.2948	83.42965	76.43658	68.28414
4/19/2022	8:00:00 AM	76.67464	47.10459	90.6673	80.80594	72.15947	61.95819

WM13: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
4/5/2022	12:45:30 PM	75.3	74.3	73.1	71.5	69.8	67.8	65.2	62.5	59.2	56.2	53.2	50.1	47.1	44.7	42.2	41.1	38.9	38.4	39.3	36.8	36.7	36.4	31.9	32.8	34.1	33.7	32.6	32.4	34.5	31.2	32.5	30.7	26.7	24.9	22.2
4/5/2022	1:00:00 PM	73.2	72.3	71.1	69.3	67.4	65.1	62.6	59.7	56.5	53.3	50.1	47.1	43.8	40.7	38	35.3	32.9	30.5	28.6	26.5	24.3	22.4	20.8	19.6	18.7	19.4	18.7	16.7	14.1	12.9	10.4	9.6	8.9	8.5	7.9	8.2
4/5/2022	2:00:00 PM	72.6	71.3	69.9	68.1	66.1	63.8	60.9	57.9	54.8	51.7	48.4	45.1	42	39	36.6	33.9	31.7	29.2	27.3	25.2	22.8	20.9	19.3	18	16.9	17.4	16.6	14.6	13.2	14.4	10	8.1	7.5	7.2	6.7	6.7
4/5/2022	3:00:00 PM	74.7	73.9	72.6	71	69.2	67.1	64.7	61.7	58.7	55.7	52.6	49.5	46.5	43.6	40.5	37.6	35	32.5	30.6	28.6	26.4	24.7	23.2	22.1	20.9	21.5	20.5	18.1	16.3	15.1	11.8	10.4	9.8	9.4	8.6	8.5
4/5/2022	4:00:00 PM	71.8	70.7	69.4	67.7	65.5	63.3	60.6	57.6	54.6	51.4	48.2	45	41.7	38.9	36.3	33.7	31.4	28.8	26.8	24.6	22.3	20.4	18.8	17.5	16.5	17.3	16.4	14.5	11.7	11.4	8.4	7.5	6.9	6.4	5.8	5.6
4/5/2022	5:00:00 PM	68.9	67.6	66.2	64.2	61.7	59	55.9	52.7	49.1	45.6	42.5	40.7	37.8	35.9	33.8	31.2	28	24.6	22.5	20.1	17.5	15.2	13	11.4	10.9	13.5	12.8	13.6	13.1	9.1	4.6	3.6	3.3	3	2.4	2.8
4/5/2022	6:00:00 PM	65.3	63.6	61.8	59.3	56.5	53.3	49.9	45.8	42	39	36.1	33.9	31.7	30.9	32.6	27	23.7	21	18.6	15.7	12.4	9.3	6.9	5.3	6	11	13	16.4	15.2	10.3	6.4	1.3	1.2	0.9	0.6	1.2
4/5/2022	7:00:00 PM	61.4	59.7	57.4	54.8	52	48.3	44.8	42	38.7	36.5	34.3	33.5	31.8	30.2	28.1	25.2	22.5	18.5	15.8	13.3	8.9	4.5	1.4	2.3	3.3	10.8	11.3	9.4	10.7	9.5	2.5	-2.1	-2.1	-2.1	-1.6	0.5
4/5/2022	8:00:00 PM	56.5	54.8	52.5	49.8	48	43.7	40.8	42.1	37.2	35.7	33.7	33.4	32.6	31.2	28.1	26.3	22.9	18.3	15.4	12.9	7.5	1.5	-3.6	-5	-5.6	-5.6	-5.4	-4.9	-4.7	-3.8	-3.9	-3.8	-3.5	-3.4	-2.3	0.4
4/5/2022	9:00:00 PM	57.4	55.8	53.5	50.7	48.3	44.5	41.7	41.1	37.2	35.6	34.1	35.3	33.8	31.8	31.2	29.2	25.4	20.8	18.3	15.5	10.7	3.1	-2.6	-4.4	-5.2	-5.2	-5	-4.9	-4.5	-3.5	-3.6	-3.5	-3.2	-3.1	-2.1	0.4
4/5/2022	10:00:00 PM	40.5	39.2	41	39.9	39.9	37.8	37.3	39.4	34.4	33.3	33.1	33.1	32.5	30.9	29	28.2	24.1	20.4	17.6	15.5	9.8	3.3	-5.7	-8.8	-8.1	-8	-7	-6.5	-6.2	-5.7	-5.3	-5.2	-4.7	-4.3	-2.8	0.4
4/5/2022	11:00:00 PM	34.5	35.1	38.7	38.2	37.4	37.2	37	37.9	34	33.9	31.9	32	30.4	29	25.9	25	20.8	16	17.5	15.2	7.9	0.9	-6.4	-6	-6.2	-6.7	-6.2	-5.7	-5.5	-5	-5.2	-5.1	-4.7	-4.4	-2.8	0.4
4/6/2022	12:00:00 AM	35.9	35.4	37.6	36.8	38.8	37.4	37.3	37.9	34.6	34.5	33.4	32.9	32	30.4	28	26.2	21.7	17.3	15.7	14.8	9.3	2.1	-5.9	-8.5	-8	-7.4	-7.1	-6.5	-6.2	-5.7	-5.4	-5.2	-4.8	-4.4	-2.8	0.4
4/6/2022	1:00:00 AM	33.1	34.3	36.7	36.2	37.8	36.5	36	37.3	32.8	32.4	30.3	30.6	30.3	29	26.4	23.9	20.3	14.7	12.9	13.5	7.3	-0.7	-7.3	-9	-8.6	-7.1	-5.1	-4.4	-5.3	-5.8	-5.4	-5.3	-4.8	-4.5	-2.8	0.5
4/6/2022	2:00:00 AM	33.7	35.2	37.9	38.3	38.8	38.7	38.9	43.5	39.3	38.6	39	37.8	34.8	32	31.4	30.9	28.2	25.6	20.9	18.3	16.3	13.4	7.6	6.9	9.4	2.5	-2.6	-6.9	-6.4	-5.8	-5.5	-5.3	-4.8	-4.5	-2.8	0.5
4/6/2022	3:00:00 AM	32.6	35.2	36.5	38.3	40.4	37.7	38.3	44.2	38.2	37.8	35.3	33.8	33.2	30.4	27	25	20.1	13.9	10.6	8.2	5	-1.9	-8.1	-9.3	-8.5	-6.9	-5.9	-4.9	-6.1	-5.8	-5.5	-5.3	-4.8	-4.5	-2.8	0.5
4/6/2022	4:00:00 AM	33.8	35	37.1	38.4	39.3	38.1	38.1	40.6	35.7	35.9	35.2	37.5	35.6	38.8	31.8	28.3	25	21.2	17.8	15.3	11.3	5.2	-2	-8.9	-8.8	-7.8	-6.8	-5	-6.3	-5.9	-5.5	-5.3	-4.8	-4.5	-2.8	0.5
4/6/2022	5:00:00 AM	33.7	35	37	38	39.2	38	38.4	44.2	37.4	36.6	36.2	36.5	35.5	33.4	33.3	29.4	25.9	22.3	19.5	18	13.7	8.3	3	1.2	11.6	21.8	32.2	37.3	34.4	26.8	13.4	3.6	1.7	-3.2	-2.2	0.7
4/6/2022	6:00:00 AM	34.9	35.6	38.3	39.9	40.9	39.3	39.3	44.9	38.9	38.1	36.7	37.6	34.8	32.9	31.2	28.7	25.3	20.4	18.5	17.3	13.4	7.7	1.1	0	16.2	25.6	35.2	40	37.3	35.4	19.5	12.4	7.6	3.4	-0.3	1.1
4/6/2022	7:00:00 AM	52.3	50.1	47.8	45.6	43.4	42.3	42.1	48.2	41.7	40.1	40.5	39.4	37.9	36.9	36.9	35.3	32.7	26.5	24.8	23.6	19.3	13.1	4.8	3.7	20.7	31.8	36.5	39.8	37	33.5	15.7	11.1	9.2	3.7	0.5	1.1
4/6/2022	8:00:00 AM	57.5	55.2	52.4	50	47.2	44.8	42.4	49	41.1	40.3	39.1	39.4	38.6	35.2	34.4	33.5	29.6	24.9	23.5	22.7	19	13	7.4	7.1	11.2	20	25.1	26	23.8	21.8	7.1	4	1.9	-2.6	-2	0.2
4/6/2022	9:00:00 AM	55.3	53.2	51.1	49.5	48.1	43.3	42.5	46.9	40.3	38.9	37.6	37.4	37	33	32	28.1	22.9	16.3	12.1	9.1	4.3	0.4	-3.3	-1.1	-1.6	-0.7	0	1.3	3.4	2.5	-3	-4	-3.9	-3.4	-2.3	0.2
4/6/2022	10:00:00 AM	56.9	55.4	53.2	50.7	48.4	44.4	42.2	47.2	40.4	38.3	36.4	35.4	34.1	30.9	28.2	25.7	20.8	15.3	12.3	8.6	4.3	0.3	-5.9	-0.2	-3.1	-1.1	0.2	1.8	2.8	5.8	-1.9	-3.5	-3.3	-2.9	-1.9	0.2
4/6/2022	11:00:00 AM	59.4	57.7	55.2	52.7	49.7	46.3	43.4	44.1	39.7	38.7	38.3	38.2	36.1	34.5	32.9	29.8	26.3	20.2	15.8	12	7.2	3	1.4	1.3	-2.2	-2.5	-2.4	0.1	4.9	4.5	0.8	-2.3	-2.4	-2	-1.2	0.6
4/6/2022	12:00:00 PM	57.3	55.7	53.3	50.2	47.5	44.3	42	43	37.8	36.6	34.9	34.1	32.2	33.5	32.9	29.3	22.2	17.8	14.1	10.8	5.1	2	1.7	1.6	-1.1	-1.6	-1.5	0.3	2.9	1.9	-1.6	-2.8	-2.8	-2.3	-1.6	0.3
4/6/2022	1:00:00 PM	56.5	55.9	52.9	50.3	47.4	43.8	41.3	39	36.6	35.6	34.6	36	32.9	31.8	29.5	26.4	22.3	17.3	14.4	9.7	5.1	2	4	6.6	18.3	24.1	24.7	29.9	24.8	9.3	5.2	2.3	-0.6	-1.8	-0.7	0.9
4/6/2022	2:00:00 PM	57.7	56.3	53.8	51.9	49.2	45.7	44.1	41.2	38.6	37.9	36.8	36.8	35.8	38.3	41.1	34.6	25.7	20.1	16.5	12.8	8.7	5.8	4.8	3.9	4.1	11.8	18.6	24.6	20.9	15.3	11	-0.7	0.4	-0.8	-0.7	0.8
4/6/2022	3:00:00 PM	56.3	53.2	51.2	48.4	46.2	43.1	41	40.2	37.5	37	36	35.7	34.6	34.3	34.5	30.9	27	20.4	15.4	11.2	6.7	2.9	3.1	2.4	-0.1	5.4	7.2	8.5	7.9	2.7	-2.4	-2.8	2.7	-2.2	-1.5	0.3
4/6/2022	4:00:00 PM	51.4	49.2	47.2	44.1	42.1	39	37.8	36.4	33	32.4	31.4	31	29.2	27.2	25.7	22.9	19.3	14.9	11.5	7.6	2.9	-1.1	-3.2	-4.3	-3.5	4.3	5.2	6.7	5.3	2	-2.3	-3.8	3.8	-3.1	-2.1	0.1

4/6/2022	5:00:00 PM	45.7	42.9	40.7	39	39.5	36.7	36.8	37.1	35.4	35.7	35.8	36.7	36.5	44.2	49.3	46.4	29.2	31.6	22.8	15.3	7.9	-2.6	-6.5	0.8	9.7	23.6	26.3	30.6	32.5	22.6	15.5	8.3	8.6	5.2	2.2	1.7
4/6/2022	6:00:00 PM	40	37.9	37.4	36.9	38.6	35.5	35.7	35.2	31.6	31.7	31.7	31.2	32.2	33.9	30.5	27.4	25.2	15.5	12.6	4.1	-2.7	-7.6	-8.3	-7.3	-2.5	12.2	22.8	25.8	26.9	17.5	10.8	4.1	3.5	0.7	-0.7	0.6
4/6/2022	7:00:00 PM	37.3	36.2	38.1	37.4	39.8	35.7	34.6	32.6	30.4	30.4	30	30.2	29.1	27.7	25.6	21.9	17.4	11.4	5.4	1.9	-3.2	-5.6	-6	7.5	16.7	30.4	31.8	34.3	33.9	21.3	11.4	6.2	4.9	1.6	-0.7	0.7
4/6/2022	8:00:00 PM	35	35.1	37.5	37.4	37.8	36.6	36.5	33.6	31.1	32.4	31.3	30.8	29.6	27.6	25.8	22.9	18.2	11.9	7	2.9	-1.7	-3.9	-7.5	-8.7	-8.3	-8.1	-7.5	-6.9	-6.2	-5.6	-5.2	-5	-4.6	-4.2	-2.7	0.2
4/6/2022	9:00:00 PM	29.9	31.7	36	36.2	39.6	35.4	33.6	32	29	28.8	28.1	29	27.8	26.2	26.1	22.6	19.9	15.5	12.6	10	5.4	-3.1	-8.6	-9.3	-8.8	-8.3	-7.7	-7	-6.3	-5.6	-5.2	-5.1	-4.7	-4.2	-2.8	0.2
4/6/2022	10:00:00 PM	30.8	32.6	37	38.4	38.1	34.8	34.9	37.9	32.5	31.7	31.1	30.3	30.1	28.1	26.6	25.4	21.9	16.1	12.4	10.3	5.1	-3.3	-8.8	-9.4	-8.9	-8.3	-7.7	-7	-6.3	-5.7	-5.3	-5.1	-4.7	-4.3	-2.8	0.3
4/6/2022	11:00:00 PM	33.6	33.3	37.1	37.6	38.5	35.4	34.4	37.4	31.9	32.8	32.7	33.5	29.3	28.1	27.5	24.7	22.2	18.3	14.3	12.5	7.1	-0.6	-7	-9	-8.8	-8.1	-6.4	-6.6	-6.1	-5.7	-5.3	-5.1	-4.7	-4.3	-2.8	0.3
4/7/2022	12:00:00 AM	29.9	31.2	36.1	36.6	36.7	34.3	33.7	35.7	30.9	30.3	29.5	29.6	27.7	29.2	28.9	25.6	23.7	18.5	16.6	14.1	10.7	2.9	-6.6	-8.9	-8.5	-5.5	-4.1	-5.9	-6.3	-5.7	-5.3	-5.1	-4.7	-4.3	-2.8	0.3
4/7/2022	1:00:00 AM	50.9	49.2	46.6	43.6	40.7	38	36.5	35.6	32.7	31.3	30.1	28.7	27.5	26.3	23.7	22.8	20	15.9	14.5	13	8	3.6	-5.2	-5.7	-7	-7.6	-7	-6.3	-5.6	-4.9	-4.7	-4.5	-4.2	-3.9	-2.6	0.3
4/7/2022	2:00:00 AM	43.1	41.6	40.3	39.7	38.7	38.8	38.3	38.7	36.8	36.9	36.3	35.5	33.7	31.5	29.7	29	26.5	24	21.1	19	14	7.1	-2.7	-8.6	-8.2	-8.1	-6.9	-6.5	-6.2	-5.6	-5.2	-5.1	-4.7	-4.3	-2.8	0.3
4/7/2022	3:00:00 AM	38.7	39.3	41.8	43.1	42.8	42.3	40.6	40.7	37.2	39	41.2	40.7	38.2	35.3	31.7	32.2	31.3	28.2	21.5	18.9	13.4	4.6	-1.4	-8.8	-8.7	-8	-6.6	-6.7	-6.4	-5.7	-5.3	-5.2	-4.7	-4.3	-2.8	0.3
4/7/2022	4:00:00 AM	38.7	37.4	37.6	38.8	40.7	36.8	36.5	38.1	34.2	33.9	33.4	34	33.4	29.7	26.3	24.2	20.9	16.9	14.8	12.5	7.8	0	-8.1	-9.2	-8.8	-7.9	-7.1	-6	-6.3	-5.7	-5.3	-5.1	-4.7	-4.3	-2.8	0.3
4/7/2022	5:00:00 AM	34.1	33.9	36.4	34.8	36.9	36.4	35.2	36.9	33	32.5	33.9	34.8	33.5	30.1	29.7	27.4	24.1	21.1	20	17.2	12.5	4.8	-4.7	-8.2	-3.3	4.9	9.3	18	29.2	32.8	22.4	1.3	-0.9	0.9	-0.7	0.4
4/7/2022	6:00:00 AM	38.1	37.3	38.6	40.3	39.9	39.6	40.1	41.7	38.6	39.2	40.6	41.2	40.7	36	34.4	33.1	31.3	26.7	22.7	19.7	13.7	10.2	8.4	12.8	29.1	39.5	42.8	48.3	45.7	42	26.8	18.7	17.6	14.8	14.4	8.5
4/7/2022	7:00:00 AM	48.5	46.2	44.4	42.3	42	40.3	38.9	42.8	38.1	37.4	37.5	38.7	37.3	35.9	36.8	33.4	30.5	27.7	23	20.9	16.3	11	13.3	7.2	21.8	30.7	34.6	40.9	37.8	26.9	20.1	13.5	9.4	1	-0.5	1
4/7/2022	8:00:00 AM	53	50.4	48.1	45.5	44.6	42.8	40.9	42.2	39.5	38.4	37.9	38.6	38.2	36.3	33.9	32.6	29.5	24.9	22.4	20.5	15.7	7.9	0.5	2.1	20.6	29.2	28.7	35.1	27.9	16.5	13.3	7.6	3	-1.8	-2	0.3
4/7/2022	9:00:00 AM	55.1	52.7	50.2	47.2	45	43.6	42.6	42.8	39.7	38.2	38.1	41.2	46.8	42.4	42.8	31.9	30.5	22.9	16.4	11.5	6	0.4	-5	-6.3	-4.3	2.3	5.3	10.3	8.4	4.3	-1.6	-3.8	-3.7	-3.3	-2.2	0.1
4/7/2022	10:00:00 AM	51.2	48.9	46.4	43.5	40.7	39.2	37.6	39.5	35.9	35.9	35.5	42.1	44	45	40.8	33.2	31.6	25.6	14.5	10.4	5.6	0.2	-0.3	0.8	7.7	23	27.4	34.5	30	28.5	11.4	5.2	9.5	5.6	4.2	3.4
4/7/2022	11:00:00 AM	50.4	48.5	46.4	43.6	41.4	39.9	37.7	37.3	36	35.4	35	34.8	34	32.5	31.2	28.4	23.8	17.8	13.6	10.3	6.5	3.9	4.1	5.2	2.9	3	5.2	6.8	8.1	7.9	0.4	-2.5	-2.7	-2	-1.1	0.5
4/7/2022	12:00:00 PM	50.9	49	46.5	44.4	40.9	38.4	36.8	36.6	33.3	32.4	31.6	31.2	31.3	29.7	27.3	25.3	20.8	15.9	19.1	11.4	8.4	7.1	9	10.5	5.3	4.4	4.2	5.2	4.5	2.8	-0.4	-1.7	-2	-1.4	-0.9	0.5
4/7/2022	1:00:00 PM	53.1	51.4	49.3	46.1	42.9	39.8	37.2	36	33.5	32.7	32.3	32.2	30.9	29.5	28.2	26.4	23	17.6	15.5	12.7	8.8	7.2	7.1	7.2	6.2	3.3	3.5	5.6	10	9.5	4.7	0.1	-0.4	-0.1	0.2	1
4/7/2022	2:00:00 PM	56.9	54.9	52.6	50.1	47.6	44	41.1	38.4	36.3	35	34.2	34.2	33.3	31.7	30.7	28.7	25.9	21	16.8	13	8.7	6.5	6.9	8.8	12.8	26.5	29.8	32.3	29	25.6	7.8	4.6	3.4	0.7	0.7	1.3
4/7/2022	3:00:00 PM	53.4	51.3	48.8	46	42.5	39.5	36.2	34.2	32.5	32	31.8	32.1	36.8	33.9	29.8	28	26.4	22.4	15	11	6.7	4	3.8	3.2	0.5	0	0	0.8	1	0.3	-1.7	-2.2	-2.3	-1.7	-1.1	0.4
4/7/2022	4:00:00 PM	52.2	50.6	47.9	44.8	41.6	38.9	35.8	34.1	32.6	31.6	31.3	34.3	35	31.3	29.1	27.2	23.7	18.9	13.8	9.8	5.5	2.8	2.9	4.9	20.8	24.9	27.9	35.2	34	19.3	9.8	8.9	4.4	0.4	-0.9	0.6
4/7/2022	5:00:00 PM	48.4	46.1	43.3	40.7	37.5	35.6	33.3	32.3	31.8	31.6	31.7	41.7	40.9	36.1	31.4	28.3	25.6	20.4	11.4	8	5.3	-1.4	-2.7	-3.4	-1.7	11.7	14.3	17.2	15	7.6	0.7	-3.3	-3.5	-2.7	-1.8	0.1
4/7/2022	6:00:00 PM	35.6	33.8	35	33.7	33.4	33.5	32	32	32	32.2	32.2	32.3	31.6	30.5	29	27.6	26.3	20.1	13.5	10.4	6.1	-3.3	-7.5	-7.4	-5.5	2.1	3.3	13.7	21	22.6	16.2	0	-3.7	-2.9	-1.9	0.1
4/7/2022	7:00:00 PM	28.3	29.9	35.2	34.3	31.1	30	29.6	28.6	28.5	28.7	28.4	27.8	26.6	25.1	23.8	20.3	16.2	8.9	2.7	0.4	-2.6	-7.5	-6.6	-1.4	14.5	29.1	32.4	35.5	30.3	29.6	11.6	5.2	7.9	2.5	4.1	1.1
4/7/2022	8:00:00 PM	27.1	29.1	34.5	29.9	28.9	29.9	26.1	26.2	25.1	25.1	23.8	24.1	22.7	21	19.8	17.2	13.1	6.5	2.2	-1.3	-5.1	-9.1	-9.8	-9.3	-8.8	-7.4	-4.7	0.2	-3.7	-5	-5.1	-5	-4.6	-4.1	-2.7	0.2
4/7/2022	9:00:00 PM	31.5	31.3	35.2	34.4	30.4	30.8	28.3	28.4	29.3	27.9	34.4	30.3	29.6	24.2	19.2	17.3	12.7	8.5	5.5	2.1	-1.8	-6.9	-9.2	-9.3	-8.7	-8.2	-7.5	-6.9	-6.1	-5.5	-5.1	-5	-4.6	-4.1	-2.7	0.2
4/7/2022	10:00:00 PM	28.7	29.3	33.2	29.9	29.2	30	28.9	29.6	28.4	28	29.8	35.7	30.6	26.7	26.1	22.8	19.2	17.6	14.8	11.3	6.3	-0.7	-7.5	-9.1	-8.1	1.2	2.8	8.3	0.4	-4.5	-5.1	-5	-4.6	-4.1	-2.7	0.2
4/7/2022	11:00:00 PM	28	27.7	30.6	27.9	27.5	29.2	28.4	28.5	27.5	27.4	28.3	30.3	25.6	24.5	21.9	19.6	15.9	12.8	11.3	9.6	6.2	0.6	-7	-6.2	-5.7	3.7	3.6	5	0.6	-2.5	-5.1	-4.9	-4.6	-4.1	-2.7	0.2

4/8/2022	12:00:00 AM	28.1	31.6	32.7	31.8	30.9	33.6	33	33.1	33.7	35.6	35	34.2	28.4	27.1	25.5	24	21.2	17.4	15.8	14.2	10.2	3.9	-4.9	-9.1	-8.8	-8.1	-7.6	-6.9	-6.2	-5.5	-5.2	-5	-4.6	-4.1	-2.7	0.2
4/8/2022	1:00:00 AM	31.3	33.6	35.6	36.2	37.9	39	39.6	37.7	34.1	34.4	38.1	40.4	37.7	33.5	30.1	28.7	27.6	25	21.2	17.7	15.3	6.8	0.4	-6.5	-2.7	11	10.2	9.2	4.3	-5.5	-5.1	-5	-4.6	-4.2	-2.7	0.2
4/8/2022	2:00:00 AM	29.2	29.9	32.6	30.9	30.6	31.9	30.2	34.8	30.4	28	28.7	29.6	26.7	24.8	28.3	22.2	19.6	16.6	14.9	14.5	14.7	16.8	13.8	18.1	22.7	21.2	21.2	16.1	11.5	0.7	-1.8	-4.1	-4.4	-4.2	-2.7	0.2
4/8/2022	3:00:00 AM	27.8	29.3	33.2	32	32.7	35.2	31.9	33.3	34.5	35.5	47	41.4	32.2	32	26.4	26	25.2	20.9	17.9	13.7	12.4	11.4	12.8	16.4	19.8	21.6	20.1	18.1	8.5	0.1	-1.7	-4.3	-4.5	-4.2	-2.8	0.2
4/8/2022	4:00:00 AM	34.1	33.3	35.4	36.2	36.3	40.5	41.5	39.8	39.1	40.3	42	45.7	44.1	34.6	34.2	32.9	31.1	32.4	26.1	24.6	21.3	11.4	6.9	-5.8	-7	1	2.6	8.9	12.7	12.8	1.8	-4.9	-4.6	-4.2	-2.7	0.3
4/8/2022	5:00:00 AM	36.1	37.4	40.2	41	41.4	42.5	42.7	40.9	41.6	42.3	43.9	44.1	43.7	36.7	33.8	34.4	35.4	38.4	35	30.4	24.6	20.1	15.9	-0.7	4.3	15.4	21.6	24.3	32	35	27.3	6.8	-2.3	-1	-1.9	0.3
4/8/2022	6:00:00 AM	38	39.7	41.2	43.7	43.4	45	43.4	42.4	43.3	44.2	43.1	46.9	45.3	43.6	40	36.2	33.7	31.9	30.3	26	21.2	18.9	10.8	2.6	15.7	25	30.4	34.9	36.2	30.9	23.3	6	3.6	0.8	-0.7	0.7
4/8/2022	7:00:00 AM	36.9	35.7	38.5	39.3	39.6	38.7	37.5	37.9	41.7	36.4	37.2	37.7	36.8	35.2	34.6	32.8	29.6	29	26.9	23.2	18.3	13.6	7.2	0.8	14	26.5	36.3	44.8	40.2	37.2	22.4	15.9	19.6	8.4	6.1	5.1
4/8/2022	8:00:00 AM	42.7	39.8	37.9	37	37.3	37.5	37	36	38.2	36.2	36.7	38.3	38.4	41.4	45.4	40.6	30.4	26.8	20.9	17.1	12.8	7.8	1.7	-3.4	6	17.1	23.3	25.2	23.7	20	3.8	0.8	0.2	-3.2	-2.2	0.1
4/8/2022	9:00:00 AM	49.8	47.2	44.9	44.1	41.3	41.6	41.7	40.9	42.4	43.6	43	44.9	44.4	41.7	38	35.8	32.7	29.4	26.1	22	17.3	13	8.8	0.6	0	5.8	7.9	10.1	8.3	5.3	0	-3.6	-3.6	-2.9	-1.8	0.2
4/8/2022	10:00:00 AM	59.4	57.9	56	53.2	50.3	47.4	44	41	38.5	37.2	36.6	38.7	35.2	34.2	33.5	31.5	28.4	25	21.3	17.7	13.4	9.3	4.2	1.7	3.1	18.6	25.8	31.3	35.5	22.8	16.7	8.8	10	6.8	4.4	2
4/8/2022	11:00:00 AM	56.8	55.6	53.2	50.9	47.8	44.5	41.3	38.7	37.2	36.4	35.7	35.4	34.6	33.7	32.5	30.4	27.2	22.7	20.9	17.3	13.1	10	8.8	8.5	5.9	5.5	4.6	7	10.2	9.9	2.5	-0.3	-0.7	-0.2	0.2	1.1
4/8/2022	12:00:00 PM	67.3	66.2	64.5	62.5	60.3	57.8	54.6	52	48.6	45.4	42.6	39.8	37.1	34.6	32.2	30.1	27.6	24.7	22.9	20.5	17.9	16.1	15.1	15.4	15.3	13.7	12.6	11.4	10.5	9.6	5.4	3	2.3	2.6	2.7	3.1
4/8/2022	1:00:00 PM	69	68	66.5	64.5	62.1	59.2	56.1	52.6	49.1	46	42.9	40	37.5	34.9	32.7	30.5	28.3	25.7	23.5	21	18.3	16.3	14.4	13.1	11.3	11.7	11.5	10.2	7.4	6.1	3.5	3	2.3	2.5	2.3	2.4
4/8/2022	2:00:00 PM	74.9	73.7	72.7	71.2	69.5	67.3	65	62.6	59.9	57	54.2	51.1	48.2	46.3	42.4	39.5	37.7	34.3	32.4	30.2	27.9	26.3	25.2	25.8	27.1	28.8	31.7	37.9	36.8	21	15.5	13.4	11.3	10.3	9.6	9.7
4/8/2022	3:00:00 PM	79.1	78.3	77.3	76	74.6	72.9	70.8	68.5	66.1	63.4	60.7	57.7	54.7	51.6	48.5	45.4	42.6	40.1	38.1	36	33.9	32.5	31.3	30.4	29.6	31.3	34.9	39.8	35	30.7	20.2	17.6	16.1	15.4	14.8	15
4/8/2022	4:00:00 PM	79.3	78.5	77.5	76.2	74.8	73.3	71.3	69.1	66.7	64.1	61.6	58.9	56	52.8	49.6	46.6	43.6	41	38.9	36.8	34.6	33.2	32	31.1	30.4	31.3	31	29.1	25.8	23.8	20.4	18.2	16.7	15.9	15.4	15.5
4/8/2022	5:00:00 PM	77.4	76.7	75.6	74.2	72.7	70.9	68.6	66.2	63.7	60.9	58.1	55.1	52.1	49	45.7	42.7	40.2	37.8	35.9	33.9	31.6	30.2	29	28	27.3	28	27.7	25.4	22	20	16.7	14.6	13.2	12.8	12.6	12.9
4/8/2022	6:00:00 PM	70.6	69.5	68.1	66.5	64.4	61.9	59	56.1	53	50.1	46.7	43.9	41.2	38.1	35.7	33.1	30.6	28.4	26.5	24	21.4	19.6	17.8	16.5	15.6	18.2	22.3	25	22.9	18.8	11.8	4.6	3.7	3.6	3.3	3.5
4/8/2022	7:00:00 PM	68.3	67	65.6	63.6	61.1	58.2	55	51.4	48	44.8	42.2	40.2	37.7	35.4	33.5	31.7	29.5	26.5	22.9	20	16.9	14.4	12.2	10.6	13.3	24.1	28.3	28.9	27	26	16.5	3.6	2.6	2	1.4	1.7
4/8/2022	8:00:00 PM	66.3	65	63.2	60.7	57.8	54.6	51	47.7	44.1	41.4	39	37.7	36.6	34.5	31.3	30.9	28.8	24.6	20.8	17.8	13.7	10.4	7.6	5.3	3.1	2.7	6.4	9.3	10.9	4.4	-0.7	-0.8	-0.8	-0.5	0.8
4/8/2022	9:00:00 PM	66.7	65.4	63.5	61.1	58.1	55	51.4	47.8	44.2	41.1	38.1	36.1	35.3	33.2	28.1	27.4	25.2	22.9	20.2	17.2	13.5	10.4	7.6	5.2	3.3	3	3.9	3.3	1.8	0.2	-0.8	-0.9	-1	-0.8	-0.6	0.7
4/8/2022	10:00:00 PM	66.7	65.4	63.5	60.8	58.1	55.3	51.7	48.3	45	42.5	40.3	38.8	36.3	35.6	34.5	33	30.1	26.7	23.2	21.4	21.9	17.4	9.7	6.7	5	4.8	4.4	4	-0.4	0	-0.6	-0.7	-0.8	-0.7	-0.5	0.9
4/8/2022	11:00:00 PM	67.3	66	64.6	62.3	60	57	53.5	50.1	46.9	43.6	40.5	37.9	35.2	32.9	30.3	29	26.9	24.9	23.4	21.8	18.9	15.9	12	9.1	7.2	6.8	5.1	2.4	0.6	1.1	0.3	0.1	0	-0.2	0.3	1.7
4/9/2022	12:00:00 AM	60.3	58.5	56.1	53.4	49.9	46.7	43.1	40.1	36.9	34.8	33.2	32.8	31	29.3	28.7	29.8	27.4	21.8	22.3	20.5	17.6	14.5	8.5	1.2	-3.8	4.4	-4	-2.7	3.2	2.4	-2.8	2.6	-2.7	-2.6	-1.8	0.3
4/9/2022	1:00:00 AM	40.5	38.3	38.1	35.9	35.7	35.4	34	34.1	33.1	33.1	30.7	31.9	31	29.3	26.9	26.2	23.8	19.8	19.3	18.7	16.5	13.6	7.2	-2.2	-7.8	7.6	-6.6	-5	3.9	5.4	-5.1	4.9	4.6	-4	-2.7	0.2
4/9/2022	2:00:00 AM	55.6	54.2	51.6	48.7	45.5	42.2	39.4	37.1	35	34	31.7	33	32	29	25.7	24.3	21.3	18.3	16.2	15.2	12.6	8.9	2.1	-5.2	-7.3	6.5	-2.3	-0.3	0.8	4.3	-4.4	4.3	-4	-3.7	-2.5	0.3
4/9/2022	3:00:00 AM	56.7	54.3	51.3	48.3	44.6	41.3	37.9	36	33.8	32	31	31.5	29.1	28.7	30	26.4	24.9	20.7	17.7	15.7	12.6	7.6	0.1	-6.4	-7.7	6.9	-2.4	5.9	2.4	4.3	-3.9	3.8	3.6	-3.4	-2.3	0.3
4/9/2022	4:00:00 AM	58.7	56.5	53.9	51.3	47.9	44.3	41.3	38.8	36.3	35.5	34.2	36.2	33.9	32.3	29.9	28.8	26.5	24	22.7	21	17.8	13	4.6	-4.6	-7	6.4	-4.6	-4.6	4.3	3.4	-3.6	3.5	3.3	-3.2	-2.2	0.4
4/9/2022	5:00:00 AM	62.2	60.6	58.8	56	52.9	49.8	46.6	43.4	40.4	39.2	37.6	38.2	36.4	34.6	32	30.7	27.1	24.4	22.2	20.7	17.4	12.9	6.3	4.3	21.3	33.3	34.4	39.9	37.7	38.4	29.6	13.6	9	4.5	3.9	2.4
4/9/2022	6:00:00 AM	62.1	60.3	57.9	55.1	51.6	48.6	45	42.7	39.1	37.7	38.4	39.7	38.7	36.5	34.5	32.6	29.9	25.7	23.4	20.5	18	13.5	5.8	0.9	16.5	28.3	34.5	38.4	40.3	34.2	23.5	12.7	10.4	2.9	1.6	2.8

4/9/2022	7:00:00 AM	65.9	64.4	62.3	59.5	56.4	53.1	49	45.6	42.4	40	38.1	38.4	36.6	36	33.6	31.5	28.4	24.7	22.3	20	17	12.8	8	10.4	11.2	20	22.1	22.3	24.6	23.3	14.7	2.6	0.1	-0.4	-0.5	0.9
4/9/2022	8:00:00 AM	59.6	58.1	55.4	52.9	49.5	46.2	42.5	40.1	37.3	36.4	36.8	40.2	34	34.1	35.3	29.9	28.7	24.4	20.7	17.2	12.7	7.7	2.7	5	6.9	17.2	28.6	32.5	30	29.7	14.4	10.6	10.1	5.8	6	2.6
4/9/2022	9:00:00 AM	55.7	53.9	51.4	48.8	45.8	43.3	41.1	41.1	38.5	38	37	36.3	35.6	34.1	32.7	30.3	26.7	21.7	16.8	14.8	12.9	7.8	12.5	19.5	20.6	13.6	9.6	12.1	8.4	3.3	-1.5	-3.4	-3.6	-3.2	-2.1	0.1
4/9/2022	10:00:00 AM	63.7	62.3	60.4	58.2	55.9	53.1	49.8	46.3	42.8	40.1	38.6	37.6	35.5	35	33.5	29.8	27.6	24	19.8	16.9	15	10.9	13	20.5	19.4	24.6	23.6	30.2	22.3	5.2	6.4	3.7	1.5	-0.7	-0.5	0.8
4/9/2022	11:00:00 AM	72	71.1	69.8	68	65.9	63.7	60.8	57.6	54.4	51.1	47.9	44.9	41.9	39.3	37	34.7	32.3	29.6	27.3	25.1	22.8	20.6	18.7	17.1	16	17.9	18.8	21.7	15.2	10.8	7.1	6.8	6.5	6.1	5.7	5.4
4/9/2022	12:00:00 PM	74.2	73.2	72	70.4	68.4	66.5	63.7	60.6	57.6	54.5	51.1	47.9	45.5	43	39.3	36.5	34.6	31.9	29.8	27.8	25.7	23.7	22	20.6	19.3	19.9	19.1	16.8	14	12.6	10.4	9.8	9.3	8.9	8.5	8.1
4/9/2022	1:00:00 PM	73.7	72.6	71.2	69.5	67.5	65.3	62.7	59.9	56.7	53.7	50.7	47.5	44.3	41.2	38.4	35.6	33.2	30.8	29	27	25	23.2	21.6	20.9	22.1	20.4	19.4	17.9	15.2	14.2	11.3	10.2	9.7	9.5	9.1	9.3
4/9/2022	2:00:00 PM	73	72.2	70.9	69.3	67.3	65.4	62.6	59.8	56.9	54.1	50.9	47.6	44.7	41.8	38.7	36.2	33.8	31.5	29.5	27.4	25.3	23.6	22.3	22.8	22.6	34.1	36.5	39.7	38.3	33.6	17.6	13.9	12.2	9.5	8.6	8.1
4/9/2022	3:00:00 PM	74.4	73.7	72.5	71	69.1	67.3	64.7	61.9	59.1	56.1	53	49.9	46.7	43.5	40.6	37.8	36	33.3	31.1	29.3	27	25.2	23.6	22.4	21.3	21.8	21	18.8	16	14.7	12.1	11.2	10.6	10.4	9.8	9.1
4/9/2022	4:00:00 PM	75.7	74.9	73.7	72.1	70.5	68.5	66.1	63.4	60.4	57.5	54.4	51.2	48	45	41.9	39.2	36.7	34.2	32.4	30.3	28.4	26.6	25.1	24.3	23.3	23.7	22.8	20.5	17.8	17.8	14.1	12.5	11.9	11.5	10.9	10.2
4/9/2022	5:00:00 PM	78.2	77.4	76.6	75.2	73.8	72.2	70.2	67.9	65.5	62.8	59.9	57	53.9	50.8	47.6	44.5	41.6	39	37	35	32.9	31.4	30.1	29.1	28.4	29.7	29.2	27.4	24.9	22.9	19.8	17.7	16.7	16	15.2	14.7
4/9/2022	6:00:00 PM	78.7	78.1	77	75.7	74.2	72.8	70.8	68.4	65.9	63.3	60.4	57.4	54.3	51.1	48	44.9	42.1	39.5	37.6	35.5	33.5	32.1	30.7	29.9	29.1	30.5	29.9	27.7	24.8	23	19.9	17.8	16.8	16	15.3	14.7
4/9/2022	7:00:00 PM	74.9	74.2	73	71.4	69.6	67.7	65.1	62.3	59.4	56.2	53.2	49.9	46.6	43.6	40.5	37.6	35.2	32.9	31.3	29.2	27.2	25.6	23.9	22.8	22.2	31.8	30.9	32.8	25.8	26.4	21.2	11.6	11.1	10.3	9.5	8.9
4/9/2022	8:00:00 PM	68.3	67.2	65.8	64	61.8	59.3	56.2	52.9	49.4	46.1	43.2	40.3	37.6	34.8	33.3	30.9	28.5	25.2	23	20.5	17.8	15.5	13.6	12.2	11	11.5	10.3	7.4	4.7	4.5	3.1	2.9	3.2	2.7	2.3	2.4
4/9/2022	9:00:00 PM	57.6	56.2	54	51.5	47.7	44.6	41.3	40.1	36.4	35.7	34.9	35.2	34.6	33.6	32.4	32.6	31.3	26	18.5	14.9	13	7.3	-2	-4.7	-5.8	-5.6	-5.3	-5.1	-4.5	-3.3	-3.5	-3.3	-2.9	-2.9	-1.9	0.5
4/9/2022	10:00:00 PM	61.7	60.2	58.2	55.5	52.5	49.2	45.3	43.2	39.1	36.9	35.7	36.4	34.2	32.8	32.1	29.8	26.8	22.3	18	16.9	16.7	16.8	14.3	13.1	8.9	7.1	4	5.9	3.3	-0.4	-1.7	-1.5	-1	-1.4	-0.9	0.9
4/9/2022	11:00:00 PM	59.8	57.9	55.5	52.4	49.3	45.7	42.3	40.2	35.6	33.7	31.9	31	29.4	28	26.7	22.7	19.5	16.3	13.6	10.1	8.2	8.6	3.3	2.8	0.9	0.9	-2	-2.9	-2.7	-1.1	-1.9	-1.5	-1.1	-1.5	-1	0.9
4/10/2022	12:00:00 AM	60.9	58.9	56.4	53.5	50.4	47	43.7	41	37.7	35.9	34.5	34.6	32.8	29.5	25.5	23.5	20.5	17.1	14.7	12.1	8	4.3	1.8	-0.1	-1.3	1.4	-1.8	-2.4	2.2	0.6	-1.3	-1	0.5	-1.1	0.7	1
4/10/2022	1:00:00 AM	55.8	53.4	50.4	47.4	44.2	40.9	38.9	39.7	35.7	35.7	34.2	34.6	35	32.5	29.5	28	23	18.9	14.9	12.6	10.7	3.5	4.5	-6.4	-6.8	6.5	-4.6	3.7	4.1	3.6	-4.2	-4	3.6	-3.6	2.3	0.6
4/10/2022	2:00:00 AM	49.8	47.4	45.2	42.5	41	37.9	35.5	36.4	32.3	32.3	30.2	31.8	32.2	30	25	23.4	19.7	15.6	11.5	7.4	1.4	5.8	9.3	-9.2	-8.8	8.1	-7.2	-4.9	4.9	5.2	-5	4.8	4.4	-4.2	2.7	0.5
4/10/2022	3:00:00 AM	58.6	56.6	53.8	51	47.5	44	40.7	39	35	33.7	31.1	30.4	28.1	26.4	24.7	23.4	18.5	14.7	11.3	8.7	13.4	15	9.9	11.2	13.2	6.3	4.7	6.8	7.1	6	-3.3	3.1	2.8	-3.2	2.1	0.7
4/10/2022	4:00:00 AM	30.8	32.4	34.7	36.1	37.3	36	38.4	42.5	33.6	33.7	32	32.6	30.6	27.9	26.8	23.2	17.5	11.4	6.5	3.7	5.7	5.2	-1	0.6	-2.1	-3	4.9	5.4	3.1	0.1	-5.5	5.4	4.8	-4.6	2.8	0.6
4/10/2022	5:00:00 AM	33.3	34.1	35.8	37.8	38.7	36.6	36.6	40.8	33.6	33.6	31.8	32.9	29.1	27.1	25.4	21.9	15.3	10.4	7	2.2	2.3	5.7	5.4	1	12.3	24.5	26.6	28.9	35.7	34	22.6	3.2	2.7	2.4	1.1	0.9
4/10/2022	6:00:00 AM	31.7	34.4	36.7	38.4	40.1	37.7	37.8	40.7	36.2	37.4	35	33.9	32.5	31.2	28	25	20.1	15.6	12.3	7.4	0.8	5.2	1.3	5.8	6.5	14.5	17.8	19	20	17	9.9	3.4	4.2	4.3	2.8	0.6
4/10/2022	7:00:00 AM	44.7	42.6	41.3	40.1	39.2	38.4	37.2	39.5	37.1	37.3	37.4	37.9	36.2	37.5	32.4	30.8	27.8	20.9	15.5	10.5	3.4	4.1	4.7	0.8	2.9	9.8	15.5	19	18.9	16.1	10.6	2.3	4	3.9	2.7	0.3
4/10/2022	8:00:00 AM	51.7	49.8	47.5	44.9	42.7	39.6	37.4	41	35.4	34.5	33.6	34.5	30.8	30.1	28.4	23.8	18.9	12.9	7.2	2.3	2.6	5.9	2.6	2	3.6	6.2	7.9	12.3	10	6.9	0.3	4	3.7	3.5	2.3	0.3
4/10/2022	9:00:00 AM	57.4	55.4	53	50.4	47.3	43.9	41.5	43.8	38.1	36.8	35.4	35	34	32.3	30.8	28	23.3	17.5	11.2	7.6	3	0.8	2.4	5.8	2	6.1	8.1	11.5	9.5	6.7	0.8	3.1	2.7	2.6	1.8	0.4
4/10/2022	10:00:00 AM	63.3	61.6	59.7	57.1	54.1	51.1	47.9	44.8	41.5	39.6	37.4	36.4	35.2	34.1	31.3	28.4	24.9	20.8	16.6	13.6	10.5	7.5	7.2	14.5	15	24.9	26.8	31	27.6	25.1	10.3	5.8	8.7	4.9	5.1	2.1
4/10/2022	11:00:00 AM	66.7	65.5	63.7	61.7	59.2	56.2	53	50	47.1	44.6	42.6	40.7	39	37.3	35.3	33.8	31.7	26.1	22	19.3	15.9	13.5	11.6	10.2	9.2	12.2	12.6	15.7	13.2	7.8	3.7	1.4	1.3	1.3	1.7	2
4/10/2022	12:00:00 PM	68.9	67.6	66.3	64	61.7	58.9	55.9	52.5	49	46	42.9	40	37.7	35.2	32.8	30.6	28.6	26	23.1	20.8	18.1	16.1	14.8	12.9	11.2	11.2	11	12.6	15	14.9	9.3	2.7	2.6	2.6	2.9	2.7
4/10/2022	1:00:00 PM	67.6	66.5	64.9	63	60.4	57.8	54.6	51	47.7	44.4	41.6	39.4	37	34.7	32.7	30.2	27.6	24.6	22.1	19.5	16.8	14.7	13.8	15	11.2	9	7.3	6.9	5	2.9	0.8	0.9	1.1	1.1	1.4	1.7

4/10/2022	2:00:00 PM	66.8	65.5	64.2	62.1	59.6	57.1	53.7	50.4	47	43.9	41	39	37.3	35.3	32.9	30.4	27.7	24.5	21.6	19.1	16.3	14.1	12.4	12.2	10.2	9.3	7.8	6.5	3.5	1.3	0.2	0.5	0.7	0.8	1.3	2
4/10/2022	3:00:00 PM	63.9	62.5	61	58.8	56	53.2	49.6	46.6	43.7	40.7	38.7	37.4	42.2	43.4	39	31.5	29.9	25.4	19.2	16.6	12.9	9.6	9.2	11.5	14.3	9.8	10.4	12.6	9.9	4	-0.9	-1.2	-1.1	-0.9	-0.2	0.9
4/10/2022	4:00:00 PM	65.8	64.5	63.3	61.9	59.9	58.1	55.9	53.7	51	48.6	46.7	43.4	40.9	38.4	35.3	32.7	30	26.8	24.4	21.9	19.4	17.6	16.5	16.3	15.1	16	16.3	17.9	12.6	11	7.4	5	3.5	2.9	2.6	2.9
4/10/2022	5:00:00 PM	58.9	57.4	55	51.9	48.7	45.7	42	38.9	36.6	35.1	34.1	33.9	32.3	31.1	29.5	27.3	24.4	19	13.1	9.3	6.1	1.4	5.2	13.5	10	11.5	14.1	15.1	12.1	6	0	-3.4	-3.2	-2.7	-1.8	0.2
4/10/2022	6:00:00 PM	50.6	47.5	46.1	43	40.3	37	34.6	33	31.7	31.2	31.1	30.5	29.4	28.2	26.2	23.1	19.9	14.8	8.4	2.2	-3.1	-7.3	-8.2	-6.2	5.8	15.4	19.4	23.2	21.2	16.5	10.3	-2.5	-3.9	-3.1	-2.4	0.1
4/10/2022	7:00:00 PM	34.6	34.3	35.3	33.8	31.5	30.8	29	29.1	27.2	25.6	25.9	27.7	25.3	25.5	24.8	22.5	20	16.1	12.3	8.6	2.1	-5.6	-8.7	-5.1	4.1	16.3	17.8	22.7	27.4	30.9	25.2	3.9	-2.2	-2.4	-2.3	0.2
4/10/2022	8:00:00 PM	41.3	39.1	37.4	34.9	34.1	34.9	32.7	31.7	30.8	30.8	32.1	35.2	31.4	30.6	28.8	26.4	23.3	18.6	16	11.9	7.3	-0.8	-8.5	-8.3	-3.8	7.9	11.5	16.8	13.9	9.2	-4.6	-4.9	-4.6	-4.2	-2.7	0.2
4/10/2022	9:00:00 PM	33.4	33.2	35.6	34	33.6	34.8	35.1	34.4	32.7	32.5	32.4	35.4	33.7	31.3	32.4	27.4	24.9	19.8	17.6	13.2	8	-0.4	-8.6	-9.5	-8.9	-7.5	-1.9	0.9	5.4	-4	-5.2	-5.2	-4.7	-4.2	-2.8	0.2
4/10/2022	10:00:00 PM	34.2	33.9	36.1	35.7	34.3	35.2	35.7	36.1	34.4	33.7	33.5	33.9	33.2	32.7	31.8	29.4	25.6	20.2	14.6	11.2	6.4	1.9	-9.1	-9.4	-8.9	-5.3	-0.8	2.1	5.5	-4.9	-5.2	-5.2	-4.7	-4.2	-2.8	0.2
4/10/2022	11:00:00 PM	39.4	37.4	36.5	34.1	33.1	33.4	33.4	33.2	31.8	32	31.1	30.8	30.6	28.3	27.4	25.8	20.7	14.2	5.9	-0.1	-3.5	-8.3	-9.9	-9.4	-8.8	-6	-5.7	-2.6	-1.2	-5.7	-5.3	-5.1	-4.7	-4.2	-2.8	0.3
4/11/2022	12:00:00 AM	39.8	37.2	35.8	34.1	33.8	34.2	34.4	33.5	32.5	32.8	32.9	34.1	30.6	30.2	28.5	25.8	21.8	16.6	11.8	6.4	-0.1	-5.9	-9.8	-9.5	-8.9	-7.3	3.5	7.8	2.6	4.6	-5	-5	-4.7	-4.2	-2.8	0.3
4/11/2022	1:00:00 AM	38.2	36.7	37.3	37.7	37.3	38.1	38.8	36.9	36.3	36.4	39.6	39.3	36	29.8	26.8	25.8	23.2	19.5	14.1	8	3.5	-5.8	-9.1	-9.3	-8.7	-5.5	2	3.9	1.8	-1	-5.3	-5.1	-4.7	-4.3	-2.8	0.3
4/11/2022	2:00:00 AM	41.5	40.2	38.9	39.7	38.6	41.2	41.4	40.1	40.2	42.3	43.7	43.3	42.8	39.8	34.3	32.6	29.1	25.7	22.1	18.6	13.3	6.8	1.6	-6.8	-5.8	-2.3	2.4	8.1	7.8	-5.1	-5.1	-4.8	-4.6	-4.3	-2.8	0.3
4/11/2022	3:00:00 AM	41.1	38.8	36.9	36.3	36.2	36.3	36.5	34.6	31.3	31	31.1	30.4	28.5	27.5	25.9	25	24.6	22.5	18.4	12.5	6.6	3	6.7	-3.5	-2.6	-0.8	6.3	14.9	12.5	-3.9	-3.9	-5	-4.6	-4.2	-2.7	0.3
4/11/2022	4:00:00 AM	68.4	67.4	65.8	63.5	60.8	57.8	54.9	51.7	48.8	46.4	45.3	42.5	41.1	38.2	34.3	33.3	31.2	28.2	25.4	21.3	17.8	15	12.8	11.2	9.9	10.9	11	12.5	12.8	8.6	2.9	2.9	3.1	2.7	2.5	3
4/11/2022	5:00:00 AM	70.9	69.4	67.7	65.4	62.9	60	56.6	53.3	49.9	46.4	43.1	40.1	37.2	35.1	32.8	30.8	28.8	26.8	24.8	22.5	19.5	17.6	15.6	14.1	13	13.9	18.5	16.1	19.5	15.2	8.3	5.1	5	4.6	4.2	4.7
4/11/2022	6:00:00 AM	75.8	74.7	73.5	71.9	70	67.8	65.3	62.7	59.8	56.8	53.7	50.6	47.4	44.4	42	39	36.2	34.2	32.3	30.3	28	26.6	25.4	24.3	23.8	25.1	24.8	24.8	20.8	16.7	13.2	11.9	11.3	10.8	10.4	10.5
4/11/2022	7:00:00 AM	75.1	74.2	73	71.5	69.4	67.3	65	62.2	59.4	56.4	53.3	50.3	47.1	44.1	41.2	38.6	36.2	34.1	32.1	30.1	27.8	26.2	24.7	23.7	23.1	25	25.3	24.1	20.2	17.1	13.2	12.1	11.4	11	10.6	11
4/11/2022	8:00:00 AM	77.6	76.8	75.6	74.3	72.5	70.6	68.4	65.8	63	60.2	57.1	54	50.8	47.7	44.6	41.8	39.7	37.4	35.4	33.4	31.3	29.9	28.5	27.6	26.9	28.3	27.7	25.4	21.9	19.6	16.6	14.9	13.5	13.5	12.6	12.5
4/11/2022	9:00:00 AM	71.7	70.4	68.9	67.3	64.8	62.2	59.4	56	53.1	49.7	46.5	43.5	40.2	37.4	35	32.7	30.6	28.7	26.8	24.7	22.4	20.7	18.7	17.4	16.7	20.2	21.7	23.2	18	12.6	7.1	6	5.7	5.2	5	5.8
4/11/2022	10:00:00 AM	78.1	77.1	75.9	74.4	72.8	71.5	69.7	67.8	65.7	63.5	61.2	58.8	56.2	53.4	50.5	47.5	44.6	41.9	39.5	37.4	35.1	33.9	32.9	32.4	32.3	33.3	33.3	32.1	29.7	28	24.9	22.5	21	20	19	19.4
4/11/2022	11:00:00 AM	78.9	77.7	76.4	74.9	73.3	71.8	69.8	67.9	65.6	63.4	61	58.3	55.6	52.7	49.8	46.9	44.2	41.7	39.3	37.3	35.2	33.6	32.4	31.8	31.6	32.8	32.5	31.1	28.5	26.9	24.1	22.3	20.7	19.2	18.5	18.9
4/11/2022	12:00:00 PM	79.3	78.5	77.6	76.3	74.9	73.4	71.6	69.7	67.6	65.3	62.8	60.2	57.7	54.8	51.8	48.9	45.9	43.2	40.8	38.7	36.5	35.1	33.9	33.2	32.9	34.3	34	32.2	29.7	28.1	25	22.5	20.3	18.5	17.8	18.3
4/11/2022	1:00:00 PM	80.9	80.3	79.8	78.9	77.7	76.9	75.7	74.2	72.6	71	69.1	67.1	64.9	62.6	60	57.4	54.6	51.8	49	46.3	43.7	41.8	40.3	39.6	39.2	40.8	40.3	38.8	37.1	36.3	34.2	32.1	30.4	28.3	26.4	26
4/11/2022	2:00:00 PM	78.5	77.6	76.5	75.4	74.1	72.8	71.2	69.3	67.1	64.7	62.1	59.1	56.1	52.9	49.7	46.5	43.8	41.3	39.1	37	35.1	33.4	32	31.1	30.3	29.6	28	25.5	23.3	22.2	20	18.3	17.8	17.3	17.6	19.6
4/11/2022	3:00:00 PM	77.9	77	76	74.9	73.7	72.3	70.7	68.6	66.3	63.7	60.8	57.7	54.6	51.4	48.1	44.9	42.2	39.9	37.9	35.8	33.8	32	30.3	29.2	28.3	27.6	25.9	23.6	21.5	21	19.6	18.5	18.6	18.5	18.7	22
4/11/2022	4:00:00 PM	79.8	79.2	78.3	77.3	76.2	75.1	73.8	72.3	70.4	68.2	65.8	63.1	60.4	57.4	54.3	51.2	47.9	44.9	42.3	39.9	37.8	36.1	34.8	34.1	33.6	33.6	32.5	30.9	29	28.3	26.7	24.9	24.4	23.4	23.1	26.8
4/11/2022	5:00:00 PM	75.6	74.9	74	72.9	71.6	70.2	68.6	66.6	64.3	61.9	59.2	56.3	53.3	50.1	46.9	43.5	40.4	37.4	35.1	32.9	31	29.4	28.3	30.7	26.7	26.3	24.9	22.5	19.7	18	14.9	11	9.1	7.5	8.1	11.4
4/11/2022	6:00:00 PM	70.4	69.3	68.2	66.6	64.6	62.3	59.7	56.9	53.6	50.4	47.6	45	42.1	39.6	37.1	33.9	31.4	28.8	26.7	24.1	21.7	19.5	17.3	16.1	15.6	16.4	15	11.8	7.2	4.5	2.2	0.9	1	0.6	1.2	3.4
4/11/2022	7:00:00 PM	70.1	69.3	68	66.5	64.8	62.6	60.2	57.6	54.4	51.4	48.3	45.3	42.6	39.9	37.2	34.7	31.6	28.9	26.7	24.6	22.8	20.6	18.2	17.3	17.1	17.5	15.5	12.5	11.2	11.7	7.2	2.7	2.7	2.2	2.8	4.8
4/11/2022	8:00:00 PM	67.9	66.8	65.5	63.8	61.4	58.9	56	52.9	49.8	46.5	44	42.2	39.6	37.7	36.2	32.7	30	26.6	23.9	22.1	20.5	18	13.8	12.8	11.7	11.2	9.1	4.7	1.3	0.3	-1.1	-1.6	-1.5	-1.9	-1.4	0.9

4/11/2022	9:00:00 PM	74.7	74		73	71.7	70.3	68.3	66.2	63.8	60.9		58	54.8	51.8	48.6	45.7	43.1	40.1		37		34	31.8	29.5	27.4	25.7	24.4	24	23.8	24.9	23.5	20.8	17.6	15.3	12	8.9	7.1	5.3	4.9	6.1
4/11/2022	10:00:00 PM	69.4	68.3	67.1	65.2	62.8	60.1	57.2	53.9	50.4	47.3	44.5	42	39.6	37.1	34.2	31.6	29.2	26.9	24.4	21.7	19.3	17.1	14.7	13.5	12.7	12.6	10	6.2	2.7	1.4	-0.1	-0.6	0.6	-1.2	-0.8	1.2
4/11/2022	11:00:00 PM	67.8	66.6	65.2	63.3	60.7	57.8	54.6	51.3	47.8	45	42.3	40	37.7	35.6	33.3	31.2	28.8	26.1	23.2	20.2	17.9	15.6	13	11.8	10.9	10.6	8	4.2	0.8	0.3	-1.4	-1.7	1.5	-2	-1.3	1
4/12/2022	12:00:00 AM	73.8	72.9	71.8	70.2	68.4	66.1	63.5	60.5	57.5	54.2	51.1	48	45.1	42.4	39.5	36.9	34.3	32	30.2	27.6	25.3	23.9	22.2	21.7	21.2	22	20	16.5	12.5	10.1	7	4.8	4	2.8	2.8	3.9
4/12/2022	1:00:00 AM	64.6	63.4	61.7	59.7	57.2	54.3	51.3	48.1	44.5	41.9	39.6	37.3	34.5	32.5	29.7	27.9	25.4	22.4	20.9	17.3	17.1	14.3	10.3	8.5	6.8	6.4	3.7	0.2	-2.4	-2.8	-3.4	-3.5	-3.2	-3.3	-2.2	0.7
4/12/2022	2:00:00 AM	68.8	67.9	66.5	64.6	62.4	59.7	56.7	53.7	50	46.9	44	41.4	38.3	35.9	32.5	29.9	27.3	24.9	22.9	20.3	18	16.4	14.7	13.8	13	13	10.7	6.9	3.6	2.3	1.4	1.7	1.4	1.1	1.6	3
4/12/2022	3:00:00 AM	67.8	66.6	64.9	62.9	60.5	57.5	54.4	51.6	47.9	44.7	41.8	38.9	36	33.2	30.4	27.9	25.7	23.1	21	18.2	15.9	14.1	12	11	10.4	10.7	8.8	6.2	5.1	4.7	6.1	7.4	7.5	7.1	7.7	7.7
4/12/2022	4:00:00 AM	69.4	68.4	67.1	65.4	63.3	60.9	58	55	51.4	47.3	43.9	41.2	38	35.3	32.3	30.3	27.7	25.5	23.4	20.7	18.6	16.9	15.1	14.4	14.6	16.4	14.6	12.6	12	11.1	12.3	13.5	13.6	12.9	13.1	13.5
4/12/2022	5:00:00 AM	70.8	69.7	68.5	67	65	62.7	60.1	57.3	53.9	50	46.1	42.8	39.9	37.1	34.6	32.2	30.1	27.7	25.6	22.9	20.8	19	17.2	16.4	16.2	16.9	14.7	11.9	11.1	9.4	9.7	11	11	10.2	10.4	11.4
4/12/2022	6:00:00 AM	77.3	76.5	75.5	74.2	72.8	71.3	69.4	67.2	64.6	61.7	58.6	55.2	51.9	48.5	45.5	42.5	39.6	37.1	35.2	32.7	30.4	29	28	27.9	28	29.1	27.7	25.2	22.3	20.5	18.5	18.6	18.1	15.9	15.4	19
4/12/2022	7:00:00 AM	77.8	77.1	76.2	75.1	73.7	72	70.1	67.8	65.1	62.4	59.3	56	52.7	49.7	46.7	43.8	40.9	38.2	36.2	33.7	31.4	29.9	28.9	28.7	28.8	30	28.6	25.9	22.6	20.4	17.2	14	12	9.8	9.3	11.3
4/12/2022	8:00:00 AM	76.1	75.6	74.6	73.3	71.7	69.6	67.5	64.8	62	58.9	55.8	52.6	49.3	46.3	43.3	40.2	37.3	35	33.2	30.7	28.5	27.1	26.3	26.2	26.1	27.2	25.9	23.2	20.4	17	13.4	10.6	8.9	7.3	7	7.9
4/12/2022	9:00:00 AM	76.1	75.5	74.4	73	71.4	69.4	67.1	64.4	61.4	58.5	55.3	52	48.9	46.1	42.9	40.6	37.1	34.7	32.6	30.2	28.2	26.7	25.6	25.3	25.1	26.1	24.6	21.6	18.1	15.7	12.5	10.3	9.1	7.8	7.3	7.4
4/12/2022	10:00:00 AM	75.7	74.9	73.8	72.6	70.8	68.8	66.4	63.7	60.6	57.7	54.3	51.1	47.9	44.9	41.9	39	36.2	33.6	31.7	29.4	27.3	25.9	24.8	24.4	24	25	23.4	20.4	16.7	14.4	11.4	9.4	8.4	7.2	6.7	6.8
4/12/2022	11:00:00 AM	74.4	73.5	72.5	71	69.1	67	64.7	61.5	58.4	55.3	52.2	49.2	46.2	43.6	42.2	41.6	39.4	35	31.8	30	27.6	24.5	22.7	22	21.3	22.2	20.6	17.5	14.3	12.4	9.3	7.8	7.2	6.2	5.7	5.7
4/12/2022	12:00:00 PM	70.2	69.3	68	66.5	64.2	61.6	59.1	55.7	52.5	49.2	46	43.2	40.6	38.1	36.3	33.9	32.6	29.9	25.6	23.2	20.9	18.6	16.6	15.5	14.5	16	14.8	17.8	15.3	10.4	4.1	2.9	2.7	2.1	1.9	2.5
4/12/2022	1:00:00 PM	74.7	73.8	72.7	71.1	69.2	67	64.5	61.5	58.3	55.1	51.9	48.8	45.9	43.3	42.6	43.7	39.4	34.8	31	28.5	26.5	24.8	23.2	21.9	20.6	21.7	20.3	17.7	15	12	8.9	7.9	7.4	6.7	6.2	6.3
4/12/2022	2:00:00 PM	74.1	73.2	72	70.3	68.4	66.1	63.6	60.6	57.3	54.1	51.1	47.7	44.7	43.4	42.2	39.2	34.6	32.7	30.1	27.7	25.7	24.1	22.6	21.4	20.3	21.3	20.4	17.6	15	13.5	10	8.7	8.2	7.4	7.1	7.4
4/12/2022	3:00:00 PM	76	75.2	74.1	72.6	70.7	68.6	66	63.3	60.1	57.1	53.9	50.7	47.6	44.5	41.6	38.8	36.4	34.2	32.4	30.5	28.5	26.9	25.4	24.1	22.9	23.8	22.5	19.4	16.1	14.3	11.3	10	9.4	8.5	8.1	8.3
4/12/2022	4:00:00 PM	73.1	72.1	71	69.1	67.1	64.5	61.7	58.6	55.5	52.4	49.1	46.2	43.4	40.9	38.7	36.1	34.2	32.3	29.4	27.1	24.9	23	21.1	19.6	18.5	19.8	18.7	16.4	13.7	11.3	8.3	7.6	7.2	6.8	6.6	6.5
4/12/2022	5:00:00 PM	72.6	71.7	70.3	68.6	66.4	63.9	61	57.7	54.5	51.4	48.3	45.5	42.9	40.7	39.3	36.8	36	32.2	28.9	27.1	24.9	22.5	20.1	18.6	18.1	20.9	21.5	25.4	22.1	15.6	6.5	5.6	5.3	4.4	3.9	4
4/12/2022	6:00:00 PM	69.6	68.5	67.1	65.1	63	60.3	57.2	54	50.7	47.4	44.5	41.4	38.7	36.3	33.9	31.7	29.8	27.3	25.2	22.8	20.1	18.1	16.1	14.4	13.3	13.9	12.2	9.6	10.7	11.8	5.6	2.4	2.5	1.9	1.8	2.8
4/12/2022	7:00:00 PM	44.7	42.2	40.6	37.3	34.7	33.4	31.5	31.2	31.1	31	31.4	31.6	30.7	30	28.3	27.5	25.1	21.6	19.2	15.3	11.8	5.4	-3.6	-4	4.2	17.1	18.4	22.9	20.9	19.1	8	-3.5	-4.1	-4.2	-2.8	0.3
4/12/2022	8:00:00 PM	50.5	48.2	45.7	42	38.7	36.1	34.1	32.4	31	30.4	30.7	31.7	30.9	29.7	27.9	26.8	24.7	20.1	16.4	12.6	8.5	2	-7	-9.2	-8.9	-8.4	-7.8	-7.1	-6.4	-7.7	-5.4	-5.2	-4.7	-4.4	-2.8	0.4
4/12/2022	9:00:00 PM	59.8	58.2	55.9	53	49.6	46.3	43.2	39.9	37.1	34.9	33.3	33.6	32.2	32.2	31.2	29.2	27	22.1	19.1	16.4	13	7.4	-0.4	-4.3	-5.8	-6.3	-6.4	-6.2	-5.6	-4.6	-4.5	-4.3	-3.9	-3.8	-2.5	0.4
4/12/2022	10:00:00 PM	55.1	53.2	50.2	47.1	43.7	41.4	39.8	36.9	34.5	34.1	33.8	33.8	32.8	32.2	31.7	30.3	27.6	23.8	19.7	16.9	13.9	8.3	-1.2	-7.9	-8.5	-8.1	-7.6	-7	-6.2	-5.5	-5.2	-5	-4.5	-4.3	-2.8	0.4
4/12/2022	11:00:00 PM	62.2	61.1	59.2	56.9	54.1	51.5	48.4	45.3	42.3	39.7	37.5	36.3	35.1	32.1	31.6	29.3	29.2	24.2	20.8	17.5	13.9	10.7	7.1	5	3.6	4.2	3.3	5.7	6.6	1.3	2.5	4.8	5.4	6.2	6.5	7.2
4/13/2022	12:00:00 AM	66.1	64.8	63.3	61.3	59.1	56.4	53.5	50.1	46	42.4	39.7	37.5	35.7	33	30.4	27.9	26.1	24.4	21.4	17.7	14.9	13.1	10.9	9.8	10.1	10.6	8.7	7.7	8.6	9.7	11.1	12.4	13.3	13.3	13.8	14.5
4/13/2022	1:00:00 AM	62.7	61.2	59.2	56.8	54.2	51	47.5	44.1	40.2	37.6	35.5	32.7	30.9	29	27.8	26.2	23.6	20.6	18	15.5	14.1	11.4	5.7	1	-1.7	-3.1	-4.4	-5.1	-5.1	-4.5	-4.4	-4.4	-4	-4	-2.6	0.5
4/13/2022	2:00:00 AM	64.9	63.4	61.6	59.3	56.6	53.7	50.2	46.7	42.7	39.5	37.3	34.2	31.7	29.6	26.8	26	24.1	22.4	19.4	16.7	16.7	13.2	8.3	4	1.4	0.7	-0.7	-1.6	-1.7	-0.9	-0.4	0.1	1	0.7	1.5	3.8
4/13/2022	3:00:00 AM	67.3	66.1	64.8	62.9	60.7	58.1	55.3	52.1	48.2	44.3	41	38.1	35.6	32.9	30.2	28.4	26.4	24	21.7	19.1	17	15.1	12.1	10.4	9.4	8.8	6.1	3.4	2.1	2.6	3.4	4.4	5.2	4.9	5.5	8

4/13/2022	4:00:00 AM	68.8	67.5	65.9	64.1	62	59.3	56.4	53	48.9	45	42.3	41.9	37.5	34.7	35.6	31.3	29.9	26.1	23.7	21.2	19	16.8	13.1	10.8	9.4	8.3	5.4	1.9	-0.3	-0.5	-0.2	0.2	0.5	-0.1	0.6	2.9
4/13/2022	5:00:00 AM	69	67.9	66.1	64.4	62.4	60.1	57.4	54.2	50.3	46.8	43.4	40.3	37.7	35.1	32.2	30.4	28.4	26	23.8	21.3	19.4	17.2	14.2	12.7	11.8	12.3	11.7	13.4	15.1	15	6.2	-1.6	-1.5	-2	-1.2	1.6
4/13/2022	6:00:00 AM	70.4	68.9	67.4	65.7	63.6	61.2	58.7	55.8	52.2	48.8	45.5	42.7	39.4	36.5	34	31.7	29.6	27.2	25	22.4	21	18.4	15.9	15.1	15.5	19.6	18.4	18.1	15.4	11.5	5	-0.7	-0.7	-1.3	-0.4	2.4
4/13/2022	7:00:00 AM	67.2	65.8	64	61.7	59.5	57	54.4	51.5	48.1	44.8	42.4	40.3	38.3	36.5	35.4	33.2	30.5	27.6	24.1	23	22.5	19.6	14.2	10.1	12.4	19.3	21.7	23.7	18.4	15.2	16.8	-2.1	-0.7	-2.5	-1.4	1.1
4/13/2022	8:00:00 AM	57.7	55.7	53.9	51.4	48.8	46.8	44	41.7	38.9	38.2	38.5	40	38.8	38.8	37.4	36.4	35.2	32.4	30	27.6	27	25.7	22.6	22.3	24.5	24.8	25.2	26.3	23.1	19.8	17.3	14.6	13.6	10.9	10	10.5
4/13/2022	9:00:00 AM	67.4	65.9	64.3	61.9	59.2	56	52.9	49.6	46.6	43.9	41.7	39.4	37.2	37.4	36.2	35.2	29.6	27.7	23.2	20.3	18.2	14.7	11.2	9.9	11.5	19.3	20.6	22.4	20.9	17.2	9.6	-0.3	-0.6	-0.7	0	2.1
4/13/2022	10:00:00 AM	69.5	68.3	66.7	64.6	61.9	59.1	56	52.6	49.3	46.5	43.6	41.1	38.6	35.9	33.7	31.4	29.3	26.9	24.6	22.3	19.8	17.9	15.8	14.2	14.6	19.7	22.4	26.9	22.5	18.8	8.4	3.2	2.6	2.7	2.7	4
4/13/2022	11:00:00 AM	74.4	73.6	72.2	70.8	68.9	66.5	64	61.1	57.9	54.6	51.7	48.8	46	43.6	41.2	39.1	36.9	34	31.7	29.6	27.5	25.8	24.1	22.8	21.7	22.5	21.3	18.4	15.4	15.8	10.4	9.3	8.9	8.4	8.2	8.6
4/13/2022	12:00:00 PM	71.7	70.3	68.9	67.1	64.8	62.1	59.2	55.9	52.6	49.4	46.2	43.2	40.2	37.7	35.5	33.1	31	29	26.9	25	22.6	20.8	18.9	19	17	16.8	16.2	14.8	13.8	12.5	7.2	5	4.8	4.4	4.6	5.7
4/13/2022	1:00:00 PM	74.4	73.4	72.4	70.7	68.8	66.5	64.1	61.2	58.2	55	51.9	48.7	45.6	42.5	39.7	37	34.7	32.7	31	29	26.7	25.1	23.6	22.3	21.3	22.3	21.1	18.3	15.1	13.4	10	8.7	8	7.3	7	7.7
4/13/2022	2:00:00 PM	75.7	74.8	73.8	72.3	70.5	68.4	66	63.2	60.2	57.1	53.9	50.8	47.7	45.5	43	39.6	36.8	34.5	32.7	30.6	28.4	26.9	25.3	24	23	24.2	23.4	22.6	18.7	16.1	11.7	10.3	9.5	8.9	8.3	8.3
4/13/2022	3:00:00 PM	74.6	73.7	72.2	70.8	68.8	66.7	63.9	60.9	57.7	54.6	51.3	48.4	45.3	42.6	39.8	37.2	36.2	33.5	30.8	28.8	26.5	24.7	23	21.6	20.4	21.2	20.1	18.9	15.4	13.4	9.6	8.4	7.9	7.3	6.8	6.9
4/13/2022	4:00:00 PM	73.2	72.2	71	69.3	67.3	64.9	62.2	59.1	56.1	52.8	49.6	46.6	43.9	41.8	41.4	36.5	34	31.5	29.3	27.1	24.6	22.9	21.3	19.6	18.5	19.4	18.3	16.4	13.4	10.7	8	6.8	6.5	5.8	5.3	5.5
4/13/2022	5:00:00 PM	73.6	72.5	71.2	69.6	67.5	65.2	62.5	59.4	56.4	53.2	50.1	47.2	44.2	41.6	39.2	36.7	34.6	32	29.7	27.8	25.2	23.4	21.6	20.3	19.4	20.4	20.1	18.1	14.2	13.4	9.7	8.4	8.3	7.1	6.4	7.3
4/13/2022	6:00:00 PM	71.7	70.6	69.3	67.4	65.2	62.5	59.5	56.2	52.9	49.5	46.7	43.8	45	47.1	38.1	35.9	36.3	30.2	27.4	24.7	21.9	19.9	18	16.5	15.5	16.9	15.6	14.2	11.7	9.2	6	4.9	4.9	4.4	4.1	4.7
4/13/2022	7:00:00 PM	65.2	63.7	61.6	59.3	56.6	53.4	49.8	46.2	42.8	40.3	38.3	37.6	35.1	33.9	32.4	30.1	27.5	23.9	20.5	17.2	13.3	9.8	6.6	4.5	6.2	11.7	16.1	18	18.2	17.3	8.3	-1.2	-1.3	-1.5	-1.1	0.8
4/13/2022	8:00:00 PM	67.1	65.7	64	62	59.7	56.4	53.5	50.1	46.9	43.7	41	39.4	37.3	35.2	33	31	28.6	25.7	22.6	19.6	16.5	13.8	11.3	9.4	8	8.5	6.6	3.5	1.2	1.2	0.5	0.1	0.2	-0.2	-0.1	1.1
4/13/2022	9:00:00 PM	60.8	59.2	56.8	53.9	50.9	47.3	43.9	40.9	38.5	36.5	35.2	34.6	33.9	32.8	32	30.9	28.9	24.3	20.3	16.5	13.8	8.7	0.3	-3.6	-5.3	-5.7	-5.9	-5.6	-5	-4	-3.7	-3.8	-3.5	-3.2	-2.3	0.3
4/13/2022	10:00:00 PM	66.9	65.6	64	61.5	58.8	55.7	52.6	48.7	45.4	42.2	39.8	38.4	36.9	34.3	33.4	31.8	30.1	26.5	23.1	20.3	17.3	13.7	9.9	7.6	6	5.8	3.8	1.1	-0.4	0	-0.3	-0.6	-0.5	-0.8	-0.5	1.3
4/13/2022	11:00:00 PM	68.8	67.8	66.2	64	61.5	58.7	55.3	51.9	48.6	45.4	42.4	39.7	37.4	35.3	33.2	31.8	30.1	27.2	24.4	22	19.7	16.8	13.9	12.2	11	11.2	9.7	6.8	4.2	3.7	3	3.2	3.5	3.1	3.3	4.2
4/14/2022	12:00:00 AM	70.8	69.6	68	66.1	63.7	61.4	58.5	55.2	51.9	48.1	44.8	41.7	38.6	36	34.1	32.3	30.5	28.3	26	23.5	20.8	18.7	16.8	15.5	14.9	15.2	13.8	10.9	8	7.2	7	7.8	8.4	8.3	9	10.4
4/14/2022	1:00:00 AM	74.7	73.3	72	70	68.1	66	63.7	60.9	57.8	54.4	50.6	47	43.7	40.8	38.2	35.9	34.2	32.5	30.6	28.4	25.8	23.8	22.1	21.2	20.8	21.2	20	17	13.1	10.9	8.1	6.3	6	5.1	5.7	8.1
4/14/2022	2:00:00 AM	75.1	74.2	72.7	70.9	68.9	66.7	64.4	61.7	58.7	55.4	52.3	49	45.8	42.5	39.6	37.2	35.3	33.5	31.7	29.4	26.8	25	23.3	22.3	21.8	22.4	21.2	18.1	14.1	11.9	9.3	7.9	7.4	6.3	6.4	8.6
4/14/2022	3:00:00 AM	75.5	74.5	73.1	71.4	69.2	66.8	64.3	61.3	58.3	55.1	51.9	49	46.1	43.4	40.8	39.8	37.6	34.6	32	29.5	27	25.2	23.4	22.6	22.3	23	21.7	18.6	14.6	12.3	9.6	7.9	7.4	6.4	6.6	8.6
4/14/2022	4:00:00 AM	71.9	70.7	69.3	67.2	64.6	61.9	58.9	55.2	51.8	48.5	45.4	42.6	40.2	37.6	34.9	33.1	30.9	29.1	27	24.8	22	20.1	17.6	15.9	15	15.1	13.2	9.7	6.4	5.3	4.1	3.4	3.5	2.4	2.3	3.4
4/14/2022	5:00:00 AM	75	74.1	73	71.5	69.4	67.1	64.4	61.3	58.1	54.8	51.8	48.6	45.3	42.2	39.3	37.1	35	33.2	31.3	29.1	26.6	25	23.4	22.6	22.2	23.1	21.9	19.1	18.5	19	12.2	8.5	8	6.8	6.6	7.8
4/14/2022	6:00:00 AM	75.8	74.9	73.7	72.1	70.1	67.7	65.2	62.2	59.1	55.9	52.7	49.6	46.4	43.3	40.2	37.6	35.4	33.7	31.9	29.9	27.5	25.8	24.2	23.3	22.9	24.2	24.1	21.7	20.9	14.7	11.8	10.8	10.1	9.5	8.2	8.9
4/14/2022	7:00:00 AM	71.4	70.3	68.7	66.7	64.2	61.5	58.5	55.1	51.7	48.3	45.3	42.4	39.8	37.3	34.5	32.5	30.6	28.5	26.3	24.4	22	19.9	17.5	16	15.5	19.8	19	19.9	19.1	21.5	12.4	9.6	7.9	7.4	7.4	8.6
4/14/2022	8:00:00 AM	70.5	69.1	67.3	65.1	62.5	59.5	56.6	53.4	50	47	44	41.6	38.7	36	33.9	31.8	29.4	27.1	25	23.1	20.7	18.6	16.1	14.5	14	16	17	20.2	21.4	17	10.6	5.3	4.9	4.5	5	6.6
4/14/2022	9:00:00 AM	76.8	75.7	74.5	72.9	70.9	68.8	66.3	63.8	61	58	55	52	48.8	45.9	43.2	40.5	37.8	36.1	35.2	32.7	31.2	29.7	28.2	26.4	29.9	28	27.2	25.9	23.9	23.3	23.2	21.9	19.2	16.6	14.9	14.6
4/14/2022	10:00:00 AM	76.9	76.1	74.7	73.2	71.3	69.3	66.8	64.3	61.5	58.5	55.6	52.5	49.5	47.4	43.4	40.2	37.8	35.9	34	32.2	29.8	28.3	27	26	26.3	28.8	30.4	36	33.4	26.3	19.7	16	14.6	13.7	12.4	13.5

4/14/2022	11:00:00 AM	76.8	75.5	74.4	72.6	70.8	68.6	66.2	63.5	60.6	57.8	54.9	51.9	49	46	44.4	42.7	39	36.1	33.8	31.7	29.3	27.8	26.3	25.3	24.9	27.1	28.5	31.4	28.8	23.3	16.7	14.6	15.5	11.6	11.1	12.8
4/14/2022	12:00:00 PM	75.1	74.2	73	71.3	69.3	67	64.5	61.5	58.4	55.4	52.2	49	47.1	43	39.8	37.5	35.6	33.3	31.5	29.6	27.2	25.6	24	23	23.3	25	24.2	22.9	21.9	18.8	17.9	18.3	16	14.7	13.6	16.7
4/14/2022	1:00:00 PM	74.7	73.6	72.5	70.7	68.7	66.4	63.8	60.7	57.7	54.7	51.6	48.4	45.4	42.3	39.5	36.9	34.6	32.6	30.8	28.8	26.4	24.7	23	21.8	21.2	22.8	22.1	22.4	20.3	15.4	11.4	10.2	9.6	9.1	8.5	9.6
4/14/2022	2:00:00 PM	77.3	76.5	75.6	74.1	72.6	70.7	68.5	66.1	63.4	60.7	57.8	54.9	51.9	48.8	45.9	43	40.3	38	36.1	34.1	31.7	30.2	28.8	27.8	27.3	28.5	27.9	25.7	22.8	20.7	17.5	15.3	14.2	13.1	12.3	12.7
4/14/2022	3:00:00 PM	77.9	77.2	76.1	75	73.5	71.9	70.1	67.8	65.5	62.9	60.3	57.4	54.6	51.6	48.6	45.6	42.7	40.2	38.1	36	33.7	32.1	30.8	30.1	29.7	31.2	30.8	29.2	26.6	24.3	20.7	17.8	15.8	14.3	13.3	13.5
4/14/2022	4:00:00 PM	77.9	77.2	76.1	74.7	73.3	71.6	69.3	66.8	64.1	61.4	58.4	55.3	52.3	49.1	46.1	43.1	40.5	38.3	36.5	34.5	32.2	30.8	29.3	28.4	27.9	29.5	29.5	30.3	29.2	21.1	17.1	14.7	13.2	12.2	11.6	12.1
4/14/2022	5:00:00 PM	75.6	74.8	73.5	72.1	70.3	68.3	65.8	63	60.2	57.2	54.2	51.3	48.1	45	42.2	39.5	37.1	35.1	33.3	31.3	28.8	27.3	25.7	24.7	24.2	26.4	26.5	27.1	24	19	13.5	11.5	10.3	9.5	8.8	9.1
4/14/2022	6:00:00 PM	75.8	75.2	74.2	73	71.1	69.4	67.2	64.6	61.9	59.1	56.2	53.1	50.1	47.5	44.3	41.3	38.7	36.4	34.5	32.5	30.2	28.7	27.1	26.2	25.6	27	26.6	25	21.3	18.9	15	12.5	11.1	10.1	9.4	10.1
4/14/2022	7:00:00 PM	70.7	69.5	68.1	66.4	64.3	61.7	58.8	55.4	52.2	48.9	46	43.3	41.5	38.1	35.6	33	30.9	28.8	26.8	24.5	22.5	20.5	17.4	15	14.4	18.8	20.8	24.6	24.3	21.3	10.3	4	2.7	1.8	1.2	1.8
4/14/2022	8:00:00 PM	69.2	67.9	66.5	64.6	62.1	59.4	56.3	52.6	49.4	46.3	43.7	41.8	39.5	37	34.5	33	30.7	28.2	25.6	23.9	22.5	20.6	16.8	15	14.9	14.5	12.5	12.2	12.7	12.5	12.7	12.6	10.8	9.7	8.4	6.5
4/14/2022	9:00:00 PM	69.7	68.6	67.1	65.3	62.8	60.1	56.8	53.4	49.9	46.8	43.9	42.5	41.1	40.2	39.1	36.1	33.3	30.7	27.8	25.7	23.6	21.7	18.3	17.8	18.5	17.6	16	16	16.3	16.5	17.4	16.6	16.5	16.1	15.8	14.2
4/14/2022	10:00:00 PM	73	72	70.7	68.9	66.9	64.4	61.5	58.6	55.2	52	49.1	46.3	43.5	41.1	39.2	37.4	36	34.2	32	29.3	26.6	24.2	22	21	20.5	20.9	19.5	17.9	17	16.8	17.5	16.8	16.8	16.1	16.3	14.7
4/14/2022	11:00:00 PM	71.6	70.6	69.1	67.2	64.9	62.3	59.1	55.7	52.3	48.7	45.7	43	40.5	38.5	37.2	35.9	34.5	32.5	29.8	27.1	24.6	22	19.2	18.2	17.9	17.7	16.2	15.3	15.2	15.1	15.8	15.6	15.4	14.4	14.2	13.2
4/15/2022	12:00:00 AM	74.2	73.2	71.8	70.1	68	65.6	62.6	59.4	56.2	53	49.7	46.7	43.6	41.2	39.2	37.9	36.7	35.1	33	30.3	27.3	25	23	21.7	21.1	21.6	20	18.1	16.8	16.7	17.7	17.3	16.6	15.5	15.7	14.5
4/15/2022	1:00:00 AM	74.1	73.3	72.1	70.1	68.1	65.8	63	59.8	56.6	53.4	50.1	47.2	44.2	41.6	39.7	38.2	37.1	35.4	33.4	30.7	27.6	25.1	23	21.2	20.3	20.9	19.3	16.4	14	13.1	14	14.2	13.5	12.7	14.5	13.8
4/15/2022	2:00:00 AM	68.3	67.2	64.9	63	60.3	57.5	54.1	50.4	47.2	44.1	40.9	39	36.4	34.5	33.4	31.7	30.7	28.1	25.7	23	20.5	18.2	14.2	11.1	9.2	9.2	7.3	4.5	4.2	2.9	-1.4	-2.4	-2.2	-1.7	-1	1
4/15/2022	3:00:00 AM	67.9	66.5	64.7	62.3	59.4	56.2	52.6	49	45.6	43	40.6	38.6	37.9	34.8	33	32.4	29.9	27.8	26.3	23.7	20.6	18.9	14.9	10.3	7	6	3.8	0.7	-0.2	-1.9	-3.8	-3.7	-3.2	-3.4	-2.2	0.6
4/15/2022	4:00:00 AM	62.5	61.2	59.2	56.6	53.4	49.7	46.3	43.3	40	37.6	38.5	36.1	34.5	31.8	29.8	28.3	26.4	24.2	21.9	19.8	17.8	16	13.3	14.6	15.8	16.6	15.8	16	16.6	16.7	17.5	18.1	16.3	15.4	14.9	19.8
4/15/2022	5:00:00 AM	62	60.3	58	55.2	51.7	48.1	44.5	41.5	38.3	36.1	34.3	33.4	31.7	30.4	28.4	27	25.1	22.5	20.1	18.6	16.7	14.8	9.7	3.4	2.6	9.3	14.1	16.8	18.8	17.2	9.6	-3.3	-3.5	-3.6	-2.4	0.4
4/15/2022	6:00:00 AM	60.5	58.7	56.4	53.7	50.9	47.1	44.1	41.1	38.6	38.3	37.4	37.8	39.4	35.5	32.2	30.4	29.2	25.8	23.5	22.1	20.4	18.4	12.9	6.7	15.7	22.6	25.7	29.1	27.4	21.2	9.1	-1.2	-2.5	-3.8	-2.7	0.3
4/15/2022	7:00:00 AM	43.1	40.7	38.8	38.2	36.7	35.8	34.4	34.8	33.8	34.6	34.9	36	34.7	33.7	30.9	30.9	26.9	24.3	23.2	21.2	20	17.9	11.7	4.7	7.9	16.7	20.1	23.9	22.1	17.7	8	-1.5	-3.2	-3.6	-2.5	0.2
4/15/2022	8:00:00 AM	60.2	59.1	57.1	54.5	51.8	48.4	45	41.8	38.9	36.3	34.6	33.5	32.1	30.1	29.4	27.2	24.5	21.6	18.9	17.6	15.9	13.8	8.1	3.1	6.9	14.5	18	21.4	18.2	11.6	1.4	-3.8	-3.7	-3.3	-2.2	0.3
4/15/2022	9:00:00 AM	64.7	63.3	61.7	59.4	56.6	53.1	49.6	46.5	43.5	41.9	41.5	41.1	40.3	39	37.1	35.3	32.8	30.5	28	25.8	25.7	21.5	18.3	14.3	10.7	16.7	20.2	23.6	22.4	17	9.7	-0.8	-2.5	-2.6	-1.9	0.3
4/15/2022	10:00:00 AM	70.1	69	67.5	65.6	63.4	60.6	57.3	54	50.6	47.2	44	41.1	38.3	36.5	34.8	31.6	29.2	27.6	25.5	23.5	20.8	18.6	16.2	14.3	13.4	16.2	16.5	17.8	14.3	7.6	3.1	2.3	1.9	1.6	1.7	2.7
4/15/2022	11:00:00 AM	70.4	69.3	67.8	65.9	63.6	60.8	57.9	54.8	51.5	48.8	46.1	43.5	41.3	39.1	37.8	36.6	33.9	30.3	27.1	25.3	22.9	20	17.2	15.5	15.5	17.8	17.8	18.3	15.6	12.5	8.5	9.1	8	7.1	6.3	6.3
4/15/2022	12:00:00 PM	71.6	70.5	69.1	67.1	65	62.2	59.4	56.2	52.7	49.6	46.9	44.1	41	38	35.6	33.4	31.5	29.7	27.4	25.6	23.2	20.9	18.5	16.6	16.4	20.6	22.3	24.2	23.2	18.2	5.9	4.8	4.2	3.8	3.7	4.8
4/15/2022	1:00:00 PM	73.8	72.8	71.5	69.9	67.8	65.3	62.6	59.6	56.3	53.1	49.8	46.8	43.9	41	38.4	36.1	34.1	32.1	30.1	28.3	25.9	23.8	21.7	19.9	18.5	19.1	18.4	17	13.4	11.2	7.7	6.9	6.3	6	5.8	6.7
4/15/2022	2:00:00 PM	71.8	70.9	69.5	67.7	65.5	62.9	60	56.6	53.3	49.9	46.7	43.7	41.1	38.6	36.3	34.1	32	29.9	27.6	25.5	22.9	20.7	18.4	16.4	15.1	18.3	21.9	25.2	21.7	19.5	6.6	5.5	4.5	3.9	3.4	3.6
4/15/2022	3:00:00 PM	67.9	66.7	65	62.9	60.3	57.4	54.1	50.6	47.2	44.2	41.8	39.8	37.9	36.4	34.7	32.8	30.2	27	23.7	21.6	19.2	15.7	12.2	9.7	9.7	14.9	16.2	17.4	14.4	9.3	2.7	0.6	0.3	0.3	0.4	2
4/15/2022	4:00:00 PM	71.8	70.8	69.6	67.8	65.8	63.1	60.4	57	53.7	50.2	47.3	44.3	42.2	39.3	36.8	35.6	33.5	30.8	28.2	25.9	23.3	21.1	18.8	16.9	15.7	17.1	17.7	17.7	13.3	9.3	5.8	5.1	4.4	4.1	3.4	3.5
4/15/2022	5:00:00 PM	72.6	71.7	70.4	68.9	66.7	64.1	61.5	58.6	55.2	52	48.7	45.5	42.9	40	37.2	35.8	33.8	31.3	29.1	26.8	24.2	22.1	20	18.3	17.2	19.1	18.5	16.6	13.5	10.5	6.6	5.8	5.2	4.8	4.3	4.5

4/15/2022	6:00:00 PM	68.9	67.8	66.4	64.3	61.7	58.9	55.8	52.2	48.7	45.5	42.6	39.9	38.1	37.9	36.6	31.3	29.7	27.4	24.6	22.2	19	16.3	13.4	11.3	10.7	14.6	14.3	14.6	12.1	8.3	2.7	1.3	0.9	0.7	0.6	1.6
4/15/2022	7:00:00 PM	61.5	60.2	58	55.8	52.8	49.5	46.2	42.5	39.1	36.4	34.2	34.2	33	30.5	29.2	28.4	25.9	21.9	19.6	17.6	14.8	14.6	4.7	2.4	6.1	13.1	14.9	17.5	17.4	14.5	2.6	-3.5	-3.4	-3	-2.1	0.2
4/15/2022	8:00:00 PM	52.7	51	48.7	45.7	42.6	39.7	36.8	35	32.7	32.4	32.5	33	33	30.9	29.2	30.8	28.5	23.6	18.7	17.6	15	10.3	3.9	-3.8	-5.4	-3.9	-2.5	-2	-1.7	-2.3	-3.6	-4.1	-4.1	-3.7	-2.6	0.1
4/15/2022	9:00:00 PM	51.6	49.8	47	44.6	42.2	39.1	36.6	34.8	32.7	32.7	33.5	46.6	37.1	33.4	37.8	33	34.8	28.6	25.6	23.2	19.8	17.9	14	11.7	4.3	-2.7	-5.7	-6	-5.3	-4.8	-4.7	-4.6	-4.3	-3.8	-2.6	0.2
4/15/2022	10:00:00 PM	33.9	34.2	36.6	36.8	36	35.9	34.9	35.4	34.5	33.9	32.7	33.9	34	31.9	31.3	30.4	28.1	25.3	22.5	21.9	19.4	15.6	11.4	8.1	7.1	6.3	7.3	8.2	6.7	7.9	6.4	6.3	5.6	4.5	3.7	2.8
4/15/2022	11:00:00 PM	31.5	34.3	36.6	37.3	39.2	40.4	39.8	37.5	36.4	35	34.7	35.4	33.7	31.6	31.1	29	26.4	22	18	16.1	13.8	9	1	-6.4	-8	-11.1	7.7	16.2	15.9	-2.3	-4.7	-4.9	-4.7	-4.1	-2.8	0.2
4/16/2022	12:00:00 AM	32.3	31.4	33.9	32.5	31	30.7	30.3	32.1	29.6	30.4	33.9	33.1	28.2	25.4	23.8	23.6	21.9	20	17.5	14.6	11.2	7.6	5.3	-2.3	-2.5	-2.8	0.4	7.2	3.6	-1.3	-4.8	-5.1	-4.7	-4.1	-2.8	0.2
4/16/2022	1:00:00 AM	46.6	44.3	42.4	39.9	39.7	37.7	38.3	37.7	36.7	38.4	41.3	40	39.9	32.2	29.4	29.2	27.4	27.6	26.4	24.1	18	15.5	10.7	1.5	-6.8	-7.9	-7.3	-6.7	-6.1	-5.5	-5.2	-5	-4.6	-4.1	-2.8	0.2
4/16/2022	2:00:00 AM	48.3	46	44.4	43.3	41.6	41.8	42.2	40.2	40.3	43.5	43.5	44.7	43.8	38.6	35.4	34.5	32.1	30.6	29.2	26.2	21.6	20.7	18.6	11.9	8.8	4	0.1	0.5	5.5	7.5	-1.6	-4.7	-4.6	-4	-2.7	0.2
4/16/2022	3:00:00 AM	44.4	41.9	40.3	38.5	37.5	36.7	37	36.5	38.3	41.4	46.6	44.5	38.3	32.1	33.2	31.3	30.8	25.7	23.3	20	16.1	13.2	7.3	-0.5	-6.7	-7	-5.6	-0.8	2.7	2.2	-4.2	-4.9	-4.6	-4.1	-2.8	0.2
4/16/2022	4:00:00 AM	47	44.6	42.1	40.1	38.7	37.2	39.2	37.1	38.2	38.5	43.5	39.9	38.6	31.4	30.1	29.1	27.5	25.6	23.4	21.3	18.6	16	13.5	12.1	10.8	4	0.5	6.4	9.6	9.9	0.9	4.9	4.5	-4	-2.8	0.2
4/16/2022	5:00:00 AM	42.2	40.8	39.5	39.4	37.9	39.9	40.5	38.1	40.1	40.6	48.9	45.1	45.9	39.3	38	37.5	35.6	34.8	32.9	30.4	26.4	23.6	19.2	15.5	13.3	10.4	11.4	15.1	17.4	14.3	1.6	4.8	3.3	-4	-2.7	0.2
4/16/2022	6:00:00 AM	41.5	38.8	37.4	35.5	35.5	35.7	34.7	35.3	35	33.6	36.3	37.2	38.5	33.9	29.9	28.7	26.4	24.3	22.1	19.8	18.3	15.1	8.2	3.7	17.9	30.2	29.9	34.6	28.5	28.6	13.1	8	8.9	2.1	1.5	1.1
4/16/2022	7:00:00 AM	55.6	53.5	51.2	48.8	46.1	43.7	42.2	41.6	41.6	45.4	45.7	43.4	41.2	37.6	35	34.3	32.3	31.2	29.8	27.9	25.2	19.9	13.9	6.2	14.9	29.5	31.7	34	30.7	31.1	13.4	9.7	12.5	5.9	5.6	1.9
4/16/2022	8:00:00 AM	57.8	56	54.1	51.2	48.2	45.1	42.6	40.2	40	39.4	40.8	40.7	38.9	35.1	32	31	29.1	31.3	28.1	27.1	22.3	17	11	1.4	1.9	10.3	11.7	13	11.8	10.9	-1.6	17.8	15.6	-1.9	-0.7	0.5
4/16/2022	9:00:00 AM	53.1	50.9	48.3	45.6	42.6	39.7	37.6	35.7	35.7	37.1	37.3	39.9	43.1	39.1	31.2	29.8	26.3	23.1	19.8	17.5	13	10.2	6.3	-1.3	4.6	15.2	16.6	18.8	16.4	10.6	2.1	3.3	4.1	-3.5	2.4	0.1
4/16/2022	10:00:00 AM	67	65.4	64.2	62.3	60.4	57.7	55	52	48.9	45.9	42.8	40.1	37.8	35.3	33.1	31.1	28.9	26	23.9	22	19.4	17.1	14.6	13	12.6	17.2	18	17.3	14.5	13.2	3.4	1.5	1.1	1.1	1.2	2.9
4/16/2022	11:00:00 AM	76.8	75.7	74.3	72.7	70.9	68.7	66.4	63.7	60.8	57.9	55	52.1	49	45.9	42.9	40.3	38	36	34	32.2	29.8	28	26.5	25.4	25	26.1	25.9	24.1	20.5	18.3	14.8	13	12.1	11.6	11.5	13.1
4/16/2022	12:00:00 PM	77	76.2	75.2	73.8	72	70.4	68	65.4	62.6	59.9	56.9	53.8	50.8	47.6	44.5	41.7	39.2	37.1	35.4	33.5	31.2	29.6	28.1	27.3	27.7	28.6	27.3	25.4	23	21.9	20.2	19.5	17.6	17.4	15.9	15.9
4/16/2022	1:00:00 PM	77.1	76.2	75.1	73.6	71.9	70.7	67.7	65.1	62.2	59.3	56.3	53.3	50	46.9	43.9	41	38.6	36.7	35	33.1	30.7	29	27.4	26.3	25.6	26.8	26.3	25	22.1	18	14.5	12.6	11.3	10.6	10.3	11.2
4/16/2022	2:00:00 PM	79.5	78.9	77.9	76.8	75.4	74	72.4	70.4	68.3	65.9	63.5	60.8	58.2	55.2	52.2	49.1	46.3	43.6	41.4	39.3	36.9	35.3	34	33.2	33.2	36.6	36.2	38.1	35	31.6	26.6	25.6	22.9	21.5	19.1	18.2
4/16/2022	3:00:00 PM	80.5	79.9	79.1	78	76.8	75.7	74.2	72.4	70.4	68.3	66.1	63.6	61	58.2	55.2	52.3	49.3	46.6	44.1	41.9	39.5	37.8	36.5	35.8	35.3	36.8	36.4	34.6	32.4	30.9	27.7	24.8	22.4	20.7	20	19.1
4/16/2022	4:00:00 PM	79.6	78.9	77.9	76.7	75.3	74	72.2	70.2	67.9	65.5	63	60.2	57.4	54.7	51.4	48.4	45.6	42.9	40.7	38.5	36.2	34.7	33.2	32.4	32	33.4	33	31.1	28.6	26.8	23.6	20.7	18.7	17.1	15.6	15.9
4/16/2022	5:00:00 PM	79	78.1	77.1	75.8	74.5	72.9	70.9	68.6	66.2	63.6	60.8	57.8	54.9	51.8	48.8	45.8	43	40.7	38.7	36.6	34.3	32.7	31.3	30.4	29.9	31.2	30.7	28.6	25.7	23.6	20.1	17.4	15.5	14.2	13.8	14.4
4/16/2022	6:00:00 PM	78.1	77.4	76.4	75.3	73.8	72.2	70.2	68	65.5	63	60.2	57.4	54.5	51.4	48.3	45.3	42.5	40	38	35.9	33.6	32	30.4	29.6	29	30.5	29.9	27.7	25	22.9	19.5	16.7	14.6	13.1	12	12.4
4/16/2022	7:00:00 PM	72	70.9	69.8	68.2	65.9	63.6	60.7	57.4	54.2	51.1	47.7	44.8	42	38.7	35.8	33.5	31.4	29.8	28	26	23.4	21.3	19	17.4	16.6	19	19	19.2	15.6	13.8	5.8	4	3.5	3.2	2.8	4.1
4/16/2022	8:00:00 PM	67.1	66.2	64.7	62.6	60	57.5	54.1	50.7	47	44.2	42.1	39.9	38.1	36.5	35.4	37.2	33.2	27.9	24.4	21.9	19.9	16.2	11.9	9	7.3	7.1	5.5	2.4	0.3	0.4	-0.5	-0.8	-0.9	-1.1	-0.9	0.6
4/16/2022	9:00:00 PM	70.9	69.9	68.6	66.9	64.7	62.3	59.4	56.2	53	49.5	46.1	44.2	40.4	38.1	37.2	33.1	31.3	28.7	26.7	24.5	22	19.5	17	15.4	14.3	14.8	13.5	10.4	7.3	5.9	3.9	3.1	2.7	2.2	1.8	2.3
4/16/2022	10:00:00 PM	64.6	63.4	61.7	60.2	57.8	55	51.6	48.6	45.2	42	38.8	36.7	34.4	32.6	31.3	29.8	27.8	23.9	21.2	18.9	16.4	13.3	9.7	7.3	5.8	6	4.5	2.2	1	-1	-1.8	-2.1	-2.1	-2	-1.4	0.7
4/16/2022	11:00:00 PM	69	67.7	66.4	64.6	62.1	59.6	56.3	53	49.6	46.2	42.9	40.1	37.3	34.5	33.2	29.9	28.2	26.2	24	21.6	19.2	18.6	13.8	12.8	15.5	10.8	8.8	5.9	4.7	5.1	5	5.7	5.4	4.2	3.5	4.1
4/17/2022	12:00:00 AM	68.5	67.6	65.8	63.8	61.4	58.5	55.3	52	48.5	45.1	42	39.3	36.8	34.6	31.7	30.1	28.1	26	23.6	21.3	18.6	16	13.1	11.1	9.7	9.9	8.2	5	2.6	2.5	0.8	0.6	0.1	-0.4	-0.3	1.1

4/17/2022	1:00:00 AM		62	60.6	58.7	55.8	52.9		50	46.2	43.4	40.1	37.9	36.4	34.4	32.4	29.9	27.7	25.9	23.6	20.9	18.5	15.9	12.7	9.3	4.3	2.7	0.3	1	3.1	7.4	3	-2.9	-3.7	-3.7	-3.5	-3.3	-2.3	0.2
4/17/2022	2:00:00 AM	58.5		56.7	54	50.9	47.3	43.9	40.6	37.8	35.3	34.4	32.6	32.3	29	28.2	24.5	24.6	21	19	17.2	13.9	10.9	8.3	1	-4.9	-7.4	-7.2	-6.9	-5.9	-5	-4.8	-4.7	-4.6	-4.2	-3.8	-2.6	0.2
4/17/2022	3:00:00 AM	56.7		54.7	51.7	48.6	45.1	42	39.2	38.3	36.3	34.3	33	33.5	32	30.4	29.6	31.5	28.6	23.1	18.7	17.4	14.8	12.1	5.5	2.9	-1.2	-4.6	-2	5	5.6	4.8	-3.4	-4.9	-4.4	-4	-2.7	0.2
4/17/2022	4:00:00 AM	35.5		34.4	34.9	36.3	36.7	39.2	37.1	37.2	35.7	34.2	33.3	34.3	31.6	31.7	30.9	28.6	25.4	24.1	22.1	19.2	16.8	14.2	8.1	-0.1	-4.9	-5.8	-5.6	4.4	13	16.9	8.1	-3.7	-4.5	-4.1	-2.8	0.2
4/17/2022	5:00:00 AM	33.1		33.2	34.2	34.1	34.3	33.5	33.3	34.9	31.8	32.1	32.2	31.4	30.7	32.6	30.1	28.8	25	23.6	21.9	19.5	19	18.6	14	12.4	13.2	17.5	17	21.1	19.6	16	5.4	-3.3	-3.4	-3.6	-2.5	0.5
4/17/2022	6:00:00 AM	38.9		39.1	39.5	39.7	41.1	40.4	41.6	40.5	40.2	40.5	41.2	39	37.4	32.5	30.7	30.1	27.9	25.9	23.3	22	19.6	15.3	9	4.7	18.9	33.3	36.4	41.7	41.2	36.7	23.5	15.2	12.8	6	7	3.3
4/17/2022	7:00:00 AM	46.2		44.3	42.5	41.6	41.5	40.3	41.1	39.8	40.1	41.4	42	41.8	42.4	37.3	34.9	33.8	30.8	29	26.2	23.5	20.3	17.2	11.8	2.3	6.8	14.8	16.6	18.3	18.3	16.2	9.8	-2.5	-4.4	-3.8	-2.6	0.1
4/17/2022	8:00:00 AM	55.4		53.5	51.3	48.9	46.1	43	41.4	38.6	36.7	35	33	33.3	31	29.1	29.2	27.6	24.7	22.9	20.2	18.8	15.1	12	5.1	5.2	19.9	28.1	31	32.8	34.1	21.7	14.4	8.4	9.2	7.1	4.6	2.5
4/17/2022	9:00:00 AM	54.7		53.1	51.2	48.1	46.3	43.4	40.7	38.9	35.6	34.2	32.7	43.6	36.7	33.3	37	32.8	32.8	25.2	24.5	19.9	13.3	8.4	4.1	1.5	3.9	10.4	11.7	13.8	10.8	4.5	-1.8	-3.5	-3.5	-2.8	-1.9	0.2
4/17/2022	10:00:00 AM	69.7		68.5	67	65.4	63	60.7	57.9	54.5	51.2	47.9	44.7	42.5	41.1	39.2	35.1	32.2	31.1	27.4	25.5	23.1	20.2	18.1	16	14.3	13.2	14.9	14.6	15.1	11.8	6.8	3.3	2.4	2	1.9	2	2.7
4/17/2022	11:00:00 AM	68.9		68.7	66.7	64.7	62.6	60.2	57.2	54	50.6	47.5	44.5	42.4	40.3	37.7	35.7	33.3	30.8	27.6	25.3	22.6	19.7	17.6	16	14.1	12.5	12.9	12	11	9.7	10.5	3.5	2.6	2.1	1.9	1.8	2.4
4/17/2022	12:00:00 PM	68.2		67.1	65.5	63.3	61	58.1	55.3	52	48.3	45.2	42	39.6	37.1	36.2	32.5	30.2	28.3	25.4	23.4	21	17.8	15.6	13.5	12	10.3	10	9.1	7.7	5.3	3.7	1.7	1.2	1	1.2	1.3	2.4
4/17/2022	1:00:00 PM	67		65.6	63.9	61.8	59.3	56.6	53.4	49.9	46.4	43.3	40.4	37.9	35.2	33.1	31.2	29.1	26.4	24	21.9	19.5	16.4	14	12.1	10.5	9.1	10.7	10.7	10.9	8.1	6.1	1.2	0.6	0.3	0.7	0.9	2.2
4/17/2022	2:00:00 PM	67.7		66.4	64.6	62.8	60.2	57.2	54	50.3	47	44	41.2	41.1	36.5	33.3	31.7	29.2	27.6	24.8	22.2	19.8	16.8	14.4	12.3	10.8	9.2	9.9	10.1	11.3	7.1	3	0.9	0.8	0.5	0.8	1.2	2.6
4/17/2022	3:00:00 PM	63.9		63	60.7	58.8	56.3	53	49.7	46.5	43.2	40.4	37.8	35.4	33.7	32.2	30.4	28.1	25.2	21.8	18.9	16.3	13.3	10.4	8.2	6.8	6.1	8.6	8.1	7.8	5.9	1	-0.7	-1.1	-1.1	-0.7	-0.2	1.2
4/17/2022	4:00:00 PM	66.9		65.7	64.3	62	59.7	56.7	53.6	49.8	46.3	42.9	40.1	37.2	34.4	31.9	29.5	27.5	25.4	23	20.5	18	14.9	12.5	10.1	8	6.7	8.6	8.3	8.5	5.4	2.5	-0.2	-0.4	0.5	-0.2	0	1.1
4/17/2022	5:00:00 PM	63.2		62.2	60	57.8	55.1	51.6	48.1	44.3	41.3	38.1	35.4	33.1	30.4	28	25.8	23.9	21.6	18.9	16.1	13.1	9.6	6.7	4.1	2	4.4	9.5	9.5	9.9	7.4	6.4	1.3	-2.6	-2.5	-2	-1.3	0.3
4/17/2022	6:00:00 PM	56.7		54.8	52.6	49.8	46.1	42.8	39.6	37.2	35.3	34	33	32.1	31	29.4	27.7	26.8	26.9	20.2	12.6	11.1	9	2.7	4.9	5.2	4.7	15.6	15.6	11.8	6.6	0.6	3.9	4.2	3.9	3.3	2.2	0
4/17/2022	7:00:00 PM	40.9		37.9	37	34.8	33	33.1	32.1	30.8	27.8	26.2	26.6	31.1	29.8	29.4	28.5	25.3	22.7	18.3	14.7	9.5	2.5	4.7	7	2.9	11.2	19.1	23.2	25.7	28.9	29.4	20.7	1.7	1.7	1.1	1.5	0.3
4/17/2022	8:00:00 PM	33.1		33.5	36.5	36.3	34.6	35.7	33.3	32.2	30.8	29.5	29.1	32.2	33	30	27.9	25.9	22	17.1	13.4	9	2.9	4.7	9.3	9.3	8.8	7.2	2.8	4.6	1.2	1.7	5.1	5	4.6	4	2.7	0.1
4/17/2022	9:00:00 PM	39.3		37.5	36.3	34.3	33	32.3	30.6	30.9	30.5	30.2	30.6	30.8	30.6	30.2	27.5	25.7	22.6	17.7	15.2	11.6	6.1	1.4	8.2	9.3	8.8	7	0	5	3.6	4.5	5.2	5.1	4.6	4.1	2.7	0.2
4/17/2022	10:00:00 PM	26.9		28.4	32.4	32.2	31.9	32.2	32.5	33.1	33.3	31.9	31.8	32.9	31.5	31	31	28.2	24.7	19.6	14.6	11.3	12	11.3	10.9	16.8	11.7	12.2	9.7	3	3.2	3.7	5.2	5.1	4.7	4.1	2.8	0.2
4/17/2022	11:00:00 PM	40.4		37.5	36.1	33.7	31.9	31.7	31.2	31.4	28.7	28.1	25.5	24.3	24	23.5	22.4	23.3	21.2	15.4	13.7	10.6	7.6	3.3	0.7	4.3	0.8	5.2	10.6	14.2	16.4	12.3	3.5	4.6	4.5	4.1	2.8	0.2
4/18/2022	12:00:00 AM	48.6		45.6	43	39.8	36.7	34.8	33.9	35	32.7	36.5	36.6	36.6	33.1	31.4	31.9	28.6	26.5	23.7	20.8	18.1	14.1	7.9	0	7.9	8.6	7.8	7.4	6.8	6.1	5.4	5.1	5	4.5	4	2.7	0.2
4/18/2022	1:00:00 AM	47.9		45.4	42.6	39.3	36.3	34.1	33.5	38.4	31.3	31.2	29.4	28.7	27.8	27.2	25.1	27.7	25.8	19.3	14.9	13.2	10.2	4.8	2.4	8.4	8.6	7.3	3.6	9.4	9	0	4.4	4.9	4.5	4.1	2.7	0.2
4/18/2022	2:00:00 AM	48.6		45.6	42.3	39.3	35.9	33	32.2	38	30.9	31.4	27.3	27.6	26.7	26	22.7	21.6	20.1	16.1	15.8	13.1	9.3	4.9	2.2	8.3	8.6	6.7	4.4	14.6	26.4	27.8	17.5	3.2	3.9	3.2	2.7	0.2
4/18/2022	3:00:00 AM	44.1		41.2	38	35.3	33.2	30.7	30.5	35.8	30.3	31.5	27.5	27.4	26.7	26.3	23.6	22.4	21.4	15.6	14.2	11.8	9.1	6.2	2.3	1	1.2	1.2	4.3	17.1	27.5	29.3	18.9	1.4	3.9	3.2	2.7	0.2
4/18/2022	4:00:00 AM	45		43.4	41.9	42.4	42.2	41.7	42.6	42.5	42	44.1	45.8	46.9	45.9	41.7	38.9	37.9	35.9	33.2	29.4	26	21.6	15.8	10.7	0.4	4.7	3.1	6.6	18.2	28.1	30.3	20.3	0.4	2.9	2.3	2.7	0.3
4/18/2022	5:00:00 AM	41.3		40.4	39.4	40.9	39.7	41.5	42.5	41.1	39.8	42.4	46.7	48.1	46.9	43.6	38.8	37.5	36.1	31.9	29.9	27.1	21.3	15.5	12.6	7.4	22.9	32.2	38.2	43.3	42.5	39.4	29.1	14.8	12.8	5.6	5.9	4.9
4/18/2022	6:00:00 AM	39.3		39.3	39.9	41.9	40.6	41.4	39.7	38.7	39.4	37.7	39.5	41.6	38.4	35.1	34.6	34.1	33.5	32.2	26.8	24.5	21.5	16.1	11.3	2.8	9.8	17.5	21.4	25	26.5	22.4	11.2	1.2	3.4	-4	2.8	0.3
4/18/2022	7:00:00 AM	48.5		46	43.9	42.7	41.7	41.9	41.4	41.1	42.2	42.2	42.3	45.2	40.9	36.7	35.7	34.5	32.5	28.9	25.2	22.4	19.7	15	9.1	2.7	17.1	24.6	30.1	37	34.7	27.4	16.6	9	7	-1	1.9	0.4

4/18/2022	8:00:00 AM	50.5	47.7	45	42.1	40	38.9	37.2	37.3	37.3	39	38.7	40.8	35.2	34.7	34.1	32.8	30.3	27.3	25.2	22.6	18.6	14.9	8.3	0.4	-0.2	8.4	10	13.8	13	8.5	-0.3	-4.1	-4.1	-3.5	-2.4	0
4/18/2022	9:00:00 AM	46.2	44	42.2	40	39.4	38.9	39.6	37.1	39.6	40.8	39.7	41.1	40	38.8	36	31.7	29.3	25.2	21.3	16.5	12.5	7.2	1.7	-1	-2.2	3.9	4.7	6.5	7.5	5.3	-1.9	-2.7	-3.1	-3	-2	0.1
4/18/2022	10:00:00 AM	58.1	56.3	54.3	52	49.3	46	43.3	40.9	39.4	39.2	38.5	38.8	37.9	35.2	30.7	27.5	24.9	22.4	18.4	13.5	10.2	6.8	4.3	3.6	1.5	4.8	4.5	5.5	5.5	2.1	-1.6	-2.4	-2.5	-1.8	-1.3	0.4
4/18/2022	11:00:00 AM	57.1	55.2	52.8	50.5	47.8	44.6	41.9	40	37.9	37.4	36.7	36.2	36.2	33.3	30.7	30.1	26.8	21.8	20.2	16.8	12.5	10.2	9.2	8.5	6.1	13.4	10.9	13.3	9.8	4.7	0.2	-0.6	-0.9	-0.3	0	0.9
4/18/2022	12:00:00 PM	71.6	70.3	68.8	66.9	64.5	61.9	59.2	56.1	52.9	49.9	46.8	44.2	40.7	38.2	35.8	34.2	31.9	28.8	26.7	25	22.1	20.3	18.8	17.7	16.8	17.5	17.7	18	15.7	11	6.8	6.1	5.7	6.3	6.6	7.9
4/18/2022	1:00:00 PM	74.7	73.7	72.2	70.5	68.5	66.2	63.5	60.5	57.5	54.3	51.2	48.2	45.1	42.1	39.2	36.5	34.2	32.3	30.4	28.4	25.9	24.2	22.7	21.6	20.8	21.5	21.6	20.3	17.4	14.2	9.8	9	8.3	8.7	8.9	10.2
4/18/2022	2:00:00 PM	74.4	73.3	71.9	70.2	68.1	65.9	62.9	59.9	56.6	53.7	50.3	47.2	44	41.2	39.2	35.6	33.4	31.5	29.6	27.6	25	23.2	21.7	20.4	19.2	19.4	19	16.4	13.2	11.2	8.3	7.8	7.3	7.7	7.7	8.6
4/18/2022	3:00:00 PM	73.1	72	70.8	68.9	66.9	64.3	61.6	58.3	55.1	51.8	48.5	45.4	42.6	40.4	37.8	35.4	32.2	30.2	28	25.8	23.2	21.4	19.7	18.2	16.9	17.6	17.2	17	12.4	10.1	6.8	6	5.6	5.9	5.9	6.3
4/18/2022	4:00:00 PM	71	69.9	68.4	66.3	64	61.5	58.4	55.1	51.8	48.8	46	44	43.3	38.8	40.2	36.3	33	31.5	28.6	25.8	22	19.7	17	14.8	13.5	17.1	16.8	15.5	13.5	11	5.5	3.5	3.2	3.6	3.9	4.4
4/18/2022	5:00:00 PM	70.3	69.1	67.4	65.5	63	60.2	57	53.5	50.1	46.8	43.8	40.8	38	35.3	33	30.5	28.3	26.1	23.8	21.5	18.6	16.6	14.9	13.4	12.4	13.6	15.4	16.9	16.1	7.4	3.2	2.7	2.4	2.8	2.9	3.8
4/18/2022	6:00:00 PM	69	67.8	66.3	64.4	62.1	59.4	56.3	53	49.7	46.3	43.5	40.8	38.4	36.3	34.2	31.3	28.6	25.8	23.4	20.9	18	16.1	14.2	12.6	11.7	13.9	13.5	13.5	13.6	8.4	1.8	1.4	1.6	1.6	2.2
4/18/2022	7:00:00 PM	75.4	74.7	73.4	72.1	70.2	68	65.3	62.6	59.3	56.2	52.9	49.9	46.9	44.7	41.2	38.2	35.9	33.7	31.9	29.7	27.3	25.6	24.1	23	21.9	22.5	21.5	19.4	23.5	28.2	20.2	9.5	8.8	8.7	8.2	8.2
4/18/2022	8:00:00 PM	78	77.3	76.2	74.9	73.3	71.7	69.5	66.9	64.3	61.5	58.4	55.4	52.4	49.2	46.2	43.4	40.6	38.3	36.4	34.3	32	30.5	29.2	28.4	27.7	28.6	27.8	25.3	22	20	16.7	14.9	14.6	13.6	12.8	12.7
4/18/2022	9:00:00 PM	76.6	75.6	74.3	73	71.1	69.2	66.9	64	61.1	57.9	54.8	51.7	48.6	45.5	42.4	39.6	37.3	35.4	33.6	31.5	29	27.5	26.1	25.1	24.2	24.9	24	21.1	17.5	15.3	12.2	10.8	10	9.7	9.4	9.7
4/18/2022	10:00:00 PM	74.5	73.4	72.2	70.6	68.6	66.3	63.5	60.4	57.2	53.8	50.7	47.5	44.5	41.5	38.8	36.2	34.1	32.2	30.4	28.2	25.6	23.9	22.4	21.2	20	20.4	19.2	15.9	12.1	10.4	8.1	7.4	6.9	6.6	6.1	6.2
4/18/2022	11:00:00 PM	69.2	68.1	66.5	64.3	61.9	59	55.4	51.8	48.3	45.3	42.7	39.9	36.8	34.1	31.4	29.3	27.4	25.5	22.9	20.3	17.3	14.9	12.8	11	9.4	9.1	7	3.9	1.7	1.6	0.8	1	0.7	0.6	0.6	1.7
4/19/2022	12:00:00 AM	68.5	67.5	65.6	63.4	60.5	57.5	54	50.7	47.1	44.3	41.1	38.5	36	33.3	31	29.1	26.6	24.2	21.7	19.2	15.8	13.5	11.4	9.6	8.1	7.6	5.9	3.2	2.6	2.5	0.5	0.4	0.2	0.2	0.3	1.3
4/19/2022	1:00:00 AM	65.8	64.6	62.4	59.7	56.7	53.4	49.7	46.2	42.8	39.5	36.6	34.6	31.4	28.6	26	24.6	22.7	20.9	17.9	14.9	11.3	8.4	5.7	3.5	1.7	0.8	-0.8	-2	-1.1	0.3	-1.9	-1.5	-2.1	-1.9	-1.4	0.5
4/19/2022	2:00:00 AM	61.2	59.5	57.3	54.4	50.9	47.6	43.9	40.9	38	36.4	35.3	36.6	33.6	28.1	25.2	24.9	22.6	19.4	16.7	13.1	9.1	4.3	-0.5	-2.9	-4.3	-1.8	-3.7	1.3	-4.6	-3.9	-3.5	-3.4	-3.6	-3.2	-2.3	0.2
4/19/2022	3:00:00 AM	60	58.3	55.7	52.8	49.3	45.8	42	39	36.5	34.6	32.9	32.3	29.5	27	25.1	23.8	21.9	19.1	16	12.2	7.7	3.5	-2.6	-5	-6.1	-3.4	1.4	1.8	3.5	4.4	-1.6	-3.9	-3.8	-3.4	-2.4	0.2
4/19/2022	4:00:00 AM	68.6	67.4	65.8	63.8	61.1	58.2	54.7	51	47.5	44.1	41.2	38.6	35.9	33.2	31	30.4	28.1	25.7	23.5	20.7	17.7	15	12.2	10.2	8.5	8.1	6.7	6.3	11.4	13	6.1	1.3	0.5	0.2	0.1	1.1
4/19/2022	5:00:00 AM	75.4	74.6	73.3	71.8	69.9	67.7	65	62.3	59.1	55.9	52.8	49.6	46.4	43.4	40.7	38	35.7	33.9	32.2	30	27.5	25.9	24.3	23.3	22.8	26.9	27.4	30.9	28	18	13.4	10	8.8	8.2	7.7	7.8
4/19/2022	6:00:00 AM	76.1	75.1	73.9	72.4	70.6	68.5	66	63.1	60.1	57.1	53.9	50.7	47.6	44.5	41.5	38.9	36.6	34.7	32.9	30.8	28.3	26.8	25.3	24.3	23.6	24.7	23.9	21.8	18.3	14.9	11.8	10.3	9.5	9	8.5	8.6
4/19/2022	7:00:00 AM	74.2	73.3	71.8	70.1	68	65.6	62.6	59.6	56.2	53.2	49.9	46.9	44.3	41.9	38.6	35.8	33.7	31.9	29.8	27.6	24.9	23.2	21.6	20.5	20.5	22.9	25.3	27.6	24.8	19.1	9.6	7.7	7.2	6.5	6.1	6.9
4/19/2022	8:00:00 AM	71.8	70.6	69.1	67	64.7	62.2	59.5	56.8	54	52.5	50.3	48.7	47.2	45.5	44.5	41.4	39.8	37.2	34.4	32.2	28.7	26.7	25.1	24.2	25.1	23.5	24	25.7	23.9	21.7	19.9	19.5	16.9	15.7	17.1	18.2

WM15: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	12:21:42 PM	39.6555	22.19254	70.65321	28.58573	26.14348	24.56681
2/8/2022	1:00:00 PM	27.47954	22.48997	48.54756	28.18373	26.36414	24.91732
2/8/2022	2:00:00 PM	27.28737	23.18811	42.62791	28.55579	26.77737	25.38652
2/8/2022	3:00:00 PM	27.22863	23.50486	39.19625	28.59143	26.84454	25.51962
2/8/2022	4:00:00 PM	32.36706	23.76544	56.67929	29.27096	27.20348	25.77208
2/8/2022	5:00:00 PM	28.1969	23.41489	39.06515	30.0915	27.4544	25.8797
2/8/2022	6:00:00 PM	27.07661	23.14747	36.35057	28.67398	26.57245	25.13942
2/8/2022	7:00:00 PM	27.85386	23.37545	38.7265	29.58291	27.15156	25.357
2/8/2022	8:00:00 PM	28.49315	23.18587	47.27712	29.6862	27.16221	25.34415
2/8/2022	9:00:00 PM	26.86315	22.95679	36.5278	28.34213	26.51747	25.06044
2/8/2022	10:00:00 PM	26.59871	22.81442	32.79357	27.9977	26.30239	25.00666
2/8/2022	11:00:00 PM	26.71906	22.96661	31.36197	28.22182	26.3953	25.05984
2/9/2022	12:00:00 AM	26.63283	22.68678	31.71459	27.98921	26.33135	25.02088
2/9/2022	1:00:00 AM	26.69154	22.82329	31.25175	28.24873	26.35893	24.92084
2/9/2022	2:00:00 AM	26.86663	22.98178	31.59139	28.4221	26.59736	25.0799
2/9/2022	3:00:00 AM	26.92042	22.9404	33.67755	28.43711	26.59997	25.18926
2/9/2022	4:00:00 AM	27.20975	23.08693	35.20727	28.8693	26.76788	25.15723
2/9/2022	5:00:00 AM	26.57897	22.99977	31.41447	27.91819	26.27698	25.14069
2/9/2022	6:00:00 AM	27.8565	22.89484	42.36977	29.31306	26.44556	25.05483
2/9/2022	7:00:00 AM	26.92717	22.93717	40.9677	28.2185	26.39296	24.96291
2/9/2022	8:00:00 AM	28.30015	22.74167	51.88099	28.31517	26.16539	24.76163
2/9/2022	9:00:00 AM	27.37524	22.23668	48.05471	27.86449	25.82586	24.41365
2/9/2022	10:00:00 AM	28.74539	22.15583	46.66481	28.82138	25.94051	24.46115
2/9/2022	11:00:00 AM	29.56693	22.05375	53.21431	28.47587	25.8455	24.47494
2/9/2022	12:00:00 PM	28.70723	22.14929	52.22817	27.99436	26.03195	24.21592
2/9/2022	1:00:00 PM	29.55588	22.48395	51.24192	29.27902	26.72662	24.76403
2/9/2022	2:00:00 PM	27.51035	22.7711	39.60962	29.00857	26.77578	25.10593
2/9/2022	3:00:00 PM	33.35708	24.29169	55.14216	33.58686	29.56225	27.10401
2/9/2022	4:00:00 PM	33.05294	25.15422	48.13001	35.28085	31.85539	28.29308
2/9/2022	5:00:00 PM	28.85476	24.16655	39.06454	30.56709	28.32726	26.43495
2/9/2022	6:00:00 PM	27.18758	23.55948	34.18338	28.7329	26.81921	25.37707
2/9/2022	7:00:00 PM	26.82846	23.09537	33.04185	28.29204	26.61827	25.01819
2/9/2022	8:00:00 PM	26.95344	23.11269	32.67299	28.3998	26.65879	25.15853
2/9/2022	9:00:00 PM	26.65378	22.81551	31.69047	28.11575	26.42519	24.82488
2/9/2022	10:00:00 PM	26.61071	23.09712	33.0669	27.91415	26.44023	24.88744
2/9/2022	11:00:00 PM	26.70715	23.05257	32.73715	28.01895	26.54603	24.95098
2/10/2022	12:00:00 AM	26.96455	23.01402	35.35361	28.48675	26.63674	25.01929
2/10/2022	1:00:00 AM	26.75036	22.71016	32.99393	28.24167	26.46262	24.82061
2/10/2022	2:00:00 AM	26.94166	22.67215	38.98419	28.38685	26.56593	24.84347
2/10/2022	3:00:00 AM	26.73819	22.91811	32.10225	28.27625	26.46381	24.8188

2/10/2022	4:00:00 AM	27.02115	23.12349	34.39445	28.497	26.7865	25.06133
2/10/2022	5:00:00 AM	26.91629	23.08154	33.63331	28.33783	26.65745	24.99646
2/10/2022	6:00:00 AM	27.70084	23.18137	41.24965	29.23385	26.83213	25.15357
2/10/2022	7:00:00 AM	30.83961	23.19315	52.26972	30.54721	27.07579	25.28289
2/10/2022	8:00:00 AM	31.18116	22.93259	54.49692	30.58042	27.23456	25.15687
2/10/2022	9:00:00 AM	30.29424	22.57151	50.08038	30.46771	26.61103	24.70427
2/10/2022	10:00:00 AM	27.3644	22.06288	48.89968	28.17171	25.77112	24.07945
2/10/2022	11:00:00 AM	28.42968	21.73091	48.44414	28.41188	25.75838	24.08958
2/10/2022	12:00:00 PM	30.39933	21.80485	50.46369	28.79256	25.4877	23.85982
2/10/2022	1:00:00 PM	27.69007	22.23789	52.73456	27.72976	25.72129	24.36852
2/10/2022	2:00:00 PM	26.93592	23.28056	42.68074	27.86894	26.20596	25.05271
2/10/2022	3:00:00 PM	27.39638	22.5128	42.58072	28.35615	26.42627	24.78629
2/10/2022	4:00:00 PM	26.76362	23.11002	33.69954	28.10729	26.56095	24.95976
2/10/2022	5:00:00 PM	27.12306	23.19586	37.22353	28.46043	26.80643	25.12392
2/10/2022	6:00:00 PM	27.06167	23.23377	38.54716	28.49452	26.75955	25.13924
2/10/2022	7:00:00 PM	28.3457	23.55407	40.28096	29.84579	27.45627	25.77829
2/10/2022	8:00:00 PM	29.2397	23.84785	47.76738	30.39264	27.87885	26.0699
2/10/2022	9:00:00 PM	27.75381	23.26375	38.19823	29.53371	27.12103	25.30133
2/10/2022	10:00:00 PM	28.44525	23.44411	40.39733	30.54317	27.427	25.4454
2/10/2022	11:00:00 PM	28.67913	23.36263	40.77676	30.4883	27.83919	25.80251
2/11/2022	12:00:00 AM	27.58951	22.8856	38.21994	29.38736	27.00003	25.1547
2/11/2022	1:00:00 AM	27.47671	23.37853	32.60604	28.98532	27.21822	25.67268
2/11/2022	2:00:00 AM	28.13953	23.64896	38.66678	29.61702	27.68673	26.09897
2/11/2022	3:00:00 AM	28.07651	24.2878	33.2517	29.54853	27.83017	26.25998
2/11/2022	4:00:00 AM	28.58109	24.24991	43.83849	29.68638	27.81104	26.25823
2/11/2022	5:00:00 AM	27.87714	23.74654	34.95393	29.25642	27.6223	26.06307
2/11/2022	6:00:00 AM	28.57085	23.74691	41.42485	30.27096	27.77834	26.18867
2/11/2022	7:00:00 AM	40.20778	23.83108	66.56184	30.40935	27.7592	26.21206
2/11/2022	8:00:00 AM	28.17111	23.38815	40.94539	29.88162	27.37876	25.84523
2/11/2022	9:00:00 AM	31.01919	23.33062	50.69197	31.27795	27.54752	25.76324
2/11/2022	10:00:00 AM	32.70435	23.25553	56.13264	31.20153	26.76991	25.35943
2/11/2022	11:00:00 AM	33.65328	22.57045	58.115	32.40145	26.62069	25.17647
2/11/2022	12:00:00 PM	28.17606	22.63948	49.25243	28.37256	26.20678	24.86441
2/11/2022	1:00:00 PM	27.21877	22.96857	39.68596	28.7373	26.53822	25.20399
2/11/2022	2:00:00 PM	27.69568	23.22845	39.13882	29.18028	26.96912	25.63886
2/11/2022	3:00:00 PM	28.5202	23.80477	44.70999	29.70621	27.25824	25.85481
2/11/2022	4:00:00 PM	29.03879	23.86769	50.47607	29.20689	27.17124	25.78786
2/11/2022	5:00:00 PM	28.32849	23.79152	39.78137	30.33836	27.26918	25.73975
2/11/2022	6:00:00 PM	27.08819	23.39652	36.14253	28.59729	26.71585	25.43015
2/11/2022	7:00:00 PM	28.32811	24.01631	37.38464	30.10322	27.69113	25.9193
2/11/2022	8:00:00 PM	30.05133	24.23078	43.61584	32.29097	28.7777	26.59728
2/11/2022	9:00:00 PM	29.55264	24.40829	42.77067	31.53288	28.4653	26.58052
2/11/2022	10:00:00 PM	27.92412	23.51465	41.81824	29.43252	27.21941	25.81904

2/11/2022	11:00:00 PM	28.14829	23.71451	40.60585	29.74499	27.4249	25.88561
2/12/2022	12:00:00 AM	28.20287	23.45494	42.0177	29.99856	27.37164	25.82949
2/12/2022	1:00:00 AM	27.13288	23.31976	36.07924	28.41799	26.72231	25.32397
2/12/2022	2:00:00 AM	26.92215	23.17251	36.03313	28.25046	26.69159	25.32445
2/12/2022	3:00:00 AM	26.83987	23.43296	32.14056	28.05359	26.63236	25.44952
2/12/2022	4:00:00 AM	26.93626	23.12703	32.14658	28.12224	26.73507	25.56878
2/12/2022	5:00:00 AM	26.78134	23.46072	33.0778	27.92229	26.61612	25.43744
2/12/2022	6:00:00 AM	28.60558	23.53341	42.09879	30.73008	27.12847	25.65241
2/12/2022	7:00:00 AM	28.76938	23.52112	47.36934	30.36153	27.29314	25.54483
2/12/2022	8:00:00 AM	30.91286	23.27664	55.46133	30.60587	27.23861	25.53174
2/12/2022	9:00:00 AM	32.25175	23.10769	52.19549	32.3569	26.96088	25.16682
2/12/2022	10:00:00 AM	28.91355	22.83021	47.31941	30.63278	26.33301	24.90341
2/12/2022	11:00:00 AM	29.34922	22.93732	51.92947	28.46465	26.34856	24.97461
2/12/2022	12:00:00 PM	29.06737	22.88232	50.04612	28.11174	26.22244	24.77794
2/12/2022	1:00:00 PM	29.47792	22.8701	56.25775	29.12348	26.49735	25.24341
2/12/2022	2:00:00 PM	27.61651	23.5553	38.06785	29.1105	26.92915	25.66735
2/12/2022	3:00:00 PM	27.53812	23.59301	40.46652	28.45336	26.93086	25.75437
2/12/2022	4:00:00 PM	27.33082	23.61607	39.95003	28.41611	26.90965	25.72361
2/12/2022	5:00:00 PM	27.50651	23.59074	38.77071	28.80889	26.90559	25.67747
2/12/2022	6:00:00 PM	30.11834	24.72249	43.71472	32.49988	29.08585	26.83527
2/12/2022	7:00:00 PM	31.42559	24.54315	44.31016	34.02334	30.04092	27.22033
2/12/2022	8:00:00 PM	27.78282	23.28979	42.86661	28.43256	26.6348	25.2092
2/12/2022	9:00:00 PM	26.87127	23.3122	32.47197	28.08074	26.70823	25.51402
2/12/2022	10:00:00 PM	26.87187	23.3624	33.17758	28.29943	26.66154	25.13442
2/12/2022	11:00:00 PM	27.07394	23.25769	34.12616	28.62259	26.78383	25.23789
2/13/2022	12:00:00 AM	28.23162	23.46478	49.10056	28.49218	26.84998	25.30227
2/13/2022	1:00:00 AM	27.25965	23.3053	38.4806	28.58464	26.81053	25.185
2/13/2022	2:00:00 AM	27.22322	23.11083	35.39952	28.87126	26.70564	25.18812
2/13/2022	3:00:00 AM	27.0931	23.24949	32.38988	28.60274	26.82828	25.23026
2/13/2022	4:00:00 AM	26.9712	23.6011	31.91358	28.40083	26.75298	25.27284
2/13/2022	5:00:00 AM	27.00227	23.42729	31.86462	28.47609	26.76131	25.19643
2/13/2022	6:00:00 AM	27.52793	22.943	37.61496	29.49171	26.64803	25.18424
2/13/2022	7:00:00 AM	30.15952	23.50117	51.79026	30.36796	27.05636	25.34662
2/13/2022	8:00:00 AM	33.02908	22.64472	54.4374	31.08319	26.53123	24.86963
2/13/2022	9:00:00 AM	27.2819	22.65105	49.07886	27.55317	25.92698	24.49814
2/13/2022	10:00:00 AM	28.17411	22.51104	48.53342	27.61473	25.6756	24.51261
2/13/2022	11:00:00 AM	27.00486	22.40913	44.95701	28.06242	25.63382	24.43755
2/13/2022	12:00:00 PM	26.60544	22.21922	50.03122	26.8781	25.41773	24.31192
2/13/2022	1:00:00 PM	28.63769	22.30221	48.94492	29.19706	25.87909	24.52243
2/13/2022	2:00:00 PM	32.54164	23.27426	57.15661	31.32085	27.08302	25.41885
2/13/2022	3:00:00 PM	31.0449	22.95418	57.45318	31.76544	26.72452	25.15881
2/13/2022	4:00:00 PM	27.57815	22.78713	41.59004	28.91615	26.50689	25.20271
2/13/2022	5:00:00 PM	27.70439	23.28836	45.19327	28.81219	26.72438	25.35735

2/13/2022	6:00:00 PM	27.21152	23.30684	37.16662	28.56582	26.83566	25.2262
2/13/2022	7:00:00 PM	27.85162	23.30005	39.39701	29.46633	27.11408	25.40284
2/13/2022	8:00:00 PM	27.31045	23.26722	34.44896	28.98077	26.87805	25.24496
2/13/2022	9:00:00 PM	28.26981	23.34768	39.57899	30.35343	27.32535	25.43488
2/13/2022	10:00:00 PM	27.59591	23.1584	38.93994	29.41529	26.90326	25.21963
2/13/2022	11:00:00 PM	28.3159	22.94215	47.58479	28.66761	26.48217	25.00991
2/14/2022	12:00:00 AM	27.47899	23.24584	41.5456	28.90007	26.65782	25.17088
2/14/2022	1:00:00 AM	27.05725	22.80782	40.00103	28.4312	26.42715	24.98822
2/14/2022	2:00:00 AM	26.85207	23.10651	32.01506	28.41212	26.50526	25.1327
2/14/2022	3:00:00 AM	26.97428	22.94202	32.63048	28.55073	26.63574	25.18711
2/14/2022	4:00:00 AM	28.41692	23.4811	41.45425	30.69973	27.09729	25.52071
2/14/2022	5:00:00 AM	26.9745	23.13359	37.61659	28.53667	26.44661	24.97842
2/14/2022	6:00:00 AM	27.21684	23.11107	41.27938	28.52297	26.41639	24.96803
2/14/2022	7:00:00 AM	26.90495	22.91624	44.81	28.27838	26.2548	24.76078
2/14/2022	8:00:00 AM	28.17333	22.2954	51.87838	27.94446	25.81697	24.39044
2/14/2022	9:00:00 AM	28.90884	22.51461	51.77402	28.33213	25.70584	24.24499
2/14/2022	10:00:00 AM	29.19878	22.42291	52.4834	27.71385	25.63857	24.23448
2/14/2022	11:00:00 AM	26.11989	21.97463	40.87326	27.54579	25.55035	24.12764
2/14/2022	12:00:00 PM	26.29738	22.21363	39.56823	27.93137	25.55739	24.04803
2/14/2022	1:00:00 PM	28.67545	22.20152	44.30855	30.6447	26.91048	24.51092
2/14/2022	2:00:00 PM	37.94677	23.05158	70.36102	31.33298	27.29699	25.38171
2/14/2022	3:00:00 PM	33.95033	22.54066	55.2184	33.89378	27.41139	25.01577
2/14/2022	4:00:00 PM	28.84897	22.38302	48.47056	30.31921	26.88215	24.93483
2/14/2022	5:00:00 PM	27.46398	22.65669	39.79548	28.91854	26.73087	24.89238
2/14/2022	6:00:00 PM	27.03874	22.83328	34.91223	28.74459	26.58721	24.89049
2/14/2022	7:00:00 PM	29.72186	22.82165	48.60104	31.10086	27.1288	25.22788
2/14/2022	8:00:00 PM	30.59473	23.10493	48.97371	31.48819	27.25976	25.28961
2/14/2022	9:00:00 PM	31.92118	22.64257	51.59322	32.86903	27.322	25.12822
2/14/2022	10:00:00 PM	31.25973	22.73791	50.90977	31.77169	27.34259	25.16981
2/14/2022	11:00:00 PM	29.10496	22.74501	42.51376	31.43118	27.76688	25.4386
2/15/2022	12:00:00 AM	28.14637	23.01715	41.56209	29.5516	27.19923	25.35661
2/15/2022	1:00:00 AM	26.89442	22.68188	33.18658	28.42641	26.63289	24.84551
2/15/2022	2:00:00 AM	27.39305	22.67186	45.65756	28.62974	26.70367	24.96236
2/15/2022	3:00:00 AM	28.33371	23.11238	41.61402	30.22942	27.41733	25.49994
2/15/2022	4:00:00 AM	34.16716	24.55456	51.86197	37.36143	30.12522	27.38853
2/15/2022	5:00:00 AM	28.60553	19.46204	43.20462	31.21653	26.88914	22.64565
2/15/2022	6:00:00 AM	22.57741	13.50508	44.1045	24.03082	19.60327	15.97402
2/15/2022	7:00:00 AM	17.62144	12.10844	38.50049	18.41575	15.23473	13.85667
2/15/2022	8:00:00 AM	18.02503	12.18067	39.33385	18.47365	15.61503	14.02547
2/15/2022	9:00:00 AM	18.72477	12.64018	47.33996	18.63213	15.9383	14.5498
2/15/2022	10:00:00 AM	17.35183	12.94978	34.47396	18.29221	16.01778	14.71536
2/15/2022	11:00:00 AM	20.03469	14.38885	40.3118	20.99581	18.38166	16.81566
2/15/2022	12:00:00 PM	22.69803	16.77618	42.26349	23.39174	20.55407	18.90328

2/15/2022	1:00:00 PM	24.41278	19.09152	40.86477	26.04418	23.49238	21.60573
2/15/2022	2:00:00 PM	25.82296	20.50044	47.45778	26.72091	24.26635	22.42555
2/15/2022	3:00:00 PM	32.66446	20.57395	52.85144	34.05457	25.79661	22.87666
2/15/2022	4:00:00 PM	32.21187	24.3192	52.26752	34.31794	29.69342	26.97867
2/15/2022	5:00:00 PM	27.55175	21.47384	43.8515	29.60415	26.45635	23.96091
2/15/2022	6:00:00 PM	26.71188	21.06442	45.15091	27.8433	25.32863	23.41329
2/15/2022	7:00:00 PM	25.7984	21.0324	38.55993	27.33236	25.29606	23.31639
2/15/2022	8:00:00 PM	26.65964	20.74159	48.17459	26.56703	24.86765	23.01176
2/15/2022	9:00:00 PM	24.92342	20.6422	30.75666	26.37864	24.76275	22.93748
2/15/2022	10:00:00 PM	25.38513	21.07657	30.88821	26.82141	25.2148	23.35224
2/15/2022	11:00:00 PM	25.38186	21.05866	34.79179	26.66124	25.13273	23.48098
2/16/2022	12:00:00 AM	25.02208	20.56492	30.24846	26.36683	24.79212	23.19683
2/16/2022	1:00:00 AM	24.9812	21.09048	31.85855	26.254	24.80889	23.24319
2/16/2022	2:00:00 AM	24.80954	20.75164	31.63037	26.15455	24.66069	22.96576
2/16/2022	3:00:00 AM	25.34214	20.89137	39.21798	26.53437	24.66386	22.95921
2/16/2022	4:00:00 AM	25.55337	20.73316	40.33126	26.4441	24.78347	23.06784
2/16/2022	5:00:00 AM	24.88618	20.72568	30.41018	26.29422	24.69252	23.02581
2/16/2022	6:00:00 AM	29.39259	20.62233	52.29665	28.8686	24.86133	23.06033
2/16/2022	7:00:00 AM	29.96533	20.34474	51.54506	27.05371	24.52287	22.70619
2/16/2022	8:00:00 AM	34.28134	20.61437	57.52734	28.1698	24.63285	22.76898
2/16/2022	9:00:00 AM	27.7392	20.60002	48.51049	28.14458	24.7782	22.87262
2/16/2022	10:00:00 AM	26.79332	20.62454	44.57534	28.41142	24.98082	22.85825
2/16/2022	11:00:00 AM	27.32868	20.79386	51.01188	27.71321	24.87894	23.04031
2/16/2022	12:00:00 PM	35.31222	20.96261	62.44734	27.12463	24.87628	23.05788
2/16/2022	1:00:00 PM	34.92368	20.88807	59.02785	26.98982	24.90728	23.12103
2/16/2022	2:00:00 PM	25.54031	21.09805	48.1615	26.71351	25.03559	23.23986
2/16/2022	3:00:00 PM	33.89096	21.85384	54.32854	37.38133	28.20535	24.58021
2/16/2022	4:00:00 PM	31.29443	24.29765	47.45158	33.67771	29.26196	26.77471
2/16/2022	5:00:00 PM	29.08156	21.60742	46.13663	29.70279	25.9501	24.11491
2/16/2022	6:00:00 PM	27.44399	21.70348	47.1245	27.75185	25.51397	23.91644
2/16/2022	7:00:00 PM	25.81109	21.57569	34.44518	27.29225	25.43237	23.84512
2/16/2022	8:00:00 PM	30.03637	21.84829	52.43825	27.59245	25.75681	24.20039
2/16/2022	9:00:00 PM	25.65781	21.80842	33.98165	26.98312	25.44404	23.95726
2/16/2022	10:00:00 PM	25.76411	21.95597	31.40353	27.07534	25.59168	24.15152
2/16/2022	11:00:00 PM	25.92072	21.77551	37.4106	27.07185	25.47718	23.97178
2/17/2022	12:00:00 AM	25.63112	21.5217	32.83673	26.93136	25.42936	23.91392
2/17/2022	1:00:00 AM	25.91889	21.79417	38.12037	27.01913	25.49818	23.98881
2/17/2022	2:00:00 AM	25.7782	21.70002	31.12406	27.06213	25.58257	24.10979
2/17/2022	3:00:00 AM	25.46171	21.46972	29.6189	26.73188	25.31987	23.93064
2/17/2022	4:00:00 AM	25.70569	21.49387	34.53432	26.88271	25.46863	24.01096
2/17/2022	5:00:00 AM	25.8677	21.5386	38.39218	27.12965	25.5349	24.05645
2/17/2022	6:00:00 AM	26.59242	21.71204	41.02632	27.48124	25.69616	24.24301
2/17/2022	7:00:00 AM	27.58854	21.6816	52.59763	27.13604	25.66841	24.22437

2/17/2022	8:00:00 AM	36.75146	21.67682	67.40437	27.41523	25.6276	24.11856
2/17/2022	9:00:00 AM	25.67683	21.19738	38.43738	26.93787	25.43974	23.78948
2/17/2022	10:00:00 AM	32.36193	21.1444	51.3802	33.30079	25.44064	23.70322
2/17/2022	11:00:00 AM	32.73096	21.24583	58.04574	30.27997	25.78353	23.95341
2/17/2022	12:00:00 PM	27.44647	21.56458	45.5802	28.61479	26.33554	24.40614
2/17/2022	1:00:00 PM	27.03169	22.31711	37.87281	28.38074	26.87132	25.02619
2/17/2022	2:00:00 PM	28.33063	22.68458	51.06192	29.15347	27.6375	25.89943
2/17/2022	3:00:00 PM	29.03503	23.0673	46.3653	29.41148	27.81771	26.1073
2/17/2022	4:00:00 PM	28.10397	23.04934	40.82138	29.40556	27.86372	26.1062
2/17/2022	5:00:00 PM	28.26153	23.15781	38.30154	29.41488	27.81574	26.04858
2/17/2022	6:00:00 PM	28.29471	23.21255	37.09896	29.97276	27.80982	26.07904
2/17/2022	7:00:00 PM	28.15891	23.23981	38.18285	29.67616	27.78277	25.92711
2/17/2022	8:00:00 PM	28.89052	23.21296	42.79681	30.5372	28.1831	26.09009
2/17/2022	9:00:00 PM	28.62674	23.20404	40.2524	30.543	27.89777	25.87742
2/17/2022	10:00:00 PM	30.66313	23.41703	44.13287	33.11243	29.03769	26.61967
2/17/2022	11:00:00 PM	29.17411	22.96257	38.82616	31.26144	28.57486	25.96949
2/18/2022	12:00:00 AM	27.96966	22.66163	38.0349	29.41799	27.50652	25.60905
2/18/2022	1:00:00 AM	27.96194	22.79617	38.80946	29.47729	27.58809	25.60892
2/18/2022	2:00:00 AM	28.88835	22.84508	47.13687	29.3689	27.69957	25.85705
2/18/2022	3:00:00 AM	27.85051	22.3778	37.00951	29.29866	27.56343	25.70319
2/18/2022	4:00:00 AM	27.66638	22.86133	34.59573	29.02513	27.49873	25.62278
2/18/2022	5:00:00 AM	27.78445	22.92692	33.62984	29.21446	27.59273	25.66738
2/18/2022	6:00:00 AM	29.87079	22.89846	47.95838	29.62993	27.60408	25.43232
2/18/2022	7:00:00 AM	27.76275	22.5268	37.29413	29.23939	27.55188	25.46298
2/18/2022	8:00:00 AM	28.35609	22.63939	56.2718	29.08463	27.32332	25.16509
2/18/2022	9:00:00 AM	28.10683	22.29507	46.75638	29.24885	27.15515	25.09167
2/18/2022	10:00:00 AM	31.56641	22.57725	52.8847	33.35359	27.21361	25.032
2/18/2022	11:00:00 AM	28.67278	22.27341	50.38259	29.52253	27.15436	25.04443
2/18/2022	12:00:00 PM	27.64871	22.41152	44.53895	29.02765	27.04838	24.93872
2/18/2022	1:00:00 PM	27.41671	22.62509	42.70379	28.90684	27.02314	24.96057
2/18/2022	2:00:00 PM	32.45409	23.37106	55.88051	29.97972	27.88797	25.78905
2/18/2022	3:00:00 PM	28.39804	23.34959	39.61706	29.88687	28.13799	26.01921
2/18/2022	4:00:00 PM	28.32906	23.16455	40.33391	29.82192	28.09362	25.9914
2/18/2022	5:00:00 PM	28.27602	23.17979	42.46009	29.70247	27.86278	25.67615
2/18/2022	6:00:00 PM	30.08314	23.67057	42.30865	32.27263	29.22285	26.70227
2/18/2022	7:00:00 PM	32.09217	25.25138	45.51197	34.52934	30.73075	28.11619
2/18/2022	8:00:00 PM	30.82778	24.0737	43.47558	33.13602	29.5643	27.34464
2/18/2022	9:00:00 PM	29.89334	24.05523	42.12694	31.9792	28.98637	26.80392
2/18/2022	10:00:00 PM	30.25592	23.93911	44.35886	32.677	28.84001	26.79349
2/18/2022	11:00:00 PM	29.82754	24.33311	40.94311	31.98539	28.94144	26.8783
2/19/2022	12:00:00 AM	28.60468	23.98111	39.6104	30.1575	28.05308	26.32383
2/19/2022	1:00:00 AM	28.5118	23.78946	42.98946	29.5649	27.78171	26.0471
2/19/2022	2:00:00 AM	28.70475	23.79731	41.33033	30.34913	28.11153	26.3654

2/19/2022	3:00:00 AM	28.65277	23.8007	42.82279	29.7942	28.02414	26.38954
2/19/2022	4:00:00 AM	28.33841	23.81156	35.96988	29.62901	28.14566	26.39021
2/19/2022	5:00:00 AM	28.47912	23.95654	38.93293	29.67935	28.14789	26.56142
2/19/2022	6:00:00 AM	28.73693	23.55124	43.5978	29.6864	28.00716	26.43216
2/19/2022	7:00:00 AM	28.5558	23.84812	42.68126	29.48184	28.04345	26.40975
2/19/2022	8:00:00 AM	31.08399	24.36231	54.30997	30.20273	28.19973	26.99146
2/19/2022	9:00:00 AM	29.70449	24.5052	50.7815	29.8436	28.1714	27.00959
2/19/2022	10:00:00 AM	29.53992	23.87403	50.64646	29.42184	27.92643	26.76519
2/19/2022	11:00:00 AM	28.92484	23.87308	49.35151	29.04319	27.68571	26.42256
2/19/2022	12:00:00 PM	28.89608	23.351	44.99657	30.30557	27.55199	26.27608
2/19/2022	1:00:00 PM	30.35157	23.47776	48.58096	32.07715	27.66457	26.22901
2/19/2022	2:00:00 PM	29.50183	24.40122	46.39479	30.80996	27.98523	26.70846
2/19/2022	3:00:00 PM	29.24686	23.81165	48.61984	29.71933	28.04797	26.71101
2/19/2022	4:00:00 PM	32.08262	24.21918	58.34306	29.89117	28.12473	26.93851
2/19/2022	5:00:00 PM	28.45744	24.04339	47.94054	29.22036	28.00429	26.82443
2/19/2022	6:00:00 PM	28.4025	23.78585	40.81315	29.48572	27.98084	26.65736
2/19/2022	7:00:00 PM	28.64803	24.71746	37.97552	30.19215	28.18773	26.80922
2/19/2022	8:00:00 PM	29.34428	24.18048	38.74984	31.19786	28.73454	26.99908
2/19/2022	9:00:00 PM	28.93278	24.15382	44.67614	30.39364	28.23848	26.81626
2/19/2022	10:00:00 PM	28.47013	24.33134	35.93587	30.02284	28.16351	26.47501
2/19/2022	11:00:00 PM	28.44057	24.40289	38.08333	29.62008	28.10955	26.79237
2/20/2022	12:00:00 AM	30.60017	24.99076	50.4409	30.44374	28.4037	27.13262
2/20/2022	1:00:00 AM	28.62138	24.56167	40.03947	29.61615	28.24427	27.0434
2/20/2022	2:00:00 AM	28.744	24.58554	42.62237	29.62121	28.14407	26.98372
2/20/2022	3:00:00 AM	28.66532	24.54708	43.09577	29.50132	27.96805	26.79867
2/20/2022	4:00:00 AM	28.26181	24.39697	34.12732	29.40756	28.09959	26.89238
2/20/2022	5:00:00 AM	28.14851	24.35586	34.8073	29.17367	27.94126	26.82294
2/20/2022	6:00:00 AM	31.36851	24.70422	59.86904	29.93756	28.09207	26.9285
2/20/2022	7:00:00 AM	34.2522	24.95016	59.83858	32.60891	28.22097	26.98844
2/20/2022	8:00:00 AM	33.67673	24.56214	55.66795	32.18227	28.07156	26.80964
2/20/2022	9:00:00 AM	31.03973	24.2327	52.40036	31.25173	28.15408	26.67984
2/20/2022	10:00:00 AM	32.99955	23.81345	54.75553	32.99686	27.99835	26.0977
2/20/2022	11:00:00 AM	36.90079	24.20284	59.02291	37.38065	29.57637	27.1672
2/20/2022	12:00:00 PM	36.14616	24.82747	55.41706	37.46452	29.70544	27.14541
2/20/2022	1:00:00 PM	46.18971	26.54132	65.51191	49.21425	37.59206	30.9035
2/20/2022	2:00:00 PM	40.36008	24.3202	59.82127	43.16971	31.89848	27.29888
2/20/2022	3:00:00 PM	37.35444	23.50514	58.08167	40.29929	30.37309	26.69138
2/20/2022	4:00:00 PM	37.53679	24.6974	55.61336	40.67815	30.98788	27.57092
2/20/2022	5:00:00 PM	31.29872	23.62197	52.58245	32.07803	27.83183	25.66388
2/20/2022	6:00:00 PM	37.95088	24.35188	61.49435	37.37057	29.52913	26.77665
2/20/2022	7:00:00 PM	38.19723	24.84008	59.84976	40.75076	31.85903	28.2079
2/20/2022	8:00:00 PM	35.86559	26.02919	50.29531	38.7904	33.67757	29.61139
2/20/2022	9:00:00 PM	33.12165	26.10805	46.54387	35.49962	31.59018	29.09526

2/20/2022	10:00:00 PM	28.90528	24.10366	38.16367	31.03331	28.1141	26.18228
2/20/2022	11:00:00 PM	26.91368	23.36142	33.25257	28.05362	26.76017	25.60252
2/21/2022	12:00:00 AM	27.32083	23.04296	42.92861	28.25205	26.51761	24.83925
2/21/2022	1:00:00 AM	26.93463	22.97488	32.39064	28.09047	26.71072	25.50447
2/21/2022	2:00:00 AM	25.52572	21.12448	31.97088	27.12434	25.26835	23.45632
2/21/2022	3:00:00 AM	24.38855	20.49913	32.86265	25.75735	24.06392	22.54931
2/21/2022	4:00:00 AM	23.7576	19.05805	40.06711	24.8619	23.04029	21.26804
2/21/2022	5:00:00 AM	26.10821	18.30111	48.49207	23.10147	21.4779	20.2747
2/21/2022	6:00:00 AM	23.09095	17.29666	42.15944	22.48578	20.88973	19.68566
2/21/2022	7:00:00 AM	27.67426	17.9153	47.83768	29.749	21.03207	19.90225
2/21/2022	8:00:00 AM	27.61525	18.01465	56.98753	25.4686	20.75377	19.76176
2/21/2022	9:00:00 AM	24.46414	17.97668	49.75764	23.09728	20.95686	19.83026
2/21/2022	10:00:00 AM	24.08742	19.22012	43.79575	23.7066	22.14859	20.92617
2/21/2022	11:00:00 AM	26.99951	20.38327	48.47185	26.18692	23.88355	22.60197
2/21/2022	12:00:00 PM	34.75805	20.44609	55.22957	36.63709	25.14285	22.87808
2/21/2022	1:00:00 PM	26.94327	21.2356	46.59902	28.08974	25.50906	24.07044
2/21/2022	2:00:00 PM	28.11329	22.55184	54.83155	27.62742	26.09332	24.84534
2/21/2022	3:00:00 PM	35.84114	22.59609	61.41727	34.57388	26.99452	25.20288
2/21/2022	4:00:00 PM	31.12703	22.78284	53.5476	32.8725	27.00773	25.1757
2/21/2022	5:00:00 PM	33.34816	22.79247	54.35846	34.05597	27.32108	25.0303
2/21/2022	6:00:00 PM	29.29324	22.29994	47.5421	30.35272	26.06722	24.61215
2/21/2022	7:00:00 PM	31.76826	22.35028	55.25294	31.00522	25.73242	24.40019
2/21/2022	8:00:00 PM	30.27499	22.34278	52.13701	28.75217	25.89165	24.68757
2/21/2022	9:00:00 PM	28.67301	22.49822	40.66559	30.923	27.74631	25.19344
2/21/2022	10:00:00 PM	30.66107	22.71763	45.94932	33.71271	28.54715	24.95018
2/21/2022	11:00:00 PM	32.58678	22.30186	56.41435	28.77748	26.00587	24.62036
2/22/2022	12:00:00 AM	26.33564	22.53795	39.58991	27.08191	25.72736	24.60524
2/22/2022	1:00:00 AM	27.50364	22.57844	38.92119	29.67346	26.56344	24.89333
2/22/2022	2:00:00 AM	27.83363	22.82782	39.30078	30.27667	26.58112	24.98683
2/22/2022	3:00:00 AM	27.08413	22.61788	40.3656	28.71795	26.52339	24.75432
2/22/2022	4:00:00 AM	25.55232	21.56808	36.81906	26.52394	25.16567	23.92848
2/22/2022	5:00:00 AM	26.02162	21.37366	40.08981	27.54892	25.31747	23.63622
2/22/2022	6:00:00 AM	28.954	20.68941	50.97107	29.73116	24.17618	22.85996
2/22/2022	7:00:00 AM	31.60654	20.657	53.67891	33.13964	26.0188	23.07987
2/22/2022	8:00:00 AM	36.51559	21.23469	67.11337	28.2642	24.89671	23.27955

WM15: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	12:21:42 PM	48.37155	29.8229	76.6442	43.29765	36.297	33.30932
2/8/2022	1:00:00 PM	38.96006	29.92048	59.33518	40.26729	35.33457	33.07143
2/8/2022	2:00:00 PM	37.97887	30.15802	58.56019	39.8894	35.13887	32.92859
2/8/2022	3:00:00 PM	35.25708	30.28777	46.46772	37.05965	34.68286	32.84516
2/8/2022	4:00:00 PM	47.63171	30.47113	71.35117	45.7688	35.73532	33.22185
2/8/2022	5:00:00 PM	49.41837	30.52598	70.2391	52.43788	38.90858	34.0023
2/8/2022	6:00:00 PM	43.35907	30.07898	65.76697	44.97366	36.19012	33.06015
2/8/2022	7:00:00 PM	45.30064	30.87852	69.0364	46.5724	37.81074	34.05188
2/8/2022	8:00:00 PM	45.14426	30.53469	68.02805	46.27474	36.90991	33.86088
2/8/2022	9:00:00 PM	37.08249	29.97445	58.59908	38.25184	35.05922	32.98128
2/8/2022	10:00:00 PM	35.04103	29.62511	51.40884	36.52233	34.27117	32.51144
2/8/2022	11:00:00 PM	35.58571	29.84911	50.96618	37.2205	34.5558	32.71306
2/9/2022	12:00:00 AM	35.33365	29.43031	53.34053	36.83717	34.39908	32.52023
2/9/2022	1:00:00 AM	35.18504	29.7448	45.47512	37.04715	34.68997	32.67461
2/9/2022	2:00:00 AM	36.23178	30.24723	50.36859	38.20126	35.42348	33.30137
2/9/2022	3:00:00 AM	39.53431	30.47761	64.23622	41.35592	36.50235	33.97573
2/9/2022	4:00:00 AM	44.26052	30.44251	67.70862	43.97503	36.42559	33.82771
2/9/2022	5:00:00 AM	36.03687	30.42578	45.04319	37.88365	35.63093	33.68718
2/9/2022	6:00:00 AM	40.4801	30.92294	57.15614	43.3137	36.6149	34.33282
2/9/2022	7:00:00 AM	39.22374	31.54305	52.10969	41.6228	37.84854	35.16927
2/9/2022	8:00:00 AM	39.03402	30.70422	55.31524	41.53001	36.74392	34.25485
2/9/2022	9:00:00 AM	40.1071	30.24959	66.64402	39.60194	36.02695	33.60153
2/9/2022	10:00:00 AM	41.70431	30.78957	65.14776	42.07899	37.28431	34.46369
2/9/2022	11:00:00 AM	45.68052	30.78675	65.64487	48.43362	39.42427	35.23209
2/9/2022	12:00:00 PM	44.12058	31.25495	67.33626	45.62269	38.60551	35.29919
2/9/2022	1:00:00 PM	46.33135	31.3973	68.38967	48.7975	40.27671	35.78037
2/9/2022	2:00:00 PM	47.45326	31.34127	69.67131	48.30252	39.09138	35.48829
2/9/2022	3:00:00 PM	55.40391	33.21456	75.45024	58.77145	46.47921	38.39579
2/9/2022	4:00:00 PM	58.06606	33.77138	75.52518	62.07241	49.11403	39.2002
2/9/2022	5:00:00 PM	49.7167	32.38456	72.23741	52.01951	41.4338	36.55536
2/9/2022	6:00:00 PM	42.31442	31.20018	66.28408	42.92899	37.55943	34.73453
2/9/2022	7:00:00 PM	37.45806	30.56322	50.70235	39.65541	36.40338	33.90457
2/9/2022	8:00:00 PM	38.2809	30.14267	56.5456	40.20574	35.57957	33.28765
2/9/2022	9:00:00 PM	37.593	29.86758	51.55206	40.36429	36.31035	33.42951
2/9/2022	10:00:00 PM	37.99805	30.98451	56.14526	39.97556	36.98596	34.45334
2/9/2022	11:00:00 PM	38.15978	31.08427	57.08739	39.66768	36.65635	34.28688
2/10/2022	12:00:00 AM	43.73415	31.31381	68.60753	44.27805	38.42391	35.58496
2/10/2022	1:00:00 AM	40.53338	30.03754	60.85253	41.88309	36.40671	33.62898
2/10/2022	2:00:00 AM	39.50146	29.72244	56.86009	42.72953	37.14296	33.76908
2/10/2022	3:00:00 AM	37.00273	30.15707	48.44401	39.32427	36.14443	33.67836

2/10/2022	4:00:00 AM	39.29752	30.57728	62.55524	40.55796	36.18254	33.77443
2/10/2022	5:00:00 AM	40.43822	30.78636	58.28311	42.92239	37.68699	34.38728
2/10/2022	6:00:00 AM	38.56051	30.77513	51.70191	40.58027	36.67751	34.18676
2/10/2022	7:00:00 AM	39.84503	30.71828	57.5872	41.61761	36.91887	34.34628
2/10/2022	8:00:00 AM	38.7872	30.87426	56.15136	40.57054	37.05847	34.62006
2/10/2022	9:00:00 AM	41.43043	30.82519	67.82737	41.04388	37.53257	34.90832
2/10/2022	10:00:00 AM	37.95636	29.85406	54.28431	39.80641	36.23112	33.59681
2/10/2022	11:00:00 AM	39.87464	29.80035	57.55255	41.67583	36.67972	33.73267
2/10/2022	12:00:00 PM	40.39896	29.26602	65.50986	41.4481	35.76408	32.7771
2/10/2022	1:00:00 PM	44.25861	29.55006	68.39834	44.30314	36.09064	33.25589
2/10/2022	2:00:00 PM	41.31314	30.27683	60.41055	43.98683	36.55299	33.68081
2/10/2022	3:00:00 PM	40.04459	29.67624	62.15034	41.14204	36.28132	33.31209
2/10/2022	4:00:00 PM	36.23218	30.01469	47.99571	38.26897	35.67415	33.26239
2/10/2022	5:00:00 PM	36.82693	30.24796	53.79665	38.5952	36.08419	33.7414
2/10/2022	6:00:00 PM	44.18199	30.8138	71.71717	44.10202	37.43457	34.48227
2/10/2022	7:00:00 PM	46.81166	31.54639	67.74351	48.63919	38.91742	35.28346
2/10/2022	8:00:00 PM	49.05957	31.95756	70.69792	51.2345	40.88076	36.42859
2/10/2022	9:00:00 PM	46.8099	30.82598	69.54119	48.31102	38.2965	34.69444
2/10/2022	10:00:00 PM	48.79119	30.82454	71.17764	50.10258	38.58904	34.40016
2/10/2022	11:00:00 PM	48.80597	31.22852	69.92878	50.9156	40.22128	35.46974
2/11/2022	12:00:00 AM	48.45145	29.99048	71.54454	49.33746	37.30765	33.81506
2/11/2022	1:00:00 AM	39.6624	30.34887	60.47937	40.46847	36.14612	33.71692
2/11/2022	2:00:00 AM	45.06322	30.84266	69.33017	42.46868	37.04079	34.40807
2/11/2022	3:00:00 AM	37.61744	31.17867	53.32761	39.59887	36.70293	34.3306
2/11/2022	4:00:00 AM	40.34561	31.73392	57.15926	42.03128	37.72332	35.12794
2/11/2022	5:00:00 AM	38.37234	30.99894	48.38236	40.92085	37.38391	34.59897
2/11/2022	6:00:00 AM	39.53399	31.81385	51.37461	42.14237	38.35146	35.50278
2/11/2022	7:00:00 AM	51.25713	31.34617	79.39585	42.85577	37.16782	34.82057
2/11/2022	8:00:00 AM	37.97908	30.88998	50.76962	40.22514	36.715	34.48286
2/11/2022	9:00:00 AM	38.48301	30.74885	54.21764	40.61443	36.37454	34.09067
2/11/2022	10:00:00 AM	39.56133	30.71434	57.55207	41.35375	36.61213	34.05791
2/11/2022	11:00:00 AM	43.70527	29.82158	65.90854	42.92174	36.06434	33.58323
2/11/2022	12:00:00 PM	43.06721	29.44211	68.26666	44.49309	35.63454	32.71453
2/11/2022	1:00:00 PM	43.4405	29.4615	64.5614	45.80333	35.25512	32.47732
2/11/2022	2:00:00 PM	39.67775	29.75407	58.32796	41.64175	34.4171	32.54589
2/11/2022	3:00:00 PM	41.40726	29.99294	62.02188	42.95469	34.81533	32.6161
2/11/2022	4:00:00 PM	43.54112	30.01369	68.54979	41.27738	34.45789	32.44149
2/11/2022	5:00:00 PM	50.37957	29.96376	71.0246	52.75109	34.36911	32.30029
2/11/2022	6:00:00 PM	38.27362	29.62132	62.81714	38.10401	33.78097	32.04148
2/11/2022	7:00:00 PM	47.66063	30.97526	68.73297	49.76103	38.86877	34.25082
2/11/2022	8:00:00 PM	53.20012	31.85124	73.65119	55.34715	42.23628	36.01859
2/11/2022	9:00:00 PM	53.10786	32.01848	74.30664	55.59689	42.03282	35.83311
2/11/2022	10:00:00 PM	49.00066	30.47948	71.44258	50.29345	37.8385	33.82557

2/11/2022	11:00:00 PM	47.91868	30.88017	68.85868	49.93949	38.54723	34.16024
2/12/2022	12:00:00 AM	50.11466	30.15856	73.24763	51.7949	39.1135	33.90402
2/12/2022	1:00:00 AM	45.03794	29.76068	68.56721	44.20582	34.71834	32.40174
2/12/2022	2:00:00 AM	42.79257	29.74329	69.19113	42.95885	35.50334	32.70625
2/12/2022	3:00:00 AM	38.355	29.93195	62.72263	39.45134	34.46909	32.4675
2/12/2022	4:00:00 AM	36.52891	29.67409	54.582	38.15309	34.39822	32.60002
2/12/2022	5:00:00 AM	34.41401	29.69284	47.54975	35.78022	33.83421	32.2406
2/12/2022	6:00:00 AM	38.7498	29.75916	55.02104	41.59521	34.72879	32.51943
2/12/2022	7:00:00 AM	38.27153	29.97935	55.48275	39.09654	34.5956	32.61179
2/12/2022	8:00:00 AM	39.27106	29.87803	64.36098	39.29192	34.81432	32.76272
2/12/2022	9:00:00 AM	39.10551	30.01362	55.24644	41.22978	35.73256	33.08657
2/12/2022	10:00:00 AM	40.6041	29.51184	57.70353	43.88105	35.4332	32.52584
2/12/2022	11:00:00 AM	48.23274	30.03008	70.47028	51.25649	42.3223	34.4505
2/12/2022	12:00:00 PM	46.05564	29.71211	67.30409	49.13588	38.97221	33.29491
2/12/2022	1:00:00 PM	44.7259	29.63644	64.54528	47.48704	37.93013	33.16955
2/12/2022	2:00:00 PM	41.26838	30.06057	61.2183	44.1134	35.1471	32.72638
2/12/2022	3:00:00 PM	38.53593	29.84751	60.25921	37.95222	34.07082	32.41444
2/12/2022	4:00:00 PM	35.92093	29.61914	51.94008	36.48434	33.80065	32.21736
2/12/2022	5:00:00 PM	41.64022	29.73574	63.9061	42.13024	34.6268	32.39304
2/12/2022	6:00:00 PM	52.45753	32.43339	73.11183	55.12522	42.79207	36.46492
2/12/2022	7:00:00 PM	54.51846	31.94557	73.79516	57.71671	45.22805	37.21701
2/12/2022	8:00:00 PM	42.79396	29.50647	64.90228	42.23221	33.99834	31.95879
2/12/2022	9:00:00 PM	37.80061	29.53372	60.99227	37.20574	33.87133	32.14785
2/12/2022	10:00:00 PM	37.01919	29.61555	61.83057	37.30635	33.87654	31.91429
2/12/2022	11:00:00 PM	39.75969	29.74005	63.14524	40.62817	34.82667	32.48448
2/13/2022	12:00:00 AM	38.58198	29.65156	61.8162	36.29978	33.78253	31.96975
2/13/2022	1:00:00 AM	44.96854	29.82369	71.47032	43.54251	35.15606	32.51607
2/13/2022	2:00:00 AM	44.69072	29.66468	66.29067	44.96003	35.49295	32.69709
2/13/2022	3:00:00 AM	36.27877	29.763	56.59088	37.60117	34.44498	32.40338
2/13/2022	4:00:00 AM	35.83338	30.08917	46.9813	38.37252	34.70294	32.51062
2/13/2022	5:00:00 AM	36.50817	29.8922	46.97126	39.15984	35.332	32.73352
2/13/2022	6:00:00 AM	35.81153	29.44199	45.04424	38.18347	34.80461	32.58455
2/13/2022	7:00:00 AM	43.15106	30.20013	62.45687	45.73268	36.95875	33.31835
2/13/2022	8:00:00 AM	36.79803	29.4003	54.20497	38.25268	34.68018	32.43898
2/13/2022	9:00:00 AM	36.66865	29.41951	53.27355	38.4056	34.47472	32.1712
2/13/2022	10:00:00 AM	37.72793	28.87722	58.88892	37.93325	33.85141	31.71288
2/13/2022	11:00:00 AM	40.20312	28.90553	59.99846	43.0983	34.8406	31.723
2/13/2022	12:00:00 PM	39.4883	28.62662	60.74709	41.11539	34.33964	31.35674
2/13/2022	1:00:00 PM	55.10685	28.56095	77.59455	55.44954	34.83762	31.25001
2/13/2022	2:00:00 PM	54.77335	29.59044	78.40483	54.77251	39.0799	33.02367
2/13/2022	3:00:00 PM	58.32798	29.72134	81.66015	60.23047	41.87939	33.22791
2/13/2022	4:00:00 PM	44.09684	29.27272	69.68806	44.14013	34.16307	32.13261
2/13/2022	5:00:00 PM	49.54273	29.98026	74.11145	48.12442	35.65141	32.89358

2/13/2022	6:00:00 PM	36.44957	29.51485	53.51131	37.2853	33.94848	32.00639
2/13/2022	7:00:00 PM	48.67919	29.6328	70.3675	50.40617	36.62758	32.71926
2/13/2022	8:00:00 PM	46.18655	30.25363	67.1288	48.29511	37.0503	33.26774
2/13/2022	9:00:00 PM	50.92028	30.3981	71.61384	53.3041	39.71605	33.67953
2/13/2022	10:00:00 PM	49.53488	29.89538	71.44557	50.44638	37.37905	32.93319
2/13/2022	11:00:00 PM	40.28408	29.38842	67.19997	38.21951	34.11254	32.12837
2/14/2022	12:00:00 AM	45.33463	30.04958	70.79867	45.13009	35.19533	32.7005
2/14/2022	1:00:00 AM	37.61023	29.36747	57.7916	38.27523	34.46419	32.36307
2/14/2022	2:00:00 AM	35.0288	29.46804	44.46147	37.29577	34.11336	32.09354
2/14/2022	3:00:00 AM	35.02911	29.39448	50.72366	36.79416	34.09189	32.16639
2/14/2022	4:00:00 AM	50.04834	30.16846	72.457	49.83171	34.9187	32.71787
2/14/2022	5:00:00 AM	43.3897	29.81493	68.84083	42.64725	35.05651	32.4172
2/14/2022	6:00:00 AM	36.05814	29.62316	50.84951	38.17572	34.65743	32.25452
2/14/2022	7:00:00 AM	39.29239	29.57361	65.07907	39.34883	35.42827	32.64516
2/14/2022	8:00:00 AM	40.72023	29.19326	64.34918	42.36938	35.36282	32.47792
2/14/2022	9:00:00 AM	38.89844	29.36622	60.55932	40.17026	34.39378	31.99992
2/14/2022	10:00:00 AM	36.97955	29.04089	56.87822	38.363	34.05939	31.69881
2/14/2022	11:00:00 AM	45.34545	28.89229	68.94679	46.07569	35.15298	32.02315
2/14/2022	12:00:00 PM	44.82291	28.74315	66.07001	46.50795	35.4031	31.62691
2/14/2022	1:00:00 PM	51.60712	29.45632	74.44674	51.15619	39.87145	33.71773
2/14/2022	2:00:00 PM	53.13597	31.54924	80.67147	50.35675	40.35429	36.05676
2/14/2022	3:00:00 PM	60.55651	30.13832	81.75569	59.60673	41.57605	34.70553
2/14/2022	4:00:00 PM	54.04907	29.51603	78.64138	54.50457	37.94635	33.40426
2/14/2022	5:00:00 PM	41.52161	29.50873	63.83167	41.87172	35.1882	32.56649
2/14/2022	6:00:00 PM	41.31792	29.70369	65.95893	40.42562	35.27939	32.6753
2/14/2022	7:00:00 PM	54.68442	30.06101	77.94265	51.78037	37.68607	34.04132
2/14/2022	8:00:00 PM	56.10855	30.46363	77.34938	56.05075	39.59667	34.1942
2/14/2022	9:00:00 PM	59.3124	29.92809	79.64262	60.93438	43.34746	34.44933
2/14/2022	10:00:00 PM	58.25621	29.63262	79.61279	58.75656	41.85272	33.9053
2/14/2022	11:00:00 PM	53.38967	29.71378	72.73487	56.16164	42.18082	33.81167
2/15/2022	12:00:00 AM	47.1033	29.60051	67.27559	49.09409	37.9499	33.19464
2/15/2022	1:00:00 AM	42.20723	29.52663	61.89912	45.15246	36.9848	33.11683
2/15/2022	2:00:00 AM	41.94211	29.78187	62.94844	44.01722	37.21249	33.53911
2/15/2022	3:00:00 AM	49.21004	30.66018	71.69394	50.64938	39.58012	34.64835
2/15/2022	4:00:00 AM	59.19137	32.04073	78.61681	61.68859	44.82641	36.82419
2/15/2022	5:00:00 AM	52.77521	27.14035	74.96882	53.91077	38.13139	31.58991
2/15/2022	6:00:00 AM	44.79689	23.27795	67.95323	45.23908	31.74854	27.48961
2/15/2022	7:00:00 AM	40.43527	21.68694	62.28368	41.9082	30.09841	25.60343
2/15/2022	8:00:00 AM	39.06685	21.33503	59.10558	41.80842	30.32444	25.71257
2/15/2022	9:00:00 AM	43.61173	22.62339	66.07435	45.60773	31.9816	27.02684
2/15/2022	10:00:00 AM	39.8784	22.76899	62.80894	40.56319	31.74992	27.61664
2/15/2022	11:00:00 AM	46.34128	24.1327	70.78839	46.42698	33.0702	28.41714
2/15/2022	12:00:00 PM	43.20377	25.19526	66.3719	44.83333	34.25131	29.49459

2/15/2022	1:00:00 PM	45.0289	27.00161	66.69554	47.05751	34.69444	30.90304
2/15/2022	2:00:00 PM	37.56605	27.69722	57.64541	38.15875	33.55828	30.87084
2/15/2022	3:00:00 PM	55.04928	27.94606	77.06674	56.81651	37.84506	31.59631
2/15/2022	4:00:00 PM	57.23446	34.55702	76.88994	60.49936	48.66787	40.23974
2/15/2022	5:00:00 PM	50.14515	30.76152	71.18316	52.06473	40.68057	35.67871
2/15/2022	6:00:00 PM	46.51223	29.70764	72.28869	47.47993	37.69677	33.98842
2/15/2022	7:00:00 PM	45.27129	29.3515	69.4418	45.60862	36.90481	33.4321
2/15/2022	8:00:00 PM	40.81179	28.80031	64.62487	39.29397	35.21238	32.61924
2/15/2022	9:00:00 PM	36.35839	28.86703	47.99562	38.55469	35.63242	32.99001
2/15/2022	10:00:00 PM	41.44104	29.73385	60.32441	44.55439	37.78802	34.10299
2/15/2022	11:00:00 PM	38.87317	29.62912	60.448	40.6919	36.19826	33.62085
2/16/2022	12:00:00 AM	37.25147	29.29207	48.02034	39.86244	36.1552	33.61561
2/16/2022	1:00:00 AM	35.95911	29.24412	45.74258	38.00659	35.39797	33.02753
2/16/2022	2:00:00 AM	36.71704	29.35352	47.85898	39.04776	35.87621	33.26397
2/16/2022	3:00:00 AM	39.80375	29.9081	55.97776	42.16381	37.04582	34.07417
2/16/2022	4:00:00 AM	39.6853	30.27828	58.6154	40.84542	37.09665	34.42221
2/16/2022	5:00:00 AM	40.07931	31.02775	61.04875	41.0607	37.76839	35.26562
2/16/2022	6:00:00 AM	45.53884	31.41908	69.4527	45.05287	39.18992	36.09317
2/16/2022	7:00:00 AM	39.77119	30.68174	57.57527	41.0945	37.59484	35.03347
2/16/2022	8:00:00 AM	46.53853	31.47221	72.05004	43.77721	39.28788	36.33981
2/16/2022	9:00:00 AM	52.68939	32.27228	75.8018	54.0816	42.47217	37.11596
2/16/2022	10:00:00 AM	52.75098	30.64571	74.11404	54.4508	42.11215	36.04064
2/16/2022	11:00:00 AM	47.77514	28.69272	71.41035	48.56329	36.84246	32.68567
2/16/2022	12:00:00 PM	46.83343	28.63194	72.57807	43.79318	35.94934	32.55876
2/16/2022	1:00:00 PM	39.31697	28.2536	60.72579	40.37443	35.02025	32.11544
2/16/2022	2:00:00 PM	37.21781	28.75719	54.56387	39.27034	35.5383	32.68076
2/16/2022	3:00:00 PM	59.39922	30.45342	78.82935	63.46354	44.59165	35.36506
2/16/2022	4:00:00 PM	57.28376	33.57465	75.48021	60.49933	49.92163	40.52505
2/16/2022	5:00:00 PM	44.02231	30.18681	63.25905	46.57636	37.3217	34.27568
2/16/2022	6:00:00 PM	40.72213	30.36205	62.2946	41.69617	36.56427	33.94304
2/16/2022	7:00:00 PM	40.30035	30.17295	64.58117	41.59722	37.0842	34.32144
2/16/2022	8:00:00 PM	45.52647	30.86554	68.86439	43.23722	38.21862	35.01852
2/16/2022	9:00:00 PM	37.45635	29.61694	54.61502	39.51543	35.63774	33.25572
2/16/2022	10:00:00 PM	37.47982	29.43441	54.64398	39.59965	35.4688	33.04135
2/16/2022	11:00:00 PM	38.9563	29.12215	60.5442	41.18016	35.44714	32.90823
2/17/2022	12:00:00 AM	39.8787	28.9276	61.06608	40.97011	35.07831	32.64667
2/17/2022	1:00:00 AM	38.49075	29.31548	60.52023	38.59005	35.07995	32.66832
2/17/2022	2:00:00 AM	38.60258	29.35451	59.90372	40.2808	36.12211	33.27095
2/17/2022	3:00:00 AM	35.49676	29.10665	45.21912	37.37803	34.99409	32.8601
2/17/2022	4:00:00 AM	37.53224	29.49561	54.65774	38.81737	35.71891	33.41253
2/17/2022	5:00:00 AM	40.14278	30.38533	60.32269	41.38823	36.77394	34.35656
2/17/2022	6:00:00 AM	41.59282	30.80731	59.10068	43.13009	37.68049	34.97871
2/17/2022	7:00:00 AM	39.79214	31.29856	56.46252	42.1859	38.408	35.58528

2/17/2022	8:00:00 AM	42.88737	31.33511	72.21401	41.88734	37.95691	35.3665
2/17/2022	9:00:00 AM	39.36043	30.73351	59.4004	41.44226	37.55748	34.86626
2/17/2022	10:00:00 AM	40.64481	30.23567	59.10869	42.10892	37.07325	34.37826
2/17/2022	11:00:00 AM	43.04078	30.1726	62.55304	45.32009	37.89653	34.64321
2/17/2022	12:00:00 PM	47.52747	29.93317	71.42852	48.05211	37.69202	34.20523
2/17/2022	1:00:00 PM	40.69202	30.30306	60.32833	42.59878	37.00553	34.2375
2/17/2022	2:00:00 PM	38.25178	30.31429	56.11331	39.60519	36.77225	34.47836
2/17/2022	3:00:00 PM	37.7059	30.53352	51.40037	39.64858	36.69315	34.42931
2/17/2022	4:00:00 PM	39.10354	30.63152	54.65371	41.53102	37.15995	34.70922
2/17/2022	5:00:00 PM	40.6061	30.70333	63.00282	41.28995	37.0193	34.51374
2/17/2022	6:00:00 PM	46.98991	30.95358	69.18042	47.19283	37.93405	34.97682
2/17/2022	7:00:00 PM	46.55867	31.42391	68.05353	48.06122	39.22424	35.51728
2/17/2022	8:00:00 PM	48.3137	31.60654	71.56573	49.7557	39.52754	35.83355
2/17/2022	9:00:00 PM	50.18308	31.79297	72.26275	51.5829	39.94849	36.05486
2/17/2022	10:00:00 PM	54.66206	32.76053	74.08954	57.6752	44.8856	37.76483
2/17/2022	11:00:00 PM	52.37867	31.55359	72.4337	55.40139	43.23051	36.55258
2/18/2022	12:00:00 AM	44.25425	30.7043	66.93105	44.88782	38.17807	35.03987
2/18/2022	1:00:00 AM	44.84826	31.09653	66.64475	46.25631	38.81376	35.42236
2/18/2022	2:00:00 AM	41.75764	31.19879	63.10506	41.92755	37.89623	35.3707
2/18/2022	3:00:00 AM	46.10525	30.56019	70.69865	46.12017	38.14996	35.30008
2/18/2022	4:00:00 AM	39.83308	30.90776	63.1701	40.60294	37.18388	34.78773
2/18/2022	5:00:00 AM	38.52222	30.72233	54.6393	41.00729	36.975	34.48267
2/18/2022	6:00:00 AM	39.93666	30.91333	58.36779	40.14706	37.27102	34.6924
2/18/2022	7:00:00 AM	39.00113	30.60343	51.71257	41.58685	37.91953	34.97727
2/18/2022	8:00:00 AM	39.7621	31.42823	56.34332	42.58299	38.40159	35.59275
2/18/2022	9:00:00 AM	40.63199	31.42194	61.05969	43.22739	39.10679	36.01408
2/18/2022	10:00:00 AM	41.98611	30.8842	66.2731	44.41007	39.01109	35.3962
2/18/2022	11:00:00 AM	44.68391	30.32245	62.2391	47.81594	41.23703	36.13955
2/18/2022	12:00:00 PM	41.91567	29.74141	59.06532	45.24745	38.14321	33.78059
2/18/2022	1:00:00 PM	45.38732	29.7515	74.39079	44.81507	37.29969	33.47731
2/18/2022	2:00:00 PM	39.32628	30.20161	61.71399	40.45379	36.27483	33.63213
2/18/2022	3:00:00 PM	41.07809	29.91694	64.49104	42.54339	36.44444	33.68318
2/18/2022	4:00:00 PM	37.70521	29.61212	60.85744	38.23274	35.78883	33.38756
2/18/2022	5:00:00 PM	37.04869	29.86901	54.23486	38.43128	35.85355	33.28366
2/18/2022	6:00:00 PM	50.39831	31.05378	71.59877	52.87644	41.14255	35.51163
2/18/2022	7:00:00 PM	56.42137	33.41351	75.61597	59.48074	45.91185	38.13554
2/18/2022	8:00:00 PM	54.45305	31.57906	74.4535	57.39587	43.23683	36.70349
2/18/2022	9:00:00 PM	53.0634	31.49832	73.87413	55.24378	41.72662	35.64377
2/18/2022	10:00:00 PM	53.55431	31.49525	74.7144	55.32743	41.21814	35.79432
2/18/2022	11:00:00 PM	52.73342	32.06739	72.93284	55.41876	42.29518	35.95271
2/19/2022	12:00:00 AM	47.89943	31.22394	71.52898	49.58931	38.74928	34.66737
2/19/2022	1:00:00 AM	46.44696	30.85489	70.57006	47.51525	37.13305	33.94574
2/19/2022	2:00:00 AM	49.19698	31.00849	71.90764	50.71721	38.36556	34.33171

2/19/2022	3:00:00 AM	48.57663	31.00535	74.09882	47.26084	37.19566	34.35113
2/19/2022	4:00:00 AM	41.48338	30.99689	63.45652	43.10247	36.66533	34.21683
2/19/2022	5:00:00 AM	38.73322	31.26054	58.57749	40.00631	36.51168	34.43968
2/19/2022	6:00:00 AM	38.81291	30.71058	53.69461	39.79595	36.6416	34.48854
2/19/2022	7:00:00 AM	38.2717	31.31158	55.10715	39.82018	37.00234	34.77292
2/19/2022	8:00:00 AM	38.17936	31.6244	54.12808	39.97569	37.09107	35.17467
2/19/2022	9:00:00 AM	37.70813	31.84789	51.73875	39.48499	36.7917	34.94256
2/19/2022	10:00:00 AM	42.07158	31.16389	64.51327	41.1053	36.73191	34.67718
2/19/2022	11:00:00 AM	40.609	30.97054	61.08994	42.15984	36.83617	34.42362
2/19/2022	12:00:00 PM	52.13685	30.37155	75.30502	52.42068	37.31853	34.09962
2/19/2022	1:00:00 PM	56.35	30.34301	76.02309	59.00121	41.54264	34.03724
2/19/2022	2:00:00 PM	54.09957	31.43482	75.34854	55.77662	39.8114	34.79876
2/19/2022	3:00:00 PM	51.35406	30.61988	76.38782	48.59983	36.35354	34.14863
2/19/2022	4:00:00 PM	40.48778	30.96834	63.32236	40.82269	35.78391	34.13106
2/19/2022	5:00:00 PM	37.81251	30.6427	59.1677	38.5598	35.57683	33.95886
2/19/2022	6:00:00 PM	38.6129	30.32527	58.76923	38.00482	35.46889	33.7518
2/19/2022	7:00:00 PM	46.09741	31.35828	69.65841	45.64464	36.38355	34.24497
2/19/2022	8:00:00 PM	50.12679	31.37924	71.47705	51.91765	39.71968	35.39228
2/19/2022	9:00:00 PM	47.45494	30.93216	73.14326	44.55524	36.39737	34.25149
2/19/2022	10:00:00 PM	42.2845	31.44385	66.01819	41.98525	37.13759	34.59941
2/19/2022	11:00:00 PM	43.48675	31.41974	65.68825	43.21457	37.02797	34.71948
2/20/2022	12:00:00 AM	45.74463	32.03473	68.83232	44.52723	37.33117	35.02782
2/20/2022	1:00:00 AM	46.85306	31.39431	70.64087	45.0664	36.55984	34.52821
2/20/2022	2:00:00 AM	48.65026	31.53773	71.81117	48.38232	37.04246	34.62441
2/20/2022	3:00:00 AM	50.12299	31.70032	73.98116	48.13069	37.21891	34.7267
2/20/2022	4:00:00 AM	42.01907	31.2535	65.60688	40.00338	36.5444	34.50223
2/20/2022	5:00:00 AM	36.9642	31.37211	46.31167	39.05695	36.2324	34.48532
2/20/2022	6:00:00 AM	39.56672	31.68537	62.06485	39.51363	36.14386	34.48096
2/20/2022	7:00:00 AM	43.70859	31.95232	65.0439	44.48002	37.06646	34.72165
2/20/2022	8:00:00 AM	49.16673	31.52495	70.84897	51.04863	37.92186	34.61818
2/20/2022	9:00:00 AM	49.50068	31.36857	73.29936	49.64569	37.75122	34.8294
2/20/2022	10:00:00 AM	58.25679	31.44133	79.91982	55.26337	39.44376	35.20192
2/20/2022	11:00:00 AM	62.94425	32.24352	82.23067	64.49639	45.53818	37.84931
2/20/2022	12:00:00 PM	62.62315	32.94004	80.74565	63.28996	44.09615	37.79795
2/20/2022	1:00:00 PM	71.05744	38.11783	85.92202	75.82366	61.22154	46.32017
2/20/2022	2:00:00 PM	67.00454	33.84778	83.87086	71.27093	54.0501	40.5791
2/20/2022	3:00:00 PM	64.8642	32.26913	82.51912	68.96884	52.43779	39.72094
2/20/2022	4:00:00 PM	65.10951	34.2005	82.32951	69.03271	53.07899	40.75301
2/20/2022	5:00:00 PM	56.64116	30.74588	79.93853	56.56853	39.12811	34.31254
2/20/2022	6:00:00 PM	63.28157	33.95517	84.27559	64.76504	46.65325	39.08835
2/20/2022	7:00:00 PM	64.14878	34.62794	81.64699	68.14613	52.3252	40.38183
2/20/2022	8:00:00 PM	62.53385	35.33829	78.8579	66.75238	55.42032	43.46158
2/20/2022	9:00:00 PM	57.98899	35.52819	75.15427	61.41121	49.43237	41.28289

2/20/2022	10:00:00 PM	48.71427	31.14285	70.27516	50.9197	40.40806	35.18203
2/20/2022	11:00:00 PM	41.35097	31.06902	59.79639	44.18341	38.27188	34.9746
2/21/2022	12:00:00 AM	40.59827	30.46818	59.67299	42.3195	37.37175	33.78982
2/21/2022	1:00:00 AM	41.39999	30.89389	58.04127	44.21502	38.37838	35.18021
2/21/2022	2:00:00 AM	41.54444	29.26228	60.87829	44.12654	38.52563	34.06725
2/21/2022	3:00:00 AM	38.51154	28.84053	56.22569	41.24144	36.54599	32.95732
2/21/2022	4:00:00 AM	37.00549	26.65272	59.48308	37.06124	32.33951	29.8997
2/21/2022	5:00:00 AM	39.73191	26.18309	61.94412	37.73737	32.42498	29.58051
2/21/2022	6:00:00 AM	37.52913	26.10064	56.5134	37.63158	33.10053	30.20823
2/21/2022	7:00:00 AM	42.17322	27.04118	59.13398	46.13665	33.96382	31.02146
2/21/2022	8:00:00 AM	34.2796	26.31256	57.22468	34.59081	31.71301	29.5157
2/21/2022	9:00:00 AM	36.54387	26.04434	58.01268	35.11674	31.04656	29.05502
2/21/2022	10:00:00 AM	35.90691	26.84786	55.93368	37.28533	32.00519	29.84466
2/21/2022	11:00:00 AM	41.18732	27.93722	65.97886	41.24686	33.18258	31.04256
2/21/2022	12:00:00 PM	60.67562	28.28694	80.89889	60.92401	36.43266	31.89401
2/21/2022	1:00:00 PM	41.42011	29.15866	64.54866	42.59088	35.40837	32.85305
2/21/2022	2:00:00 PM	38.89008	29.98184	59.35748	40.65924	34.90925	32.88538
2/21/2022	3:00:00 PM	59.24038	30.08397	81.92798	60.82855	42.43359	33.72113
2/21/2022	4:00:00 PM	56.14377	30.50777	81.04658	56.7396	41.12757	34.13285
2/21/2022	5:00:00 PM	59.10829	30.52229	81.44657	58.39637	40.83866	33.96134
2/21/2022	6:00:00 PM	53.7409	29.68757	75.89093	52.83898	36.22538	33.02226
2/21/2022	7:00:00 PM	58.06484	29.7085	81.48729	56.4452	35.07974	32.56072
2/21/2022	8:00:00 PM	53.81748	29.78574	79.75273	46.75132	35.02736	32.90615
2/21/2022	9:00:00 PM	53.75471	30.22762	72.84386	57.13327	43.36275	34.79872
2/21/2022	10:00:00 PM	55.78847	30.2688	74.95634	59.00461	44.41535	33.84594
2/21/2022	11:00:00 PM	49.4702	29.67229	71.45239	50.81962	37.69509	33.22643
2/22/2022	12:00:00 AM	39.38646	29.73981	61.38851	40.13493	33.99011	32.30017
2/22/2022	1:00:00 AM	47.63272	29.83251	69.94598	48.59063	37.69648	33.24975
2/22/2022	2:00:00 AM	47.03903	30.26652	70.38431	47.92668	38.07475	33.68851
2/22/2022	3:00:00 AM	47.07599	31.17564	69.76566	48.2708	39.12763	35.03243
2/22/2022	4:00:00 AM	40.38751	29.5989	65.10309	41.00598	35.95921	33.21101
2/22/2022	5:00:00 AM	45.77084	29.49998	68.90533	47.12466	36.95339	33.35496
2/22/2022	6:00:00 AM	46.50938	28.26129	73.6535	43.97755	34.51789	31.57076
2/22/2022	7:00:00 AM	56.97765	28.21682	79.69314	56.77561	39.55374	31.81141
2/22/2022	8:00:00 AM	47.09541	29.32787	73.70747	46.56383	35.99872	32.7345

WM15: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	12:21:42 PM	54.9263	32.15337	79.74844	54.79591	43.88833	37.74625
2/8/2022	1:00:00 PM	49.86511	31.69443	73.5957	49.96012	40.475	36.62916
2/8/2022	2:00:00 PM	44.19943	31.43327	69.49035	45.32289	39.16818	35.77631
2/8/2022	3:00:00 PM	39.64555	31.4002	54.1896	42.0082	38.5348	35.59629
2/8/2022	4:00:00 PM	57.21313	31.61257	80.59228	58.6274	41.16006	36.19346
2/8/2022	5:00:00 PM	62.51325	31.88152	82.55982	65.93964	50.13512	37.90036
2/8/2022	6:00:00 PM	57.43963	31.33605	80.99436	59.20043	43.43508	36.59561
2/8/2022	7:00:00 PM	58.66032	32.46694	81.45715	60.43015	46.23746	38.28024
2/8/2022	8:00:00 PM	58.237	31.91763	79.43978	60.22559	44.20794	37.48199
2/8/2022	9:00:00 PM	48.01412	31.13286	72.8101	48.55016	39.52164	35.98582
2/8/2022	10:00:00 PM	41.53327	30.63881	65.30921	40.88326	37.54454	34.91809
2/8/2022	11:00:00 PM	43.7401	30.87564	63.6768	44.47801	38.44209	35.4445
2/9/2022	12:00:00 AM	43.39598	30.65814	66.04184	44.53815	38.59031	35.39683
2/9/2022	1:00:00 AM	39.81023	31.0452	56.82933	41.80091	38.48027	35.55429
2/9/2022	2:00:00 AM	42.93925	32.13558	64.66181	44.05103	39.83426	36.698
2/9/2022	3:00:00 AM	49.91682	32.59463	75.4777	49.21685	41.85486	37.94372
2/9/2022	4:00:00 AM	58.35353	32.27671	81.6791	58.31817	42.31496	37.80667
2/9/2022	5:00:00 AM	41.21462	32.24213	59.36815	43.35519	40.17821	37.19864
2/9/2022	6:00:00 AM	45.0123	32.93798	67.20316	46.91704	41.24451	38.08581
2/9/2022	7:00:00 AM	43.45472	33.70826	59.19447	45.94595	42.21751	38.98836
2/9/2022	8:00:00 AM	44.59063	32.61757	64.60263	46.99792	41.62997	38.26882
2/9/2022	9:00:00 AM	51.22788	32.44614	79.69828	47.22356	41.29282	37.65859
2/9/2022	10:00:00 AM	53.33611	33.22625	77.46493	52.63871	43.71435	39.1979
2/9/2022	11:00:00 AM	58.04486	34.02637	77.38728	61.1504	49.0438	41.28088
2/9/2022	12:00:00 PM	56.57726	34.09464	79.80608	58.67868	47.27967	40.73784
2/9/2022	1:00:00 PM	58.85074	34.57018	80.58239	61.73271	49.58736	41.40645
2/9/2022	2:00:00 PM	59.87957	33.95665	82.17543	60.47715	47.00083	41.0584
2/9/2022	3:00:00 PM	68.02256	36.99875	86.67159	71.90836	59.60536	46.57706
2/9/2022	4:00:00 PM	70.44178	36.79136	87.13651	74.65636	62.1404	46.2257
2/9/2022	5:00:00 PM	62.6619	35.41818	84.39747	65.32792	52.31135	42.47079
2/9/2022	6:00:00 PM	53.98029	33.43698	78.87338	53.78112	42.80422	38.86326
2/9/2022	7:00:00 PM	44.09686	32.57418	61.80506	46.69643	40.84519	37.4421
2/9/2022	8:00:00 PM	49.38873	31.85425	70.17997	51.8476	40.49124	36.74337
2/9/2022	9:00:00 PM	43.42707	31.69236	66.18379	45.33585	40.67987	36.98243
2/9/2022	10:00:00 PM	46.9136	33.58521	72.54241	48.03549	42.43999	38.88646
2/9/2022	11:00:00 PM	48.72154	33.60305	71.16919	49.41508	42.15568	38.61026
2/10/2022	12:00:00 AM	57.43216	33.96527	82.46701	57.83227	44.85878	40.00655
2/10/2022	1:00:00 AM	54.01577	32.34979	75.18102	55.32396	43.04273	37.81586
2/10/2022	2:00:00 AM	45.50554	31.82952	73.4675	46.84849	41.2522	37.44336
2/10/2022	3:00:00 AM	42.17456	32.31293	62.2175	44.2422	40.6373	37.49665

2/10/2022	4:00:00 AM	51.75777	32.53196	75.68809	52.78619	41.07408	37.29377
2/10/2022	5:00:00 AM	50.37457	32.49484	71.40254	51.67517	42.09201	38.08409
2/10/2022	6:00:00 AM	42.14972	32.60206	57.96806	44.40863	40.61985	37.54273
2/10/2022	7:00:00 AM	43.5449	32.68061	61.93639	45.51958	41.0994	37.91924
2/10/2022	8:00:00 AM	43.08909	32.86153	59.26746	45.2904	41.42344	38.32119
2/10/2022	9:00:00 AM	51.07612	33.20779	78.78447	48.73743	43.1359	39.34175
2/10/2022	10:00:00 AM	45.57328	32.34938	62.34287	48.44796	42.29066	38.28239
2/10/2022	11:00:00 AM	48.78099	32.42098	67.39235	50.96412	42.8481	38.32071
2/10/2022	12:00:00 PM	51.82817	32.07765	76.27331	53.77285	44.17958	37.94049
2/10/2022	1:00:00 PM	56.58123	32.00621	80.69289	57.12172	44.04812	38.22497
2/10/2022	2:00:00 PM	53.39704	32.35006	72.09461	56.67602	43.95649	38.14785
2/10/2022	3:00:00 PM	48.95983	31.67408	74.54133	48.83692	41.0393	37.22344
2/10/2022	4:00:00 PM	40.89733	31.75002	55.54083	43.19364	39.87217	36.71646
2/10/2022	5:00:00 PM	43.95865	31.91636	69.23228	43.56163	40.18671	37.13456
2/10/2022	6:00:00 PM	58.28623	33.27554	84.25641	58.5271	45.89103	39.21346
2/10/2022	7:00:00 PM	61.17505	34.03376	81.96515	63.54058	49.6254	40.43634
2/10/2022	8:00:00 PM	63.53256	34.35541	83.2788	66.57508	53.03891	42.27807
2/10/2022	9:00:00 PM	61.60943	32.77724	83.382	63.46511	48.31101	39.43415
2/10/2022	10:00:00 PM	63.36912	32.8131	84.65292	65.38527	49.57748	39.58021
2/10/2022	11:00:00 PM	63.09944	33.76792	83.59633	65.96476	51.77489	41.0292
2/11/2022	12:00:00 AM	63.10861	32.05382	86.80368	64.5597	46.46893	38.28461
2/11/2022	1:00:00 AM	52.35351	32.09842	74.29413	52.52123	41.19623	37.18408
2/11/2022	2:00:00 AM	58.60038	32.40125	83.10582	53.83224	41.6831	37.66245
2/11/2022	3:00:00 AM	43.78012	32.50588	66.45083	44.86642	40.53338	37.24943
2/11/2022	4:00:00 AM	44.08943	33.48932	62.119	46.05961	41.73186	38.45969
2/11/2022	5:00:00 AM	43.17385	32.71484	58.22917	45.78962	41.3282	37.79441
2/11/2022	6:00:00 AM	43.84913	34.05806	61.56449	46.32146	42.38201	39.0647
2/11/2022	7:00:00 AM	55.64292	33.16493	83.39329	47.58825	41.29399	38.0962
2/11/2022	8:00:00 AM	42.0219	32.84005	55.60406	44.45056	40.84769	37.89012
2/11/2022	9:00:00 AM	46.40711	32.76273	63.82659	49.68153	41.74162	37.72668
2/11/2022	10:00:00 AM	46.83843	32.97683	64.57676	49.86915	43.14381	38.35534
2/11/2022	11:00:00 AM	49.06367	31.76739	68.96068	51.46455	42.51635	37.6919
2/11/2022	12:00:00 PM	55.61215	30.83358	81.13449	57.49537	43.82907	36.49312
2/11/2022	1:00:00 PM	56.09356	30.30555	76.24989	59.03058	43.6278	34.98152
2/11/2022	2:00:00 PM	49.82562	30.38562	70.67891	50.66612	37.78163	34.31061
2/11/2022	3:00:00 PM	51.10755	30.53311	74.68176	52.90604	38.58633	34.20087
2/11/2022	4:00:00 PM	54.14255	30.44737	78.16635	53.27045	38.05277	33.95349
2/11/2022	5:00:00 PM	63.1436	30.32911	83.67766	66.1591	37.68461	33.50789
2/11/2022	6:00:00 PM	51.42872	29.94319	77.71889	49.21557	36.44298	33.19927
2/11/2022	7:00:00 PM	62.42747	32.14066	82.90497	65.11648	51.09879	39.12475
2/11/2022	8:00:00 PM	67.54767	33.85871	86.62158	70.61344	55.93471	42.70191
2/11/2022	9:00:00 PM	67.43391	33.83911	87.4371	70.67113	56.19351	42.23341
2/11/2022	10:00:00 PM	63.75734	31.78538	85.04079	65.832	49.7728	38.00251

2/11/2022	11:00:00 PM	62.68372	32.33956	83.46298	65.06227	50.96846	38.82621
2/12/2022	12:00:00 AM	64.668	31.192	86.54156	66.98958	51.88744	38.92856
2/12/2022	1:00:00 AM	59.46142	30.50487	83.20458	59.11786	40.25292	34.54461
2/12/2022	2:00:00 AM	56.40036	30.60351	80.79815	56.77924	42.00853	35.3982
2/12/2022	3:00:00 AM	51.03541	30.6154	77.19885	51.42415	38.92147	34.72802
2/12/2022	4:00:00 AM	46.96883	30.6997	69.08272	48.70364	37.77943	34.78142
2/12/2022	5:00:00 AM	37.56734	30.41611	53.15828	39.59493	36.24838	33.86864
2/12/2022	6:00:00 AM	41.97999	30.57301	58.48562	45.27918	37.61324	34.32119
2/12/2022	7:00:00 AM	40.77027	30.80904	58.95408	41.76768	37.0905	34.38601
2/12/2022	8:00:00 AM	41.82007	30.60242	66.4655	42.36867	37.63139	34.68361
2/12/2022	9:00:00 AM	44.20239	31.5386	59.96651	47.20097	40.7558	36.44024
2/12/2022	10:00:00 AM	52.81409	30.44488	72.17221	56.67863	42.31941	35.09345
2/12/2022	11:00:00 AM	61.0083	31.33444	83.8111	64.56012	55.31801	42.60075
2/12/2022	12:00:00 PM	59.15738	30.66954	79.36926	62.66249	50.94801	38.31877
2/12/2022	1:00:00 PM	57.55969	30.53978	77.7678	60.39643	49.00671	36.90549
2/12/2022	2:00:00 PM	51.49418	30.66464	74.03029	54.22084	39.37223	34.43985
2/12/2022	3:00:00 PM	43.38074	30.21309	66.2922	43.30811	36.08225	33.44536
2/12/2022	4:00:00 PM	38.37873	29.90371	56.36146	39.68831	35.28351	33.05007
2/12/2022	5:00:00 PM	55.25077	30.2299	78.61028	55.41439	38.81062	33.79193
2/12/2022	6:00:00 PM	67.05046	33.97984	86.57628	70.35059	56.69886	43.64378
2/12/2022	7:00:00 PM	68.80506	33.61491	85.90723	72.67741	60.0378	45.93369
2/12/2022	8:00:00 PM	54.85885	29.78145	78.9433	55.36326	37.19327	32.79805
2/12/2022	9:00:00 PM	50.38845	29.88603	75.48195	46.93854	35.89651	33.13944
2/12/2022	10:00:00 PM	49.10215	29.92796	76.00254	46.97065	35.84478	32.85908
2/12/2022	11:00:00 PM	53.11654	30.2974	75.81415	53.99865	39.6073	34.14433
2/13/2022	12:00:00 AM	41.20301	29.9546	65.42466	40.02555	35.43165	32.87398
2/13/2022	1:00:00 AM	58.71996	30.57435	85.0669	57.35504	41.92789	34.5988
2/13/2022	2:00:00 AM	59.23846	30.25595	80.56973	59.61311	40.57844	34.62151
2/13/2022	3:00:00 AM	45.59237	30.28978	71.78878	43.31705	36.77832	33.84658
2/13/2022	4:00:00 AM	39.54878	30.76843	58.8173	41.87269	37.25949	34.25238
2/13/2022	5:00:00 AM	39.92481	30.63783	58.6563	42.50135	38.032	34.61784
2/13/2022	6:00:00 AM	39.12416	30.30002	50.63228	41.7922	37.73899	34.70391
2/13/2022	7:00:00 AM	47.42939	31.29912	67.42293	50.07144	40.34914	35.72202
2/13/2022	8:00:00 AM	39.96776	30.29098	56.89888	42.08725	37.68699	34.60931
2/13/2022	9:00:00 AM	43.87359	30.55562	61.47973	46.95863	39.51927	35.08719
2/13/2022	10:00:00 AM	44.84848	29.74857	64.27506	48.10866	39.32389	34.22448
2/13/2022	11:00:00 AM	49.10921	29.59851	68.85872	52.822	43.28951	35.01354
2/13/2022	12:00:00 PM	51.99089	29.24283	75.72892	53.63667	43.35911	34.36008
2/13/2022	1:00:00 PM	67.60328	28.98524	87.68451	69.26958	44.95529	32.95393
2/13/2022	2:00:00 PM	66.4968	30.52193	87.86401	68.47152	50.40441	37.20613
2/13/2022	3:00:00 PM	70.73346	31.02659	90.49968	73.96486	55.40088	37.95032
2/13/2022	4:00:00 PM	55.43281	30.02222	81.82435	51.91909	38.37946	34.21851
2/13/2022	5:00:00 PM	62.4491	31.22917	86.05925	61.36825	42.31646	36.17324

2/13/2022	6:00:00 PM	40.99366	29.90772	60.78066	43.29027	36.20571	33.14423
2/13/2022	7:00:00 PM	63.14317	30.18888	83.93753	65.41382	45.84848	34.98198
2/13/2022	8:00:00 PM	61.07355	31.23767	80.57273	63.77503	48.88811	37.56944
2/13/2022	9:00:00 PM	65.68394	31.38778	86.31421	68.72071	53.59073	39.406
2/13/2022	10:00:00 PM	64.01942	30.78801	84.63448	65.91673	49.47271	36.26931
2/13/2022	11:00:00 PM	53.40239	29.85736	80.7505	48.4543	36.55112	33.38281
2/14/2022	12:00:00 AM	59.48539	30.75398	83.93331	59.25624	40.14421	34.74714
2/14/2022	1:00:00 AM	46.51739	30.05686	71.11292	45.55105	37.18467	33.94607
2/14/2022	2:00:00 AM	37.58031	29.81102	52.34943	40.11034	35.7103	32.95765
2/14/2022	3:00:00 AM	41.00883	29.86822	65.56252	40.05801	35.91747	33.28537
2/14/2022	4:00:00 AM	64.3504	30.70898	85.23201	65.0744	37.51427	34.15314
2/14/2022	5:00:00 AM	57.48412	30.52032	81.10136	56.26189	39.09326	34.31314
2/14/2022	6:00:00 AM	39.87844	30.25252	58.0556	42.24605	37.35878	33.93994
2/14/2022	7:00:00 AM	50.25718	30.33346	77.88048	43.84757	38.25816	34.63097
2/14/2022	8:00:00 AM	52.26912	30.2279	76.57203	53.77928	39.59891	35.10576
2/14/2022	9:00:00 AM	50.54813	30.23099	75.11415	51.33597	38.48103	34.47812
2/14/2022	10:00:00 AM	47.64438	29.81955	70.72227	48.01475	38.01588	34.07724
2/14/2022	11:00:00 AM	58.43716	29.93283	82.10259	59.59594	43.60404	35.54313
2/14/2022	12:00:00 PM	58.23888	29.75579	79.88895	60.28087	43.64918	35.38923
2/14/2022	1:00:00 PM	64.78775	31.74466	87.02061	65.43068	49.27195	40.11228
2/14/2022	2:00:00 PM	64.77611	34.50125	88.48983	64.09435	48.92555	42.2535
2/14/2022	3:00:00 PM	71.54745	32.90359	90.91303	72.739	51.45005	41.11633
2/14/2022	4:00:00 PM	66.58115	31.35659	88.26591	68.54381	48.31617	38.37493
2/14/2022	5:00:00 PM	52.92437	30.53868	76.12393	52.51393	39.15288	34.99007
2/14/2022	6:00:00 PM	55.32775	30.65646	80.79283	51.32336	39.34107	35.27971
2/14/2022	7:00:00 PM	66.53778	31.8321	88.34668	65.59241	44.9586	38.42272
2/14/2022	8:00:00 PM	67.88182	32.21975	87.81795	69.37048	50.7102	39.18574
2/14/2022	9:00:00 PM	71.11783	32.01913	90.74803	74.26549	56.3529	40.18909
2/14/2022	10:00:00 PM	70.08405	31.42391	89.69777	72.006	54.6294	40.03759
2/14/2022	11:00:00 PM	66.21317	30.96209	85.20877	69.47656	55.1441	39.26758
2/15/2022	12:00:00 AM	59.86102	30.41455	79.71582	62.31152	48.29609	36.17076
2/15/2022	1:00:00 AM	55.00089	30.37705	75.50947	58.40557	45.59784	35.66465
2/15/2022	2:00:00 AM	54.22326	30.98658	75.78097	56.86239	46.38551	37.36651
2/15/2022	3:00:00 AM	61.85884	32.06254	83.01429	64.18052	50.04817	38.763
2/15/2022	4:00:00 AM	70.94974	34.53093	88.67858	74.40658	58.38874	43.46932
2/15/2022	5:00:00 AM	64.96359	28.56749	86.49574	67.49391	49.1451	36.00975
2/15/2022	6:00:00 AM	58.44119	25.56599	81.26618	59.91287	40.07007	32.67172
2/15/2022	7:00:00 AM	54.90988	24.91208	76.47294	56.92785	41.83066	32.42787
2/15/2022	8:00:00 AM	53.68772	24.35336	73.59036	56.7532	42.39986	32.53719
2/15/2022	9:00:00 AM	57.69487	26.4689	79.65377	60.23354	44.25207	34.02041
2/15/2022	10:00:00 AM	53.27966	26.04369	75.23265	54.10791	40.61278	33.84725
2/15/2022	11:00:00 AM	58.78871	27.32389	81.14426	60.20125	44.28444	34.94372
2/15/2022	12:00:00 PM	55.78638	28.17064	78.10924	57.81813	44.60534	35.25903

2/15/2022	1:00:00 PM	57.96415	29.13471	78.53911	60.42713	42.73208	34.87309
2/15/2022	2:00:00 PM	42.99196	29.03616	64.71499	43.70683	37.49578	33.86815
2/15/2022	3:00:00 PM	66.87575	29.12693	87.82985	69.73712	48.75586	35.72826
2/15/2022	4:00:00 PM	69.28474	38.63251	86.94208	73.05508	61.49268	49.08871
2/15/2022	5:00:00 PM	62.67701	33.86074	83.156	65.23778	51.16091	41.25353
2/15/2022	6:00:00 PM	58.35141	32.60173	82.86849	60.05592	46.71841	39.21352
2/15/2022	7:00:00 PM	57.69039	32.40707	80.91471	58.88817	45.28813	38.66293
2/15/2022	8:00:00 PM	49.34277	31.42086	73.1091	50.50272	40.75566	37.00696
2/15/2022	9:00:00 PM	42.2336	31.51811	59.00036	44.35795	40.72889	37.40574
2/15/2022	10:00:00 PM	53.68255	32.69301	74.48106	57.2464	46.57004	39.3112
2/15/2022	11:00:00 PM	49.35541	32.31905	73.6662	51.78432	41.95596	38.07254
2/16/2022	12:00:00 AM	42.98768	32.18785	58.33653	45.64953	41.4803	38.03645
2/16/2022	1:00:00 AM	40.97455	31.58483	53.1496	43.41288	40.16671	37.00919
2/16/2022	2:00:00 AM	42.34665	32.04839	60.14174	44.16565	40.61597	37.32481
2/16/2022	3:00:00 AM	44.60944	32.92654	60.37527	47.14972	42.28925	38.67534
2/16/2022	4:00:00 AM	49.48322	33.34712	71.99908	50.60881	42.5359	38.98115
2/16/2022	5:00:00 AM	52.13622	34.29729	75.84066	50.98118	43.5384	40.01869
2/16/2022	6:00:00 AM	48.22083	34.80011	70.72873	48.97559	44.23296	40.75228
2/16/2022	7:00:00 AM	46.18198	33.88961	65.38603	48.12095	43.04247	39.73508
2/16/2022	8:00:00 AM	51.78964	34.77289	73.46078	54.21626	46.61217	41.51203
2/16/2022	9:00:00 AM	65.39598	35.71955	86.34501	67.66217	54.09524	43.4522
2/16/2022	10:00:00 AM	65.85475	34.26762	85.70563	68.22679	52.01501	42.12958
2/16/2022	11:00:00 AM	60.88707	31.38518	83.87537	62.24645	46.54373	37.66487
2/16/2022	12:00:00 PM	54.21692	30.98467	77.81599	55.89311	43.2771	37.26457
2/16/2022	1:00:00 PM	49.68747	30.66549	70.75541	52.32243	41.89396	36.82508
2/16/2022	2:00:00 PM	46.71119	31.40613	67.57005	48.16393	41.16358	37.30659
2/16/2022	3:00:00 PM	71.097	34.06555	88.70981	75.5219	56.80744	42.50964
2/16/2022	4:00:00 PM	69.63217	37.85424	87.67951	73.23759	63.1055	51.4616
2/16/2022	5:00:00 PM	56.4578	33.17721	74.79693	59.78589	44.44389	39.32066
2/16/2022	6:00:00 PM	49.00806	33.11429	72.67967	50.08198	42.42504	38.61313
2/16/2022	7:00:00 PM	52.00898	32.72799	78.95425	51.05369	42.74257	38.97944
2/16/2022	8:00:00 PM	52.47163	33.62203	76.75416	53.96443	44.33433	39.7141
2/16/2022	9:00:00 PM	47.99397	32.15939	68.26382	50.88878	42.44684	37.997
2/16/2022	10:00:00 PM	47.68281	31.88592	67.79624	49.89894	41.567	37.52177
2/16/2022	11:00:00 PM	50.46458	31.51576	74.91311	53.32513	42.3551	37.70338
2/17/2022	12:00:00 AM	51.92284	30.96255	73.9587	52.51025	40.56045	36.83726
2/17/2022	1:00:00 AM	49.42843	31.34353	73.62772	46.37966	40.20758	36.63315
2/17/2022	2:00:00 AM	47.79412	31.41835	72.16699	47.54441	41.09543	37.30678
2/17/2022	3:00:00 AM	41.19196	31.39543	59.92472	43.18019	39.72261	36.63333
2/17/2022	4:00:00 AM	46.86655	31.52355	68.59983	47.19433	41.03785	37.53089
2/17/2022	5:00:00 AM	53.46615	33.17808	75.57326	54.48925	43.37373	39.18642
2/17/2022	6:00:00 AM	51.88079	33.79603	71.61297	54.00967	44.49634	39.93319
2/17/2022	7:00:00 AM	48.40384	34.1197	71.46101	49.89541	43.89242	40.21033

2/17/2022	8:00:00 AM	46.02289	34.24314	72.66514	47.06686	42.99401	39.75725
2/17/2022	9:00:00 AM	48.649	33.94909	70.45715	50.5503	43.76089	39.82557
2/17/2022	10:00:00 AM	50.4103	33.55206	69.88372	53.35079	44.15128	39.56061
2/17/2022	11:00:00 AM	52.3368	32.87768	71.22056	55.51554	45.08673	39.63241
2/17/2022	12:00:00 PM	60.44637	32.57898	83.04587	60.92155	45.35244	39.13467
2/17/2022	1:00:00 PM	52.98059	32.6184	74.23517	55.03666	44.11762	38.81334
2/17/2022	2:00:00 PM	47.57125	32.40392	70.78976	45.91919	41.00845	37.76764
2/17/2022	3:00:00 PM	44.31909	32.20942	64.12688	46.66571	40.84744	37.48266
2/17/2022	4:00:00 PM	46.37817	32.45548	64.02616	49.23554	41.31012	37.82546
2/17/2022	5:00:00 PM	50.91401	32.33872	76.8455	48.83164	40.91901	37.49897
2/17/2022	6:00:00 PM	61.12219	32.52799	82.94357	61.86198	45.13458	38.66545
2/17/2022	7:00:00 PM	60.96313	33.4837	81.88836	62.8269	48.46259	40.48776
2/17/2022	8:00:00 PM	62.68409	33.86885	85.09966	65.01976	50.16505	40.73385
2/17/2022	9:00:00 PM	64.6308	34.44549	85.44134	66.89298	50.32659	41.18298
2/17/2022	10:00:00 PM	69.00522	36.04575	87.11404	72.48038	59.1725	45.18333
2/17/2022	11:00:00 PM	66.95246	34.53653	85.71692	70.48654	56.86047	42.99827
2/18/2022	12:00:00 AM	57.37304	33.05004	81.07943	57.0961	43.33825	38.98596
2/18/2022	1:00:00 AM	59.04739	33.48668	80.89415	60.48501	46.72104	40.16022
2/18/2022	2:00:00 AM	52.98755	33.59903	77.79571	51.91661	42.84935	39.21796
2/18/2022	3:00:00 AM	60.33844	32.99303	83.1959	60.67647	45.64817	39.70588
2/18/2022	4:00:00 AM	51.24709	32.97012	77.36154	50.3219	41.72811	38.22549
2/18/2022	5:00:00 AM	46.27861	32.74082	68.14817	47.80428	41.26549	37.76505
2/18/2022	6:00:00 AM	44.39175	33.15631	64.25805	45.62341	41.67605	38.39562
2/18/2022	7:00:00 AM	43.23208	33.07347	56.06457	45.93973	42.03658	38.60602
2/18/2022	8:00:00 AM	45.02829	34.41311	58.81309	47.89194	43.76809	40.32113
2/18/2022	9:00:00 AM	48.04525	34.49785	67.8322	50.94427	44.85092	40.80093
2/18/2022	10:00:00 AM	53.56827	34.4575	78.3165	56.76099	49.24504	42.51064
2/18/2022	11:00:00 AM	57.40021	34.22199	74.40018	61.05229	53.44315	45.64157
2/18/2022	12:00:00 PM	54.74038	31.75969	72.5206	58.46102	49.08049	40.05704
2/18/2022	1:00:00 PM	57.09526	31.68131	86.09997	57.88773	46.75771	38.14671
2/18/2022	2:00:00 PM	50.17214	31.32664	75.01306	51.4091	41.03398	36.97489
2/18/2022	3:00:00 PM	52.5699	30.98978	76.45588	54.57422	41.47941	36.62778
2/18/2022	4:00:00 PM	46.94424	30.60086	73.88522	44.38079	38.64399	35.53133
2/18/2022	5:00:00 PM	43.48256	31.09026	69.27441	43.37169	39.16948	35.95659
2/18/2022	6:00:00 PM	64.88575	32.86761	83.98313	67.89829	53.79956	41.90772
2/18/2022	7:00:00 PM	70.55379	36.11514	88.09297	74.38301	60.4946	46.33872
2/18/2022	8:00:00 PM	68.75966	33.52794	86.77882	72.30238	57.14643	43.43618
2/18/2022	9:00:00 PM	67.53506	32.9693	86.65926	70.51312	55.22987	41.42886
2/18/2022	10:00:00 PM	67.78653	33.46368	87.78219	70.27542	53.78684	40.87449
2/18/2022	11:00:00 PM	67.23792	33.78388	85.7757	70.63665	56.22691	42.04686
2/19/2022	12:00:00 AM	62.2454	32.49763	84.00587	64.57271	49.91245	39.05276
2/19/2022	1:00:00 AM	60.09819	31.90944	82.92083	62.11662	46.78278	37.29554
2/19/2022	2:00:00 AM	63.74993	32.07033	85.82397	65.95217	49.57206	37.42476

2/19/2022	3:00:00 AM	61.78583	31.87208	86.45752	61.20071	45.63287	37.38299
2/19/2022	4:00:00 AM	53.97453	32.05292	78.94688	55.69469	42.51838	36.6636
2/19/2022	5:00:00 AM	48.2664	32.32368	72.64106	49.17335	39.95398	36.7198
2/19/2022	6:00:00 AM	41.65078	32.05922	56.08278	43.48942	39.75338	36.85418
2/19/2022	7:00:00 AM	42.20607	32.77578	59.5276	44.13243	40.70499	37.66695
2/19/2022	8:00:00 AM	42.24659	33.11427	56.02712	44.66739	41.07475	38.14178
2/19/2022	9:00:00 AM	43.3199	33.26893	58.69075	45.95361	41.20397	37.95612
2/19/2022	10:00:00 AM	49.08401	32.50452	69.97011	51.60151	42.69913	37.90748
2/19/2022	11:00:00 AM	50.64244	32.4764	70.2532	54.17066	44.65784	38.36587
2/19/2022	12:00:00 PM	64.95572	31.8088	87.12043	66.12348	46.41429	37.71898
2/19/2022	1:00:00 PM	69.23831	31.6607	87.51857	72.37366	54.42551	38.48386
2/19/2022	2:00:00 PM	67.1727	32.90459	88.20315	69.72599	50.77393	38.90745
2/19/2022	3:00:00 PM	63.93512	31.68167	87.82996	62.11556	42.54642	36.94938
2/19/2022	4:00:00 PM	50.12409	31.81325	76.04821	49.20758	39.55921	36.25739
2/19/2022	5:00:00 PM	48.60889	31.55257	72.81729	48.75932	39.59614	36.17125
2/19/2022	6:00:00 PM	44.91254	31.09423	66.85521	44.85519	38.25114	35.44873
2/19/2022	7:00:00 PM	60.49955	32.07227	83.97739	60.28893	41.19385	36.52586
2/19/2022	8:00:00 PM	64.73727	32.96668	84.62428	67.20934	50.35053	39.3247
2/19/2022	9:00:00 PM	61.11088	31.91733	85.94467	57.80699	40.70497	36.49335
2/19/2022	10:00:00 PM	55.53384	32.81104	79.56617	54.2597	42.36458	38.04789
2/19/2022	11:00:00 PM	56.43222	32.68146	79.81829	55.49153	42.16487	37.71755
2/20/2022	12:00:00 AM	59.10566	33.2025	82.83954	57.05477	43.33368	38.17913
2/20/2022	1:00:00 AM	58.89938	32.15202	81.39576	57.9378	41.0179	36.62687
2/20/2022	2:00:00 AM	60.94702	32.23492	83.85251	61.5028	42.32856	36.7254
2/20/2022	3:00:00 AM	62.79919	32.7563	87.10066	61.32166	41.69756	37.36043
2/20/2022	4:00:00 AM	53.73581	32.02945	77.88941	46.83603	39.55965	36.40871
2/20/2022	5:00:00 AM	40.66023	32.29567	53.69953	43.16392	39.32978	36.64312
2/20/2022	6:00:00 AM	48.45789	32.60871	71.74437	47.26894	39.46512	36.57519
2/20/2022	7:00:00 AM	53.86405	32.87324	76.12617	53.54574	41.59564	37.28389
2/20/2022	8:00:00 AM	61.84959	32.57651	82.20103	64.51959	47.35009	37.92612
2/20/2022	9:00:00 AM	61.81994	32.83801	83.6425	63.15593	45.29807	38.56095
2/20/2022	10:00:00 AM	69.68158	33.74935	90.42621	68.9781	49.349	40.61091
2/20/2022	11:00:00 AM	73.78122	35.47026	91.60359	76.94724	58.33291	45.04262
2/20/2022	12:00:00 PM	73.26283	36.11599	91.30225	75.81782	55.29923	44.76445
2/20/2022	1:00:00 PM	80.72031	43.31323	94.23009	85.58639	74.01179	55.19839
2/20/2022	2:00:00 PM	77.62043	37.87704	92.62747	82.46891	67.58475	49.15322
2/20/2022	3:00:00 PM	76.24581	36.44643	91.55227	80.98117	66.0765	49.09912
2/20/2022	4:00:00 PM	76.38149	38.90611	91.98392	80.91077	66.59391	48.94885
2/20/2022	5:00:00 PM	68.37738	32.32642	89.00538	69.72885	47.28242	39.18975
2/20/2022	6:00:00 PM	73.77623	37.91335	91.85777	77.01759	59.13815	46.2095
2/20/2022	7:00:00 PM	75.25433	38.30555	91.07126	79.76105	65.60368	48.54756
2/20/2022	8:00:00 PM	74.44238	38.76994	89.7612	78.83934	68.4801	54.49909
2/20/2022	9:00:00 PM	70.52118	38.83659	87.30549	74.35007	62.4376	49.04102

2/20/2022	10:00:00 PM	61.83813	32.66867	83.18582	64.35848	49.92406	39.63849
2/20/2022	11:00:00 PM	52.67298	32.75151	72.66294	56.11381	44.89095	38.91232
2/21/2022	12:00:00 AM	48.62267	31.70777	70.13611	50.32789	41.6298	36.76979
2/21/2022	1:00:00 AM	51.92637	32.03457	71.48596	54.98205	43.03203	37.83675
2/21/2022	2:00:00 AM	51.60937	30.88485	73.61024	53.44783	43.39	37.45194
2/21/2022	3:00:00 AM	47.59495	30.37926	71.01024	49.80835	41.6039	36.38212
2/21/2022	4:00:00 AM	48.47703	27.81907	72.2626	47.55834	36.7457	32.62789
2/21/2022	5:00:00 AM	45.51472	27.74583	65.71438	47.86219	39.18948	33.52685
2/21/2022	6:00:00 AM	41.87575	28.50429	61.7633	43.99338	38.01825	34.1696
2/21/2022	7:00:00 AM	45.07089	29.3715	64.99262	48.10607	38.5657	34.90968
2/21/2022	8:00:00 AM	38.38055	28.25262	58.49963	40.12644	36.64336	33.44886
2/21/2022	9:00:00 AM	44.29469	28.44377	66.61944	45.02156	37.31995	33.54263
2/21/2022	10:00:00 AM	46.41156	28.52799	67.33934	48.60615	38.12854	34.01184
2/21/2022	11:00:00 AM	49.5003	29.33052	73.91513	49.84809	38.82667	34.50907
2/21/2022	12:00:00 PM	71.89739	30.13972	90.68732	73.91327	44.46731	36.27705
2/21/2022	1:00:00 PM	53.41366	30.7078	77.44021	54.18457	41.38208	36.35885
2/21/2022	2:00:00 PM	49.3037	31.12382	68.90821	52.23212	40.88345	35.74851
2/21/2022	3:00:00 PM	70.95255	31.33845	90.70065	73.86177	55.05385	37.94986
2/21/2022	4:00:00 PM	67.8983	32.19778	90.07274	70.15063	53.72082	39.86392
2/21/2022	5:00:00 PM	70.259	32.42345	90.89578	71.32464	51.96983	38.66741
2/21/2022	6:00:00 PM	65.70164	31.05538	87.01849	66.16902	43.67864	36.12386
2/21/2022	7:00:00 PM	69.18976	30.66448	90.07116	69.65505	40.59967	35.25351
2/21/2022	8:00:00 PM	64.34522	30.74098	89.70147	58.42291	39.05555	35.19297
2/21/2022	9:00:00 PM	68.23258	31.58825	86.49897	72.05753	57.81618	40.93213
2/21/2022	10:00:00 PM	69.92015	31.39353	87.86758	74.00303	58.44153	39.20978
2/21/2022	11:00:00 PM	63.06758	30.84852	83.21319	65.61986	49.15708	37.29271
2/22/2022	12:00:00 AM	51.25718	30.28288	74.40443	52.70705	38.76106	34.21672
2/22/2022	1:00:00 AM	61.48543	30.59236	82.75337	63.19406	46.6608	36.45387
2/22/2022	2:00:00 AM	60.63548	31.41145	84.03557	61.84168	46.96254	38.28166
2/22/2022	3:00:00 AM	60.25401	32.74773	83.60053	61.93758	48.56962	39.63663
2/22/2022	4:00:00 AM	52.40889	30.93847	79.11782	52.2848	42.45792	36.41828
2/22/2022	5:00:00 AM	59.76077	31.32729	81.49537	61.64355	45.99505	37.98579
2/22/2022	6:00:00 AM	58.98764	29.19426	85.02174	57.20675	41.98313	34.87828
2/22/2022	7:00:00 AM	69.00001	29.80579	90.04477	70.35685	50.0448	37.34529
2/22/2022	8:00:00 AM	59.8071	30.93847	84.24179	60.04036	43.05852	36.80665

WM15: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
2/8/2022	12:00 PM	50.6	48	44.4	42.7	40.8	37.9	34.3	33.6	33.3	34.2	37.5	37.9	38.2	39.8	39.9	36.7	36.6	35.9	31.2	30.6	31.4	24.7	29.6	25.6	25.3	28.1	26.5	23.3	23.4	23.4	23.9	21.8	18.7	16.3	12.1	8.1
2/8/2022	1:00:00 PM	46.1	43.5	40.5	38.9	37.2	34.8	32.4	30	25.9	22.3	19.2	18.1	26.8	26.2	22.7	23.3	28.9	27.3	23.2	22.2	12	8.8	14	15.4	13.2	7.4	6.5	5.7	4.8	3.4	9.7	4.1	-1.3	-2.6	-2	0.2
2/8/2022	2:00:00 PM	35.8	34.1	35.1	34.4	35.9	34.9	33.4	31.5	27	22.2	19.1	17.4	18.4	21.5	22.8	23.6	29.4	27.6	23.1	22.2	11.5	9	10	10.3	9.9	8.8	7.9	7	6.2	4.9	13.2	5.1	-0.6	-2.8	-2.2	0.2
2/8/2022	3:00:00 PM	30.1	29	30.1	31.1	30.4	28.9	25	22.3	18.6	16.7	15.4	15	17.5	21.3	22.7	23.7	29.4	27.7	23.2	22.1	11.5	9.3	10.2	10.5	10.2	9.3	8.6	7.5	6.6	5.2	8.6	7.6	-0.4	-2.8	-2.3	0.2
2/8/2022	4:00:00 PM	52.9	50.7	48.9	46.6	43.9	41.4	38	36.2	35.8	36.6	37.4	37.9	37.4	37.6	35.8	32.9	33.7	30.9	27.4	26	20.1	13.8	10.9	10.8	10.3	9.6	8.9	8.1	7.1	5.7	4.1	2.3	0.1	-2.2	-1.8	0.4
2/8/2022	5:00:00 PM	57.9	56.7	55.1	52.7	49.7	47	43.6	40.1	37	33.9	31	28.1	25.9	25.5	25.5	25.3	29.9	28	23.8	22.9	13.7	12.6	13.4	13.2	12.2	10.4	9.2	8.2	7.2	6	4.4	2.9	0.9	-1.2	-1.1	0.5
2/8/2022	6:00:00 PM	54	51.8	48.8	45.8	42.5	39.7	35.9	33.6	30.3	27.6	25.5	23.6	22.2	22.8	23.8	24.1	29.1	27.1	22.9	21.8	12.6	11	11.7	11.7	10.7	9.2	7.8	6.8	5.7	4.4	2.8	1.3	-0.5	-2.5	-1.9	0.3
2/8/2022	7:00:00 PM	54.8	52.9	50.6	47.8	44.8	41.1	38.1	35.3	33	31.7	30.7	29.8	28.5	27	26.1	24.8	29.8	28.3	22.4	21.2	13.4	11.9	13.2	13.1	12.3	9.9	8.1	7	5.7	4.4	2.8	1.4	-0.3	-2.2	-1.7	0.4
2/8/2022	8:00:00 PM	54.9	52.2	49.9	46.3	42.8	40	36.9	34.7	32.6	31.7	31.1	30.8	34.5	33.8	27.8	26.2	29.5	28.3	22.8	21.8	13.6	12.2	13.4	13.4	12.5	10.1	8.4	7.2	5.9	4.5	3	1.6	0	-2.1	-1.6	0.4
2/8/2022	9:00:00 PM	44.6	41.6	38.5	36.8	34.1	31.2	28.9	26.8	23.6	21.7	20.7	19.6	19.4	21.1	22.8	23.5	29.3	27.2	22.3	21.5	11.9	10.3	10.9	11	10.4	9	7.9	7	5.9	4.5	3	1.3	-0.7	-3	-2.4	0.2
2/8/2022	10:00:00 PM	36.1	33.7	33	31	29.3	27.8	25.2	23.6	20.5	19	17.9	17.9	18	20.8	22.7	23.8	28.7	26.7	22.5	21.8	11.5	9.2	9.7	10.1	9.7	9	8.2	7.3	6.3	4.9	3.4	1.6	0.4	-3.1	-2.4	0.2
2/8/2022	11:00:00 PM	39.3	36.7	34.6	33.2	31	29.4	26.5	24.4	21.7	20	18.9	17.1	18	20.7	22.6	23.5	28.7	27.2	22.5	21.8	11.6	9.2	10	10.3	9.9	9.1	8.2	7.2	6.3	4.8	3.3	1.6	0.5	-3.1	-2.4	0.2
2/9/2022	12:00 AM	38.9	36	34.5	32.9	31.9	28.5	25.3	24.2	20.4	19.3	17.7	16.6	17.7	20.4	22.4	23.1	28.3	27.4	22.5	21.9	11.6	9.1	9.8	10.2	9.6	8.8	7.8	6.8	5.8	4.4	2.8	1.2	0.8	-3.3	-2.5	0.2
2/9/2022	1:00:00 AM	31.1	29.5	30.4	30.8	30.3	28.4	25.8	25.1	20.7	19.6	18.2	16.7	17.8	20.6	22.5	23.4	28.9	27.5	22.3	21.6	11.5	8.8	9.3	9.9	9.4	8.7	8	7.1	6.1	4.6	3.1	1.4	0.6	-3.2	-2.5	0.2
2/9/2022	2:00:00 AM	37.1	34	33.6	33.6	33.1	31.1	28.2	27.3	23.2	22.5	20.6	18.8	18.6	21	22.6	23.4	28.6	27.8	22.6	21.8	11.8	9.1	9.9	10.4	10	9.1	8.3	7.4	6.4	5	3.5	1.8	0.3	-3.1	-2.5	0.2
2/9/2022	3:00:00 AM	45.7	43.3	41.4	39	37.9	35.1	34.4	30.5	28.6	26.9	26.3	25.9	23	21.8	22.9	23.7	28.6	27.6	22.6	22.1	11.8	9.3	10.2	10.6	10.1	9.1	8.3	7.4	6.4	4.9	3.4	1.8	0.3	-3	-2.4	0.2
2/9/2022	4:00:00 AM	54.6	52.8	50.2	47.3	43.8	40.5	36.6	33.3	30.1	28	25.4	26.8	23.2	22.6	23.6	24	28.9	27.9	22.7	21.8	12.6	10.5	11.2	11.4	10.8	9.4	8.3	7.4	6.3	4.9	3.5	2	0.1	-2.4	-1.9	0.4
2/9/2022	5:00:00 AM	31.9	30.3	32.4	32.2	32.7	30.8	28.1	27.6	24.1	23.2	21.2	20.2	19.6	21.6	22.9	23.8	28	26.9	22.7	22	11.8	8.9	9.4	9.9	9.6	8.9	8.3	7.5	6.5	5.1	3.6	1.9	0.1	-3	-2.4	0.2
2/9/2022	6:00:00 AM	36.6	35.6	34.9	34.3	34.6	33.2	31.7	32	30.6	30.9	30.9	30.1	29.4	29.2	29.5	28	29.2	27.3	23	22.2	13.2	9.5	9.9	11.5	10.7	9	8.3	7.4	6.4	5.2	4	1.9	0.2	-3.1	-2.5	0.2
2/9/2022	7:00:00 AM	31.2	31.2	34	33.4	33.8	33.6	32.9	31.2	30.5	31.4	30	26.8	24.7	24.7	25	24.6	29.1	26.7	22.1	21.5	12	8.9	9.4	10	9.6	9	8.4	7.5	6.5	5.1	12	4.2	0.2	-3.1	-2.5	0.2
2/9/2022	8:00:00 AM	35.3	34.1	34.5	34.5	36.1	35.4	34.6	33	29.3	26.6	24.6	26.9	23.9	22.5	23.1	24.2	28.7	26.5	22.2	21.7	11.8	9	9.6	10.7	12.6	14.2	17.6	14	7.5	7.6	17.7	15.9	0.3	-3.1	-2.5	0.2
2/9/2022	9:00:00 AM	47.1	45.3	41.8	40	39.4	36.9	34.7	32.3	28.3	26.1	25.6	23.9	22.2	23.5	22.9	23.6	28.2	26.8	22	21.4	11.5	8.9	10.1	11.4	12.5	12.4	16.5	12.6	6.4	7.2	9.9	5.8	1.6	-3.1	-2.3	0.2
2/9/2022	10:00:00 AM	49.3	46.9	45.2	42.6	40.8	38.2	35.2	33.5	30.5	30	28.5	27.1	23.9	23.3	23.1	23.1	27.8	27.2	22.1	21.8	11.5	8.8	20.6	20	16.6	12	14	11.3	5.5	4.5	1.7	0	1.8	-3.2	-2.3	0.2
2/9/2022	11:00:00 AM	53.8	51.8	50.1	47.9	45.6	43	40.4	38	34.4	31.2	29	27.2	25.2	28.3	25.4	23.3	27.3	26.7	22.3	22	12.2	10.2	17.5	20	20	19.7	15.5	13.8	7.3	6.2	4.1	1	1.2	-2.6	-1.9	0.3
2/9/2022	12:00 PM	52.1	50.6	49	46.4	43.9	41.3	38	35.7	32.2	29.7	27.9	26.3	26	24.1	23.4	22.6	28.3	27.7	21.2	21.2	12	10	19.4	21.1	17.9	10.2	8.6	7.5	6	4.2	1.7	0	1.9	-3.1	-2.2	0.2
2/9/2022	1:00:00 PM	54.4	52.9	51.2	48.5	46.2	43.8	40.9	38.4	35.2	32	29.3	27.2	26.4	24.8	23.8	22.6	28.6	28.4	21.7	21.4	13.2	12.4	19.3	20.9	21.3	11.5	11.5	9.3	8	5.1	2.7	0.9	1.2	-2.8	-2.1	0.2
2/9/2022	2:00:00 PM	55.4	53.5	52.4	50.2	47.5	44.8	42.2	39.6	36.2	33.1	30.8	28.8	26.7	26.1	25	23.9	28.3	28.1	22.7	22.1	12.6	10.9	12.2	12.5	11.6	10.2	9.9	8.1	6.7	5.3	3.6	1.8	0.5	-2.6	-2.1	0.3
2/9/2022	3:00:00 PM	63.1	62.1	60.6	58.5	56.1	53.2	50.3	46.9	43.5	40.7	37.5	34.6	32.3	30.4	29.1	27.5	29.4	29.2	24.6	23.7	17.5	18.3	25.4	24.8	25.8	17.6	16.3	13.6	11.8	9	6.5	5.1	2.5	0.4	0.5	2
2/9/2022	4:00:00 PM	65.6	64.4	62.7	61.1	58.6	56.1	53	50	46.6	43.3	40.5	37.5	40.3	34.7	32.1	29.8	31.2	30.6	25.7	24.2	19.6	20.3	22.2	22.1	20.7	18.6	16.4	13.2	10.6	9.2	7.9	6.7	4.1	1.9	1.7	2.3

2/9/2022	5:00:00 PM	58.2	57	54.7	52.6	49.9	47.2	44.4	41	38	35.2	32.7	30	27.9	26.8	26.2	24.7	29.1	29.1	23	22	14.8	14.7	16.3	16.3	15.3	13.1	11.5	9.7	8.2	6.8	5.1	3.4	0.9	-1.6	-1.5	0.4
2/9/2022	6:00:00 PM	49.5	48	45.8	44.1	41.1	39.2	36.3	33.6	31.1	29.9	28.5	27.5	26.1	24.2	24	23.1	27.6	28.1	22.7	22.4	12	10.2	11.1	11.5	11	9.9	9.3	8.4	7.3	6	4.3	2.4	-0.1	-2.8	-2.3	0.2
2/9/2022	7:00:00 PM	38.1	36.5	35.2	33.4	32.7	31.5	29.7	29.2	26.3	27	26.1	25.8	23.9	22.8	22.9	22	28.3	28.2	21.9	21.1	11.8	9.2	10	10.7	10.4	9.7	9.2	8.4	7.4	6.1	4.4	2.5	0	-2.9	-2.4	0.2
2/9/2022	8:00:00 PM	45.3	43.4	40.7	38.6	36.1	33.9	31.4	29.7	26	24.2	22.1	20.3	20.1	22.5	22.8	22.6	28	27.9	22.7	21.9	11.8	9.3	9.9	10.6	10.5	9.9	9.6	8.8	7.8	6.5	4.8	2.8	0.2	-2.7	-2.3	0.2
2/9/2022	9:00:00 PM	36.2	33.3	33.5	33.6	34.1	32.9	32.3	30.6	27	26.8	25.8	23.3	21.3	21.6	22.6	22.6	28.1	27.5	22	21.1	11.6	9.2	9.9	10.9	10.8	9.9	9.4	8.5	7.3	5.9	4.2	2.3	-0.2	-3.1	-2.5	0.1
2/9/2022	10:00:00 PM	42.5	39	38.1	36.3	36.3	33.2	32.2	30.3	26.5	25.9	25.3	23.2	20.7	21.2	22.3	22	28.3	27.8	21.6	20.5	11.7	10	10.7	11.1	10.8	9.7	9	8.1	6.8	5.4	3.9	1.9	-0.4	-3.2	-2.6	0.2
2/9/2022	11:00:00 PM	44.9	42	39.9	37.3	36.4	33.8	31.8	29.9	25.9	25.1	24	21.8	20.2	21	22.5	22.1	28.3	28	21.6	20.4	12	9.6	10.8	11.5	11.1	9.9	9	8.1	6.7	5.3	3.8	1.9	-0.3	-3.2	-2.5	0.2
2/10/2022	12:00:00 AM	54.2	51.4	48.8	45	43	40.2	37.3	34.4	31.9	30.3	29.4	27.5	24.3	23.1	23.6	23	27.5	27.7	22.3	21.2	13	11.2	12	12.4	11.9	10.3	9.2	8.2	6.7	5.3	3.7	2	-0.1	-2.8	-2.2	0.2
2/10/2022	1:00:00 AM	50.7	48.1	45.2	42.4	39.1	36.4	33.5	31.1	27.6	25.6	23.6	21.8	20.7	21.6	22.9	22.4	27.7	27.8	22	21	12.4	10.2	11.3	11.8	11.5	10.1	9	8.1	6.6	5.2	3.6	1.9	-0.3	-3	-2.4	0.2
2/10/2022	2:00:00 AM	39.6	36.6	33.8	34	33.2	35.9	33.9	33.7	31	29.7	28.6	28.8	24.3	21.5	22.3	22.4	28.3	28.1	22.1	21.1	12.1	11.9	10.7	10.4	10.5	9.6	8.9	8.1	6.8	5.4	3.9	2	-0.2	-3.2	-2.6	0.1
2/10/2022	3:00:00 AM	33.2	31.1	33	33.1	32.5	32.2	30.5	29.4	26.8	26.3	25.5	22.9	20.1	20.6	22.3	22.4	27.8	28	22.5	21.2	11.7	9	9.7	10.5	10.5	9.7	9.1	8.3	7	5.6	4.1	2.2	-0.1	-3.2	-2.6	0.1
2/10/2022	4:00:00 AM	48.4	45.9	42.5	39.5	37.7	34.6	31.9	30	27.4	25.7	24.1	22.6	20.9	21.3	22.7	22.9	28.7	28.2	21.8	21	12.2	10	11	11.5	11.4	10.2	9.3	8.4	7	5.5	4	2.1	-0.1	-3.1	-2.5	0.2
2/10/2022	5:00:00 AM	45.8	43.8	42.3	39.5	38.1	35.5	34.6	32.8	31.7	30.7	27.9	27.2	23.9	22.1	22.5	22.6	28.6	28.2	21.6	20.8	11.8	9.2	10	11	10.9	9.8	9.1	8.3	7	5.5	3.9	2.1	-0.1	-3.1	-2.5	0.2
2/10/2022	6:00:00 AM	30.1	29.7	32.1	32.2	32.5	30.9	29.4	29.6	28.2	29	29.4	28.4	26.7	26.1	25.6	24	28.8	28.4	21.6	20.8	12	9.4	11	14.7	15.4	10.9	10.8	10	7.5	6	4.5	2.5	0.2	-3.1	-2.6	0.2
2/10/2022	7:00:00 AM	32.4	31.2	32.9	32.7	34.1	32.7	32.1	31.3	29.7	30	30.2	29.1	27.9	27.5	26.9	25.9	29.2	28.5	21.9	21.3	12.5	10.5	18.7	20.9	21.2	14.7	17.3	15	9.8	10.6	22	10.9	1	-2.2	-2.4	0.3
2/10/2022	8:00:00 AM	31.6	31.1	32.9	32.6	34.3	34	32.3	31.3	27.7	26.1	26.5	28.2	25.1	22.6	23.1	23.7	29.1	28.2	21.8	21.4	12.4	11.4	22.1	24.3	22.4	14.2	15.2	13	9.9	7.4	16.7	13.2	-0.2	-3.2	-2.6	0.2
2/10/2022	9:00:00 AM	45.1	44.2	43.3	41.8	41.3	38.7	36.1	33.4	30.6	28.6	28.1	25.8	23.1	22.1	22.4	22.5	28.5	28	21.4	20.9	11.7	10.2	12	15.6	17.4	18.5	21.3	22.3	11.5	12.5	11.3	5.7	1.3	-2.1	-2	0.2
2/10/2022	10:00:00 AM	39.9	38.2	36.8	35.1	34.9	33.6	31	29.7	26.5	25.3	25.2	25	23.7	24.5	25.2	24.6	27.7	27	22.1	20.8	11.5	9.2	13.7	12.5	12.2	11.8	16	12.7	6.8	6.5	3.3	0.6	-1.6	-3.2	-2.4	0.1
2/10/2022	11:00:00 AM	44.1	42	39.8	38	37.2	35.3	32.8	31.3	28.8	28.2	28.2	28.2	27.2	26.9	26.4	25.3	27.9	27.1	21.7	20.9	12	10.4	19.3	19.9	15.6	10.3	11.8	9.1	5.9	4.3	2.1	0.4	-1.7	-3.1	-2.3	0.2
2/10/2022	12:00:00 PM	47.7	45.5	43.1	41.1	39.9	37.9	35.6	31.5	27.5	25.1	23.6	22.2	20.3	21.8	21.4	26.8	26.5	21.6	21.2	12.2	11.1	21.1	22.9	23.9	15.6	12.4	12.1	9.6	6.7	3.3	1	-1.6	-3	-2.2	0.2
2/10/2022	1:00:00 PM	52.4	50.3	48	46.4	45.2	42.5	38.9	36	31.6	28	26.1	24.3	21.9	21.5	22.5	22.1	25.9	26.4	22.6	22	12.1	9.7	13.8	18.3	13.1	11.5	14.3	15.2	7.4	8.3	10.2	7.1	-0.6	-2.7	-2.2	0.2
2/10/2022	2:00:00 PM	49	47.3	45.6	43.2	40.7	38.5	35.4	33.2	29	26.4	25	23.3	21.5	22.4	23.3	22.9	26.3	26.8	23	22.6	12.3	9.8	13.3	14.3	12.8	9.5	8.9	8.3	7.2	5.9	4.2	2.2	-0.2	-2.7	-2.3	0.2
2/10/2022	3:00:00 PM	44.1	42.5	40.6	37.7	36.8	34.4	33	31.8	30.2	29.3	28.2	28.2	27.7	26.9	26.4	25.4	28.3	27.9	22	21.7	12.9	9.9	10.1	10.9	11.1	10.4	11.1	10	7.3	5.9	4	1.9	-0.5	-3	-2.4	0.1
2/10/2022	4:00:00 PM	30.2	28.5	31	31	33.7	30.7	28.5	29.1	24.3	23	22.3	22	20.1	21.1	22.2	21.5	28	28.1	21.3	20.8	12.1	10	10.7	11.2	11.4	10.8	11.1	9.2	7.5	6	4.3	2.3	-0.2	-3	-2.5	0.1
2/10/2022	5:00:00 PM	39	35.4	34.2	33.1	34	31.2	29	29.2	25.4	23.7	24	22.8	20.4	21.5	22.6	21.7	28.1	28.4	21.4	21	12.5	10.6	11.6	13.8	12.8	10.8	10.5	9.4	7.8	6.3	4.6	2.6	0.1	-2.9	-2.5	0.1
2/10/2022	6:00:00 PM	54.7	52.7	49.8	47.1	43.6	39.8	37.4	33.7	31.6	28.9	26.6	24.9	23	23.2	24	23.2	28.1	28	21.6	20.9	13.2	11.7	12.5	12.5	12.1	10.6	9.1	8.1	6.6	5.1	3.4	1.7	-0.4	-2.5	-1.7	0.8
2/10/2022	7:00:00 PM	57.8	55.5	52.4	49.8	46.4	42.7	39.1	36.2	33.4	31.2	29.6	28.6	28.4	28.2	27.6	26.1	28.8	28.5	22.8	22	16.1	14.2	14.7	14.2	13.5	11.4	9.6	8.4	6.9	5.3	3.7	2.2	0.4	-1.8	-1.5	0.6
2/10/2022	8:00:00 PM	60.2	57.9	54.9	51.7	48.4	44.7	41	38.2	34.8	32.7	30.3	29.6	35.3	35.8	26.4	25.9	29.1	28.6	23.2	22.1	16	15	15.7	15.3	14.5	12.1	10.1	8.8	7.3	5.8	4.3	2.9	1.2	-1	-0.8	0.8
2/10/2022	9:00:00 PM	58.5	55.7	52.9	49.7	46.2	42.7	39.1	36.4	33.4	31.2	29.1	27.3	25.5	24.9	25.2	24.7	28.4	28.2	22.5	21.7	14.6	13.3	13.9	13.7	13	11.1	9.5	8.6	7.1	5.6	4.1	2.5	0.5	-1.8	-1.5	0.5
2/10/2022	10:00:00 PM	60	57.5	55	52	48.6	44.9	41.5	38.6	35.2	32.5	30.1	28.3	26.5	26	26.2	25.4	28.8	28.7	23.2	22.4	15.8	14.8	15.3	14.9	14	11.8	9.9	8.8	7.2	5.7	4.2	2.7	1	-1.1	-0.9	1.1
2/10/2022	11:00:00 PM	59.5	57.5	54.5	52.2	48.7	45.2	41.5	38.6	35.3	32.9	30.9	29	27.7	27.3	26.7	25.8	28.8	28.6	23.7	23	16.4	15.1	15.5	15	14.2	11.8	9.9	8.8	7.3	5.7	4.3	2.8	1	-1.3	-1.2	0.6

2/11/2022	12:00:00 AM	59.6	57.5	54.9	51.3	48.4	44.7	41.5	38.1	34.4	31.7	28.6	26.3	24.5	23.9	24.4	23.9	28	27.9	24	22.1	13.9	12.5	13.1	12.8	12.1	10.6	9.2	8.3	7	5.5	4	2.4	0.5	-1.9	-1.6	0.4
2/11/2022	1:00:00 AM	48.6	46.5	44.2	40.9	38.5	34.6	32.1	30.6	26.4	24.3	22.2	20.9	19.5	21	22.4	21.8	28	28.5	25.7	21.1	12.2	10.1	11	11.1	11	10	8.9	8.2	7	5.5	3.9	2	-0.2	-2.9	-2.4	0.2
2/11/2022	2:00:00 AM	54.6	53	50.5	48.1	44.6	41.4	37.8	35.8	32.9	31.1	28.7	24.9	22.4	22.4	23	22.2	28.9	29.6	26.2	20.5	12.5	10.6	11.7	11.6	11.3	10.1	9	8.2	7	5.5	4	2.2	-0.1	-2.7	-2.2	0.4
2/11/2022	3:00:00 AM	37.4	35.8	34.4	32.7	34.3	30.7	29.2	29.4	26.8	26	24.4	23.9	22	20.8	22	21.7	29.1	29.8	26.4	20.4	11.8	9.7	10.7	10.6	10.6	9.9	8.9	8.2	7.1	5.6	4	2.1	-0.2	-3.1	-2.5	0.1
2/11/2022	4:00:00 AM	33.2	32	32.8	33.2	35.8	31.9	31.9	32.5	30.4	30.6	30.6	30.7	28.8	27.9	27.3	26.8	29.2	29	26.6	21.6	12.6	11.5	10.7	10.5	10.6	10	9.1	8.4	7.3	5.8	4.3	2.4	0	-3	-2.5	0.1
2/11/2022	5:00:00 AM	33.4	32.4	33.2	32.8	34.7	32.8	32	30.9	28.7	29.4	26.3	25.2	22.3	22	22.1	21.4	29	28.5	26.3	21.5	11.8	9.6	10.5	11.2	11.9	10.2	9.3	8.5	7.3	5.8	4.2	2.3	0	-3.1	-2.6	0.1
2/11/2022	6:00:00 AM	33	32.1	33.7	33.1	34.3	34.2	33.5	32.3	30.9	29.9	29.1	28	26.1	23.2	23.1	22.1	29.4	28.9	26.2	21	12.1	10.3	12.2	15.7	16.8	11.3	9.7	8.7	7.4	5.8	4.2	2.3	0	-3.1	-2.6	0.2
2/11/2022	7:00:00 AM	41.7	40	37.7	50.4	47.2	33	47.4	41.6	43.1	37.1	35.5	41.6	43.1	34.1	40.5	39.4	35.9	34.7	30.6	28.6	30	33	33.9	30.4	26.3	23.3	18.2	13	8.2	7.1	4.3	2.2	-0.2	-3.1	-2.6	0.1
2/11/2022	8:00:00 AM	28.8	28.9	31.3	32.2	34.4	32.1	30	31.2	26.4	25.1	25.2	25.8	26.8	23.5	23.3	22.2	28.8	28.5	26	20.8	12.1	9.8	11.4	14.8	14.2	10.4	11.2	9.3	6.9	5.8	8.9	6.2	1.6	-3.3	-2.6	0.1
2/11/2022	9:00:00 AM	41.3	39.5	37.8	35.7	35	31.8	29.6	29.5	26.3	25.4	25.1	25	25.6	24.2	23.6	22.2	28.8	28.5	25.9	20.1	11.9	10.3	23.3	23.2	21.9	13.4	14	12.1	8.3	6.6	12.6	9.7	-1	-3	-2.4	0.1
2/11/2022	10:00:00 AM	41.6	39.4	37.7	35.7	36.2	33.1	30.8	30.5	28.6	28.4	27.4	27.1	27.3	25.4	24.7	22.7	28.4	28.1	25.7	20.6	12.8	10.5	26.3	24.5	20.7	14.9	17.4	15.2	9.3	8.5	23.6	19.8	-1	-2.7	-2.3	0.2
2/11/2022	11:00:00 AM	43.4	41.1	39.5	37	36.3	34	32.2	32.3	32.6	32.6	32.9	32.4	33.6	35.8	32.2	33.5	32.2	29.3	28.1	24.6	18.6	13	23.4	24.1	22.8	15.6	20.5	18	11.7	13.7	7.9	6.7	1.2	-2.2	-2.2	0.2
2/11/2022	12:00:00 PM	51	49.9	47.9	46	42.4	39.5	36.8	33.8	30.5	27.7	24.9	24	29.3	24	23	22.6	27.3	27.4	25.4	20.9	12.3	8.9	15.4	15.8	17.3	10.7	9.4	7.9	10.1	6.8	12.8	8.4	-1.8	-2.9	-2.1	0.2
2/11/2022	1:00:00 PM	51.9	50.2	48.2	46.2	43.1	40.2	36.9	33.7	30.9	28.1	26.1	25.4	28.8	24.9	24.9	23.9	27.7	27.7	25.7	21.1	11.6	9.2	9.8	9.8	9.1	8.2	7.3	6.3	5	3.9	2.3	0.7	-1.2	-2.5	-1.9	0.2
2/11/2022	2:00:00 PM	45.7	43.7	41.1	39.2	36	33.1	30.8	29.1	27.7	28.1	27.9	27.3	28.2	27.5	26.4	24.2	28.2	27.9	26	21.9	12.1	9.4	10.1	10.5	9.9	9	8	7.2	6.2	5	3.3	1.5	-0.7	-2.7	-2.2	0.2
2/11/2022	3:00:00 PM	47	44.7	42.5	40.3	37.1	34.5	32.3	31.1	31.1	30.3	30.1	30.3	30.7	29.1	28.1	28	29.6	28.5	26	21.7	12.3	9.9	10.7	11	10.4	9.7	9.3	8	6.9	5.6	3.8	1.9	-0.4	-2.6	-2.2	0.2
2/11/2022	4:00:00 PM	49.9	48.1	46.1	43.5	40.5	37.8	35.2	31.9	28.7	26.4	24.5	25.2	32.7	38.3	29.1	23.7	28.6	28.4	25.9	21.8	12.3	9.9	10.6	10.8	10.4	9.8	9.4	8.1	7	5.7	3.9	2.1	-0.2	-2.4	-2.1	0.2
2/11/2022	5:00:00 PM	58.5	57	55.6	53.9	50.7	48.2	44.9	41.5	38.1	35.4	32.1	29.1	27.1	26.2	25.9	24.4	28.7	28.3	25.9	22.1	14.1	12.6	13.3	13.3	12.5	10.7	9.2	8.2	7.1	5.9	4.2	2.6	0.6	-1.4	-1.3	0.5
2/11/2022	6:00:00 PM	48.5	45.5	42.2	39.8	36.4	32.4	30	26.3	23.7	21.6	19.7	18.6	19.1	21	22.5	22	28	27.7	25.4	20.3	12.2	10.2	11	11.2	10.7	9.6	8.2	7.3	6.2	4.9	3.3	1.7	-0.3	-2.6	-2.1	0.2
2/11/2022	7:00:00 PM	59.2	56.5	54	50.7	47.4	43.8	39.9	36.8	33.4	30.9	28.9	27.3	26.7	25.9	25.7	24.5	28.1	27.7	25.4	22.5	15.5	14.5	15.3	15.1	14.1	11.4	9	7.7	6.2	4.9	3.5	2.3	0.9	-1	-0.8	0.6
2/11/2022	8:00:00 PM	63.8	61.9	59.5	56.6	53.2	49.7	46.3	43.1	39.4	36.8	33.9	31.5	32.8	31.2	28.1	26.7	28.9	28.4	26	23.8	18	17.3	18.2	17.9	16.9	13.8	10.9	9	7.2	5.9	4.7	3.9	2.8	0.9	0.9	1.8
2/11/2022	9:00:00 PM	63.7	61.7	59.4	56.6	53.2	49.6	46.6	42.8	39.5	36.9	33.6	31	29.3	28.2	27.6	26.2	28.9	28.1	25.8	23.5	17.4	16.6	17.5	17.2	16.2	13.1	10.3	8.6	7	5.7	4.5	3.7	2.6	0.8	0.7	1.4
2/11/2022	10:00:00 PM	60.4	58.1	55.3	51.9	48.7	45.1	41.9	38.6	35.5	32.3	30.3	28	26.7	26.2	25.8	24.1	28.2	27.1	24.8	23.1	14.8	13.4	14	13.6	12.7	10.3	8.1	7	5.8	4.6	3.4	2.3	0.9	-1	-0.7	0.8
2/11/2022	11:00:00 PM	59.3	57.1	54.2	51	47.3	43.7	40.2	37.2	34.3	31.6	29.4	28.4	27	26.6	26.4	24.8	28.5	27.4	25	22.9	15.3	13.9	14.5	14	13	10.4	8.3	7.2	5.9	4.7	3.5	2.4	1	-0.8	-0.6	1
2/12/2022	12:00:00 AM	61.3	58.8	56	53.7	50.1	46.5	43	40	36.8	33.8	30.9	28.4	26.5	25.8	25.6	24.4	28.5	27.3	25	23.2	15.5	14.2	14.8	14.3	13.2	10.6	8.4	7.2	6.1	4.9	3.7	2.7	1.5	-0.4	-0.3	1.3
2/12/2022	1:00:00 AM	56	53.8	51	47.8	45	41.4	37.9	34.4	31.1	28	25.3	23.2	22.2	22.2	23	22.1	28.3	26.7	24.6	22.7	12.8	10.8	11.6	11.5	10.8	9.3	7.6	6.8	5.8	4.6	3.3	1.9	0.2	-2	-1.6	0.4
2/12/2022	2:00:00 AM	52.8	50.5	48	45.4	42.5	38.9	35.7	33.5	30.2	28.2	25.2	23	21.8	21.8	22.5	21.8	28.2	26.5	24.5	22.5	12.3	10.2	11.3	11.3	10.6	9.1	7.5	6.7	5.6	4.4	3.1	1.6	0.2	-2.4	-2	0.3
2/12/2022	3:00:00 AM	47.1	45.6	43	38.8	36.9	33.7	30.8	28.1	24.5	22	19.7	18.1	18.3	20.3	21.8	21.3	28.1	26.4	24.5	22.7	12	10.1	10.8	10.5	10	9.1	7.6	6.9	5.8	4.6	3.2	1.6	0.3	-2.7	-2.2	0.2
2/12/2022	4:00:00 AM	42.8	40.9	38.5	35.7	33.9	31.3	29.1	26	22.9	20.6	20.2	17.8	17.9	20.2	21.8	21.4	28.1	26.4	24.7	22.8	11.9	10.2	11.1	10.6	10	9.2	8.2	7.4	6.3	5	3.6	2	0.1	-2.9	-2.4	0.2
2/12/2022	5:00:00 AM	27.4	25.2	25.5	25.9	29.7	25.4	23.3	22.3	18.8	18.9	19.4	18.1	18.5	20.8	21.9	21.6	28.1	26.2	24.6	22.7	11.6	9.4	10.3	10.3	10.2	9.3	8.3	7.5	6.4	5	3.6	1.9	0.1	-3	-2.5	0.2
2/12/2022	6:00:00 AM	27.6	27	28	28.9	33.9	31.1	32.2	33	29.8	28.7	26.9	26.2	26.1	25.6	25.5	24.5	28.5	26.4	24.7	22.9	12.5	11.1	12.9	18	19.7	11.2	9.2	8	6.8	5.3	3.8	2.2	0.2	-2.9	-2.4	0.2

2/12/2022	7:00:00 AM	27.6	26.7	28.1	28.6	30.7	28.4	27.2	29	27.6	27.9	27.5	27.1	30.5	26.4	25.6	24.2	28.5	26.4	24.7	22.7	12.2	10.5	13	17.6	18	12.8	15	14	7.6	7.5	5	2.6	0.4	-2.7	-2.4	0.2
2/12/2022	8:00:00 AM	29.2	27.4	27.7	28.1	31.9	28.4	28.9	31.9	31.4	27.6	27.2	28	31.3	27.1	25.9	25.1	28.6	26.3	24.5	22.8	12	10.7	13	17.5	18.6	15.1	20.4	19	9.7	12.3	22.3	20.7	0.9	-2.4	-2.3	0.2
2/12/2022	9:00:00 AM	37.2	35.2	34	32.8	34.5	30.8	31.1	31.2	28.5	28.5	28	27.1	28.8	25.5	24.5	24.2	28.2	25.7	23.8	22.6	12	11.2	15.5	22.9	24.9	19	22.7	21.5	14.2	13.8	9.7	4.5	0.6	-2.4	-2.2	0.2
2/12/2022	10:00:00 AM	48.8	46.8	44.7	42	40.1	36	33	32	27.4	24.5	22.9	22.2	29.2	22.3	21.9	22.9	27.9	25.7	23.9	22.6	11.6	9.9	11.5	14.9	15.8	15.4	21.2	15.5	7.6	9.1	4.5	1.1	-1.4	-2.8	-2.2	0.2
2/12/2022	11:00:00 AM	56.5	55.55	53.2	50.8	47.8	44.7	41.8	39.1	36.3	33.8	32.3	30.7	30.8	27.9	31.6	34.6	30	26.1	24.2	22.9	12.3	9.7	11.8	10.9	10.1	8.8	10	7.2	4.7	3.9	2.1	0.7	-1	-2.2	-1.6	0.5
2/12/2022	12:00:00 PM	54.7	53.55	51.3	49.3	46.3	43	39.9	37	33.6	30.4	27.8	25.4	27.6	23	22.6	22	27.6	25.9	24	22.9	12.5	10.3	19.3	19.5	20.1	12.2	15.3	10.4	6.5	6.2	2.5	0.6	-1.3	-2.5	-1.8	0.3
2/12/2022	1:00:00 PM	53.5	51.55	49.7	47.3	44.3	41	38	35.9	32.5	30.7	29.3	28	30.2	25.8	24.8	23.2	27.8	26.3	24	23.3	12.4	10.6	16.9	18.2	19.4	14	18.1	16.4	8	10.4	9.3	4.7	-0.6	-2.3	-1.9	0.2
2/12/2022	2:00:00 PM	47.2	45.33	43.1	40.7	38.4	35.1	33.1	32.4	31.2	30.8	30.3	29.2	29.7	28	27.1	24.7	28.7	26.8	24.3	23.5	12.4	9.3	10	9.9	9.9	9.1	8.2	7.4	6.6	5.2	3.5	1.6	-0.6	-2.7	-2.2	0.2
2/12/2022	3:00:00 PM	37.7	35.43	32.3	30.8	31.3	26.6	25.1	26.4	24.6	24.2	31.8	33.6	22.7	23.6	23.9	22.3	28.5	26.6	24.1	23.7	12.3	9.6	11.4	13.1	12	9.8	8.9	8	7	5.6	3.8	1.8	-0.5	-2.7	-2.3	0.2
2/12/2022	4:00:00 PM	28.6	26.11	24.2	24.4	27.3	24.7	23.6	27	24.4	24.1	23.8	23.2	22.5	23.3	23.8	24	28.7	26.6	24.1	23.6	12.5	9.7	10.7	11	10.7	9.8	9.2	8.1	7	5.6	3.9	2	-0.3	-2.7	-2.3	0.2
2/12/2022	5:00:00 PM	51.8	49.24	47.4	43.4	40.5	36.3	32.9	30.8	28.6	27.5	26.8	25.6	24.7	24.8	25	23.8	28.4	26.6	23.9	23.3	13.6	11.6	12.7	13.2	12.8	10.1	8.5	7.4	6.3	4.9	3.4	1.7	-0.3	-2.4	-2	0.3
2/12/2022	6:00:00 PM	63.6	61.33	58.7	55.6	52.5	48.8	45.5	42.1	38.8	36.2	33.6	31.5	29.5	28.8	28.3	27	29.3	28.2	25.8	24.4	18.8	18.1	18.7	18	16.8	13.6	10.9	9	7.3	5.9	4.7	3.9	2.9	1.1	1	1.8
2/12/2022	7:00:00 PM	65.1	63.11	60.7	57.7	54.8	51.1	47.9	44.3	41.5	38.3	35.5	33.4	31.3	30.3	29.7	28.3	29.9	29	26.7	25.2	20.2	19.8	20.5	20.1	18.9	15.7	12.7	10.5	8.4	6.9	5.7	5	3.9	2.2	2.2	2.8
2/12/2022	8:00:00 PM	51.7	48.33	46.1	43.3	39.2	36.4	34.2	33.3	32	32.6	31.9	31.1	30.3	29.7	28.4	25.2	28.6	26.7	24	23.1	13.8	11	11.3	11.2	10.9	9.7	8.2	7.3	6.2	4.8	3.2	1.5	-0.5	-2.6	-2.1	0.2
2/12/2022	9:00:00 PM	46.7	44.33	42.7	39.1	35.3	31.8	28.2	28.7	23.8	20.5	19.5	18.4	18.4	20.7	22.1	21.4	28.1	26.3	23.8	23.1	12	10.1	10.9	10.8	10.7	10	8.8	7.9	6.8	5.3	3.7	1.9	-0.2	-2.7	-2.3	0.2
2/12/2022	10:00:00 PM	45.6	43.32	40.5	37.5	33.9	30.8	27.2	26.8	22.1	20.2	19.8	19.3	18.8	20.7	22.2	21.8	28.3	26.6	24.2	22.2	11.9	10	11.1	10.9	10.7	9.7	8.3	7.4	6.4	4.9	3.3	1.6	-0.4	-2.8	-2.3	0.2
2/12/2022	11:00:00 PM	49.9	47.24	44.3	41	37.8	35	31.8	30.1	26.8	24.5	23.3	22.2	20.9	22.1	22.6	22.2	28.6	26.9	24.3	21.9	12.1	10.4	11.9	11.9	11.5	9.9	8.2	7.3	6.1	4.7	3.2	1.5	-0.4	-2.6	-2.1	0.2
2/13/2022	12:00:00 AM	31.7	29.63	27.9	27.6	29.8	26.6	26.8	28.3	28.5	28.7	28	26.6	26.3	26.2	28.4	29.6	29.9	27.1	24.1	23	13.3	10.3	10.9	10.9	10.8	10.2	9.1	8.3	7.2	5.7	4.1	2.3	0.1	-2.7	-2.3	0.2
2/13/2022	1:00:00 AM	55.1	52.84	50.4	47.7	45.1	41	38.9	35.1	32	28.6	27.7	26.2	24.6	24.3	24.2	23.1	28.7	26.9	24.1	22.3	12.7	11	11.7	11.5	11	9.7	8.3	7.4	6.3	4.9	3.3	1.8	-0.1	-2.4	-2	0.3
2/13/2022	2:00:00 AM	56	53.44	50.6	47.5	44.1	40.8	37.3	35.1	30.5	28	25.6	23.6	22.1	22.6	23.1	22.6	28.9	27.1	24.4	21.7	12.6	11.1	11.8	11.5	11	9.6	8.2	7.4	6.3	4.9	3.4	1.9	0.1	-2.1	-1.7	0.4
2/13/2022	3:00:00 AM	41.4	39.33	36.9	33.6	32.7	29.8	26.6	28.4	22.6	20.4	19.3	18.9	18.4	20.9	21.9	21.7	29	27.1	24.2	22	11.5	9.6	10.6	10.5	10.5	9.7	8.8	8	6.9	5.5	3.9	2.1	0	-2.7	-2.3	0.2
2/13/2022	4:00:00 AM	30.4	28	27.7	27.3	30	25.9	23.6	33.1	20.7	18.2	17.8	16.8	17.8	20.5	21.8	21.7	28.7	26.8	24.1	22	11.6	9.8	10.9	10.8	10.8	10	9	8.2	7.1	5.6	4.1	2.3	0.2	-2.8	-2.4	0.2
2/13/2022	5:00:00 AM	29.1	28	27.4	27.2	29.6	28.1	25.1	33.9	24.4	23.3	20.3	19.3	19.2	21	21.9	21.7	28.8	27	24.3	21.9	11.6	9.7	10.6	10.4	10.5	9.7	8.9	8.1	7	5.6	4.1	2.3	0.2	-2.8	-2.4	0.2
2/13/2022	6:00:00 AM	28	27.7	27.3	27	29.3	27	25.1	31.3	23	22.5	20.6	19	18.3	20.7	21.9	21.8	28.8	27	24.3	21.4	11.6	10.2	12.4	15.6	15.9	10.7	9.8	8.3	6.8	5.3	3.8	2	0	-2.9	-2.5	0.2
2/13/2022	7:00:00 AM	26.6	26.66	26.7	42.7	39	28.8	37.7	36.7	35.4	32.9	33.4	34.4	31.3	29.3	29.5	25.8	29.1	27.2	24.5	22.2	13.4	11.7	18.4	20.4	21.3	13.1	13.8	11.3	7.8	6.4	11.8	5.7	0.1	-3	-2.5	0.2
2/13/2022	8:00:00 AM	27.2	26.61	27.4	30.5	31.5	27.2	24.8	30.6	24.4	20.8	21.6	19.5	18	20.6	22	21.6	28.3	26.2	23.7	22.4	12	11.9	19.2	22.2	22.9	20.6	24	25.7	16	15.8	13.2	8.2	4.1	-0.9	-2.1	0.2
2/13/2022	9:00:00 AM	38.8	36.55	34.4	32.4	33.4	28.7	26.9	29.4	26.5	25.3	24.8	23	22.3	22.7	23	22.3	27.9	25.6	23.2	22.4	11.4	9	9.6	9.9	9.9	8.9	10.5	8.3	5.1	5.5	19.1	13.4	-1.4	-2.9	-2.2	0.2
2/13/2022	10:00:00 AM	40	37.79	35.7	33.1	33	28.8	25.6	28.6	23.2	21.9	23	21.8	22.8	32.1	27.2	22.7	27.7	25.2	23	22.5	11.3	9.2	13.2	18.7	16.8	10.7	14	11.6	5.6	5.4	9.1	6.7	-1.9	-3	-2.2	0.2
2/13/2022	11:00:00 AM	44.8	42.88	40.1	37.8	35.6	32.9	30.5	31.2	29	29.2	29.2	28.4	29.4	31.9	28.1	24.6	27.8	25.5	23.1	22.6	11.8	8.9	9.8	9.7	9.6	7.9	6.7	5.5	4.3	3.1	1.2	-0.4	-2.1	-3.1	-2.2	0.2
2/13/2022	12:00:00 PM	48.3	45.99	43.9	40.7	37.9	34.5	31.7	30.7	27.5	26.5	25.4	24.4	23.1	23.3	22.8	21.5	26.9	24.9	22.7	22.9	13.5	8.9	10.7	9.3	8.7	7.2	5.9	5.1	3.8	3.1	15.9	14.8	-2.1	-2.9	-0.4	4.9
2/13/2022	1:00:00 PM	62.8	61.18	59.8	58	55.2	53.2	50.4	47.1	44	40.6	38.4	35	32.6	30.8	28.6	26.6	28.7	27	24.6	23.6	15	12.8	13.3	12.5	11.4	9.3	7.4	5.9	4.8	3.4	3	1.8	-0.4	-0.9	-0.3	1.3

2/13/2022	2:00:00 PM	61.6	60.5	58.8	57	54.3	52	48.9	45.5	42.6	39.8	37.3	40.5	45.1	40.7	34.7	32.2	30.7	27.4	24.6	24.1	16.3	14.9	16	16	15.1	12.9	10.5	8.8	8.4	6.7	6.9	4.9	0.7	-0.3	-0.1	1.8
2/13/2022	3:00:00 PM	66	64.8	63.1	60.8	58.5	56.3	53.6	50.3	47.4	44.7	42.4	39.2	37.2	34.9	32.4	30.2	30.4	28.7	26.2	24.6	17.5	15.2	15.1	14.6	13.6	11.5	9.4	8	6.7	5.3	3.9	2.9	1.6	0.8	1	2.3
2/13/2022	4:00:00 PM	51.2	49.5	47.2	44.7	41.8	39.6	37.3	35.6	34.3	33.5	32.6	32.1	31	29.4	27.7	25.7	28.5	26.7	23.5	23.4	12	9.4	10.1	10.3	9.8	8.8	7.4	6.6	5.7	4.5	2.9	1.2	-0.7	-2.4	-2	0.2
2/13/2022	5:00:00 PM	58.1	56.7	54.5	52.3	49.2	47.2	44.4	40.8	38	36.2	32.7	30.6	28.7	27.5	26.4	24.4	28.6	26.8	23.9	23.4	13.2	11.3	12	11.9	11.3	9.4	7.7	6.7	5.8	4.6	3.2	1.8	0.1	-1.4	-1	0.8
2/13/2022	6:00:00 PM	35.2	32.5	29.8	28	27.7	25.7	24.9	27.5	25.3	26	25	24.8	24.3	23.9	23.8	22.5	28.8	26.8	23.9	22.8	12.1	10.2	11	11.1	10.9	9.9	8.6	7.7	6.7	5.4	3.9	2.1	0	-2.2	-2	0.2
2/13/2022	7:00:00 PM	59.5	57.7	54.8	51.7	48.4	45.1	41.1	38.1	35.4	32.8	31.1	29.5	27.7	26.6	26.2	25.6	29.1	26.9	24.3	22.1	13.5	12.4	13.7	13.6	12.9	10.3	8.1	7	5.9	4.7	3.4	2.1	0.6	-1	-0.7	0.9
2/13/2022	8:00:00 PM	57.9	55.1	52.7	49.3	45.6	42.3	38.4	35	31.5	28.6	26.3	24.5	23.2	23.4	24.1	23.4	28.8	27	24.2	21.7	13.4	12	12.9	12.8	12	9.7	7.6	6.5	5.4	4.2	2.9	1.7	0.3	-1.3	-1	0.6
2/13/2022	9:00:00 PM	62.2	60.1	57.3	54.2	50.7	47.3	43.7	40.4	37	33.9	31.2	28.6	26.7	25.9	25.8	24.9	29.2	27.5	24.7	22.2	15.3	14.3	15	14.8	13.7	11.1	8.5	7.1	5.9	4.8	3.7	2.8	1.6	0.2	0.3	1.4
2/13/2022	10:00:00 PM	60.4	58.3	56	52.8	49.2	46.1	42.9	39	36.2	32.7	29.9	27.1	25.2	24.5	24.6	23.8	29.1	27.4	24.5	21.3	13.5	12.3	13.1	13.1	12.4	10.1	7.9	6.8	5.8	4.6	3.5	2.4	1	-0.6	-0.4	1.1
2/13/2022	11:00:00 PM	49.9	47.1	45.4	42.8	38.2	35.3	31.6	29.3	25.6	23.5	20.9	19.5	19	21.1	22.5	23	28.7	29.8	27.6	20.5	12.6	10	10.6	10.5	10.1	9.2	7.5	6.9	9.1	4.7	3.3	1.7	-0.1	-2.3	-2	0.2
2/14/2022	12:00:00 AM	55.8	54	51.1	48.6	44.4	40.7	37.4	35.3	32	30	28.7	27.7	26.7	26	25.8	25.8	29.3	27.1	24.8	21	12.5	10.8	11.5	11.3	10.8	9.2	7.5	6.7	5.9	4.7	3.4	2	0.3	-1.7	-1.5	0.4
2/14/2022	1:00:00 AM	42.5	39.5	37.6	35.3	33.6	30.2	27.6	30.1	26.1	25.6	25.1	23.9	22.8	23.5	24	24.9	28.8	26.7	24.6	21.5	11.6	9.3	10	10.1	9.9	8.9	7.6	6.8	5.9	4.7	3.3	1.7	0.2	-2.5	-2.1	0.2
2/14/2022	2:00:00 AM	26.1	23.5	22.1	23.3	28.9	25	20.4	30.2	18.3	16.2	16.3	16.8	17.5	21	22.4	23.2	28.7	26.6	24.7	20.8	11.7	9.6	10.4	10.4	10.5	9.6	8.3	7.5	6.5	5.2	3.7	2	0	-2.5	-2.2	0.2
2/14/2022	3:00:00 AM	36.4	32.9	30.5	28.7	29.2	25	21.2	27.9	18.4	16	15.4	15.9	17.5	21	22.4	23.2	29	26.8	24.7	21.1	11.8	9.7	10.4	10.5	10.6	9.7	8.5	7.7	6.7	5.3	3.9	2.1	0.1	-2.5	-2.2	0.2
2/14/2022	4:00:00 AM	60.7	58.6	55.9	53.8	50.3	46.7	43	39.6	36.3	33.2	30.5	28.1	26.2	25.7	25.5	25.2	29.3	27.5	25.3	21.7	15.1	14.1	15.1	14.8	14.2	11.9	9.8	8.4	7.1	5.7	4.4	3.1	1.5	-0.5	-0.4	1.2
2/14/2022	5:00:00 AM	54	51.7	49.1	46.2	42.8	39.1	36.2	33.8	30.1	27.2	24.4	22	21.3	22.5	23.2	23.6	28.7	26.8	24.7	20.9	12.5	10.6	11.2	10.9	10.4	9.1	7.6	6.8	5.9	4.6	3.3	1.9	0.1	-1.9	-1.7	0.3
2/14/2022	6:00:00 AM	30.8	28.7	27.4	28.5	31.2	26.9	24	31.9	22	21.1	21.3	20.1	20.2	22.2	23.2	23.4	28.5	26.5	24.3	21.4	12.1	10.5	11.1	13.8	14.5	9.9	8.6	7.6	6.5	5.1	3.7	2.1	0	-2.5	-2.2	0.2
2/14/2022	7:00:00 AM	46.3	43.6	42	39.4	37.4	34.6	31.5	33.9	27.4	25.7	24.6	22.3	21	22.5	22.7	23.1	28.5	26.5	24.2	21	11.7	9.6	10.2	10.2	10.3	9.7	11	9.3	6.7	5.8	10.5	4.6	0.3	-2.6	-2.2	0.2
2/14/2022	8:00:00 AM	47.5	46.2	44.7	42.4	40	37	33.7	33.5	27.9	27.7	27.6	21.7	20.1	21.8	22.3	22.7	28	25.9	24	21.2	11.5	9.7	15	18.4	19.7	11	9.4	8.5	6.3	4.2	11.2	6.7	1.1	-2.8	-2.2	0.2
2/14/2022	9:00:00 AM	46.4	44.4	42.7	39.6	37.9	33.9	31.3	31.3	25.8	23.2	23	20.2	19	21.5	21.9	22.2	27.8	25.8	23.7	21.5	11.8	9.8	21.8	21.2	17.3	10.5	11.1	8.8	5.8	4.4	2.1	0.4	-1.5	-2.8	-2.2	0.2
2/14/2022	10:00:00 AM	44.2	41.3	38.3	35.6	33.7	30.7	27.8	29.3	23.6	21.8	21.8	20.1	19.3	21.5	22	22.2	27.9	25.9	23.9	21	11.5	10.5	18.2	17.8	16.7	14.7	19.9	17.8	9.6	11.2	5.6	2	-1.2	-2.7	-2.1	0.2
2/14/2022	11:00:00 AM	54.2	52.6	50.6	48.1	45.6	42.3	39.5	36.6	33.5	30.7	28	25.7	23.5	23.3	23.1	22.6	27.6	25.7	23.6	21.5	11.6	9.1	9.7	9.6	8	6.6	5.1	4.4	3.6	2.7	1.3	0.1	-1.5	-2.3	-1.7	0.3
2/14/2022	12:00:00 PM	54.4	52.2	50.4	47.4	44.9	41.2	37.9	35.6	33	30.8	28.6	26.8	25	24.2	23.6	22.8	27.4	25.7	23.4	21.6	12.1	10.4	11.3	10.5	9.1	7.3	5.4	5.1	5	4.8	4.5	1.5	-1.4	-2.2	-1.7	0.3
2/14/2022	1:00:00 PM	60.5	59.2	56.6	54.4	52.2	48.8	46.3	42.3	39.7	36.8	34.7	32.5	30.6	29.1	27.9	26.2	28.4	26.9	24.2	22.5	15.5	15.3	16.5	16.1	15	12.4	9.7	7.6	5.6	4.2	3	2.1	0.6	0	0.1	1.2
2/14/2022	2:00:00 PM	60.3	58.5	56.7	54.7	52.9	50	48	45.6	42.9	41.5	39.5	37.4	34.4	34.6	35	31.6	31.6	30.7	28.1	28.1	27.7	26.8	23.8	25.2	30.7	24	25.2	23.1	24.3	20.5	24.6	20.3	17.8	13.9	12.7	9.2
2/14/2022	3:00:00 PM	66.2	65.2	63.6	62.3	60.5	58.5	56.2	54.1	51.5	49	46.3	42.9	40.1	37.4	34.8	32.2	31.9	30.4	27.7	25.7	20.9	19.6	20	20.1	19.9	18.3	16.7	15	12.5	10.2	8.3	6.9	5.6	4.5	4	3.9
2/14/2022	4:00:00 PM	62	60.5	58.9	56.6	54.6	51.9	49.4	46	42.7	39.8	36.5	34.2	31.4	29.3	27.8	25.8	29.2	28.4	24.2	22.9	15.3	14.1	14.7	14.3	13.3	11	8.8	7.1	5.7	4.6	3.5	2.6	1.2	0.2	0.1	1.1
2/14/2022	5:00:00 PM	49.1	47.1	44.3	41.4	38.8	35.2	32.6	32.5	30.2	30.5	30.5	29.8	28.7	28.3	26.8	23.8	29	28.2	23.7	21.4	12.2	10.4	11.1	10.6	9.9	7.8	6.4	5.9	5.1	4.1	2.9	1.5	-0.3	-1.8	-1.7	0.3
2/14/2022	6:00:00 PM	52.2	49.4	46.8	42.7	39.6	36.3	33.3	33.2	27.4	25.6	23.9	22.5	21.4	22.6	23	22.2	28.9	27.7	24	21	12.6	11.3	12	11.3	10.2	8.5	6.8	6.3	5.3	4.2	3	1.5	-0.2	-1.9	-1.7	0.3
2/14/2022	7:00:00 PM	61.4	60.4	58.9	57.3	55	52.6	50.2	47.8	43.7	40.9	37.9	35.5	32.9	30.9	29.4	27.6	30	28.6	25.3	22.2	16.2	15.4	16.4	15.9	14.8	12.5	10	8.2	6.4	5	3.7	2.6	1.2	0.1	0.3	1.8
2/14/2022	8:00:00 PM	62.7	61.6	60.3	58.6	56.9	54.1	51.4	48.6	45.6	42.5	40	37.2	34.6	33	31.3	29.5	30.8	29.6	26.1	22.7	17	15.7	16.1	15.6	14.6	12.3	10	8.2	6.3	4.8	3.5	2.5	1.2	0.2	0.3	1.4

2/14/2022	9:00:00 PM		66	65	63.3	61.8	59.8	57.5	54.8	52.1	48.9	45.7	43	39.8	37.3	34.6	32.7	30.6	31.3	30.3	27.4	24.2	18.9	17.1	17.1	16.5	15.4	13.3	10.9	8.9	6.8	5.2	3.9	3	1.9	1.1	1.3	2.5
2/14/2022	10:00:00 PM	65		63.8	62.5	60.7	58.7	56.5	53.9	51.1	47.4	44.9	41.7	38.4	35.8	33.3	31.1	29.2	30.9	30	26.4	23.4	18.1	16.8	17.2	16.8	16	14	11.8	9.5	7.4	5.5	4.1	3	1.7	0.8	0.9	2.1
2/14/2022	11:00:00 PM	61.6		60.3	58.6	56.3	54.1	51.1	48.2	45	41.3	38.2	35.2	32.2	29.3	27.9	26.7	24.8	30	29.4	24.7	21.3	15.5	15	15.8	15.1	14	12.1	10.2	8.6	7.1	5.8	4.2	2.7	0.8	-0.7	-0.6	1.1
2/15/2022	12:00:00 AM	55.3		54.3	52.3	49.9	47.4	44.1	41.1	38.4	34.7	32	30.1	28.3	27.3	27.7	27.1	24.9	29.8	29.1	24.2	21.5	13.9	11.3	11.5	10.6	10.2	9.4	8.6	7.8	6.7	5.4	3.7	1.9	-0.3	-2.4	-2	0.2
2/15/2022	1:00:00 AM	51		49.1	46.9	44.4	41.7	38.3	35.5	34.9	29.9	26.3	26.1	22.4	21.2	22.9	22.4	20.7	28.7	28	23.2	21.4	11.5	9.4	10.1	9.3	9.4	8.9	8.1	7.5	6.4	5	3.4	1.5	-0.7	-2.9	-2.4	0.2
2/15/2022	2:00:00 AM	49.9		48.55	46.1	43.8	41.3	38.3	35.3	34.1	30	26.9	25.4	24.6	23.1	24.6	24.3	21.9	29.1	28.2	23.4	20.7	15.7	14.7	10.3	10	9.9	9.4	8.7	7.8	6.6	5.2	3.6	1.7	-0.6	-3	-2.5	0.1
2/15/2022	3:00:00 AM	57.3		55.58	54.2	52.1	49.8	46.6	43.7	41	37.4	34.7	31.7	29.2	26.9	26.6	25.5	23.3	29.7	28.9	24.2	21.1	14	13.4	14.1	13.3	12.6	11.2	10	8.9	7.6	6.2	4.8	3.1	1.1	-1.1	-0.8	2
2/15/2022	4:00:00 AM	65.7		64.7	63.4	61.8	59.7	57.3	54.7	52.1	48.7	45.4	42.3	39.1	36.5	34.2	32.5	30.4	32	30.8	27.1	24.5	21.3	21.6	22.6	22.5	22.2	20.6	18.9	17.1	15.6	15.4	17.7	16.4	15.8	14	14	22.1
2/15/2022	5:00:00 AM	59.6		59.5	57.6	55.9	53.4	51.2	47.7	45.1	40.5	36.9	33.3	30.3	28.4	27.5	26.3	24.9	29.5	26.3	21.2	17.7	15	16.2	17.2	16.8	16	14	12.1	10.3	9.5	10.1	10.7	10.3	11.2	9.8	10.1	16.3
2/15/2022	6:00:00 AM	54.4		52.55	50.6	48.4	45.4	41	37.9	34.6	30.7	29	27.5	26.6	26.8	27	25.1	23.3	22.8	16.1	12.5	10.5	8	8.4	9.3	9.9	9.7	6.8	5.1	3.9	3.5	4.9	7.9	7.1	7.3	6.1	6.7	11.3
2/15/2022	7:00:00 AM	51.2		49.55	46.5	44	40.1	36.4	32.4	29.5	26.7	25.3	23.7	21.8	21.9	22.7	20.1	17.6	14.6	6.9	3.6	2.5	4.3	6	6.3	5.3	4.9	3.7	1.8	0.2	-0.9	-1.1	6.2	4.2	0.7	-2.2	-1.1	5.6
2/15/2022	8:00:00 AM	50		48.44	45.4	42.2	38.5	34.7	31.2	28	25.3	23.6	21	20.2	21.1	22.2	20	16.5	14.7	7.5	5	5	5.9	6.8	7.1	6	5.4	4.1	2.4	0.5	-0.7	0.4	8.3	3.4	0.4	-1.7	-0.6	9.5
2/15/2022	9:00:00 AM	53.9		51.77	49.9	47.1	43.9	40.6	37.1	32.9	29.9	28.6	24.9	22.2	21	21.1	19.1	16.1	14.7	7.5	5.6	4.1	5.6	7.3	7.33	5.8	5.3	5.1	5	0.9	-0.9	-1	11.4	7	2.6	-2.6	-2.1	3
2/15/2022	10:00:00 AM	49.3		47.73	45.4	42.9	39.8	36.8	33.8	30.7	28.1	26.3	24.3	21.9	20.6	19.9	18.1	16.3	15.6	8	5.8	3.7	4.9	6.6	8.7	6.3	5.4	3.8	2	0.5	-1.2	-1.7	-0.8	-2.2	3.6	-4.4	-2.8	0.2
2/15/2022	11:00:00 AM	54.1		52.66	50.9	49.6	47.1	43.9	41.4	38.5	35	31.8	29.1	25.8	23.7	22.7	20.8	19.1	18.9	12.6	9.5	6.8	7.6	9.2	9.55	8.4	7.6	6.2	4.3	2.8	0.9	0.2	2.9	1.5	-0.9	-2.5	-1.8	0.5
2/15/2022	12:00:00 PM	51.5		49.99	48.1	44.9	42.8	40.6	37.3	34.7	32.1	30.4	28.7	26.2	26.2	27.1	25.2	22.6	23.6	16.3	11.7	7.3	7.6	9	9.4	8.6	8.2	7.4	6.2	5.8	5.7	6.9	10.2	10.4	2.5	-0.4	-0.7	1
2/15/2022	1:00:00 PM	53.6		52.1	50.1	48.3	45.3	42.1	39.1	35.9	33.1	30.7	28.1	25.8	24.7	24.4	22.6	23.5	27.9	22	15.6	9.5	8.6	10	10.7	10	9.6	8.7	7.8	7.4	6.8	6	9.9	7.8	3.5	-1.4	-1.2	0.6
2/15/2022	2:00:00 PM	36.8		34.99	33.9	32	30.3	29.2	27.3	26.3	25.9	26.6	26.6	26.7	27.5	28.3	27.3	25.5	29.1	23.7	17.8	12	8.3	8.6	9.5	9.1	9.5	9.2	8.8	8.9	8.5	7.8	12.2	10.2	3	-2.3	-2.2	0.3
2/15/2022	3:00:00 PM	61.6		60.55	59.7	57.6	55.5	53.1	50.8	47.7	44.5	41.1	37.7	34.8	32	29.9	27.6	26.2	29.8	25.5	20.7	17	16.3	18.8	25.3	25.4	24.6	18.3	15.1	14.9	11.6	8.3	10.5	6	1	-1	-1.1	1.1
2/15/2022	4:00:00 PM	64.2		63.22	61.7	59.9	57.8	55.5	52.3	49.2	46.2	43.4	40.7	38.2	36.2	34.8	33	30.6	31.2	27.5	23.8	20.2	19.3	20.8	21.9	21.3	20.1	18.3	15.7	12.7	10	7.7	11.7	9.7	3.9	0	0.1	1.6
2/15/2022	5:00:00 PM	58		56.55	55.3	52.9	50.7	47.8	44.8	41.5	38.6	35.7	33.6	31.5	29.2	28.6	27	25.3	29.7	26	20	14.4	13.1	14.8	15.7	15	14.3	11.7	10.7	8.7	8.1	5.9	4.2	2.7	0.6	-2.1	-1.8	0.4
2/15/2022	6:00:00 PM	53.5		52.66	50.4	48.3	46.2	44.1	41.4	38.5	35.7	34	31.9	30.7	28.8	28.3	27.5	25.4	29.2	25.9	19.7	14.4	11.8	12.2	13	12.2	11.5	10.5	9.3	8.2	6.8	5.3	3.7	2.1	0	-2.6	-2.1	0.6
2/15/2022	7:00:00 PM	53.1		51.77	49.9	48	45.2	42.7	40.2	37.5	33.5	31.1	28.1	25.8	24	23.6	23.1	22.1	29.1	25.9	19.2	12.9	10.4	11.5	12.3	11.3	10.6	9.6	8.7	7.8	6.5	5.2	3.6	2.2	0.1	-2.5	-1.9	0.7
2/15/2022	8:00:00 AM	44.9		42.99	40.7	38.1	35.9	33.4	30.9	29	25.1	23.1	21	21.4	34.8	35.5	25.1	22.2	29.4	25.5	19	12.2	8.7	8.8	9.6	9.2	9.3	8.9	8.2	7.5	6.3	5	3.5	2	-0.1	-2.8	-2.3	0.2
2/15/2022	9:00:00 PM	33.3		31.96	33.6	33.3	33.5	32.1	30.1	29.8	25.5	25.3	23.7	20.7	18.4	20.9	21.3	21.1	28.8	25.4	18.8	11.8	8.1	8.4	9.4	9.1	9.3	8.9	8.2	7.4	6.2	4.8	3.4	1.9	-0.3	-3.1	-2.5	0.2
2/15/2022	10:00:00 PM	49.5		47.99	45.5	42.9	40.4	37.7	36.1	33.4	29.9	29.6	27.2	23.8	21.4	21.9	21.7	21.1	29.1	25.9	18.9	12.1	9.1	10	10.9	10.1	9.6	9	8.3	7.5	6.3	4.9	3.5	2	-0.1	-2.9	-2.4	0.2
2/15/2022	11:00:00 PM	44.8		42.99	41.2	39.1	37.3	34.7	32.6	31.7	27.2	26.1	24.8	23	22.3	23.4	22.8	21.5	29.3	26.1	18.7	11.8	8.4	9	10	9.4	9.3	8.9	8.1	7.3	6.2	4.8	3.4	1.9	-0.2	-3	-2.5	0.2
2/16/2022	12:00:00 AM	32.4		32.22	34.7	33.9	35.2	32.5	31.6	30.8	26.8	26.8	24.5	23.9	22.4	21.8	21.2	20.7	28.9	25.6	18.4	11.6	8.3	8.8	9.7	9.4	9.4	8.9	8	7.1	5.9	4.5	3.1	1.7	-0.3	-3.2	-2.6	0.2
2/16/2022	1:00:00 AM	29.6		29.44	32.3	31.7	32.1	31.2	30.6	29.5	24.2	24	22.7	21.2	19.9	21.3	21.2	20.8	28.8	25.3	18.4	11.7	8.3	8.9	9.9	9.5	9.6	9.1	8.4	7.6	6.4	4.9	3.5	2.1	0.1	-3	-2.5	0.2
2/16/2022	2:00:00 AM	33.4		32.44	33.2	32.9	33.5	31.8	31.1	30.1	26	26.3	25.9	22.9	20.2	21.3	21.2	20.8	28.8	25.1	18.4	11.7	8.2	8.7	9.4	9	9.1	8.7	7.9	7.1	5.9	4.5	3.2	1.7	-0.3	-3.2	-2.6	0.2
2/16/2022	3:00:00 AM	32.3		32.2	35.5	35.3	35.7	35.5	34.1	32.7	30.3	30.7	29.4	29.7	27.3	27.1	25.9	23	28.8	24.9	18.4	11.6	8.1	8.7	9.6	9.2	9.3	8.8	8	7.2	6	4.5	3.2	1.7	-0.3	-3.2	-2.6	0.2

2/16/2022	4:00:00 AM	45.4	42.8	40.6	37.8	37	34.9	33.2	33.1	28.9	28.4	28.2	27.1	25.8	25.4	24.7	25.4	29.1	25.1	18.5	12.2	8.8	9.3	10.2	9.8	9.6	9	8.1	7.2	6.1	4.6	3.3	1.9	0	-3	-2.5	0.2
2/16/2022	5:00:00 AM	48.5	46.1	43.2	40.5	38.7	35.7	34.1	33.7	28.7	27.5	26.4	24.1	22.5	22.8	21.9	21.3	28.6	24.9	18.3	11.8	9	9.6	10.6	9.9	9.6	8.8	7.8	6.9	5.7	4.3	3.1	1.7	-0.2	-3	-2.5	0.2
2/16/2022	6:00:00 AM	34.4	34.6	36.6	36.5	37.6	36.4	36.5	36	32.9	33	32.5	39.3	39.9	36.8	32.2	29.4	30.2	26.4	21.9	18.5	14	10.7	10.8	11.4	11	8.9	7.9	7	6.1	4.5	4.9	4.4	0.9	-3	-2.5	0.2
2/16/2022	7:00:00 AM	39.5	37.6	37.3	35.8	36	34.4	32.8	33.9	30	30.1	28.8	27.5	26.1	26.6	25.9	23.2	28.7	24.8	18.5	12.8	9.2	11.9	21.2	22.8	23	13.2	14.1	12.5	9.6	6.9	9.9	5	-0.6	-3.3	-2.6	0.2
2/16/2022	8:00:00 AM	45.7	43.9	42.4	40.3	38.9	37.1	35.5	34.4	30.7	28.7	28.2	43.1	41.4	25.6	28.1	30.1	29	25.9	19.7	13.6	11.2	15.6	26.3	27.6	26	15.2	15.5	13.2	11.9	8.1	21.5	21.8	12.6	2.4	3.1	4.3
2/16/2022	9:00:00 AM	60.8	59.4	57.7	55.6	53.4	50.5	47.1	44.2	40.9	38.4	36	34.4	31.2	29.1	27.1	25.4	28.9	25.5	21	15.7	11.8	11.8	16	16.1	15.7	10.2	9.2	8.4	7.5	7.1	9.7	8.7	2.7	-1.6	-1.6	0.8
2/16/2022	10:00:00 AM	61.7	59.8	58	55.7	53	50.2	47.3	43.8	41.2	38.8	36	33.7	31.5	29.4	27.3	25.4	28.7	25.2	20.6	15.6	12.1	12.2	12.5	11.7	10.7	9.3	7.7	6.3	5	3.6	7.9	5.1	-0.7	-2.4	-1.8	0.8
2/16/2022	11:00:00 AM	56.6	55.1	53.2	50.5	47.7	44.8	41.8	39.3	35.7	33.7	31.7	29.6	28.1	27.4	27.1	25.6	29.1	25.6	20.7	17.4	14.2	12.3	12.5	11.8	11.1	10.2	8.3	9.3	14.7	7.7	8.7	15.6	1.4	-2.7	-1.2	0.3
2/16/2022	12:00:00 PM	49.2	47.5	45.4	43	40.8	38.6	37.3	36.9	36.6	36.6	36	35.9	34.8	33.9	34.5	36.5	37.7	33.3	29	30.3	25.4	17.7	14.5	24.8	12.6	9.2	9.9	7.1	7.3	5.6	10	11.9	2.5	-2.1	-1.7	0.6
2/16/2022	1:00:00 PM	45.3	43.5	41.4	38.9	37.3	34.7	31.3	28.9	25.2	23.2	20.6	19	19.4	21.5	21.5	20.5	28.6	25.7	20	14.3	9.7	9.5	15.4	27	31.1	22.2	21.2	19	13.6	9.2	18.5	8.4	0.9	-1.6	-1.4	2.2
2/16/2022	2:00:00 PM	41.9	40.1	38.2	36	35	33.4	31.9	29.5	26.3	23.8	20.7	18.9	19.9	21.5	21.5	20.3	28.7	26.1	20	14.2	9.5	9.3	9.9	9.3	9.2	9.1	8	7	6.1	7.6	6.8	7.3	5.3	1.2	2.1	19.1
2/16/2022	3:00:00 PM	65.9	64.9	63.5	61.6	59.9	57.7	55	52	49	45.7	42.7	40.3	38.8	38.2	33.7	31.2	31.8	29.5	26	23.6	21.8	22	22.9	22.7	21.9	20.5	18.2	14.9	11.8	9	7	5.3	3.3	1.1	1.5	3.6
2/16/2022	4:00:00 PM	64.7	63.7	62.1	59.9	57.8	55.3	52.4	49.5	46.6	43	40	37	34.1	31.9	30	27.5	30.4	28.6	23.4	20.1	18.7	20.1	21.2	20.6	19.2	17.2	14.6	11.7	9.1	7.1	5.6	4.2	2.1	-0.3	-0.2	1.7
2/16/2022	5:00:00 PM	51.8	50.5	48.7	46.9	44.4	41	38	35.4	32	29.3	26.9	24.7	22.9	23.3	23.1	20.8	28.7	27.1	20.3	15.5	11.8	13.8	15.9	18.9	23.2	15.9	8.9	7.3	9.2	6.2	4.1	4.6	-0.5	-3.1	-2.4	0.2
2/16/2022	6:00:00 PM	44.5	42.1	39.9	37.9	36.1	34.7	32.8	31.9	30.2	30	30.1	29.9	29.4	28.8	28.7	27.3	29.5	27.6	21.9	19.1	14.7	11.3	10.4	9.4	9.2	8.7	7.9	7	5.7	4.4	3	1.4	-0.6	-3.1	-2.5	0.2
2/16/2022	7:00:00 PM	47.9	45.9	44.4	40.6	37.9	36.5	33.8	31.4	28.9	28.2	26.8	26.2	26.1	24.4	23.6	21.1	28.7	26.8	20.2	16	10.6	9.8	10.2	9.5	9.2	8.7	7.8	6.9	5.7	4.4	3.1	1.5	-0.5	-3.1	-2.5	0.2
2/16/2022	8:00:00 PM	47.5	45.5	43.5	41.2	38.9	37.7	35.6	32.8	30.6	29.4	27.7	27.6	40.7	40.6	31.1	24.5	30.8	28.4	21.6	18.6	13	10.9	10.9	10.1	9.8	9.3	8.6	7.6	6.5	5.3	4.2	3.3	1.1	-1.4	-1.1	1.3
2/16/2022	9:00:00 PM	43.8	41.3	39.8	37.4	35.2	33.7	31.2	29.1	25	23.1	21.7	19.7	19.6	21.7	22.2	19.7	28.7	26.7	20	16.3	10.3	10.1	10.7	9.9	9.6	9.1	8.4	7.4	6.2	4.8	3.6	2.4	-0.1	-2.9	-2.4	0.2
2/16/2022	10:00:00 PM	43.1	41.7	39.1	36.7	35.6	32.9	31.3	28.3	25.7	25.7	24.1	20.9	19.5	21.4	22	19.4	28.6	26.7	20.1	16.6	10.4	11	11.7	10.7	10	9.3	8.5	7.6	6.4	5	3.6	2	-0.1	-3.1	-2.5	0.2
2/16/2022	11:00:00 PM	46.3	44.2	42.7	39.8	37.1	34.7	32.2	29.4	26.3	25.2	24.5	22.6	22.6	23.8	24.2	21.7	28.9	26.8	20.2	16.4	11	11	10.9	10	9.7	9.1	8.4	7.4	6.1	4.7	3.3	1.7	0.3	-3.2	-2.5	0.2
2/17/2022	12:00:00 AM	47.7	45.8	44.2	41.4	38.9	35.7	33.5	31.2	27.7	27.3	25.5	22.3	20.9	21.8	22.1	19.9	28.9	26.8	20.1	15	9.7	9.9	10.4	9.8	9.4	8.9	8	7	5.7	4.3	2.9	1.4	-0.6	-3.3	-2.6	0.2
2/17/2022	1:00:00 AM	44.5	43.5	41.9	39.2	36.7	34.3	32.5	30.1	26.9	25	22.8	20.8	19.2	21.2	21.7	19.7	29.1	27	20.1	14.9	10.1	13.6	12.5	9.6	9.3	8.8	8	7.1	5.8	4.5	3.2	1.6	-0.4	-3.2	-2.5	0.2
2/17/2022	2:00:00 AM	42.9	40.3	39.5	37.6	37	34.7	33.5	31.4	28.8	26.9	23.8	21.6	21.5	21.3	21.9	19.8	29.2	27.1	20.1	14.5	9.4	9.4	9.9	9.4	9.4	8.8	8	7.2	5.9	4.6	3.3	1.8	-0.2	-3.1	-2.5	0.2
2/17/2022	3:00:00 AM	33.4	31.2	32.1	31.7	31.9	30.7	28.5	29.2	22.1	21	19	17.3	17.8	20.5	21.6	19.7	28.9	26.8	19.9	14.3	9.3	9.5	10.1	9.6	9.4	8.8	7.9	6.8	5.6	4.3	3	1.6	-0.3	-3.3	-2.6	0.2
2/17/2022	4:00:00 AM	42.5	40	38.3	35.8	34.8	32.2	30.5	29.9	26.6	25.8	24.6	23.8	22.1	22	22.3	20.7	29.1	26.9	19.9	14.1	9.4	9.6	10.3	9.8	9.5	8.8	7.8	6.8	5.6	4.3	3	1.6	-0.2	-3.3	-2.6	0.2
2/17/2022	5:00:00 AM	50.2	47.5	44.5	41.7	38.9	35.6	33.1	31.2	27.6	25.8	24.1	22.3	21.2	22.2	22.3	20.5	29	26.8	20	14.1	10.2	10.5	11.4	11.8	11.6	9.3	8.3	6.8	5.8	4	2.7	1.4	-0.3	-3.2	-2.5	0.2
2/17/2022	6:00:00 AM	48.2	45.4	42.8	40	38	35.7	34.4	33.3	31.8	31.6	31.6	30.9	29.9	27.9	26.5	23.5	29.3	26.9	20.3	15	11.9	11.1	12	12.3	11.1	9.1	7.8	6.5	5.2	3.8	2.6	1.3	-0.4	-3.2	-2.5	0.2
2/17/2022	7:00:00 AM	43.6	41.6	39.1	37.6	36.8	34.6	33.5	32	30.1	31.5	30.1	26.8	24.5	23.8	22.7	20.6	29.3	27	19.7	13.4	9.5	9.9	10.7	10	9.5	8.6	7.5	6.7	9.1	9.1	21.8	15.9	0.1	-2.8	-2.5	0.3
2/17/2022	8:00:00 AM	32.5	32.4	35	35	36.1	35.8	34.8	33.1	30.8	30.8	29.1	29.5	31.1	34.4	32.6	28.3	31.5	29.6	27.7	23.7	22.7	22.4	20.7	24.4	26.3	24.2	26.1	24.3	24.9	25.2	24.9	22.9	20.8	16.1	11.3	10.3
2/17/2022	9:00:00 AM	43.3	41.7	41	38.3	37.5	35.8	33.3	32	28.9	28.7	27.2	25.4	22.9	22.6	21.5	20.5	29.6	26.8	19.8	13.5	8.7	8.8	9.8	9.2	8.8	8	6.9	5.7	6	5.5	2.1	0.5	-1.1	-2.9	-2.3	0.2
2/17/2022	10:00:00 AM	46.1	44	41.9	39.6	37.6	35	32.3	31.8	27.5	25.4	28.5	32.3	28.1	22.1	23.2	22.1	29.7	26.7	20.2	14.8	11.1	14.9	27.9	25.8	21.9	16.7	11.2	11.6	7.9	4.7	1.8	0.2	-1.5	-3	-2.2	0.2

2/17/2022	11:00:00 AM		48	45.9	43.6		41		39		37	35.7	34.4	33.1	32.9	32.7	32.6	31.1	30.3	28.9	25.7	30.4	27.4	21.2		16	11.4	12.2	22.5	23.5		23	11.7	9.6	9.9	9.9	9.9	28	14.3	3.8	-0.7	-1.6	0.6
2/17/2022	12:00:00 PM	56.3		54.7	52.3	49.9		47.6		44.2	41.2	38.7	36.3	34.4	32.7	31.2	29.7	28.6	25.8	23.9	30.5	28.2	21.7	15.9	11.5	10.3	11.9		12.7	8.2	6.1	5.2	4.1	3.4	5.4	5.9	-0.9	-2.2	-1.4	0.3
2/17/2022	1:00:00 PM	49		47.2	44.4	42.1		39.9		37.1	33.9	31.6	28.2	25.6	23.9	21.9	20.2	21.6	21.6	20.1	30.6	29	22.5	16.7	11.7	9.9	9.8	9.1	8.8	7.4	6	4.8	3.6	2.4	4	3.6	-0.2	-3	-2.2	0.2
2/17/2022	2:00:00 PM	43.5		40.8	38	37.2		34.9		32.8	30.3	29	26.1	24.3	22.9	21.2	20.3	22	22.1	20.7	31.4	29.9	23.1	17.6	12.2	10.6	10.8	10.5	9.7	8.4	7.1	6.2	5.1	4.1	19	3.3	-1.1	-2.9	-2.4	0.2
2/17/2022	3:00:00 PM	38		36.8	35	33.3		34.7		33.8	28	25.8	24	24	21.5	19.9	19.9	21.9	22.1	21.2	31.7	30	23.2	17.5	12.4	11.5	16.6	18.5		17.1	10.1	8.3	7.4	6	4.5	9.2	5.7	1.9	-2.5	-2.3	0.2
2/17/2022	4:00:00 PM	40.8		38.9	37.2	35.7		35.1		34	32.9	32.2	28.5	25.8	25.2	24.1	23.1	23.8	23.3	21.8	31.7	30	23.2	17.5	12.2	10.5	11.1	10.5		10.2	9.1	7.9	7.1	6.2	4.7	4.8	3.3	-0.3	-3	-2.4	0.2
2/17/2022	5:00:00 PM	46.9		44.5	42.8	39.3		37.5		34.6	32.3	30.9	28.5	28.1	28.2	28.3	27.2	27.2	26.8	24.3	31.6	29.9	23	17.2	12.4	11	11.1	11		10.4	9.3	7.9	6.8	5.6	4.3	2.8	1.2	-0.7	-3.1	-2.4	0.2
2/17/2022	6:00:00 PM	57.3		55.6	53.2	49.9		46.3		43.6	39.7	36.4	33.3	30.8	28.8	27.6	26.5	26.4	25.2	23.5	31.4	29.7	23.1	18	14	12.9	12.9	12.4		11.5	9.7	7.9	6.6	5.3	4	2.6	1.4	-0.1	-2.2	-1.6	0.5
2/17/2022	7:00:00 PM	57.5		55.3	52.7	49.2		46.1		42.4	38.6	35.7	32.5	30.6	28.8	29	26.5	26.2	26.6	23.2	31.4	29.4	23	17.6	13.5	12.6	12.7	12		11.3	9.5	7.7	6.4	5.1	3.9	2.5	1.3	-0.2	-2.2	-1.7	0.4
2/17/2022	8:00:00 PM	59.2		57	54.3	51.2		48.1		44.3	40.8	37.5	34.8	32.2	29.6	28.2	32.8	27.4	25.8	24.8	31.5	29.6	24.1	19	15.6	14.5	14.5	13.8		12.6	10.3	8.2	6.7	5.4	4.2	2.9	1.8	0.6	-1.5	-1.2	0.6
2/17/2022	9:00:00 PM	61.2		58.9	56.1	53.3		49.7		46.7	43.8	40.3	36.8	34	31.1	29.2	27	29	25.6	24.4	31.5	29.3	23.5	18.6	15	14.4	14.4	13.8		12.7	10.5	8.3	6.9	5.5	4.3	3	1.9	0.7	-1.4	-1	0.9
2/17/2022	10:00:00 PM	65.3		63.3	60.9	58.1		54.6		51.5	47.7	44.5	40.9	38.3	35.6	33.8	32.3	31.6	31.1	29.1	32.2	30.1	24.9	21	18	17.5	17.9	17.5		16.2	13.2	10.5	8.5	6.7	5.3	4.2	3.5	2.6	0.7	0.8	1.9
2/17/2022	11:00:00 PM	63.3		61.2	59	56		52.2		48.9	45.2	41.4	38.3	35.5	32.7	30.4	28.4	27.3	26.6	25.3	31.5	29.5	23.9	19.2	15.9	15.6	16.2	15.9		14.9	11.9	9.5	7.5	5.9	4.7	3.6	2.7	1.6	-0.4	0.1	1.6
2/18/2022	12:00:00 AM	53.7		51.5	49	46.5		43.1		39.5	37	34.9	31.9	31.2	29.4	29.5	28	26.5	25.4	23.8	31.5	29.5	22.8	17	12.1	11.1	11.1	10.5		10	8.8	7.4	6.3	5.1	3.8	2.4	1.1	-0.6	-2.9	-2.2	0.2
2/18/2022	1:00:00 AM	55.8		53.4	50.1	46.9		43.8		40.7	38.2	35.2	31.6	29.8	27.6	27.1	25.3	24.3	23.9	22.7	31.3	29.4	22.9	17.4	13.1	12.3	12.7	12.1		11.2	9.4	7.7	6.4	5.1	3.8	2.5	1.3	-0.2	-2.5	-1.8	0.5
2/18/2022	2:00:00 AM	49.4		47.1	43.8	40.9		38.6		36.1	34.1	32.4	29.3	29.3	28.7	28.8	28.6	28.6	27.4	25.8	31.8	30.4	24.3	19.4	15.3	11.4	10.6	10.1		9.8	8.8	7.4	6.3	5.2	3.8	2.5	1.1	-0.7	-3.1	-2.4	0.2
2/18/2022	3:00:00 AM	56.6		55.1	51.8	48.8		45.4		42.8	39.4	35.4	32.8	29.8	27.3	26.2	23.2	23.5	23.4	22.4	31.3	29.6	22.8	17.2	12.5	11.5	11.8	11.2		10.5	9	7.3	6.1	5	3.7	2.4	1.2	-0.3	-2.6	-2	0.3
2/18/2022	4:00:00 AM	47.4		45	42.9	40.7		36.9		34.5	32.4	30.4	26.6	25.2	24.5	25.6	25.3	22.8	22.8	22	31.4	29.4	22.8	17	11.5	10.4	10.6	10		9.7	8.7	7.3	6.3	5.1	3.8	2.4	1.1	-0.6	-3.2	-2.4	0.2
2/18/2022	5:00:00 AM	41.2		39.1	36.9	35.8		35.1		32.6	31.5	30.2	27.6	26.9	24.9	23.9	22.1	22.5	22.3	21.8	31.5	29.5	22.9	17.4	11.6	10.3	10.4	10.5		10.1	8.8	7.6	6.6	5.5	4.1	2.8	1.4	-0.4	-3.2	-2.5	0.2
2/18/2022	6:00:00 AM	35.1		34.7	34.7	34.5		34.8		32.8	31.8	31	28.9	29.2	28.7	28.4	27.7	27.9	27.4	25.7	31.9	29.3	23.7	19.7	16.2	12.8	11.2	13.1		11.8	9.2	9.3	10.9	11.4	13.7	21.8	16.4	6.8	2.4	-2.1	1.3
2/18/2022	7:00:00 AM	28.3		29.5	33.2	34.6		34.3		34.1	32.9	31.7	29.2	28.3	26.3	25.7	25.4	23	22.8	22.5	31.6	29.1	22.8	17.1	11.8	10.5	10.8	11.2		10.3	9	8	7.1	5.7	4.5	4.5	2.1	-0.3	-3.2	-2.6	0.2
2/18/2022	8:00:00 AM	30.9		32	35.5	36.4		37.8		36.5	34.2	33.9	30.3	27.7	25.7	24	21.2	22.4	22.1	22	31.5	28.9	22.7	17.2	11.7	10.4	10.8	13.9		17.6	14.3	10.5	9.2	6.6	7	4.4	4.1	5	-1.7	-2.2	0.3
2/18/2022	9:00:00 AM	41.7		40.4	39.2	38.1		37.7		36.5	34.9	33.8	31.8	31.2	28.8	26.3	24.8	23.5	22.1	21.9	31.4	28.6	22.6	17.3	11.5	10.1	10.1	11.9		12.1	8.8	7.8	7.4	8.6	7.6	17.3	13.7	5.4	-0.8	-1.5	0.5
2/18/2022	10:00:00 AM	48.9		47.2	46.5	43.4		41		38.3	35.4	33.1	29.2	26.7	25.6	23.9	22.6	23.5	22.9	22.4	31.2	28.7	23.2	18.5	12.9	11.5	24.6	24.3		20.9	12.5	10.4	10.3	12.9	12.7	17.3	15.3	6.6	-1.3	-1.6	0.3
2/18/2022	11:00:00 AM	53.2		51.6	49.4	47		44.2		41.5	38.3	35.5	32.3	30.1	29	28	27	26.1	24.8	23.5	31.1	28.7	23.7	19.2	13.7	11	13.3	17.4		14.4	9.1	8.1	8.3	9.3	9.9	12.8	9.8	4.9	-2.2	-1.8	0.4
2/18/2022	12:00:00 PM	50.8		48.9	46.5	44.1		41.2		38.4	35.1	32.3	28.7	25.9	24	22.5	21.9	23.2	22.6	21.8	30.8	28.7	23.6	18.9	12.9	10.2	9.6	9		8.7	8	7.5	8.5	9.2	9.1	11	7.8	1.5	-2.5	-2.1	0.2
2/18/2022	1:00:00 PM	52.8		50.5	48.5	47.1		45.8		43.8	40.6	37.8	34.9	30.6	27.4	24.1	22.5	22.5	22.1	21.3	30.5	28.5	24	19.5	13	10.5	12	10.3		9.2	7.9	6.4	5.5	4.8	3.5	1.9	0.2	-1.8	-3	-2.2	0.2
2/18/2022	2:00:00 PM	46		43.9	42.2	39.4		37.4		34	30.6	27.1	23.4	20.4	17.9	16.3	17.8	21.5	22.1	21.8	31.4	29.5	24.6	20.2	14.1	13	25	24.4		24.3	13.5	13.8	11.5	12.6	8.1	19.1	13.6	0.1	-2.7	-2.1	0.3
2/18/2022	3:00:00 PM	47.9		46.7	44.8	42.5		40.1		37.1	33.5	30.8	28.2	26.7	26.1	24.2	23	23.5	23.2	22.3	31.6	29.8	24.6	19.9	13.6	11.1	10.9	10.5		10.1	9.2	8.1	7.2	6.3	4.9	6.4	5.3	0.4	-2.7	-2.2	0.2
2/18/2022	4:00:00 PM	41.5		41.1	39	37.2		34.5		32.2	28.2	25.6	22.7	19.1	17.6	16.3	17.9	21.6	22.3	21.6	31.6	29.8	24.6	19.5	13.6	10.9	11	11		10.4	9.5	8.5	7.8	8.6	6.7	3.7	1.8	0.5	-2.9	-2.3	0.2
2/18/2022	5:00:00 PM	38.8		35.4	33.4	32.5		31.3		30	26.1	24.4	23	23.8	23.9	22.2	21.1	22.6	23.4	22.4	31.1	29.7	24.3	18.4	13.5	11.4	11.9	12.1		12.5	9.8	8.6	7.5	7	5.2	8.5	7.1	2.3	-2.7	-2.3	0.2

2/18/2022	6:00:00 PM	61.6	58.8	56.5	53.6	50.1	47	43.5	40	36.9	34.2	31.8	29.8	28.5	27.8	27.6	26.1	31.3	30.3	25.8	21.6	18.3	17.1	17.2	16.9	16	12.8	10.1	8.3	6.6	5.2	3.9	3.1	1.9	-0.1	0	1.1
2/18/2022	7:00:00 PM	66.8	64.8	62.5	59.6	56.5	53.3	50.1	46.8	43.5	40.5	37.6	35.2	33.3	32.2	30.9	29.3	32.1	31	27.3	23.8	20.9	19.9	20.1	19.7	18.7	15.6	12.4	10.3	8.2	6.7	5.5	5	4	2.3	2.4	3.6
2/18/2022	8:00:00 PM	65.1	63	60.6	57.8	54.5	51.2	47.9	44.3	40.9	38	35.3	32.8	31.8	30.6	29.2	27.4	31.7	30.4	26.1	22.2	19.1	17.9	18.3	17.9	17.2	14.1	11.1	9.3	7.4	5.9	4.6	4.1	2.8	0.9	1.2	2.4
2/18/2022	9:00:00 PM	64	61.8	59.1	56.5	53.1	49.8	46.5	42.5	39.3	36.3	33.6	31	29	28	27.4	26	31.5	30.2	25.5	21	17.7	16.4	16.6	16.1	15.2	12.4	9.6	8.2	6.6	5.3	4.1	3.5	2.1	0.2	0.4	1.7
2/18/2022	10:00:00 PM	64.1	62	59.7	56.9	53.4	50.4	46.9	43.5	40.7	37.5	34.8	32.6	30.7	29.5	28.7	26.9	31.6	30.3	25.6	21.3	17.9	16.7	17.1	16.7	15.9	13	10.2	8.6	6.8	5.5	4.2	3.6	2.2	0.2	0.6	2
2/18/2022	11:00:00 PM	63.7	61.4	59.1	56	53	49.3	45.8	42.1	38.8	35.7	32.8	30.4	28.4	27.7	27.3	25.9	31.4	30.1	25.5	21.2	17.7	16.5	16.7	16.2	15.2	12.2	9.6	8.1	6.6	5.3	4	3.6	2.2	0.2	0.3	1.4
2/19/2022	12:00:00 AM	58.8	56.5	53.9	50.6	47.3	44.5	41.2	37.9	34.8	32.4	29.5	27.4	25.9	25.4	25.2	23.7	31.1	29.7	24.5	19.5	15	13.4	13.7	13.2	12.6	10.2	8.1	7	5.7	4.3	2.9	1.8	0.3	-1.7	-1.2	0.6
2/19/2022	1:00:00 AM	56.3	54.5	51.8	49	46.3	42.4	39.2	36.7	33.7	32.1	30.7	29.1	27.8	27.2	26.9	25.4	31.2	29.6	24.4	19.3	14.6	12.2	12.1	11.7	11.3	9.4	7.6	6.7	5.5	4.1	2.5	1.3	-0.4	-2.4	-1.8	0.3
2/19/2022	2:00:00 AM	60.4	57.8	55.2	52.8	49.1	45.6	41.9	38.5	35.3	32.2	29.2	26.9	25.3	24.9	24.9	23.7	31.5	29.9	24.4	19.5	15.2	13.5	13.3	12.8	12.2	10.1	8	7	5.7	4.4	3	2	0.5	-1.5	-1.1	0.6
2/19/2022	3:00:00 AM	57.2	56.6	53.8	51.5	48.4	45.3	42.9	39.6	36.5	33.9	31.4	29.5	27.8	26.8	26.3	24.8	31.6	30	24.2	19.1	14	12.2	12.1	11.6	11.2	9.5	7.8	6.8	5.5	4.3	2.7	1.4	-0.3	-2.3	-1.6	0.7
2/19/2022	4:00:00 AM	50.3	47.7	45.6	43.2	40.7	37.3	34.3	32.2	28.7	25.9	23.3	21.5	20.6	22.2	22.7	21.6	31.6	30.1	24.2	19	13.3	11.4	11.3	10.7	10.4	9.2	7.9	7.1	5.9	4.6	3	1.4	-0.5	-3	-2.4	0.2
2/19/2022	5:00:00 AM	44.2	41.5	39.6	37.3	35.5	32.6	29.7	30.5	26.1	24.8	23.3	22.3	21.8	23	23.1	21.8	31.5	30.3	24.2	18.9	13.2	11	11.1	11.9	14	10.2	7.8	7	5.9	4.6	3	1.4	-0.6	-3.2	-2.5	0.2
2/19/2022	6:00:00 AM	27.3	27.2	29.9	30.6	32.1	30.3	29.1	31	27.7	28.2	27.7	27	26.7	26	25.4	23.6	31.3	30.2	24.3	19	13.5	10.7	10.4	12.4	12.7	9.4	8.7	9.9	10.1	7.7	10.5	8.4	4	-1.4	-2.1	0.2
2/19/2022	7:00:00 AM	30.5	30.2	32.5	33.2	32.8	30.6	29	31.3	26.5	26	26.1	24.8	24.1	24.2	24.1	22.5	31.3	30.2	24.3	18.4	13.2	10.4	10.5	12.7	15.2	9.7	9.3	7.9	6.5	5	8.5	6.5	2.2	-1.9	-2.4	0.2
2/19/2022	8:00:00 AM	29.7	29.5	32.9	33.3	33.9	30.9	27.2	32.8	23.1	22.7	23.6	21.6	20.2	21.7	22.1	20.5	30.7	31.2	24.8	18.3	12.7	11.6	20.4	22	23.1	13.4	12.8	10.9	9	5.8	10.9	9	-0.8	-3.4	-2.5	0.2
2/19/2022	9:00:00 AM	36.4	34.7	34.6	33	32.9	30.5	27.1	31.2	22.9	22.8	22.5	20.6	19.9	21.6	22.2	20.5	30.7	31.3	24.8	18	12.3	9.9	15.4	16.7	18.2	12.6	15.7	11.3	8.1	7.8	12.6	11.1	4.4	-2.7	-2.1	0.2
2/19/2022	10:00:00 AM	44.2	42.3	39.9	37.8	36	33	29.8	31.9	25.4	25	24.9	25.9	36.7	35.5	26.6	24.7	31.2	31.1	24.6	18.3	12.4	9.4	13	10.9	12	8.4	8.6	8.3	8.8	8	7	4.4	-0.6	-2.9	-2.2	0.2
2/19/2022	11:00:00 AM	46.5	44.4	42.1	39.6	37.5	34.3	31.9	30.9	27.8	27	26.2	25.3	24.6	26.3	29.3	30.4	30.6	30.7	24.6	18.8	13.1	9.2	9.9	9.8	9.3	7.9	7.4	6.1	4.2	3.4	8.9	4.5	1.8	-3	-2.2	0.2
2/19/2022	12:00:00 PM	60.4	59.2	57.5	54.4	52.2	49.7	47.1	43.9	40.7	37.9	35.3	32.9	30.9	29.6	28.1	25.2	29.9	30.8	25.1	19.6	14.4	11.4	10.7	9.9	9.5	8.2	7	7	7	5.7	8.8	4.9	0.7	-2	-1.4	0.6
2/19/2022	1:00:00 PM	64.8	63.3	61.4	59.4	56.8	53.9	51.1	47.9	44.7	41.9	39.2	36.8	34.3	32.3	30.7	28.3	30.5	31.1	26.2	21.4	16.6	14.1	14.1	13.9	14.1	10.3	7.4	5.9	4.4	3	4.6	2.7	0.1	-0.6	-0.1	1.5
2/19/2022	2:00:00 PM	62.5	61.5	59.7	57.3	54.2	51.7	48.4	45.4	42.1	39.4	36.8	34.4	32.1	30.2	28.7	26.2	30.3	31.2	25.7	20.2	15	12.4	12.5	12.1	12.2	9.5	7.5	6.4	4.9	3.7	3.5	2.7	0.1	-1.5	-1.1	0.6
2/19/2022	3:00:00 PM	59.3	58	55.9	54.4	52.2	49.1	46	42.6	39.7	36.1	33.5	31	28.7	29.3	27.7	29.3	30.2	31.1	25.4	19.9	14.1	11.2	11.6	11.3	10.9	9.2	7.6	6.7	5.5	4.3	3	1.5	-0.6	-2.1	-1.6	0.5
2/19/2022	4:00:00 PM	46.4	43.6	41.2	38.4	35.4	33.2	30.9	30.2	29	29.4	29.7	29.5	27.8	26	24.7	21.4	30	31.1	25	18.8	13.1	10.5	11.9	13.1	17.6	20.1	24.2	23.2	14.1	16.6	12.3	8.3	3.4	-0.6	-1.5	0.3
2/19/2022	5:00:00 PM	44.9	42.7	39.4	36.8	35	31.9	28.8	26.5	23.6	21	19.5	18.8	19.1	21.4	22.4	19.6	29.7	30.8	24.8	19	12.9	10.1	10.9	10.7	11.4	11.7	13.5	11.6	7	5.8	3.6	1.6	-0.8	-2.9	-2.3	0.2
2/19/2022	6:00:00 PM	39	37.8	35.7	33.9	33.1	30.5	29	29.2	27.2	27.4	27.5	27.2	26.9	25.3	24.6	21.5	29.7	30.8	24.9	19.6	13.3	10.8	11.3	10.9	11	9.8	8.4	7.6	6.4	5	3.3	1.4	-0.7	-3	-2.4	0.2
2/19/2022	7:00:00 PM	57	54.8	52.2	49.1	45.6	42.5	38.7	35.2	31.8	28.8	26.8	24.9	23.5	23.6	24.1	21.7	29.9	30.8	25.1	19.6	14.1	12.5	13.7	13.5	13.2	11	8.9	7.8	6.3	5	3.4	1.8	0	-2	-1.6	0.4
2/19/2022	8:00:00 PM	61.2	59.2	56.3	53.3	50	46.5	42.9	39.7	36.3	33.2	31	28.9	27	26.3	25.9	23.7	29.9	30.6	25.3	20.2	15.5	14.5	16.1	16.1	15.8	12.9	10	8.4	6.6	5.2	3.7	2.4	0.8	-0.9	-0.6	1.2
2/19/2022	9:00:00 PM	57.5	54.9	52.8	50.9	47.2	44.2	40.6	37.7	34.4	31.5	29.7	28.7	27	26.4	26.4	24	30.4	31.1	25	19.3	14.1	12.3	13	12.4	11.9	10.1	8.3	7.4	6.2	4.8	3.3	1.8	-0.1	-2.1	-1.6	0.6
2/19/2022	10:00:00 PM	52	49.2	47.7	44.4	41.2	38	34.7	32.7	28.9	26.6	25.1	23.7	22.4	23.2	23.5	20.9	30	30.5	24.9	20.2	13.4	12.2	13.5	13.1	12.3	10.1	8.2	7.3	6	4.7	3.1	1.5	-0.4	-2.5	-2.1	0.2
2/19/2022	11:00:00 PM	52.3	50.7	48.5	46.3	42.4	39.2	35.9	34.2	31.1	29.1	27.6	25.8	24.4	24.6	24.6	21.6	30.1	30.8	24.9	19.1	13.1	11.5	12.4	11.9	11.2	9.4	7.8	7.1	5.8	4.5	3	1.3	-0.5	-2.5	-2	0.3
2/20/2022	12:00:00 AM	55.3	53.8	50.5	47.8	44.4	41.2	37.4	35.7	32.8	31.5	30.4	29.4	28.5	28.1	28.7	30.8	32.8	31.8	26.5	21.4	16.3	13.6	14.6	14.3	13.4	10.9	8.8	7.5	6	4.6	3.1	1.6	-0.2	-2.1	-1.6	0.4

2/20/2022	1:00:00 AM	53.8	52.7	51.6	49.6	47.5	44.4	41.2	39	34.9	31.6	29	25.5	23.1	23.3	23.4	21	30.5	31.2	25.1	18.8	13.4	11.4	11.8	11.2	10.8	9.4	8.1	7.3	6.1	4.8	3.3	1.7	-0.2	-2.3	-1.9	0.3
2/20/2022	2:00:00 AM	56.2	54.9	53.3	51.1	49.3	46.1	43.6	41.3	36.9	33.7	30.5	27.5	25.1	24.4	24.2	21.9	30.5	31.2	25	18.5	13.6	11.6	11.9	11.5	11.6	10.5	8.9	7.6	6.2	4.8	3.3	1.8	0.1	-1.9	-1.5	0.5
2/20/2022	3:00:00 AM	58.1	56.9	55.3	52.9	50.8	47.2	44.5	42.5	38.3	35.4	32.4	29.7	27.2	25.8	25	22.7	30.4	31	25.1	18.7	13.5	11.6	12	11.4	11	9.3	7.7	6.8	5.6	4.3	2.9	1.5	-0.3	-2.1	-1.3	0.6
2/20/2022	4:00:00 AM	49	47.9	45.9	43.7	41.6	38.3	35.5	35.2	28.6	25.6	24.7	21.5	20.5	22.2	22.6	20.1	30.3	30.9	24.7	18	12.5	10.6	11.2	10.9	10.9	9.7	8.4	7.6	6.5	5	3.5	1.6	-0.4	-2.8	-2.3	0.2
2/20/2022	5:00:00 AM	30	28.8	29	31.4	31	28	26.6	32.7	21.2	19.2	19.7	17.5	18.4	21.3	22.2	19.8	30.2	30.7	24.5	17.6	12.3	10.4	11	11.2	12.6	9.8	8.4	7.5	6.4	5	3.3	1.5	-0.6	-3.1	-2.5	0.1
2/20/2022	6:00:00 AM	43.3	42.7	40.2	37.6	35.6	32.7	29.8	29.9	27	26.5	26.6	25.5	25.2	25.5	26	23.8	30.8	30.8	24.7	18	12.9	11	12.3	17.6	17.1	16.4	22.9	21.9	12.3	14.1	9.8	7.5	2.9	-1.3	-1.6	0.3
2/20/2022	7:00:00 AM	49.2	47.6	45.8	43.7	41.3	38.1	36.7	34.6	32.7	31.7	31.7	31	29.5	29.3	29.3	27.4	31	31	24.9	18.2	13.2	12.7	24.6	22.2	22.1	20.8	25.2	25	15.5	16.3	20	15	7.6	2.2	-0.5	0.6
2/20/2022	8:00:00 AM	57.4	55.8	54.1	51.9	49.8	46.5	43.4	40.5	37.3	34.2	31.7	30.1	26.3	25.7	25.9	22.5	30.3	31	24.9	19.3	14.8	14.2	22.9	24	25.8	18.7	22.9	22.7	13.9	13.2	13.6	13.5	2.2	-0.9	-1.1	0.6
2/20/2022	9:00:00 AM	57.2	55.5	54.2	52.2	50	47.4	44.5	40.9	37.3	34.7	32.5	30.2	28.5	27.7	27.1	24.9	30.2	30.8	25.2	19.6	14.6	13.1	19.5	20.3	20.1	15.8	19.7	16.1	8.4	9.4	4.4	2.3	-0.1	-1.5	-1.3	0.4
2/20/2022	10:00:00 AM	64.5	63.2	62.2	60.4	58.2	56.3	54.1	51.2	48.6	45.7	42.7	39.8	37.3	34.8	32.5	30.1	31.3	31.4	27.5	24	19.3	17.9	20.3	21	22.1	16.3	15.3	11.8	9.4	6.8	4.4	3.1	1.7	0.8	1.1	2.6
2/20/2022	11:00:00 AM	68.4	67.2	66	64.5	62.8	61.1	58.6	56.5	54.2	51.1	48.6	46	43.2	40.6	37.9	35.3	34.3	33.5	30.4	27.4	24.3	23	23.3	23.5	23.3	21.6	20	18.1	15.6	12.8	13.4	11.8	8	5.2	4.9	5.6
2/20/2022	12:00:00 PM	67.7	66.5	65.4	64.3	62.7	60.8	58.6	56.2	53.6	50.7	47.7	45	42.2	39.5	37	34.5	33.6	33.2	30.1	26.8	23.5	22.3	23.1	23	22.5	20.6	18.6	16.3	13.3	10.5	8.1	6.5	4.9	4	4.1	5.1
2/20/2022	1:00:00 PM	74.7	73.7	72.9	71.7	70.1	68.8	66.9	65.1	63	60.8	58.5	56	53.6	51.3	48.6	46.1	43.8	41.8	39.5	36.8	33.7	31.8	31.3	31.2	30.9	29.4	28.1	26.7	24.7	22.4	20.1	18.1	15.8	13.7	12.7	13.3
2/20/2022	2:00:00 PM	72.1	71	69.8	68.4	66.8	65	62.9	60.6	58.3	55.7	53.1	50.4	47.6	45	42.2	39.6	37.8	36.3	33.9	31.2	27.7	26	25.9	25.8	25.4	23.7	21.9	20	17.5	14.7	12.8	10.9	9	7.7	7.7	9.1
2/20/2022	3:00:00 PM	71	69.8	68.6	67.1	65.1	62.9	60.5	57.8	55.3	52.4	49.3	46.8	44	41.4	38.9	36.6	35.3	34.3	31.6	28.6	24.6	23.1	23	22.9	22.3	20.1	18	15.7	13.2	10.7	8.7	7.6	6.5	5.6	5.9	7
2/20/2022	4:00:00 PM	71	70	68.7	67.3	65.4	63	60.8	58.3	55.5	52.8	49.8	46.9	44.1	41.5	39	36.7	35.5	34.6	31.9	28.6	24.7	23.2	23.1	22.8	22.3	20.2	18	15.8	13.1	10.5	8.6	7.5	6.4	5.5	5.5	6.5
2/20/2022	5:00:00 PM	63.3	61.9	60.7	59.4	57.1	55	51.9	48.8	46.2	43.2	40.7	37.3	34.9	32.7	31.3	28.3	30.2	30.6	26.1	23.8	18.8	17.1	17.5	17.5	16.8	15	13.6	11.9	9.6	7.4	5.9	4.8	3.1	1.5	1.2	2.2
2/20/2022	6:00:00 PM	68.2	67.1	66.1	64.5	62.9	61.1	59.1	57.1	54.6	52.2	49.5	47.1	44.8	42.3	39.5	36.9	35.5	34.3	31.1	28.4	25.2	23.8	24.1	24.2	23.9	22.5	21.3	19.5	17.3	15	12.8	10.8	8.7	6.6	5.9	6.2
2/20/2022	7:00:00 PM	69.9	68.8	67.4	66	64.5	62.3	60	57.4	54.7	51.9	49	46.3	43.6	41	38.5	36.2	35.2	33.8	30.9	28.6	25.5	25.1	25.9	26.1	26	24.6	23.1	20.8	18.1	15.2	12.7	10.5	8.5	6.7	6.4	7.5
2/20/2022	8:00:00 PM	69.4	68.1	66.9	65.1	63.1	60.8	58.1	55	51.8	48.7	45.6	42.6	39.6	37.2	35.5	33	32.9	32.4	29	27.1	23.7	23.7	24.5	24.5	24	22.2	20	17.2	14.2	11.8	9.8	8.2	6.3	4.1	3.9	5.3
2/20/2022	9:00:00 PM	65.7	64.5	63.1	60.8	58.6	55.9	52.8	49.8	46.4	43.5	40.7	38.1	35.7	34.2	32.9	30.4	31.2	30.8	26.7	25	20.5	20.8	21.9	21.7	21.2	18.9	16.4	13.6	10.8	8.8	7	5.3	3.3	0.7	0.5	1.7
2/20/2022	10:00:00 PM	57.9	55.5	54	51.5	49	46.2	42.4	40.5	36.7	33.8	31.7	29.5	27.6	26.9	26.1	23.1	28.7	29	23.9	22.6	14.9	15	16.3	16.3	15.7	13.5	11.5	9.6	7.9	6.6	5.4	4.1	2.7	0.6	0.7	3.7
2/20/2022	11:00:00 PM	48.3	46.5	44.2	42	41.6	36.8	34.1	36.3	29.6	26.5	25.9	24.4	22.9	24	23.7	19.2	28.3	28.3	22.6	21.1	11.3	9.8	10.7	10.5	10.2	9.3	8.3	7.5	6.5	5.6	4.9	3.9	2.9	1.1	1.5	4.9
2/21/2022	12:00:00 AM	43.6	41.5	39.2	37.7	38.1	33.1	31.4	37.1	29.2	28.1	28.6	27.9	27.5	27.4	26.7	23.9	29	28.8	23	19.9	12	9	9.7	9.5	9.4	8.6	7.5	6.7	5.5	4.3	3.1	1.5	-0.1	-2.2	-1.5	1.5
2/21/2022	1:00:00 AM	47.3	45.9	43.4	41.5	39.6	36.5	33.8	37.8	29.4	26.5	27	25.2	23.9	25.6	25.5	20.2	29.3	29.3	22.5	15.1	9.8	8.3	9.2	9	9.1	8.4	7.4	6.5	5.4	4.2	3.2	2.1	0.9	-0.9	-0.1	2.9
2/21/2022	2:00:00 AM	46.4	45.3	43.3	41	41.8	36.3	34	38.1	30.1	26.9	28.9	25.7	23.7	25.2	24.4	19.6	28.1	27.3	20.2	13.8	7.8	7.3	8.6	8.5	8.7	8	7	6	5.1	4.7	4.9	4.6	4.7	3.7	4.6	9.2
2/21/2022	3:00:00 AM	43	40.4	38.5	36.5	37.3	31.7	30.3	36.2	27	23.3	25	23.1	20.9	23	22.8	19.5	27.6	25.6	17.9	11	6	6.5	8.2	8	8.2	7.7	6.6	5.4	4.6	4.8	5.4	5	4.7	3.1	3.9	10.6
2/21/2022	4:00:00 AM	45	42.4	39.7	36.4	33.8	30.5	27.4	28.4	25	23.9	24.5	24.9	24	24.4	23.6	21.4	27.3	24.2	16.7	8.9	5.2	6.1	7.9	7.6	7.8	7	5.7	4.4	3.3	3.1	3.6	3.4	3.8	3.1	4.5	8.3
2/21/2022	5:00:00 AM	39.9	37.6	35.8	33.9	33.1	30.3	29	32.3	29.8	28.8	30.3	30.1	30.4	29.4	28	27.4	28.9	23.5	21.2	17.6	11.1	6.6	7.8	9.6	9.7	6.7	5	3.3	2.1	1.7	1.9	1.1	0.9	-0.3	1.2	7.4
2/21/2022	6:00:00 AM	34	32.2	30.7	30.3	31.1	29.4	26.6	32.4	26.6	27.2	28.6	27.1	27.4	28	26.8	23.3	25.1	20.8	14.6	10.7	6.8	6.1	7.5	8.3	9	6.4	4.7	3.1	1.9	1.4	4.9	2.9	0.6	-2.1	-0.7	6.3
2/21/2022	7:00:00 AM	36.4	33.7	32.2	31.8	31.8	30.8	30.3	33	31.8	33.3	34	33.8	33.2	33	32.6	30	27.6	22.8	17.2	14.8	10	6.7	7.8	7.8	9.1	8.7	9.9	8.9	11.1	12.5	17.3	11.8	1.9	-3.3	-2.8	0.2

2/21/2022	8:00:00 AM		29	27.9	27.6	29.2	28.6	26.1	23.5	26.2	20	21.4	22.6	17	28.1	23.2	20.7	17.9	24.2	20.6	13.3	4.7	5.2	8	8.9	10.9	14.6	16.9	20.6	19.9	9.6	12.4	15	9.1	3.1	-2.2	-2.1	0.5
2/21/2022	9:00:00 AM	39.3		37.6	35.6	33.7	31.2	29.1	27	25.4	24.5	24.9	25.8	26	26.7	26.9	27	23.9	24.8	21.5	14.4	6.9	4.7	6	7.8	8.5	9.4	10.9	14.9	11.1	6.7	6.5	10	7.8	0.1	-1.2	-1.5	0.5
2/21/2022	10:00:00 AM	42.2		40	38	35.9	33.7	31	28.7	26.2	24	24.1	23.9	22	22.3	21.9	22.1	18.9	25.5	23.3	16.5	8.3	4.9	6.9	13.4	13.2	11.9	8.2	10	10.5	4.7	4.1	5.5	2.9	-0.7	-2	-1.7	8.3
2/21/2022	11:00:00 AM	44.3		43.1	41.3	38.5	36.3	34.2	34	33.4	31.7	30.8	30.4	30.5	30.5	29.6	28.6	26.4	28.5	26.8	21.9	20.3	15.9	10.8	8.5	7.7	7.7	6.8	5.5	4.6	3.5	2.1	1	0	-1.1	-2.8	-1.9	0.6
2/21/2022	12:00:00 PM	66.4		65.4	64.5	62.8	61	58.7	56.5	53.3	50.6	47.7	45.5	43	40.4	38.5	36.9	35.6	34.3	31.9	28.6	25.6	22	19.5	19.1	18.8	18.5	17.8	15.8	13.8	13.3	12.7	12.7	11.2	11.4	10	10.7	13.6
2/21/2022	1:00:00 PM	49.5		47.2	45.2	42.8	40.4	36.8	34	31.9	28.6	27.2	27.2	26.6	26.8	27.7	26.7	24.7	30	27.8	19	12.6	9.4	8.4	9.9	10.7	9.9	8.3	8.1	8.1	9.1	10	12.2	10.9	2.8	-0.7	-1.5	0.3
2/21/2022	2:00:00 PM	45.1		43.2	40.9	38.5	36.1	33	30.1	27.7	26.3	25.9	25.4	25.4	25.3	26.2	25.1	22.8	30.1	28.5	20	13.3	9	8.9	9.7	9.5	9.4	8.4	7.2	11.5	17.9	15.6	16.8	13	2.2	-2.2	-1.5	1.2
2/21/2022	3:00:00 PM	65.9		64.8	63.3	61.6	59.4	56.7	54.3	51.5	48.7	45.8	43	42	40.9	44.9	39	33.4	36.5	31.6	30.7	26.3	23.7	23.1	18.6	16.7	16	13.2	11.3	9.7	8.1	6.6	17.5	14.7	6	2.4	0.7	2.6
2/21/2022	4:00:00 PM	63.1		61.5	60.1	58.4	56.1	54.2	52	48.6	46.5	43.2	40.7	37.4	35	32.9	30.7	28.4	31.1	29.7	24.1	19.8	17.2	17.6	18.7	18.8	18.3	16.6	14.5	11.7	10	8.2	6.8	4.4	1.6	-0.7	0.5	2.7
2/21/2022	5:00:00 PM	64.9		63.8	62.5	61	59.5	57.4	54.7	52.1	49.2	46.6	43.8	41	38.4	36.4	38.5	34.1	31.8	30.3	25.9	22.3	19.2	18.7	19.4	19.4	18.7	16.8	14.8	12.5	10.1	7.5	6.6	4.5	5.2	1.4	1.5	4
2/21/2022	6:00:00 PM	60.5		59.5	58.7	55.9	54	51.9	49.1	46.1	42.8	39.9	37.1	34.7	32.3	32.2	32.6	28	30.4	28.8	23.2	19	15.5	14.1	14.4	14.1	13.2	11.5	9.6	7.8	6	4.3	3.2	2.2	1.3	-0.3	0.6	3.4
2/21/2022	7:00:00 PM	63.7		62.7	61.6	60.2	58.2	56.1	54	51.2	47.9	46	42.3	40.4	38.8	36.3	32.9	31.2	32.2	30.2	26.2	21.9	17.4	15.7	15.6	15.3	14.7	13	11.4	9.4	7.4	5.3	3.9	2.6	1.4	-0.5	0.3	3.1
2/21/2022	8:00:00 PM	58.8		57.6	56.4	55.3	53.6	52.2	50.1	47	43.8	41.8	39.1	36.6	34.9	33.3	32.3	30.5	31.6	29.5	24.9	21.7	17.5	14.1	12.7	12.3	12	10.6	9.2	7.7	6	4.2	2.9	1.5	-0.2	-2.6	-2	0.4
2/21/2022	9:00:00 PM	64.6		62.6	59.8	57.4	53.9	50.3	46.9	43.5	40.3	37	34.2	31.6	29.5	28.4	27.5	25.6	29.9	28.2	22.1	17.7	16.1	16.6	17.2	16.6	15.2	12.2	9.6	7.6	6	4.6	3.6	2.6	1.5	-0.9	-0.5	1
2/21/2022	10:00:00 PM	66		64.3	62	59.1	56	52.7	49	46	42.6	39.6	37.1	34.9	33.2	31.9	31	28.9	30.6	28.9	23.7	19.9	18.4	19	19.8	19.3	17.9	14.9	12	9.4	7.2	5.5	4.5	3.6	2.8	0.4	0.5	1.8
2/21/2022	11:00:00 PM	59.6		57.2	54.7	51.8	48.1	44.4	41.6	38.9	36.5	34.9	34.3	33.7	32.9	32.1	32.5	36.1	36.6	31.9	27.2	22	14.9	11.9	11.7	11	10	8.4	7	5.9	4.9	3.7	2.6	1.5	0	-2.3	-1.8	0.5
2/22/2022	12:00:00 AM	47.8		45.2	42.5	39.8	36.3	32.9	30.2	27.9	26.2	26.1	26.6	26.2	26.4	27.3	25.8	23.5	29.6	27.8	20.5	13.5	9.4	8.9	9.4	9.1	8.8	7.8	6.7	5.8	4.8	3.5	2.4	1.1	-0.6	-3	-2.4	0.2
2/22/2022	1:00:00 AM	57.7		55.7	53.4	50.6	47.5	44.5	41.1	38.4	35	32.4	29.9	27.8	26	25.5	24.9	22.9	29.6	27.9	21.1	15.2	13.4	14.6	15.9	15.3	13.8	11.5	9.2	7.2	5.7	4.3	3.1	1.8	0.3	-1.9	-1.3	0.9
2/22/2022	2:00:00 AM	56.7		54.7	53	49.7	47.1	43.9	40.5	37.7	34.1	31.7	30.1	27.8	26.3	26	25.2	23.1	29.5	27.8	21	15.6	13.6	15.5	17.1	16.5	14.8	12.2	9.8	7.6	5.9	4.4	3.2	2.1	0.8	-1.1	-0.4	1.9
2/22/2022	3:00:00 AM	56.2		54.2	52.5	49.7	47.3	44.2	40.9	38.8	34.8	31.9	30	27.8	26.2	26.3	25.7	22.4	29.4	27.5	20.2	14.4	12	14	15.5	14.9	12.8	10.5	8.4	6.7	5.4	3.9	3	1.9	0.9	-1	0	3
2/22/2022	4:00:00 AM	48.3		46.7	44	41.5	39.2	35.6	33.4	33.4	27.9	26.2	26.1	24.7	24.2	25.3	24.2	21.7	29	26.8	18.9	12.7	8.1	8.9	9.8	9.4	8.9	8.1	7	6	4.8	3.4	2.6	1.5	0.2	-1.8	-0.9	1.8
2/22/2022	5:00:00 AM	56.3		53.8	51.3	48.5	45.8	42.2	39	37.2	33.2	30.5	28.4	25.8	24.2	24.1	23.3	21.5	28.4	25.6	17.9	11.7	10.9	13.1	14.7	15	14.2	10.1	7.8	6	4.7	3.5	3.2	2.5	1.9	0.5	1.5	3.7
2/22/2022	6:00:00 AM	54.5		53.1	50.7	49.4	46.6	43.9	42.2	37.8	34.8	32	29.1	27.5	25.4	24.8	23.9	21.9	28.1	25.4	17.9	12.9	10.5	12.3	21.1	21.7	21.1	11.5	9	7.5	5.7	4	11	8.9	3.6	-1.9	-2	0.5
2/22/2022	7:00:00 AM	64.2		62.9	61.2	59.1	57.6	54.7	52.3	49.3	46.9	43.9	41.2	38.5	36.6	34.6	32.3	30.1	30.3	28.1	23.7	20.2	18	18.5	20.3	20	18.8	16.8	14.9	12.5	9.6	7.2	14	13.6	6.5	2.6	3.3	6.5
2/22/2022	8:00:00 AM	56.4		53.8	51.1	48.2	45.3	41.9	39.7	36.1	34	32.1	31.3	31.2	30.8	32	35.8	34.5	31.9	29.5	23.4	25	26.4	26.6	22	24.4	23.9	22.8	26.3	22.6	20.6	25.6	20.7	21.8	19.2	17.6	14.6	10.5

WM16: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	7:49:34 AM	44.8092	18.58038	72.10997	32.75564	25.98111	21.96374
4/5/2022	8:00:00 AM	40.4371	20.51032	64.7354	40.07571	33.87212	27.58345
4/5/2022	9:00:00 AM	47.15675	19.94434	70.4274	40.46499	30.64873	24.56371
4/5/2022	10:00:00 AM	59.46294	20.09663	85.31194	54.57335	31.40531	24.50036
4/5/2022	11:00:00 AM	48.19846	19.69876	73.58752	39.91784	28.80584	23.36486
4/5/2022	12:00:00 PM	43.73727	17.68095	69.14048	39.19461	28.52714	21.88937
4/5/2022	1:00:00 PM	42.493	16.93342	66.88532	37.22232	27.62714	20.99254
4/5/2022	2:00:00 PM	41.5751	15.34884	65.42326	37.01486	26.55587	20.0302
4/5/2022	3:00:00 PM	39.75147	14.4371	65.83684	36.88521	26.45885	19.63062
4/5/2022	4:00:00 PM	35.69792	15.67316	58.06304	37.51549	28.54305	21.38536
4/5/2022	5:00:00 PM	45.96276	14.45969	68.01798	39.42784	29.46647	21.82286
4/5/2022	6:00:00 PM	46.51863	8.824893	73.91561	38.22036	23.63983	16.90327
4/5/2022	7:00:00 PM	37.78353	10.78787	64.96008	33.11729	25.23257	17.78639
4/5/2022	8:00:00 PM	30.18602	21.10076	43.96305	33.00797	28.64082	25.08933
4/5/2022	9:00:00 PM	31.98178	23.36386	46.35795	34.632	30.59696	27.46417
4/5/2022	10:00:00 PM	29.77386	20.71419	44.44997	32.45445	28.45043	25.18482
4/5/2022	11:00:00 PM	28.25877	18.08913	41.83921	31.10937	26.45789	22.99941
4/6/2022	12:00:00 AM	30.19513	17.18034	59.48191	32.25976	27.45019	21.83901
4/6/2022	1:00:00 AM	27.4612	18.72119	41.45958	30.04379	26.04075	22.90285
4/6/2022	2:00:00 AM	31.5746	15.63862	63.52749	32.06359	26.05152	21.69478
4/6/2022	3:00:00 AM	26.11415	13.90052	38.62078	29.25339	24.14052	19.27801
4/6/2022	4:00:00 AM	32.89504	20.90426	64.14852	32.4282	28.37346	24.71937
4/6/2022	5:00:00 AM	42.94278	17.91789	69.18597	29.93224	23.92303	21.12114
4/6/2022	6:00:00 AM	49.18353	17.12382	69.57887	49.5132	26.06895	20.81103
4/6/2022	7:00:00 AM	52.61158	19.12037	73.2415	51.51025	28.47454	23.74479
4/6/2022	8:00:00 AM	55.86049	21.95361	75.07917	44.6531	30.85295	26.55484
4/6/2022	9:00:00 AM	50.40043	13.47199	68.3573	37.20853	21.03902	17.80921
4/6/2022	10:00:00 AM	50.70773	13.76658	73.75318	29.10291	20.28963	17.72345
4/6/2022	11:00:00 AM	35.15676	15.53645	59.4892	28.48539	22.23198	19.60031
4/6/2022	12:00:00 PM	28.77329	15.73166	54.40224	27.79176	22.21661	19.52537
4/6/2022	1:00:00 PM	32.47908	15.44888	57.63306	29.22731	22.03003	19.21468
4/6/2022	2:00:00 PM	25.97139	13.87776	53.41254	26.23826	20.20168	17.49783
4/6/2022	3:00:00 PM	39.37674	13.10087	68.38647	26.47823	19.62556	16.9411
4/6/2022	4:00:00 PM	44.14342	11.94501	70.50545	21.56756	17.72931	15.15816
4/6/2022	5:00:00 PM	43.07008	7.886661	68.46713	26.92285	17.41583	13.86068
4/6/2022	6:00:00 PM	53.96101	2.441196	82.87825	30.4352	14.18719	9.210781
4/6/2022	7:00:00 PM	40.74286	6.665071	65.37035	27.94718	17.97407	12.87318
4/6/2022	8:00:00 PM	23.60114	10.94793	39.16166	25.64641	19.99128	16.50555
4/6/2022	9:00:00 PM	21.35687	8.859281	35.22415	24.06491	18.96132	14.59478
4/6/2022	10:00:00 PM	26.29525	12.94743	40.47704	29.12512	24.33695	19.37275

4/6/2022	11:00:00 PM	26.37881	15.48995	38.51818	29.26696	25.02016	21.10721
4/7/2022	12:00:00 AM	27.90162	17.20223	38.25691	31.16071	26.23758	21.97808
4/7/2022	1:00:00 AM	21.77869	13.22859	37.0306	24.14359	20.44314	17.72041
4/7/2022	2:00:00 AM	28.1783	17.49472	42.7546	30.09001	25.93846	22.10063
4/7/2022	3:00:00 AM	30.42761	18.92618	41.11273	33.38618	29.4593	23.78782
4/7/2022	4:00:00 AM	30.69515	20.35732	42.30817	33.82034	28.89364	25.08461
4/7/2022	5:00:00 AM	37.24341	25.02512	62.86482	33.86658	31.12654	28.5336
4/7/2022	6:00:00 AM	57.6001	24.37086	76.72868	57.2088	31.23309	27.99633
4/7/2022	7:00:00 AM	52.57025	24.62451	77.5046	50.02567	31.44536	28.68376
4/7/2022	8:00:00 AM	52.09075	22.75345	83.59706	35.37105	29.79528	26.86727
4/7/2022	9:00:00 AM	48.49377	16.51862	67.82121	37.53384	25.43874	20.62872
4/7/2022	10:00:00 AM	44.96078	9.802353	66.54777	30.10823	19.85885	14.66528
4/7/2022	11:00:00 AM	41.76571	7.137867	64.4302	25.49646	16.65327	11.53553
4/7/2022	12:00:00 PM	35.67214	9.438653	63.77871	25.12257	17.65768	13.72833
4/7/2022	1:00:00 PM	24.86318	11.59068	49.75576	24.39991	18.49229	15.12616
4/7/2022	2:00:00 PM	32.70105	11.11396	59.02464	27.96189	19.61613	15.48024
4/7/2022	3:00:00 PM	42.2542	10.42517	66.77369	27.14204	17.91498	14.2374
4/7/2022	4:00:00 PM	42.62301	9.19133	66.17123	26.20197	15.85445	12.63912
4/7/2022	5:00:00 PM	49.30116	6.622702	73.15685	43.05753	14.7407	11.23254
4/7/2022	6:00:00 PM	54.34104	0	82.55892	38.17658	16.95404	7.503871
4/7/2022	7:00:00 PM	46.67614	1.800251	69.71579	32.07731	14.67257	8.240173
4/7/2022	8:00:00 PM	19.54449	6.208873	33.49416	21.94455	17.60536	11.69961
4/7/2022	9:00:00 PM	21.04997	9.716931	40.79527	22.92721	18.24484	14.69351
4/7/2022	10:00:00 PM	23.41245	14.42513	38.291	25.84967	21.72427	18.86396
4/7/2022	11:00:00 PM	21.89602	12.19705	38.04681	23.87635	19.72985	17.12606
4/8/2022	12:00:00 AM	25.11766	9.864016	39.29773	27.82519	23.30935	16.73069
4/8/2022	1:00:00 AM	27.55319	17.8001	42.38926	30.61313	25.22903	21.71631
4/8/2022	2:00:00 AM	30.62642	22.07005	43.98693	33.11352	29.20858	26.13698
4/8/2022	3:00:00 AM	33.76287	22.45009	62.98816	34.12803	30.71856	27.60023
4/8/2022	4:00:00 AM	33.2091	23.91725	46.33577	35.85349	31.64227	28.32407
4/8/2022	5:00:00 AM	42.53468	21.15668	70.68726	32.35934	27.8077	24.7808
4/8/2022	6:00:00 AM	51.37568	21.42916	73.26958	49.61039	28.74496	25.05983
4/8/2022	7:00:00 AM	45.50645	21.33559	77.214	33.90485	29.56834	25.57035
4/8/2022	8:00:00 AM	54.16971	19.53463	75.46805	46.87301	26.07036	23.09885
4/8/2022	9:00:00 AM	50.90025	16.95934	68.71211	47.33569	24.78791	21.13891
4/8/2022	10:00:00 AM	54.94447	16.68937	85.0798	51.16006	24.41378	20.53592
4/8/2022	11:00:00 AM	45.59094	11.25332	66.9727	29.25849	21.4685	17.16497
4/8/2022	12:00:00 PM	39.60219	12.922	64.53837	35.85471	25.64632	18.28847
4/8/2022	1:00:00 PM	51.03697	13.14919	73.96977	35.07262	23.83373	18.07236
4/8/2022	2:00:00 PM	51.32271	13.82476	81.01808	39.68791	28.35599	20.02381
4/8/2022	3:00:00 PM	58.16589	14.60137	84.28558	46.14074	34.87773	24.31571
4/8/2022	4:00:00 PM	51.60297	10.71922	82.26891	42.48235	30.48868	19.11238
4/8/2022	5:00:00 PM	39.5152	13.59398	66.24822	37.25785	27.1294	19.73096

4/8/2022	6:00:00 PM	42.11084	13.07742	66.48316	38.56474	28.18713	19.60141
4/8/2022	7:00:00 PM	35.34102	9.153791	60.90744	33.84114	24.21391	15.70146
4/8/2022	8:00:00 PM	23.39926	5.613466	44.09901	25.99366	16.90766	11.44391
4/8/2022	9:00:00 PM	31.70351	8.157419	59.9377	27.35375	18.24248	13.50082
4/8/2022	10:00:00 PM	32.59387	10.79265	49.49803	36.55025	26.74391	16.86094
4/8/2022	11:00:00 PM	35.15686	18.65771	52.42173	38.54127	31.54449	26.06841
4/9/2022	12:00:00 AM	29.55416	12.66752	47.13786	32.77412	24.14993	19.15075
4/9/2022	1:00:00 AM	31.11829	19.28387	47.49837	33.90253	28.82086	24.27431
4/9/2022	2:00:00 AM	29.45907	19.99747	43.75718	32.44175	27.27166	23.79786
4/9/2022	3:00:00 AM	28.68332	19.40709	43.65484	31.32071	26.88258	23.6771
4/9/2022	4:00:00 AM	32.50997	23.72242	44.79918	35.33068	31.00517	27.68507
4/9/2022	5:00:00 AM	38.4073	28.12979	64.01383	39.70198	35.49524	32.4196
4/9/2022	6:00:00 AM	48.39304	24.13237	71.24679	40.72242	33.93614	29.35135
4/9/2022	7:00:00 AM	64.57394	21.86578	89.64298	54.10125	33.42193	28.22271
4/9/2022	8:00:00 AM	69.16832	18.01012	90.57365	60.39297	27.27608	21.57207
4/9/2022	9:00:00 AM	54.61661	14.84044	77.11553	50.43622	22.48609	19.03394
4/9/2022	10:00:00 AM	39.1775	16.52927	64.73776	35.8486	27.01468	21.30271
4/9/2022	11:00:00 AM	54.51052	19.78856	82.52709	44.76574	36.73303	27.74114
4/9/2022	12:00:00 PM	57.36397	17.11878	86.51846	43.0341	32.54198	23.62454
4/9/2022	1:00:00 PM	42.67523	16.70562	68.55142	40.69868	30.89133	22.88342
4/9/2022	2:00:00 PM	40.90864	14.05253	69.4387	38.03296	27.42662	19.80539
4/9/2022	3:00:00 PM	36.40818	14.36315	66.10927	35.89868	25.51441	19.23428
4/9/2022	4:00:00 PM	45.23561	12.89941	72.36444	37.92441	27.11698	18.82731
4/9/2022	5:00:00 PM	39.88711	15.1511	64.75826	43.1237	33.22083	23.46278
4/9/2022	6:00:00 PM	39.57627	16.8564	57.10711	43.6032	33.94335	24.21868
4/9/2022	7:00:00 PM	48.83872	12.38695	80.30774	37.64745	26.93039	19.72624
4/9/2022	8:00:00 PM	29.07452	19.99108	45.57286	31.17315	26.49601	23.68791
4/9/2022	9:00:00 PM	32.15995	22.14319	55.93948	32.89895	29.35979	26.44926
4/9/2022	10:00:00 PM	30.08293	21.59677	43.41766	32.59564	28.85418	25.79467
4/9/2022	11:00:00 PM	30.88754	21.98608	43.75144	33.28545	29.88957	26.77462
4/10/2022	12:00:00 AM	31.24184	22.36422	43.16838	33.75075	30.19206	27.10115
4/10/2022	1:00:00 AM	29.95845	20.39805	46.10922	32.4022	27.96257	24.77441
4/10/2022	2:00:00 AM	27.86687	16.53007	43.579	31.09889	24.87916	20.69314
4/10/2022	3:00:00 AM	22.5972	11.93789	42.29104	24.7361	19.97375	16.73547
4/10/2022	4:00:00 AM	24.24982	12.1508	38.99426	27.5652	21.49036	17.12624
4/10/2022	5:00:00 AM	40.32208	9.763056	66.82073	28.65976	21.14748	14.40647
4/10/2022	6:00:00 AM	59.58258	6.49602	87.10404	56.50488	22.59003	13.0541
4/10/2022	7:00:00 AM	53.33963	8.093358	69.91221	55.45007	18.50102	13.31874
4/10/2022	8:00:00 AM	50.605	9.520209	69.91782	45.64959	19.2497	14.65582
4/10/2022	9:00:00 AM	44.61692	10.56105	67.54783	30.61589	21.78705	16.82089
4/10/2022	10:00:00 AM	63.02382	9.764392	90.07057	29.09835	20.02497	15.03884
4/10/2022	11:00:00 AM	55.33884	12.46086	80.15012	32.43076	21.75246	16.93815
4/10/2022	12:00:00 PM	48.10589	12.33876	73.44528	33.75814	23.54249	17.47144

4/10/2022	1:00:00 PM	43.69156	12.70727	73.08098	33.97386	23.52844	17.39162
4/10/2022	2:00:00 PM	42.2577	11.93201	67.73385	30.8756	21.28905	16.56636
4/10/2022	3:00:00 PM	31.76484	12.58368	59.89217	29.87166	21.12033	17.05797
4/10/2022	4:00:00 PM	38.56946	10.18301	64.71869	29.60578	19.76145	14.99742
4/10/2022	5:00:00 PM	26.41504	8.116853	46.08486	28.73192	18.30971	13.25606
4/10/2022	6:00:00 PM	58.50711	#NUM!	88.04505	28.1147	13.43067	4.386818
4/10/2022	7:00:00 PM	40.66018	#NUM!	75.56866	25.30017	13.34262	4.045362
4/10/2022	8:00:00 PM	25.66189	14.92678	40.1954	28.54413	23.36886	19.81006
4/10/2022	9:00:00 PM	24.07754	12.99735	38.14916	27.10293	22.17855	18.39121
4/10/2022	10:00:00 PM	19.40344	0	37.26733	22.61279	11.50582	7.480579
4/10/2022	11:00:00 PM	22.97845	0	41.932	23.65804	11.4959	5.204112
4/11/2022	12:00:00 AM	24.54089	0	44.18106	24.54787	14.39095	9.718613
4/11/2022	1:00:00 AM	16.82607	7.150273	34.47131	18.66766	14.21446	11.36027
4/11/2022	2:00:00 AM	33.2703	6.810199	66.4201	28.03099	16.71959	11.82094
4/11/2022	3:00:00 AM	22.88566	11.6551	38.87804	26.09116	19.45552	15.69803
4/11/2022	4:00:00 AM	37.52881	13.50904	53.92766	41.75314	32.48216	20.19135
4/11/2022	5:00:00 AM	35.54654	13.90084	61.28069	34.75355	25.52681	19.27062
4/11/2022	6:00:00 AM	42.32637	14.48124	67.8639	36.82562	27.35046	19.64395
4/11/2022	7:00:00 AM	42.67112	17.33531	69.78217	41.20564	31.21035	23.2333
4/11/2022	8:00:00 AM	41.09471	23.01622	56.39731	45.14444	36.68499	29.27152
4/11/2022	9:00:00 AM	38.09396	16.94234	59.68452	41.9099	31.93335	21.86981
4/11/2022	10:00:00 AM	42.1584	14.50665	61.60743	46.56452	26.69757	19.43723
4/11/2022	11:00:00 AM	43.13264	21.191	61.45531	46.67045	37.44436	29.34069
4/11/2022	12:00:00 PM	43.40442	20.79441	62.32788	46.99272	37.17709	28.04855
4/11/2022	1:00:00 PM	50.45834	30.29644	65.10681	54.44656	46.48477	38.66053
4/11/2022	2:00:00 PM	49.17706	28.23393	65.22538	52.85119	46.13222	38.47104
4/11/2022	3:00:00 PM	46.41107	24.44576	60.95304	50.26393	43.01487	34.49737
4/11/2022	4:00:00 PM	49.10721	26.74066	62.89772	53.08346	45.7544	36.77712
4/11/2022	5:00:00 PM	40.13635	10.97453	58.33775	43.86221	25.42007	15.9118
4/11/2022	6:00:00 PM	38.24884	10.67524	55.74913	42.72903	27.82878	15.95938
4/11/2022	7:00:00 PM	30.2323	6.50203	48.50111	33.43541	23.2514	14.22676
4/11/2022	8:00:00 PM	40.0172	13.95899	58.39498	43.68766	31.92656	20.867
4/11/2022	9:00:00 PM	43.94401	13.36765	60.94831	47.70721	36.16827	22.27853
4/11/2022	10:00:00 PM	42.25136	16.53181	59.64289	46.26676	37.78565	27.78778
4/11/2022	11:00:00 PM	44.35551	17.88945	58.57	48.43247	40.23224	29.45409
4/12/2022	12:00:00 AM	42.58555	15.26098	57.43768	46.75648	37.74126	26.41517
4/12/2022	1:00:00 AM	39.83397	17.40644	55.53789	43.76864	34.32383	24.84303
4/12/2022	2:00:00 AM	38.79265	15.75049	53.73548	42.84803	33.59852	24.98948
4/12/2022	3:00:00 AM	28.04902	8.622898	44.81863	31.76387	21.62893	14.019
4/12/2022	4:00:00 AM	39.01403	12.60696	57.10156	43.01325	31.87333	19.65765
4/12/2022	5:00:00 AM	42.88691	21.14976	57.12927	46.75449	39.24683	31.11697
4/12/2022	6:00:00 AM	42.18025	20.85471	57.13565	46.18265	38.41482	30.62473
4/12/2022	7:00:00 AM	46.59146	27.21608	59.64178	50.29702	44.07073	36.71188

4/12/2022	8:00:00 AM	48.30469	30.31406	60.75873	51.94056	45.9475	39.21554
4/12/2022	9:00:00 AM	45.87519	21.47436	59.72037	49.72041	43.07368	34.12336
4/12/2022	10:00:00 AM	36.43203	11.55887	54.10154	40.46155	29.38294	19.91855
4/12/2022	11:00:00 AM	34.39892	10.07507	54.05793	37.6628	26.29755	17.83631
4/12/2022	12:00:00 PM	35.57374	10.57271	53.22085	39.57927	28.64887	18.08262
4/12/2022	1:00:00 PM	35.15804	9.971886	51.8925	39.17637	27.61331	16.76425
4/12/2022	2:00:00 PM	33.77229	8.519491	52.36315	37.31237	25.35245	15.23168
4/12/2022	3:00:00 PM	30.40071	5.105215	50.41959	33.81439	20.10967	13.52063
4/12/2022	4:00:00 PM	36.67146	11.17127	54.46243	40.42055	29.88979	19.97758
4/12/2022	5:00:00 PM	33.20656	7.158131	52.5843	36.92415	24.50243	15.96849
4/12/2022	6:00:00 PM	30.73129	4.483006	51.36317	33.27185	20.96026	12.57491
4/12/2022	7:00:00 PM	45.23368	#NUM!	69.27864	25.97222	11.01631	4.713046
4/12/2022	8:00:00 PM	19.69444	0	42.66623	21.58747	13.12493	6.927874
4/12/2022	9:00:00 PM	22.50229	4.714338	43.41525	23.64054	15.57873	10.57285
4/12/2022	10:00:00 PM	22.51674	2.921858	41.89656	25.41627	16.64492	9.86503
4/12/2022	11:00:00 PM	29.11584	6.073688	47.25506	32.78429	20.25116	12.67033
4/13/2022	12:00:00 AM	34.33025	12.27025	53.32836	37.66494	28.10343	20.05844
4/13/2022	1:00:00 AM	32.78619	7.366759	52.47254	36.43316	25.52937	15.37027
4/13/2022	2:00:00 AM	26.23226	6.545432	45.96375	29.48804	19.72066	13.0017
4/13/2022	3:00:00 AM	31.09668	7.461854	52.20126	34.01297	22.52807	13.85087
4/13/2022	4:00:00 AM	30.39456	9.304603	48.72255	33.94053	23.60784	15.81566
4/13/2022	5:00:00 AM	34.12649	10.41538	51.17282	37.8799	27.18169	19.01323
4/13/2022	6:00:00 AM	30.58285	6.259902	52.34205	32.53203	20.60248	13.41416
4/13/2022	7:00:00 AM	42.7132	10.5094	65.23428	39.12796	30.19371	21.54652
4/13/2022	8:00:00 AM	36.92696	13.59151	59.94463	38.26949	30.31818	22.26184
4/13/2022	9:00:00 AM	36.1662	12.88449	52.79785	39.84246	30.11694	20.51494
4/13/2022	10:00:00 AM	31.84444	10.18242	48.94666	35.47334	24.48104	16.67751
4/13/2022	11:00:00 AM	43.8351	13.22839	72.95362	41.67029	31.9346	20.53622
4/13/2022	12:00:00 PM	33.40391	12.30321	50.95972	37.26253	27.76625	19.59205
4/13/2022	1:00:00 PM	49.1901	12.32669	75.98903	37.64979	25.51973	18.07722
4/13/2022	2:00:00 PM	34.83189	13.86085	53.43112	38.51184	28.8154	20.68311
4/13/2022	3:00:00 PM	40.26642	11.94129	64.51521	36.77495	26.52911	17.81814
4/13/2022	4:00:00 PM	41.6933	13.50296	64.82483	35.69331	24.06624	18.75235
4/13/2022	5:00:00 PM	32.06987	13.63401	52.24731	35.15632	24.80519	18.8177
4/13/2022	6:00:00 PM	33.16254	9.78809	53.48465	35.8627	25.94911	18.35057
4/13/2022	7:00:00 PM	49.73109	7.353989	72.71535	32.07581	20.31091	13.36173
4/13/2022	8:00:00 PM	25.06162	8.031102	42.23546	28.4248	18.89362	13.03358
4/13/2022	9:00:00 PM	31.45317	8.567935	53.24612	33.46993	23.24457	15.77634
4/13/2022	10:00:00 PM	27.74687	8.324063	49.18152	30.51432	20.62328	14.13488
4/13/2022	11:00:00 PM	31.84979	6.063318	53.57573	33.90966	21.67362	11.96321
4/14/2022	12:00:00 AM	32.77893	13.09914	50.5333	36.18291	28.30998	21.26717
4/14/2022	1:00:00 AM	24.99527	10.27205	43.98329	27.70456	19.23675	14.86238
4/14/2022	2:00:00 AM	25.7834	11.32127	44.91933	28.41732	20.16085	15.23037

4/14/2022	3:00:00 AM	28.67107	13.84834	45.50431	31.85574	23.54848	18.11978
4/14/2022	4:00:00 AM	33.4774	13.78157	51.68762	37.20517	28.43449	19.41526
4/14/2022	5:00:00 AM	40.87665	19.98357	55.75231	44.61147	37.88346	30.28093
4/14/2022	6:00:00 AM	39.51909	22.51378	58.13897	43.20491	36.21474	29.80733
4/14/2022	7:00:00 AM	36.90739	18.87741	55.20467	40.64096	33.06889	25.34063
4/14/2022	8:00:00 AM	34.63899	17.12337	57.72471	37.44387	28.43934	22.59218
4/14/2022	9:00:00 AM	52.77625	20.43063	80.13343	44.37311	35.75687	28.32597
4/14/2022	10:00:00 AM	51.10743	18.22343	73.2678	43.71993	35.70073	27.91874
4/14/2022	11:00:00 AM	52.3126	18.25698	78.23353	42.41946	33.79292	25.85179
4/14/2022	12:00:00 PM	52.10457	19.40483	79.37792	43.36143	33.95544	26.0646
4/14/2022	1:00:00 PM	40.59224	17.96329	69.33947	38.09464	29.29005	22.9024
4/14/2022	2:00:00 PM	37.731	15.32085	60.51897	38.80448	26.55343	20.93094
4/14/2022	3:00:00 PM	41.18003	17.56616	66.42326	44.60812	33.68175	23.22102
4/14/2022	4:00:00 PM	35.58207	18.96493	56.52145	38.52073	29.14886	23.3293
4/14/2022	5:00:00 PM	41.05128	13.26006	62.46454	36.34374	24.65706	18.31437
4/14/2022	6:00:00 PM	31.25354	14.72947	49.75544	34.61154	26.31968	20.51498
4/14/2022	7:00:00 PM	37.27815	17.67721	62.08186	33.93371	27.00659	22.71203
4/14/2022	8:00:00 PM	37.74121	19.61766	53.7021	41.27964	33.11459	26.59098
4/14/2022	9:00:00 PM	40.618	19.6355	55.32458	44.3848	36.46323	29.31525
4/14/2022	10:00:00 PM	35.39623	16.54136	52.66546	38.828	31.18897	24.52954
4/14/2022	11:00:00 PM	35.92986	14.49454	53.83742	39.80059	30.48413	22.06102
4/15/2022	12:00:00 AM	35.25011	14.71433	50.09578	39.26842	30.24779	21.84573
4/15/2022	1:00:00 AM	33.90035	16.92359	49.83182	37.68669	29.75589	22.32144
4/15/2022	2:00:00 AM	34.43257	16.01633	50.9347	37.88538	29.91629	23.16655
4/15/2022	3:00:00 AM	28.37024	14.08978	48.25382	31.03469	22.23339	19.10436
4/15/2022	4:00:00 AM	30.95724	17.06117	49.47653	32.51584	24.55602	20.57619
4/15/2022	5:00:00 AM	38.34423	13.13628	65.83847	34.97172	25.16584	17.69806
4/15/2022	6:00:00 AM	54.88245	12.68916	76.36741	43.28617	27.23002	19.18584
4/15/2022	7:00:00 AM	51.3243	10.80487	68.38517	52.55334	24.2341	17.17261
4/15/2022	8:00:00 AM	63.20827	10.55687	88.93339	34.96147	21.0958	15.34376
4/15/2022	9:00:00 AM	45.48407	12.78749	72.62885	30.24647	20.79361	16.92132
4/15/2022	10:00:00 AM	43.4979	13.64224	65.53409	36.62918	24.08667	18.56914
4/15/2022	11:00:00 AM	51.39643	15.96438	80.37099	33.42026	25.98489	20.97803
4/15/2022	12:00:00 PM	37.85612	14.1182	64.89257	31.14034	22.74432	17.8869
4/15/2022	1:00:00 PM	42.8176	13.6807	66.74934	33.7733	23.43368	18.49732
4/15/2022	2:00:00 PM	33.55504	14.1028	61.69131	34.95791	24.11999	18.47344
4/15/2022	3:00:00 PM	40.67333	13.83742	70.48683	31.8821	23.21216	18.91055
4/15/2022	4:00:00 PM	35.88224	13.6995	68.75807	29.82811	22.41688	18.23131
4/15/2022	5:00:00 PM	50.61461	11.51967	71.33163	47.76789	19.728	15.04678
4/15/2022	6:00:00 PM	32.23795	6.060891	61.0218	30.42955	17.14065	11.29731
4/15/2022	7:00:00 PM	42.84141	7.342967	66.85084	28.54164	17.28767	12.20025
4/15/2022	8:00:00 PM	28.16398	9.370218	45.03847	31.35357	24.75247	18.57212
4/15/2022	9:00:00 PM	26.19481	10.81684	43.15105	29.06352	22.46077	17.29416

4/15/2022	10:00:00 PM	28.74985	10.85968	42.75557	31.91673	26.6755	18.10931
4/15/2022	11:00:00 PM	25.5008	11.04256	42.15334	29.05944	20.66189	15.70598
4/16/2022	12:00:00 AM	18.39832	9.267604	36.91813	20.38103	15.8723	13.08698
4/16/2022	1:00:00 AM	28.15784	10.53561	56.55614	28.10012	21.78891	17.64234
4/16/2022	2:00:00 AM	25.42005	12.79399	41.29603	28.26202	21.9052	18.05714
4/16/2022	3:00:00 AM	21.63104	8.694533	42.55769	23.21564	18.73818	14.73006
4/16/2022	4:00:00 AM	25.40813	14.77909	47.61872	28.56508	22.27692	18.99976
4/16/2022	5:00:00 AM	27.64663	13.29233	55.50244	25.38876	20.59728	17.64554
4/16/2022	6:00:00 AM	56.21741	12.58639	73.41982	43.99929	23.04744	17.67614
4/16/2022	7:00:00 AM	60.10886	13.37664	90.21201	56.80863	24.28138	19.97214
4/16/2022	8:00:00 AM	53.57138	17.53637	74.91324	51.28251	25.07674	21.55039
4/16/2022	9:00:00 AM	43.45576	17.99153	66.51073	29.10303	24.38629	21.44719
4/16/2022	10:00:00 AM	33.23864	16.00093	51.69853	37.47465	24.13267	20.00966
4/16/2022	11:00:00 AM	42.19369	21.8739	65.38725	45.10896	36.7852	29.32906
4/16/2022	12:00:00 PM	48.94065	21.87871	70.7868	47.04927	39.17416	30.68655
4/16/2022	1:00:00 PM	46.06159	23.56233	64.59184	49.6554	42.44217	34.88291
4/16/2022	2:00:00 PM	50.40014	26.81786	74.31009	50.54448	43.31357	35.20764
4/16/2022	3:00:00 PM	47.73902	19.11406	71.9392	46.88283	38.50341	28.74622
4/16/2022	4:00:00 PM	41.91578	20.60013	57.92267	45.98002	36.71979	27.74279
4/16/2022	5:00:00 PM	43.01861	19.75565	61.58475	46.85563	38.19381	26.65026
4/16/2022	6:00:00 PM	40.09425	15.18989	63.59078	41.83394	31.82009	23.75195
4/16/2022	7:00:00 PM	36.39562	12.26292	61.40272	34.52079	23.22683	17.07385
4/16/2022	8:00:00 PM	33.47212	14.92273	53.46483	36.8257	25.67483	19.99193
4/16/2022	9:00:00 PM	39.64159	20.43291	56.04594	43.67926	34.59385	27.03532
4/16/2022	10:00:00 PM	36.95729	18.58786	54.18871	40.84375	31.39368	24.13645
4/16/2022	11:00:00 PM	36.36562	17.10748	52.89243	40.19915	30.6208	23.2837
4/17/2022	12:00:00 AM	34.092	15.33439	50.15871	37.8217	27.82962	21.16728
4/17/2022	1:00:00 AM	30.30004	12.52518	49.30652	33.4406	23.64407	17.61548
4/17/2022	2:00:00 AM	27.62497	8.77327	47.95721	30.07057	20.13315	13.89454
4/17/2022	3:00:00 AM	28.61373	9.915866	52.21211	29.5792	20.28528	14.81174
4/17/2022	4:00:00 AM	18.57114	9.173055	34.62285	21.05166	16.73309	13.12199
4/17/2022	5:00:00 AM	48.59193	7.541847	78.68089	30.3216	16.81302	11.82311
4/17/2022	6:00:00 AM	59.52326	9.222516	77.70174	55.33084	23.03247	15.15016
4/17/2022	7:00:00 AM	56.07404	10.02736	75.60576	59.18109	20.63353	15.04216
4/17/2022	8:00:00 AM	53.65728	10.30661	71.50627	56.54929	19.7551	15.1794
4/17/2022	9:00:00 AM	50.89132	12.40781	74.2965	33.25251	21.49849	16.60041
4/17/2022	10:00:00 AM	43.36073	14.32985	68.08256	31.48959	22.53009	18.99178
4/17/2022	11:00:00 AM	30.57946	15.55005	53.57879	32.68877	23.67767	19.49741
4/17/2022	12:00:00 PM	47.44818	15.7197	77.91807	34.50308	24.45215	19.54617
4/17/2022	1:00:00 PM	57.18898	14.90211	77.2627	51.4636	23.3695	19.21927
4/17/2022	2:00:00 PM	52.84865	14.06201	73.93603	36.18091	24.10816	18.59327
4/17/2022	3:00:00 PM	42.05232	13.02024	63.1999	34.87441	24.53087	17.78447
4/17/2022	4:00:00 PM	44.80133	9.379379	68.09805	27.64714	17.60377	13.11956

4/17/2022	5:00:00 PM	48.73275	8.652532	68.90103	33.54945	17.89217	13.20287
4/17/2022	6:00:00 PM	51.04871	2.327648	74.09454	26.69921	15.41143	9.253357
4/17/2022	7:00:00 PM	39.02979	2.889593	70.90704	26.61519	15.04712	9.282832
4/17/2022	8:00:00 PM	30.45735	16.63852	57.11677	32.41415	26.71616	22.08845
4/17/2022	9:00:00 PM	23.98078	11.23366	39.13389	26.88971	20.62551	17.0409
4/17/2022	10:00:00 PM	24.37425	13.36367	40.60109	27.48725	21.45211	17.99493
4/17/2022	11:00:00 PM	28.8192	12.42828	62.04824	24.83962	20.28459	17.10131
4/18/2022	12:00:00 AM	32.87005	15.85151	66.36148	30.12573	24.3838	20.65243
4/18/2022	1:00:00 AM	30.10742	17.41376	52.37776	29.9907	25.29273	22.11192
4/18/2022	2:00:00 AM	25.77772	16.54627	38.8616	28.77056	23.63324	20.61732
4/18/2022	3:00:00 AM	37.28345	18.14377	69.09997	29.14144	25.10108	22.2595
4/18/2022	4:00:00 AM	37.90089	22.13276	69.02305	33.47836	28.85218	25.68979
4/18/2022	5:00:00 AM	57.56233	23.95224	82.14256	36.23853	30.24594	27.40518
4/18/2022	6:00:00 AM	61.86651	24.40435	86.74437	60.70895	31.55025	27.91081
4/18/2022	7:00:00 AM	57.58928	25.08796	84.9911	56.74722	33.40091	29.53163
4/18/2022	8:00:00 AM	47.51458	23.11176	68.31429	40.4827	31.717	27.51689
4/18/2022	9:00:00 AM	36.16305	21.02292	58.35391	35.72669	28.90963	25.23372
4/18/2022	10:00:00 AM	30.27654	15.41247	54.48498	28.99559	24.22207	21.01536
4/18/2022	11:00:00 AM	36.29054	14.30407	60.38841	30.05382	22.82119	18.64269
4/18/2022	12:00:00 PM	34.94118	15.28627	51.98965	38.95552	30.18034	22.5276
4/18/2022	1:00:00 PM	37.28305	14.2216	56.01855	40.8611	31.21369	21.4265
4/18/2022	2:00:00 PM	46.63683	15.2702	67.58716	40.52133	30.51465	21.6408
4/18/2022	3:00:00 PM	51.77466	11.38217	73.48755	35.138	23.57178	16.88105
4/18/2022	4:00:00 PM	53.33456	10.46318	82.97338	40.01406	26.54214	16.57569
4/18/2022	5:00:00 PM	52.04761	10.42471	75.22819	42.44085	23.10487	15.72896
4/18/2022	6:00:00 PM	36.60173	9.828302	62.30074	37.47263	25.77303	17.18998
4/18/2022	7:00:00 PM	39.09616	13.3144	62.34693	41.07937	30.16014	20.81894
4/18/2022	8:00:00 PM	37.81478	16.6797	54.78177	41.68113	32.6639	24.53556
4/18/2022	9:00:00 PM	39.65749	20.52837	57.2995	43.48292	36.18502	28.32481
4/18/2022	10:00:00 PM	41.63958	23.3273	54.49247	45.34263	39.14799	32.53837
4/18/2022	11:00:00 PM	35.79091	14.24415	50.93866	39.84609	31.34908	21.60567
4/19/2022	12:00:00 AM	33.71343	14.57745	49.81906	37.55733	29.24095	21.50285
4/19/2022	1:00:00 AM	19.21126	6.152121	38.04281	21.81139	14.46628	10.43006
4/19/2022	2:00:00 AM	22.16671	6.164575	52.671	22.92219	14.1537	10.35492
4/19/2022	3:00:00 AM	28.58396	11.93329	47.75374	31.73732	23.62924	17.74781
4/19/2022	4:00:00 AM	35.57692	14.01981	59.65001	38.27345	25.44948	18.98876
4/19/2022	5:00:00 AM	42.61713	12.83542	65.69006	39.66381	27.27447	18.4362
4/19/2022	6:00:00 AM	54.11636	10.81898	75.89008	53.36976	22.94475	15.59536

WM16: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	7:49:34 AM	55.60569	37.88535	77.13456	57.91922	47.13879	41.90382
4/5/2022	8:00:00 AM	62.18508	38.81241	78.13683	66.37414	55.72427	46.19773
4/5/2022	9:00:00 AM	60.83494	37.54618	78.54312	64.79488	52.71146	43.59397
4/5/2022	10:00:00 AM	63.45632	38.28525	84.79361	66.3235	54.13763	44.42061
4/5/2022	11:00:00 AM	62.24172	37.24167	80.50208	65.98827	52.48089	43.24683
4/5/2022	12:00:00 PM	62.56785	36.5698	80.34373	66.73681	53.41	43.277
4/5/2022	1:00:00 PM	61.59802	36.26044	78.34338	65.64907	52.90984	43.08693
4/5/2022	2:00:00 PM	62.19183	36.71789	79.01769	66.20152	54.14901	43.84465
4/5/2022	3:00:00 PM	61.23851	35.55167	79.74896	65.03284	52.82245	42.79988
4/5/2022	4:00:00 PM	62.21066	35.46519	79.18658	66.46571	55.47195	44.278
4/5/2022	5:00:00 PM	62.7698	34.27051	79.24127	66.9806	56.38305	44.64348
4/5/2022	6:00:00 PM	57.58245	34.32545	77.08276	60.91378	49.36558	41.20355
4/5/2022	7:00:00 PM	49.87863	34.55007	70.7775	51.98667	45.76632	40.67482
4/5/2022	8:00:00 PM	50.32349	39.47878	66.87903	53.2664	48.00282	44.11799
4/5/2022	9:00:00 PM	52.1627	42.09834	67.0619	54.85547	50.53888	46.98865
4/5/2022	10:00:00 PM	49.32874	39.25533	61.59716	52.08967	47.81515	44.39632
4/5/2022	11:00:00 PM	48.11126	37.94654	61.21678	50.96492	46.63345	43.17398
4/6/2022	12:00:00 AM	49.70066	37.23966	62.74638	52.85706	48.38935	43.13294
4/6/2022	1:00:00 AM	48.00059	38.46172	60.57787	50.45782	46.78508	43.80056
4/6/2022	2:00:00 AM	48.37675	36.57941	64.34872	51.425	46.43394	42.27392
4/6/2022	3:00:00 AM	47.38425	35.58873	59.14261	50.37968	45.36442	41.41737
4/6/2022	4:00:00 AM	49.28378	39.63871	64.5796	51.97342	47.78241	44.41298
4/6/2022	5:00:00 AM	47.50182	36.99146	67.80992	49.20236	45.19213	42.00745
4/6/2022	6:00:00 AM	49.76258	37.74084	68.18796	51.01632	45.1193	42.28053
4/6/2022	7:00:00 AM	54.01723	40.13531	71.94149	55.51426	49.85363	45.58383
4/6/2022	8:00:00 AM	56.68194	41.99924	74.00522	56.21932	51.6912	47.42235
4/6/2022	9:00:00 AM	51.94107	36.4539	77.08623	50.4137	45.69647	42.22998
4/6/2022	10:00:00 AM	51.4012	36.56329	73.26069	50.32088	45.0281	41.53388
4/6/2022	11:00:00 AM	50.39582	37.13745	70.44675	52.66404	46.01363	42.2302
4/6/2022	12:00:00 PM	52.26308	37.01456	73.34506	54.96145	46.71247	42.21556
4/6/2022	1:00:00 PM	53.2428	35.89655	75.9771	54.85724	45.76319	41.15693
4/6/2022	2:00:00 PM	48.88078	34.10062	73.86407	50.13765	42.88169	39.10676
4/6/2022	3:00:00 PM	48.46858	32.58571	75.62937	49.33769	41.85784	37.66447
4/6/2022	4:00:00 PM	46.89546	32.9603	69.9125	47.68556	41.39777	37.58178
4/6/2022	5:00:00 PM	48.42284	30.19013	73.70615	46.55087	40.70346	36.82586
4/6/2022	6:00:00 PM	52.7697	27.96228	81.25075	45.38155	39.46474	34.78344
4/6/2022	7:00:00 PM	49.76565	31.81681	68.0081	53.00446	45.88345	39.81837
4/6/2022	8:00:00 PM	49.52383	32.78698	67.80507	52.97095	45.72977	40.02913
4/6/2022	9:00:00 PM	46.72717	31.25119	61.17374	50.15039	43.944	38.63853
4/6/2022	10:00:00 PM	46.9267	34.32279	61.66999	49.82277	44.67393	40.18728

4/6/2022	11:00:00 PM	47.81811	36.66306	59.94411	50.77971	46.47335	42.04479
4/7/2022	12:00:00 AM	49.00126	36.56078	59.96205	52.25748	47.42381	42.92771
4/7/2022	1:00:00 AM	44.35733	34.44002	56.49377	47.1516	43.14909	39.84862
4/7/2022	2:00:00 AM	49.85298	37.90376	61.62316	52.4455	48.09209	43.92175
4/7/2022	3:00:00 AM	53.02114	40.0797	61.86409	56.20552	51.89559	46.65771
4/7/2022	4:00:00 AM	52.17609	40.18595	62.5388	55.28839	50.75135	46.32773
4/7/2022	5:00:00 AM	53.97634	46.18556	64.3752	56.11624	53.32692	50.71056
4/7/2022	6:00:00 AM	58.09707	44.77459	75.3268	59.04832	53.33116	49.95959
4/7/2022	7:00:00 AM	55.60495	43.55097	76.24466	57.03606	52.66703	49.55065
4/7/2022	8:00:00 AM	54.35746	42.38487	81.99598	54.6751	50.66492	47.37741
4/7/2022	9:00:00 AM	51.69355	36.16866	69.46773	52.72214	46.21038	41.69363
4/7/2022	10:00:00 AM	51.28543	30.74632	73.16912	47.63288	41.25312	36.57095
4/7/2022	11:00:00 AM	45.1132	26.51464	66.42932	46.50789	38.74557	32.54303
4/7/2022	12:00:00 PM	46.53854	27.8742	74.25292	46.8182	37.90461	33.14337
4/7/2022	1:00:00 PM	45.10688	28.65804	64.35256	48.06049	39.1696	34.02231
4/7/2022	2:00:00 PM	48.10968	28.83437	70.62893	49.4312	39.62412	34.39137
4/7/2022	3:00:00 PM	50.27813	28.44887	76.49798	48.56294	39.28104	33.84976
4/7/2022	4:00:00 PM	49.29157	27.94604	77.3639	44.70908	36.5483	32.98439
4/7/2022	5:00:00 PM	51.82586	27.26941	77.88136	46.31982	35.68922	32.17303
4/7/2022	6:00:00 PM	52.949	26.01908	80.92028	44.89642	35.81598	31.30018
4/7/2022	7:00:00 PM	47.22996	26.9126	68.55458	46.97205	39.54602	33.70532
4/7/2022	8:00:00 PM	42.43253	31.03074	54.55873	45.55492	40.59058	36.29793
4/7/2022	9:00:00 PM	42.80991	31.01807	59.70922	45.44259	40.39619	36.57031
4/7/2022	10:00:00 PM	46.51238	35.58147	58.12796	49.48685	45.08379	41.41072
4/7/2022	11:00:00 PM	43.64327	32.563	57.63908	46.54035	41.77293	38.26011
4/8/2022	12:00:00 AM	47.07557	33.17939	58.84729	50.23212	45.348	39.8945
4/8/2022	1:00:00 AM	48.30278	37.82219	60.45875	51.1985	46.87752	43.20162
4/8/2022	2:00:00 AM	52.20092	42.82849	62.50815	55.03531	50.85161	47.42298
4/8/2022	3:00:00 AM	53.13784	40.81222	65.47297	55.76619	52.2129	48.05327
4/8/2022	4:00:00 AM	53.68766	44.73566	64.03666	56.1077	52.65325	49.58611
4/8/2022	5:00:00 AM	50.81948	39.88782	69.74953	53.27109	49.08958	45.23503
4/8/2022	6:00:00 AM	52.82659	40.15044	72.28051	53.95958	48.62524	45.17165
4/8/2022	7:00:00 AM	51.7791	41.09756	75.64316	53.74162	50.12065	46.29641
4/8/2022	8:00:00 AM	53.78949	37.902	74.51644	51.24411	45.81021	42.69746
4/8/2022	9:00:00 AM	52.25543	36.44975	70.60902	52.553	45.62152	41.75699
4/8/2022	10:00:00 AM	54.59788	35.38247	83.51892	53.75535	45.60956	41.24901
4/8/2022	11:00:00 AM	50.39625	28.17161	69.44749	52.61793	43.15632	36.01474
4/8/2022	12:00:00 PM	58.6126	29.33378	76.02664	62.52858	51.17426	39.57819
4/8/2022	1:00:00 PM	58.60631	30.28463	76.99985	62.00527	50.55448	39.27779
4/8/2022	2:00:00 PM	63.81073	32.60962	82.66294	67.9476	56.78418	43.83544
4/8/2022	3:00:00 PM	68.07115	33.42002	84.97908	72.07782	63.34209	51.60593
4/8/2022	4:00:00 PM	65.89672	30.16656	83.6241	70.35278	58.89121	45.61017
4/8/2022	5:00:00 PM	62.19748	32.80036	77.95006	66.30691	56.34736	45.17486

4/8/2022	6:00:00 PM	63.75708	31.59636	80.0788	67.98066	57.27833	45.6167
4/8/2022	7:00:00 PM	59.28991	31.63311	75.52996	63.3493	53.25794	43.85969
4/8/2022	8:00:00 PM	53.64958	28.05466	74.3136	56.81857	46.14739	37.12066
4/8/2022	9:00:00 PM	54.81778	28.39492	76.68746	57.77754	47.13487	37.85279
4/8/2022	10:00:00 PM	61.6502	30.12612	78.28072	65.77247	54.86553	43.27504
4/8/2022	11:00:00 PM	63.679	35.48536	79.55102	67.88564	57.77602	47.80133
4/9/2022	12:00:00 AM	56.33286	31.23004	76.05298	59.27612	44.01003	37.49528
4/9/2022	1:00:00 AM	55.54062	36.91311	74.27242	59.13226	49.19147	43.05497
4/9/2022	2:00:00 AM	56.40089	36.30296	74.2205	59.88123	49.26804	42.56065
4/9/2022	3:00:00 AM	53.52454	36.143	71.75658	56.95224	48.55053	42.58592
4/9/2022	4:00:00 AM	58.01429	39.02299	74.44889	61.8067	52.28233	45.43332
4/9/2022	5:00:00 AM	62.36958	44.79392	77.70434	66.36746	58.11068	51.25957
4/9/2022	6:00:00 AM	60.13243	42.15625	76.44288	63.78773	55.16696	48.76016
4/9/2022	7:00:00 AM	65.39569	38.42603	88.36349	66.16289	56.68851	47.43177
4/9/2022	8:00:00 AM	67.74597	36.37575	89.06851	61.61221	46.5324	40.904
4/9/2022	9:00:00 AM	55.38363	34.06789	78.31077	54.88366	44.64517	39.75335
4/9/2022	10:00:00 AM	60.14887	34.80476	76.28334	64.34135	52.77456	41.77857
4/9/2022	11:00:00 AM	68.19981	37.57843	83.89107	72.54625	63.71532	50.60821
4/9/2022	12:00:00 PM	65.89486	34.57342	86.05363	69.87489	59.52262	46.24332
4/9/2022	1:00:00 PM	64.46112	34.35668	80.50029	68.78853	57.51751	44.51703
4/9/2022	2:00:00 PM	62.35577	31.48589	78.99826	66.41836	53.29373	39.74458
4/9/2022	3:00:00 PM	60.84109	31.97599	78.76058	64.55416	51.07689	38.42481
4/9/2022	4:00:00 PM	61.90749	32.08771	79.19885	66.08389	53.45787	40.73937
4/9/2022	5:00:00 PM	67.28685	35.45253	82.57069	71.56596	61.79056	49.14091
4/9/2022	6:00:00 PM	67.41236	35.60357	81.43999	71.87806	61.85607	48.82372
4/9/2022	7:00:00 PM	62.75701	32.04159	82.14035	66.45106	54.28691	42.60944
4/9/2022	8:00:00 PM	55.27456	36.57507	75.72121	57.08006	45.76897	41.61172
4/9/2022	9:00:00 PM	49.52879	39.1213	67.1812	51.9476	47.76807	44.32162
4/9/2022	10:00:00 PM	50.33563	38.51899	68.7153	52.9157	47.80284	44.03687
4/9/2022	11:00:00 PM	52.70822	39.79262	70.10847	55.59872	49.61072	45.6218
4/10/2022	12:00:00 AM	53.15501	40.2078	70.34502	55.87521	50.02708	45.92183
4/10/2022	1:00:00 AM	55.22119	37.10896	74.45263	58.68549	49.76905	43.58151
4/10/2022	2:00:00 AM	57.07925	33.70722	75.05032	60.7636	50.41937	41.34093
4/10/2022	3:00:00 AM	48.34865	30.91873	72.03327	48.83579	40.38346	36.37948
4/10/2022	4:00:00 AM	45.20185	32.86103	61.54744	48.26559	42.34122	38.40354
4/10/2022	5:00:00 AM	45.12116	31.3992	66.64753	46.95189	41.16434	36.51993
4/10/2022	6:00:00 AM	58.013	30.96636	85.41353	55.22113	40.18429	36.57677
4/10/2022	7:00:00 AM	52.23885	32.14494	68.46867	54.46574	41.40195	37.41831
4/10/2022	8:00:00 AM	50.66415	32.08756	69.54795	49.72036	42.5068	38.19221
4/10/2022	9:00:00 AM	53.30662	31.45979	72.33008	56.52535	47.31442	39.46549
4/10/2022	10:00:00 AM	61.80922	31.13905	88.56129	51.35994	42.55059	37.30611
4/10/2022	11:00:00 AM	57.94308	30.53973	81.82522	58.65576	46.44498	37.35389
4/10/2022	12:00:00 PM	59.22901	30.70257	78.4961	62.92102	51.27533	37.9609

4/10/2022	1:00:00 PM	59.0348	30.11745	77.27542	62.92194	50.12032	36.61803
4/10/2022	2:00:00 PM	57.222	30.75784	77.12616	60.0447	47.20417	36.42507
4/10/2022	3:00:00 PM	53.34527	30.32673	71.12728	56.9842	44.02723	35.88051
4/10/2022	4:00:00 PM	55.20379	29.0019	75.55466	58.26589	44.69848	35.10813
4/10/2022	5:00:00 PM	52.74189	27.31452	71.85956	55.67654	42.72978	33.17084
4/10/2022	6:00:00 PM	57.16381	22.6987	86.4234	48.81184	37.1861	29.11789
4/10/2022	7:00:00 PM	45.52993	22.72965	74.43977	47.55795	37.06899	29.37224
4/10/2022	8:00:00 PM	45.69217	32.94879	62.88108	48.67429	42.80551	38.67202
4/10/2022	9:00:00 PM	42.94558	31.56984	58.56742	45.87867	40.87924	37.03524
4/10/2022	10:00:00 PM	39.07602	25.50415	57.09848	42.51433	34.76351	30.8445
4/10/2022	11:00:00 PM	46.80542	24.37617	63.85078	50.43783	40.14647	32.04815
4/11/2022	12:00:00 AM	45.29511	25.53619	63.5199	48.6545	37.88675	31.75998
4/11/2022	1:00:00 AM	38.13096	27.32845	52.88894	40.9512	36.03869	32.62711
4/11/2022	2:00:00 AM	44.02303	28.76788	65.51103	48.00151	38.30714	33.86879
4/11/2022	3:00:00 AM	42.40088	31.23155	58.08638	45.63242	39.14497	35.89216
4/11/2022	4:00:00 AM	65.36082	32.58054	79.94473	69.80249	59.85954	40.69209
4/11/2022	5:00:00 AM	60.34842	33.26484	77.24863	64.1325	55.01436	45.81529
4/11/2022	6:00:00 AM	61.40829	32.81545	77.22641	65.3641	55.59199	44.41945
4/11/2022	7:00:00 AM	65.17793	35.70229	80.01745	69.49853	59.92009	49.2534
4/11/2022	8:00:00 AM	68.58065	41.19622	81.6099	72.80103	64.75359	55.09635
4/11/2022	9:00:00 AM	65.29284	33.18593	80.13377	69.85839	58.41859	41.33823
4/11/2022	10:00:00 AM	67.76629	32.17184	82.7403	73.06214	47.35276	37.09032
4/11/2022	11:00:00 AM	67.35029	35.37981	82.16733	71.69809	61.49701	48.87181
4/11/2022	12:00:00 PM	68.68734	37.25855	83.27048	73.18047	62.45365	48.06463
4/11/2022	1:00:00 PM	74.42106	45.61257	85.21329	78.35103	72.1714	62.82902
4/11/2022	2:00:00 PM	74.14646	47.60456	85.03855	77.79838	72.39385	64.19141
4/11/2022	3:00:00 PM	72.99158	45.20004	83.90144	76.84056	70.75929	61.85589
4/11/2022	4:00:00 PM	74.43621	48.07435	84.34245	78.20406	72.65954	64.10539
4/11/2022	5:00:00 PM	67.24473	31.1269	83.01175	71.97909	54.11181	37.7201
4/11/2022	6:00:00 PM	67.01345	30.53363	81.62141	71.8869	58.35675	41.58236
4/11/2022	7:00:00 PM	59.37792	31.11303	77.56629	63.08584	53.13607	42.45624
4/11/2022	8:00:00 PM	67.93852	33.31668	82.36727	72.35639	61.9403	48.40122
4/11/2022	9:00:00 PM	70.41196	34.10583	84.20332	74.84595	65.40451	50.88851
4/11/2022	10:00:00 PM	70.2157	39.00385	82.65444	74.35719	67.04774	57.22845
4/11/2022	11:00:00 PM	71.66081	42.36928	83.63289	75.66786	68.89744	59.10836
4/12/2022	12:00:00 AM	70.26136	39.33778	82.28426	74.47497	67.04707	56.42601
4/12/2022	1:00:00 AM	68.39521	39.01309	81.73224	72.55965	64.46688	54.64995
4/12/2022	2:00:00 AM	67.76901	40.46138	80.73524	71.94141	64.09285	55.04528
4/12/2022	3:00:00 AM	59.18238	32.21167	74.7132	63.14633	53.42845	43.67966
4/12/2022	4:00:00 AM	67.62446	35.20904	81.95594	72.10598	62.33534	49.35996
4/12/2022	5:00:00 AM	70.71238	43.65372	83.03998	74.61204	68.1542	59.2751
4/12/2022	6:00:00 AM	70.2376	44.65481	82.81378	74.21984	67.46702	59.07032
4/12/2022	7:00:00 AM	73.45097	49.78527	83.7821	77.02159	71.81973	64.44603

4/12/2022	8:00:00 AM	74.62099	53.48185	84.34482	78.02861	73.28863	66.80679
4/12/2022	9:00:00 AM	73.17955	45.86158	83.74127	76.91959	71.3501	62.53708
4/12/2022	10:00:00 AM	65.42513	32.60737	81.07974	69.74921	59.59413	47.8309
4/12/2022	11:00:00 AM	62.41825	31.09761	79.47778	66.40928	55.17708	43.95425
4/12/2022	12:00:00 PM	64.52794	30.05005	78.99032	68.95216	58.07127	45.63679
4/12/2022	1:00:00 PM	63.57834	30.6776	79.20323	67.97089	55.29909	39.30755
4/12/2022	2:00:00 PM	62.01121	28.36255	78.20965	66.00585	54.3005	41.26259
4/12/2022	3:00:00 PM	58.897	26.2565	78.43408	62.149	48.04915	36.02889
4/12/2022	4:00:00 PM	65.30457	35.55653	80.69499	69.57006	59.83295	49.35126
4/12/2022	5:00:00 PM	61.22657	28.44896	78.08047	65.2374	53.81176	42.84572
4/12/2022	6:00:00 PM	57.07168	25.85397	77.08769	60.00762	48.69671	37.80325
4/12/2022	7:00:00 PM	47.4794	22.16999	69.51437	48.20098	37.42901	29.43577
4/12/2022	8:00:00 PM	50.49383	23.78695	72.55067	53.6633	43.4436	34.01151
4/12/2022	9:00:00 PM	50.66872	26.54781	70.65808	54.19114	44.07872	34.82716
4/12/2022	10:00:00 PM	52.12092	27.37602	70.53852	55.38371	46.58849	38.77991
4/12/2022	11:00:00 PM	58.09436	31.69945	75.36824	62.08608	50.59522	42.34467
4/13/2022	12:00:00 AM	63.77628	38.83201	78.30205	67.87755	59.52298	51.10731
4/13/2022	1:00:00 AM	63.45452	33.82139	80.17515	67.6356	58.27758	48.10214
4/13/2022	2:00:00 AM	57.77498	30.89602	75.02544	61.47024	52.08295	43.99702
4/13/2022	3:00:00 AM	61.62067	32.37632	78.41379	65.34231	54.93281	43.68098
4/13/2022	4:00:00 AM	61.18467	33.34639	77.18262	65.17676	56.08165	46.22433
4/13/2022	5:00:00 AM	63.83753	34.56796	79.25149	67.93311	58.74142	50.27483
4/13/2022	6:00:00 AM	58.9606	33.60943	77.04693	62.52929	51.70242	42.19095
4/13/2022	7:00:00 AM	63.31689	38.96317	77.08255	67.27979	59.52952	51.5273
4/13/2022	8:00:00 AM	63.22223	40.36719	77.62394	67.06649	59.79621	52.21122
4/13/2022	9:00:00 AM	64.2659	37.01584	80.00459	68.21821	59.50247	49.64001
4/13/2022	10:00:00 AM	60.71248	35.2511	77.2395	64.40104	54.63386	45.44034
4/13/2022	11:00:00 AM	66.15258	36.95478	82.45548	70.47654	61.34981	50.04974
4/13/2022	12:00:00 PM	63.14928	36.34973	78.99182	67.26198	58.13517	48.53124
4/13/2022	1:00:00 PM	63.0643	35.51477	80.73949	67.14069	55.39296	45.1812
4/13/2022	2:00:00 PM	63.27222	36.5774	78.78776	67.46974	58.17276	48.10088
4/13/2022	3:00:00 PM	61.44126	35.35705	77.25601	65.57458	54.75422	44.07162
4/13/2022	4:00:00 PM	60.13783	34.8981	76.79238	64.15201	51.5665	42.43501
4/13/2022	5:00:00 PM	58.64691	34.3503	75.56646	62.36307	51.66627	42.5316
4/13/2022	6:00:00 PM	60.04559	32.47329	77.482	63.92681	53.39755	42.53577
4/13/2022	7:00:00 PM	57.08525	28.98262	77.6816	59.40896	48.04371	37.91839
4/13/2022	8:00:00 PM	52.74092	28.07325	70.85007	55.88751	43.17073	34.19239
4/13/2022	9:00:00 PM	57.37388	30.30465	76.04442	61.09088	51.6192	42.28929
4/13/2022	10:00:00 PM	55.38971	28.46493	74.09526	58.81529	48.15868	39.20362
4/13/2022	11:00:00 PM	57.25823	25.96423	75.31086	60.89651	49.26857	35.06849
4/14/2022	12:00:00 AM	62.06182	37.13448	76.12145	66.03802	58.25955	50.20486
4/14/2022	1:00:00 AM	54.10621	30.68201	72.24327	57.40763	47.84418	39.98438
4/14/2022	2:00:00 AM	55.93318	31.01636	74.54608	59.11574	49.42392	39.751

4/14/2022	3:00:00 AM	59.02706	33.41441	74.64641	62.72411	54.20451	45.93568
4/14/2022	4:00:00 AM	63.37726	34.74161	78.65441	67.46373	58.60302	48.29962
4/14/2022	5:00:00 AM	69.11818	44.01621	81.10691	73.04075	66.59962	58.71965
4/14/2022	6:00:00 AM	68.06486	46.18951	80.32915	71.9946	65.32621	57.97861
4/14/2022	7:00:00 AM	65.77434	39.41827	79.20445	70.0243	61.96091	52.68523
4/14/2022	8:00:00 AM	60.86702	34.70798	77.90849	64.69401	54.57958	44.20624
4/14/2022	9:00:00 AM	65.69029	36.87211	82.18839	69.83643	61.14739	50.35898
4/14/2022	10:00:00 AM	65.42095	35.96795	79.8931	69.53011	61.17132	50.7705
4/14/2022	11:00:00 AM	65.93546	36.1779	81.50885	70.08138	61.02999	50.77568
4/14/2022	12:00:00 PM	66.55411	36.75217	83.07403	70.68918	61.91809	52.03427
4/14/2022	1:00:00 PM	61.74058	34.3594	77.20112	65.79537	55.8956	45.63229
4/14/2022	2:00:00 PM	59.48613	32.75655	78.13798	63.07765	49.58478	39.78909
4/14/2022	3:00:00 PM	67.3588	33.99897	81.48249	72.05012	60.58013	46.03486
4/14/2022	4:00:00 PM	61.83811	34.61125	79.32122	65.7924	53.66053	42.32496
4/14/2022	5:00:00 PM	59.23557	29.59481	77.0983	62.8154	49.92001	37.20496
4/14/2022	6:00:00 PM	59.30191	32.27467	76.77394	62.82123	52.62969	42.85994
4/14/2022	7:00:00 PM	55.26044	31.60263	74.63112	58.39842	46.6603	38.64247
4/14/2022	8:00:00 PM	63.6937	32.98143	80.02334	67.61548	56.22754	45.15879
4/14/2022	9:00:00 PM	67.01439	36.97145	81.40964	71.22393	62.10861	51.72676
4/14/2022	10:00:00 PM	61.97537	32.56287	79.47541	65.71821	55.31277	44.39271
4/14/2022	11:00:00 PM	63.09416	31.62695	80.01348	67.15988	56.3684	43.95564
4/15/2022	12:00:00 AM	62.53799	29.19322	78.15511	66.71154	55.45767	42.65574
4/15/2022	1:00:00 AM	61.63977	32.90217	77.5053	65.67461	56.06472	45.69843
4/15/2022	2:00:00 AM	62.47732	34.19018	78.27575	66.40349	57.07227	47.29258
4/15/2022	3:00:00 AM	55.7135	28.79072	75.51977	58.48852	41.52956	34.45473
4/15/2022	4:00:00 AM	55.1987	30.74355	75.25635	58.24589	44.72889	35.96495
4/15/2022	5:00:00 AM	57.65658	27.95356	79.48319	60.4482	46.96024	33.81434
4/15/2022	6:00:00 AM	55.26966	28.37046	77.12118	53.5516	42.47631	34.39968
4/15/2022	7:00:00 AM	50.36427	27.80517	67.94236	51.78547	36.3312	32.63484
4/15/2022	8:00:00 AM	61.63089	27.55706	87.28024	48.81872	38.87662	33.06977
4/15/2022	9:00:00 AM	51.00154	29.79497	73.73131	52.78952	41.41755	35.73742
4/15/2022	10:00:00 AM	58.57298	30.79662	80.70048	61.86714	49.62433	37.99747
4/15/2022	11:00:00 AM	55.25311	32.62117	79.49315	57.30602	49.26932	41.37328
4/15/2022	12:00:00 PM	56.06289	30.43061	79.32264	58.12865	46.26816	35.76561
4/15/2022	1:00:00 PM	57.19324	29.59244	79.20791	59.65147	46.82584	36.20849
4/15/2022	2:00:00 PM	59.62773	30.1982	77.63992	63.15195	50.35474	39.07731
4/15/2022	3:00:00 PM	55.07979	30.54556	77.32817	57.45869	43.86978	36.66096
4/15/2022	4:00:00 PM	53.02034	30.35574	72.47411	56.59693	45.66556	36.60129
4/15/2022	5:00:00 PM	54.18678	28.3294	76.85542	53.78214	39.7347	33.84907
4/15/2022	6:00:00 PM	48.72517	26.35638	68.38716	51.90847	41.77477	33.96217
4/15/2022	7:00:00 PM	49.12975	27.81285	72.49506	50.90698	41.93526	34.73675
4/15/2022	8:00:00 PM	57.68863	29.16513	73.78297	61.68767	51.95352	40.52336
4/15/2022	9:00:00 PM	43.90936	28.81534	61.02802	47.15533	39.75773	34.70197

4/15/2022	10:00:00 PM	46.69071	30.02099	60.17683	49.93492	44.76218	37.48278
4/15/2022	11:00:00 PM	48.38451	30.23593	64.1283	52.21806	44.37091	38.05554
4/16/2022	12:00:00 AM	43.39923	27.44445	62.78802	46.12396	35.98484	32.33589
4/16/2022	1:00:00 AM	44.39933	30.78916	62.30633	47.26929	41.33181	36.81906
4/16/2022	2:00:00 AM	44.85172	31.72765	59.64519	48.38469	41.38827	37.08162
4/16/2022	3:00:00 AM	40.93157	29.14104	57.57523	43.40536	38.45635	35.04796
4/16/2022	4:00:00 AM	44.76483	34.14965	59.11586	47.59353	42.98342	39.52086
4/16/2022	5:00:00 AM	40.69599	32.0934	55.85791	43.25063	39.38119	36.52658
4/16/2022	6:00:00 AM	54.77195	31.6582	71.85547	46.47088	39.26971	36.04201
4/16/2022	7:00:00 AM	58.6588	32.68247	88.57004	55.99413	43.28834	39.36615
4/16/2022	8:00:00 AM	52.81908	35.37551	73.4421	52.07819	43.87009	40.55589
4/16/2022	9:00:00 AM	45.8615	33.65863	65.48644	46.69202	42.33551	38.79056
4/16/2022	10:00:00 AM	57.47961	31.77156	76.94447	60.48295	41.16229	36.42139
4/16/2022	11:00:00 AM	67.69165	36.3907	80.89831	72.13987	62.91318	51.67161
4/16/2022	12:00:00 PM	69.80132	39.748	83.00943	73.82573	66.65317	56.68823
4/16/2022	1:00:00 PM	71.68076	42.56415	83.01149	75.55738	69.35482	60.80408
4/16/2022	2:00:00 PM	72.35146	45.19847	84.08413	76.17716	70.06568	61.38127
4/16/2022	3:00:00 PM	69.64438	35.84181	82.68731	73.84651	65.81128	54.08318
4/16/2022	4:00:00 PM	68.95573	37.91608	82.20899	73.30054	64.47078	53.16427
4/16/2022	5:00:00 PM	69.68647	37.13939	82.78656	74.0061	65.6848	52.52804
4/16/2022	6:00:00 PM	65.89277	33.41769	80.54394	70.26005	59.98125	48.59128
4/16/2022	7:00:00 PM	59.44747	28.68955	77.1071	63.08176	49.51796	37.46463
4/16/2022	8:00:00 PM	61.43675	30.23839	78.87789	65.20133	50.35213	37.7466
4/16/2022	9:00:00 PM	67.39121	36.35642	82.21246	71.77842	62.22824	49.94808
4/16/2022	10:00:00 PM	65.14542	34.25017	80.46468	69.54571	58.89461	46.98049
4/16/2022	11:00:00 PM	64.88637	32.71729	80.85056	69.21905	58.4941	47.06487
4/17/2022	12:00:00 AM	63.1138	33.72928	78.67042	67.29589	56.50534	45.40095
4/17/2022	1:00:00 AM	59.54219	30.23366	76.85373	63.31522	51.89307	40.33331
4/17/2022	2:00:00 AM	57.37802	29.13412	77.70727	60.33617	48.7998	37.66243
4/17/2022	3:00:00 AM	55.93804	30.6594	74.72342	59.25728	48.74024	39.8511
4/17/2022	4:00:00 AM	46.9002	30.75249	66.30533	49.65513	42.42077	37.23086
4/17/2022	5:00:00 AM	48.74145	29.52236	77.17645	47.30949	40.75748	35.55951
4/17/2022	6:00:00 AM	57.99149	29.80115	76.1174	54.41424	40.00536	35.16116
4/17/2022	7:00:00 AM	54.65253	30.90719	73.96451	57.76753	40.22775	36.13801
4/17/2022	8:00:00 AM	52.70061	31.19	70.40587	55.6376	41.51727	37.04897
4/17/2022	9:00:00 AM	54.80029	31.23524	76.2635	56.56947	44.59809	37.53837
4/17/2022	10:00:00 AM	54.69307	30.28657	77.12812	57.24959	44.72278	36.25021
4/17/2022	11:00:00 AM	56.9678	31.40708	75.01635	60.4469	48.00983	37.69245
4/17/2022	12:00:00 PM	57.37599	31.92888	78.99844	60.45474	46.77953	37.44649
4/17/2022	1:00:00 PM	59.46476	30.77639	78.12947	61.23096	42.93705	35.98942
4/17/2022	2:00:00 PM	59.3534	31.73767	78.14637	62.30367	49.18648	38.84328
4/17/2022	3:00:00 PM	60.09881	31.83234	77.61676	63.79827	52.03234	38.9776
4/17/2022	4:00:00 PM	52.83403	27.41902	72.46265	55.28111	41.20919	33.31362

4/17/2022	5:00:00 PM	53.03636	29.29901	71.07499	55.67515	45.72804	36.69427
4/17/2022	6:00:00 PM	51.64159	26.56804	73.37638	51.15065	41.11891	33.50711
4/17/2022	7:00:00 PM	47.76416	25.22686	70.92815	50.5521	41.20379	33.6449
4/17/2022	8:00:00 PM	47.66414	32.60576	66.49524	50.41601	44.77373	39.98539
4/17/2022	9:00:00 PM	46.09648	30.52198	64.16001	49.1341	40.96855	36.35514
4/17/2022	10:00:00 PM	44.34006	32.55305	57.84848	47.94363	41.87962	37.69212
4/17/2022	11:00:00 PM	42.63471	31.08307	62.48573	45.42538	40.01716	36.12703
4/18/2022	12:00:00 AM	45.62743	33.62291	65.71021	48.83144	43.12476	39.11825
4/18/2022	1:00:00 AM	46.92877	35.19645	63.1364	49.64176	44.81504	40.76206
4/18/2022	2:00:00 AM	44.69619	33.21122	57.13258	47.9735	42.75415	38.9239
4/18/2022	3:00:00 AM	45.93861	35.34876	67.67952	48.40082	44.39837	40.79448
4/18/2022	4:00:00 AM	50.48106	39.08985	68.09008	53.77976	48.47768	44.05699
4/18/2022	5:00:00 AM	56.98245	40.36012	80.55464	53.41308	48.98868	45.14029
4/18/2022	6:00:00 AM	60.86809	41.25672	85.2463	60.54548	50.57499	46.23927
4/18/2022	7:00:00 AM	57.90214	43.91443	83.43169	58.67361	52.58469	48.80081
4/18/2022	8:00:00 AM	52.94878	40.33311	68.92027	55.1738	50.42251	45.90392
4/18/2022	9:00:00 AM	50.33753	38.37605	70.12995	51.9851	46.59923	43.14586
4/18/2022	10:00:00 AM	47.18815	33.5672	66.07422	49.99369	43.5721	39.41595
4/18/2022	11:00:00 AM	50.36875	30.33306	67.87595	53.73325	44.45785	37.16411
4/18/2022	12:00:00 PM	60.64201	32.15709	76.55098	64.8464	53.16564	41.00519
4/18/2022	1:00:00 PM	63.11699	31.18425	79.10285	67.40948	56.26547	42.88046
4/18/2022	2:00:00 PM	64.50113	32.42235	79.07204	68.84283	58.99583	46.62102
4/18/2022	3:00:00 PM	59.68833	31.3366	77.71655	62.68616	51.254	40.344
4/18/2022	4:00:00 PM	62.57599	31.29078	82.72345	66.6286	55.23548	41.34162
4/18/2022	5:00:00 PM	59.88624	30.06419	78.47797	62.86231	52.22887	41.71062
4/18/2022	6:00:00 PM	62.42889	30.76096	80.33204	66.33404	54.03731	42.10637
4/18/2022	7:00:00 PM	65.30869	32.7886	80.25687	69.64305	59.14993	47.17312
4/18/2022	8:00:00 PM	66.24731	36.50787	80.52024	70.46391	61.56761	51.23633
4/18/2022	9:00:00 PM	68.04015	41.87603	81.25728	72.14795	64.88794	55.93308
4/18/2022	10:00:00 PM	69.78638	44.14906	81.3134	73.58203	67.54279	59.78954
4/18/2022	11:00:00 PM	64.82181	37.15715	78.7748	69.14461	60.06244	49.01689
4/19/2022	12:00:00 AM	63.08761	36.76459	77.96739	67.21033	58.34047	49.59043
4/19/2022	1:00:00 AM	50.16144	27.78464	68.75237	53.26703	42.89803	34.76042
4/19/2022	2:00:00 AM	47.31081	27.90376	70.78735	48.62155	39.43901	33.83649
4/19/2022	3:00:00 AM	58.82378	31.07448	76.00249	62.4904	53.03013	43.87171
4/19/2022	4:00:00 AM	63.37488	32.5795	79.68777	67.35041	54.97302	44.73936
4/19/2022	5:00:00 AM	63.98031	30.83268	81.26417	68.09329	55.54802	40.66793
4/19/2022	6:00:00 AM	60.42038	29.46977	81.22333	61.92106	47.22396	37.09895

WM16: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	7:49:34 AM	68.84868	42.98255	85.4936	72.74399	61.17767	50.1725
4/5/2022	8:00:00 AM	76.04688	43.01234	90.05865	80.2569	71.30737	58.90105
4/5/2022	9:00:00 AM	74.39538	41.01368	89.7567	78.8037	68.15529	54.22508
4/5/2022	10:00:00 AM	75.33438	42.62527	90.74513	79.5842	69.05921	55.3125
4/5/2022	11:00:00 AM	75.02535	41.24192	90.84703	79.47656	67.16295	52.40922
4/5/2022	12:00:00 PM	75.36269	40.43065	91.1567	79.85206	67.90634	52.6093
4/5/2022	1:00:00 PM	74.73088	40.28087	89.81349	79.23857	67.53264	53.35034
4/5/2022	2:00:00 PM	74.8945	40.95736	89.88524	79.29228	68.14805	54.47755
4/5/2022	3:00:00 PM	74.11502	40.09597	90.02883	78.38928	67.11624	52.50069
4/5/2022	4:00:00 PM	75.41368	40.73372	90.59598	79.74275	69.99619	57.13472
4/5/2022	5:00:00 PM	75.74358	39.70432	90.81037	80.03458	70.73835	58.29552
4/5/2022	6:00:00 PM	71.0111	38.84999	88.90755	75.01327	63.56718	51.28105
4/5/2022	7:00:00 PM	60.30676	37.59297	81.28419	61.9935	50.01537	44.31544
4/5/2022	8:00:00 PM	58.69532	41.64599	78.3969	61.43717	51.18673	46.85589
4/5/2022	9:00:00 PM	58.26287	44.13045	78.58515	59.85381	53.24377	49.38437
4/5/2022	10:00:00 PM	54.43746	41.80604	69.82638	57.46522	51.90667	47.80059
4/5/2022	11:00:00 PM	54.52223	40.75814	70.70849	57.90916	51.58845	46.91774
4/6/2022	12:00:00 AM	55.76606	40.3641	71.27882	59.18161	53.03896	47.32121
4/6/2022	1:00:00 AM	55.03851	41.20978	69.06927	58.45234	51.98812	47.51254
4/6/2022	2:00:00 AM	54.43637	39.53189	71.00445	57.71537	51.12321	46.01787
4/6/2022	3:00:00 AM	51.76635	38.70207	66.40226	54.73482	49.34497	45.15422
4/6/2022	4:00:00 AM	52.03222	41.75288	66.01053	54.71176	50.63369	47.20187
4/6/2022	5:00:00 AM	50.69945	39.80841	68.72114	52.90809	48.96085	45.53722
4/6/2022	6:00:00 AM	52.05672	40.48225	69.62945	53.70929	48.86446	45.72644
4/6/2022	7:00:00 AM	55.99346	42.60341	73.04989	57.91094	52.82309	48.60017
4/6/2022	8:00:00 AM	58.59925	44.60735	74.97845	59.38801	54.8941	50.73328
4/6/2022	9:00:00 AM	59.16968	40.16851	86.98592	59.93173	51.69597	46.90968
4/6/2022	10:00:00 AM	58.83965	39.77066	78.75161	61.37944	51.61931	46.12264
4/6/2022	11:00:00 AM	62.65996	40.31152	82.41634	65.87773	54.39084	46.92455
4/6/2022	12:00:00 PM	65.31386	40.53296	84.70095	68.73594	57.39258	47.91325
4/6/2022	1:00:00 PM	65.56403	39.35296	85.67561	68.52085	56.05372	46.63018
4/6/2022	2:00:00 PM	60.93567	37.61858	83.77497	62.95876	50.16801	44.11963
4/6/2022	3:00:00 PM	59.97395	35.84767	86.79503	61.18342	49.45301	42.60732
4/6/2022	4:00:00 PM	56.45761	36.25169	77.21528	58.78413	48.59038	42.34412
4/6/2022	5:00:00 PM	53.72311	33.82055	75.84566	55.46284	46.35569	41.36519
4/6/2022	6:00:00 PM	55.34542	32.03121	82.01583	54.9889	46.93088	40.59208
4/6/2022	7:00:00 PM	62.64367	38.33354	79.82555	66.3904	58.4463	50.01199
4/6/2022	8:00:00 PM	62.50806	38.8468	81.13709	66.37514	57.76307	49.69724
4/6/2022	9:00:00 PM	59.57457	37.62167	74.67636	63.30333	55.95896	48.77945
4/6/2022	10:00:00 PM	53.3889	36.97571	71.85993	55.98148	48.35968	43.41972

4/6/2022	11:00:00 PM	53.86646	38.94541	71.82977	56.83312	49.81962	44.86367
4/7/2022	12:00:00 AM	53.33748	38.90228	68.52111	56.45164	50.58192	45.89969
4/7/2022	1:00:00 AM	50.49027	37.5567	66.76174	53.63592	47.50887	43.65987
4/7/2022	2:00:00 AM	52.98817	40.35831	65.12804	55.78277	51.25338	46.9536
4/7/2022	3:00:00 AM	56.08547	42.94667	64.99465	59.20189	55.00976	50.03444
4/7/2022	4:00:00 AM	54.87441	42.55138	64.5469	57.92623	53.58366	49.26082
4/7/2022	5:00:00 AM	56.59676	48.35621	66.63775	58.81808	55.93828	53.21129
4/7/2022	6:00:00 AM	59.6255	46.98244	75.94039	60.95529	56.13757	52.67959
4/7/2022	7:00:00 AM	57.44106	45.59461	76.88251	59.27574	55.14813	51.93159
4/7/2022	8:00:00 AM	56.61903	44.62198	82.83616	57.94057	53.62075	50.13617
4/7/2022	9:00:00 AM	55.90928	39.04615	73.22114	58.47408	50.83178	45.70327
4/7/2022	10:00:00 AM	55.39408	34.01267	76.04249	56.97013	47.82894	41.4647
4/7/2022	11:00:00 AM	55.55206	30.75435	76.83867	58.26847	47.1679	38.86793
4/7/2022	12:00:00 PM	56.76117	32.18044	79.20429	59.23107	46.52138	39.04472
4/7/2022	1:00:00 PM	58.33319	31.92893	77.2076	61.56192	49.75335	40.1845
4/7/2022	2:00:00 PM	59.68711	32.04658	80.78008	62.51679	49.44006	39.9158
4/7/2022	3:00:00 PM	59.51148	32.16461	80.73303	62.59794	50.95211	40.61296
4/7/2022	4:00:00 PM	55.45333	31.32547	80.48673	56.89518	44.10165	38.2627
4/7/2022	5:00:00 PM	53.59698	31.24311	78.56302	51.6422	42.02313	37.62553
4/7/2022	6:00:00 PM	55.36647	30.23975	81.78752	54.72816	45.6887	38.18394
4/7/2022	7:00:00 PM	55.69782	32.5546	73.34329	58.96458	51.29557	43.65194
4/7/2022	8:00:00 PM	53.33478	35.47219	66.74155	57.15799	50.12154	43.82253
4/7/2022	9:00:00 PM	50.61302	34.53378	67.04633	53.83705	47.2855	41.83907
4/7/2022	10:00:00 PM	52.25874	38.31473	66.08586	55.50338	49.80563	45.30729
4/7/2022	11:00:00 PM	50.50572	35.4564	68.652	53.80627	47.37582	42.53113
4/8/2022	12:00:00 AM	51.1448	36.05505	66.94173	54.27828	48.4911	43.19332
4/8/2022	1:00:00 AM	51.47179	40.26457	63.74832	54.25797	49.92944	46.09869
4/8/2022	2:00:00 AM	54.73739	45.00545	65.23796	57.59292	53.38363	49.87221
4/8/2022	3:00:00 AM	55.40588	42.95962	67.28163	58.08599	54.44814	50.29379
4/8/2022	4:00:00 AM	56.10419	46.68187	67.12577	58.5796	54.96154	51.8107
4/8/2022	5:00:00 AM	53.66726	42.23371	70.71626	56.34286	52.10464	48.11713
4/8/2022	6:00:00 AM	54.66954	42.23253	73.8837	56.36237	51.38364	47.77865
4/8/2022	7:00:00 AM	54.00062	43.1936	76.2484	56.21352	52.55807	48.79992
4/8/2022	8:00:00 AM	55.37545	40.1438	75.28636	54.84056	49.58993	45.90184
4/8/2022	9:00:00 AM	57.2333	39.50785	75.70624	59.77808	51.82039	46.39614
4/8/2022	10:00:00 AM	61.36506	38.97174	85.22493	64.15266	54.61001	47.03418
4/8/2022	11:00:00 AM	62.62739	32.25354	81.02117	66.02806	54.74718	43.21359
4/8/2022	12:00:00 PM	71.33396	33.3908	87.17265	75.69888	64.67855	51.47755
4/8/2022	1:00:00 PM	70.85775	33.49214	86.92278	75.0438	63.89746	50.25901
4/8/2022	2:00:00 PM	75.72819	36.00787	90.37162	80.15461	70.17659	56.40329
4/8/2022	3:00:00 PM	79.22436	39.76723	92.121	83.30519	75.98504	65.36011
4/8/2022	4:00:00 PM	77.49292	38.32144	91.00646	82.08065	72.11593	58.79657
4/8/2022	5:00:00 PM	74.45353	40.38584	88.18059	78.80445	69.61487	58.18678

4/8/2022	6:00:00 PM	76.14785	37.87579	90.32889	80.49547	70.9814	59.42132
4/8/2022	7:00:00 PM	72.35834	40.64339	87.01071	76.54054	66.88394	56.95644
4/8/2022	8:00:00 PM	66.82704	35.26431	85.92521	70.42713	59.47748	49.12678
4/8/2022	9:00:00 PM	67.32199	33.45962	85.01065	71.12408	60.58264	50.27032
4/8/2022	10:00:00 PM	74.23764	35.73927	89.57764	78.51112	68.5025	56.62292
4/8/2022	11:00:00 PM	76.18939	43.62251	90.8979	80.53149	71.41495	60.85941
4/9/2022	12:00:00 AM	69.91342	33.76025	88.23604	73.63313	52.78635	41.40655
4/9/2022	1:00:00 AM	68.70078	38.97133	86.36331	72.65671	60.79344	46.99939
4/9/2022	2:00:00 AM	70.44489	39.18759	86.90008	74.51856	63.11422	50.92669
4/9/2022	3:00:00 AM	67.59062	39.61177	84.99343	71.49187	61.4396	50.34248
4/9/2022	4:00:00 AM	72.22315	41.53618	87.51933	76.39517	66.6192	54.35035
4/9/2022	5:00:00 AM	75.6644	49.28016	90.06516	79.86002	71.72889	62.00465
4/9/2022	6:00:00 AM	73.21573	44.93238	88.18105	77.4395	67.91384	56.69784
4/9/2022	7:00:00 AM	75.6274	43.23798	91.87717	79.69616	70.96219	59.32663
4/9/2022	8:00:00 AM	71.79429	39.44916	91.35335	73.62125	60.17472	46.0784
4/9/2022	9:00:00 AM	65.26826	37.28154	87.43301	67.51723	55.49644	45.13563
4/9/2022	10:00:00 AM	73.59958	38.0079	88.38141	78.03315	67.23591	53.20037
4/9/2022	11:00:00 AM	80.16979	43.17828	91.97229	84.36175	77.21295	65.66079
4/9/2022	12:00:00 PM	77.94986	39.77595	91.52221	82.3053	73.61278	60.28516
4/9/2022	1:00:00 PM	77.25254	38.19449	90.47115	81.65601	72.00106	58.46768
4/9/2022	2:00:00 PM	75.34184	35.96568	89.94595	79.8409	68.03671	51.54454
4/9/2022	3:00:00 PM	73.8935	35.27712	89.30381	78.21424	65.88027	48.59957
4/9/2022	4:00:00 PM	74.9853	35.9376	90.3231	79.40479	68.07651	53.32636
4/9/2022	5:00:00 PM	78.88749	41.23365	91.93282	83.20245	75.04098	63.34231
4/9/2022	6:00:00 PM	79.16258	40.00214	91.63644	83.56845	75.23147	62.59181
4/9/2022	7:00:00 PM	74.92615	35.69874	90.64583	79.19398	68.29974	55.45505
4/9/2022	8:00:00 PM	68.2665	38.31233	88.08224	70.88643	53.68573	44.48301
4/9/2022	9:00:00 PM	55.43659	40.78334	76.70457	57.27453	50.93418	46.56788
4/9/2022	10:00:00 PM	60.65522	40.53096	81.99904	63.26737	53.77272	47.38318
4/9/2022	11:00:00 PM	63.94492	41.81564	83.5402	67.29314	56.65539	48.97333
4/10/2022	12:00:00 AM	64.50779	42.06145	83.75157	67.49147	56.76776	49.38423
4/10/2022	1:00:00 AM	68.87638	39.86948	85.99401	72.7841	62.39116	51.02223
4/10/2022	2:00:00 AM	71.197	38.48262	87.95275	75.28043	65.3082	53.8128
4/10/2022	3:00:00 AM	61.36243	33.54069	84.03033	62.29606	47.0958	40.15188
4/10/2022	4:00:00 AM	54.10109	35.84346	73.36543	57.18549	46.91127	42.14907
4/10/2022	5:00:00 AM	52.90421	34.19103	74.31004	54.18214	44.895	40.28199
4/10/2022	6:00:00 AM	58.75184	34.57577	86.05843	56.42657	45.24223	40.98094
4/10/2022	7:00:00 AM	53.81967	35.86397	70.3431	56.12306	46.91444	42.54488
4/10/2022	8:00:00 AM	57.86026	35.84701	77.97509	59.96091	50.12723	43.60909
4/10/2022	9:00:00 AM	65.69063	35.17773	84.24229	69.56912	58.81369	46.66247
4/10/2022	10:00:00 AM	65.90372	34.26272	90.64058	63.77991	50.29335	42.15632
4/10/2022	11:00:00 AM	68.4952	33.50258	88.6759	71.86396	59.02693	44.75402
4/10/2022	12:00:00 PM	71.88246	34.08531	88.10985	76.09825	64.98251	48.24257

4/10/2022	1:00:00 PM	71.57432	32.5924	87.3652	75.79948	63.54089	45.20393
4/10/2022	2:00:00 PM	69.82811	33.5513	87.41295	73.50397	60.63079	43.46845
4/10/2022	3:00:00 PM	66.26137	32.44858	83.62749	70.22507	55.80586	40.65325
4/10/2022	4:00:00 PM	68.23929	32.09634	87.14674	71.77614	57.78429	42.52841
4/10/2022	5:00:00 PM	65.58789	29.92709	83.99302	68.91628	54.74868	37.67192
4/10/2022	6:00:00 PM	60.88124	27.12098	87.46351	61.70868	48.71823	37.10996
4/10/2022	7:00:00 PM	57.8754	28.32688	78.81083	60.99193	49.65939	38.74802
4/10/2022	8:00:00 PM	56.50329	35.5624	75.90307	59.65345	51.2029	44.0946
4/10/2022	9:00:00 PM	51.85408	34.14874	69.56308	55.1804	47.06864	41.20189
4/10/2022	10:00:00 PM	47.80664	29.66032	64.44111	51.4142	43.87033	37.57454
4/10/2022	11:00:00 PM	59.2413	29.4421	75.94815	63.07767	52.68391	42.65174
4/11/2022	12:00:00 AM	55.81608	29.42984	75.01291	59.708	46.79723	36.86878
4/11/2022	1:00:00 AM	42.9935	30.30694	60.69844	45.80785	40.35803	36.51167
4/11/2022	2:00:00 AM	46.99346	31.78024	66.68258	50.72887	42.00467	37.56985
4/11/2022	3:00:00 AM	46.96232	34.06452	63.11957	50.40092	43.38316	39.58443
4/11/2022	4:00:00 AM	77.17909	35.44521	89.92357	81.68098	72.72992	46.1919
4/11/2022	5:00:00 AM	73.01015	41.4511	88.32245	77.01773	68.23806	59.00751
4/11/2022	6:00:00 AM	73.78759	38.82417	89.41084	77.84892	68.79924	57.44445
4/11/2022	7:00:00 AM	76.92682	46.10532	90.96427	81.34466	72.82963	62.38252
4/11/2022	8:00:00 AM	79.78943	53.1331	91.48908	83.83984	77.01592	68.07021
4/11/2022	9:00:00 AM	76.86546	36.69371	90.0669	81.45032	71.29825	52.20068
4/11/2022	10:00:00 AM	78.10902	35.2198	91.77362	83.45917	60.12107	42.93764
4/11/2022	11:00:00 AM	78.51808	43.75988	91.41733	82.89938	74.33749	62.37393
4/11/2022	12:00:00 PM	79.62071	42.96095	92.16176	84.0573	75.24768	61.59543
4/11/2022	1:00:00 PM	84.03406	53.15222	93.60055	87.58459	82.56838	75.0377
4/11/2022	2:00:00 PM	84.19665	60.38589	93.98957	87.54903	82.93068	76.27775
4/11/2022	3:00:00 PM	83.15256	56.7566	92.76369	86.72649	81.5252	73.86815
4/11/2022	4:00:00 PM	84.2123	61.00605	93.18623	87.61524	82.85891	75.87103
4/11/2022	5:00:00 PM	77.77906	36.40844	92.6438	82.63703	67.12511	46.70266
4/11/2022	6:00:00 PM	77.92272	36.77957	91.22498	82.7327	71.36961	54.3338
4/11/2022	7:00:00 PM	71.62108	40.48762	88.4315	75.47973	66.29423	55.40987
4/11/2022	8:00:00 PM	78.74236	40.16052	91.77402	83.1373	74.27333	61.65956
4/11/2022	9:00:00 PM	80.80635	45.97008	92.91485	85.14103	77.1613	64.29074
4/11/2022	10:00:00 PM	80.94826	52.53061	91.62958	84.88724	78.61085	69.97059
4/11/2022	11:00:00 PM	82.01623	53.77442	92.60715	85.78879	79.97907	71.43545
4/12/2022	12:00:00 AM	80.77494	51.5613	91.97915	84.69389	78.36495	69.16278
4/12/2022	1:00:00 AM	79.28579	50.84238	91.30565	83.32453	76.31964	67.31111
4/12/2022	2:00:00 AM	78.86035	52.61509	90.57571	82.86094	76.06678	67.88681
4/12/2022	3:00:00 AM	71.4373	40.68064	86.48615	75.52555	66.55984	56.6536
4/12/2022	4:00:00 AM	78.57659	45.6099	91.77694	82.97532	74.59183	62.52438
4/12/2022	5:00:00 AM	81.45613	56.69071	92.24528	85.14829	79.62251	71.7113
4/12/2022	6:00:00 AM	81.03724	56.0167	91.96553	84.7462	79.00212	71.51101
4/12/2022	7:00:00 AM	83.55817	62.21945	92.71203	86.86279	82.28668	76.07105

4/12/2022	8:00:00 AM	84.49118	65.95915	93.09028	87.6712	83.412	77.92905
4/12/2022	9:00:00 AM	83.35758	58.51347	93.24487	86.84039	81.91923	74.57261
4/12/2022	10:00:00 AM	76.87317	40.16388	90.78867	81.1855	72.35308	60.93415
4/12/2022	11:00:00 AM	74.26306	37.27543	89.63282	78.48171	68.23506	56.41112
4/12/2022	12:00:00 PM	76.31628	38.16211	89.8043	80.71971	71.10406	59.13037
4/12/2022	1:00:00 PM	75.63909	34.94559	90.25796	80.14353	68.66997	49.18852
4/12/2022	2:00:00 PM	74.16113	34.5827	88.87398	78.42362	67.63463	54.45305
4/12/2022	3:00:00 PM	70.97326	31.95902	89.18021	74.85856	61.18745	46.81994
4/12/2022	4:00:00 PM	76.96306	47.39339	90.60911	81.26856	72.69116	62.64049
4/12/2022	5:00:00 PM	73.32549	36.39657	89.45631	77.63475	66.79982	55.2195
4/12/2022	6:00:00 PM	69.40204	32.64068	87.78753	72.77472	61.76646	49.28473
4/12/2022	7:00:00 PM	57.23589	28.93386	77.3456	59.88974	49.38823	40.17823
4/12/2022	8:00:00 PM	63.50963	31.9878	83.03319	67.15761	56.67448	46.62324
4/12/2022	9:00:00 PM	63.91395	33.34342	82.38393	67.6961	57.40811	46.50921
4/12/2022	10:00:00 PM	65.2892	35.80237	83.16254	68.64821	60.04122	51.69257
4/12/2022	11:00:00 PM	70.4621	42.76568	86.89448	74.65915	63.53588	55.13076
4/13/2022	12:00:00 AM	75.68101	51.99641	89.23097	79.69276	72.16419	64.15399
4/13/2022	1:00:00 AM	75.08904	44.96852	89.54134	79.26622	70.70055	61.26253
4/13/2022	2:00:00 AM	69.98975	40.63394	86.07107	73.81643	65.1265	56.78799
4/13/2022	3:00:00 AM	73.31832	38.19793	88.53025	77.40901	67.59303	55.36327
4/13/2022	4:00:00 AM	72.93458	42.75118	87.68267	76.95599	68.61731	58.52591
4/13/2022	5:00:00 AM	75.29677	42.621	89.36383	79.42302	71.08743	62.6623
4/13/2022	6:00:00 AM	70.66995	38.47005	88.34527	74.4083	63.89131	52.05724
4/13/2022	7:00:00 AM	74.8521	47.21265	87.44258	78.91997	71.40776	63.36987
4/13/2022	8:00:00 AM	74.95287	49.18516	87.54374	78.88625	71.84993	64.01803
4/13/2022	9:00:00 AM	75.80381	44.84459	89.7793	79.96552	71.80808	61.64877
4/13/2022	10:00:00 AM	72.74831	40.90161	88.15377	76.65007	67.51819	57.2348
4/13/2022	11:00:00 AM	77.42829	45.98198	90.12399	81.68225	73.81664	62.85606
4/13/2022	12:00:00 PM	75.3354	43.05324	89.55488	79.48745	71.09227	61.29995
4/13/2022	1:00:00 PM	75.0049	41.77978	91.003	79.35128	68.65041	56.99687
4/13/2022	2:00:00 PM	75.37901	42.98035	88.91928	79.67524	71.16541	60.78743
4/13/2022	3:00:00 PM	73.5102	40.4167	88.51682	77.8854	67.57728	53.498
4/13/2022	4:00:00 PM	72.26577	38.89747	87.74849	76.54868	64.34192	51.59912
4/13/2022	5:00:00 PM	71.04705	38.77036	87.6056	75.13503	64.30937	53.02209
4/13/2022	6:00:00 PM	72.24871	37.28774	87.6502	76.44262	66.34118	52.76285
4/13/2022	7:00:00 PM	69.22703	35.62199	87.96847	72.68429	61.43238	49.38572
4/13/2022	8:00:00 PM	65.498	31.51013	83.40916	69.05588	55.27611	40.48623
4/13/2022	9:00:00 PM	70.41587	39.1875	87.34067	74.35141	65.15439	55.36323
4/13/2022	10:00:00 PM	68.46991	35.82196	85.92732	72.26512	61.6478	51.61358
4/13/2022	11:00:00 PM	69.89807	29.63805	85.98609	73.78978	62.34086	46.78687
4/14/2022	12:00:00 AM	74.46572	49.05675	87.8563	78.35625	71.06626	62.98519
4/14/2022	1:00:00 AM	66.76706	39.69296	83.93858	70.25892	60.82372	51.94773
4/14/2022	2:00:00 AM	68.64829	36.89052	86.45551	72.15931	62.26472	51.16376

4/14/2022	3:00:00 AM	71.65371	42.73403	86.50283	75.45012	67.20025	58.82698
4/14/2022	4:00:00 AM	75.43573	42.5293	89.27129	79.5879	71.42851	61.23127
4/14/2022	5:00:00 AM	80.23621	56.5116	91.21987	83.91325	78.30321	71.26462
4/14/2022	6:00:00 AM	79.42296	57.3523	90.64148	83.09711	77.27564	70.38182
4/14/2022	7:00:00 AM	77.37552	51.34424	89.68171	81.53993	74.17633	65.45515
4/14/2022	8:00:00 AM	73.66429	39.36559	88.89049	77.69111	68.35582	57.02801
4/14/2022	9:00:00 AM	77.78133	47.66849	89.93801	81.95263	74.49638	64.71088
4/14/2022	10:00:00 AM	77.35675	45.54989	90.25357	81.46263	74.14709	64.40002
4/14/2022	11:00:00 AM	77.54817	45.77664	90.52707	81.77935	73.89054	63.83912
4/14/2022	12:00:00 PM	78.04188	48.23325	90.69245	82.21266	74.72502	65.29283
4/14/2022	1:00:00 PM	74.29291	40.40532	89.01392	78.54559	69.2298	58.25417
4/14/2022	2:00:00 PM	72.30883	37.46877	89.08531	76.44982	63.0723	49.30219
4/14/2022	3:00:00 PM	78.66702	39.61211	91.64413	83.2433	73.79818	59.07623
4/14/2022	4:00:00 PM	74.26055	39.45654	89.89091	78.47972	67.47224	54.34958
4/14/2022	5:00:00 PM	71.68683	35.26529	88.54396	75.79053	63.55278	48.87874
4/14/2022	6:00:00 PM	72.38239	38.89156	88.64753	76.27266	66.51245	56.10644
4/14/2022	7:00:00 PM	68.21171	35.27921	86.9759	71.82983	60.00641	48.08976
4/14/2022	8:00:00 PM	75.65141	39.94944	90.1248	79.82942	69.9832	59.20225
4/14/2022	9:00:00 PM	78.6177	48.32307	91.34079	82.75852	74.99475	65.42353
4/14/2022	10:00:00 PM	74.31153	40.3848	90.53461	78.26589	69.06773	58.28948
4/14/2022	11:00:00 PM	75.33729	36.78338	90.11154	79.60037	70.04709	58.21076
4/15/2022	12:00:00 AM	74.78185	37.78055	89.49645	79.06947	69.28076	57.07536
4/15/2022	1:00:00 AM	74.20007	43.57152	88.24494	78.32843	69.76727	60.02916
4/15/2022	2:00:00 AM	74.87981	46.79958	89.45483	78.88322	70.65876	61.44042
4/15/2022	3:00:00 AM	68.77114	31.06678	87.21244	72.30956	55.30451	39.37259
4/15/2022	4:00:00 AM	68.24451	33.14502	87.56275	71.89612	58.58701	42.94333
4/15/2022	5:00:00 AM	70.29181	31.71704	90.10774	73.79194	61.18378	42.53488
4/15/2022	6:00:00 AM	64.76732	32.31475	84.96703	67.3028	55.46639	43.96254
4/15/2022	7:00:00 AM	55.85184	31.33156	76.0149	57.97575	42.32085	37.67433
4/15/2022	8:00:00 AM	63.62371	31.45512	88.27307	61.76621	48.90367	38.62219
4/15/2022	9:00:00 AM	62.40473	33.24235	82.96213	65.08137	48.93584	40.76575
4/15/2022	10:00:00 AM	70.89582	34.4481	88.96413	74.89144	62.7606	48.35202
4/15/2022	11:00:00 AM	66.60898	37.02027	84.70961	70.24439	61.33032	50.94245
4/15/2022	12:00:00 PM	67.6949	33.53439	85.14643	71.54628	59.3846	44.17311
4/15/2022	1:00:00 PM	69.40275	32.27091	88.19409	72.93217	59.88985	44.61088
4/15/2022	2:00:00 PM	72.00396	33.75276	88.28364	76.03992	63.78931	50.62782
4/15/2022	3:00:00 PM	67.69462	33.51524	87.83922	71.1133	55.01001	41.87861
4/15/2022	4:00:00 PM	66.41432	34.12072	84.74246	70.35071	58.94344	44.75502
4/15/2022	5:00:00 PM	64.74683	32.39592	85.89532	66.02607	49.83597	40.36737
4/15/2022	6:00:00 PM	61.62989	33.14297	80.01373	64.96344	55.15504	45.8224
4/15/2022	7:00:00 PM	61.85093	33.39826	83.07144	64.75769	55.09435	45.79104
4/15/2022	8:00:00 PM	70.90442	32.39126	86.91586	75.06925	65.7251	52.49911
4/15/2022	9:00:00 PM	53.32261	31.45492	71.69135	57.09596	46.10502	38.37241

4/15/2022	10:00:00 PM	52.54869	33.33622	70.4191	55.72007	48.66556	41.41292
4/15/2022	11:00:00 PM	60.16796	34.88253	77.03702	64.26396	53.87331	43.96256
4/16/2022	12:00:00 AM	56.43068	29.90816	75.94651	59.3972	40.43067	35.97641
4/16/2022	1:00:00 AM	48.61625	33.33136	65.04556	51.94716	45.08378	39.98354
4/16/2022	2:00:00 AM	48.27979	34.27499	62.62247	51.76867	45.14025	40.61981
4/16/2022	3:00:00 AM	43.82287	31.78071	58.94936	46.4702	41.80247	38.19493
4/16/2022	4:00:00 AM	47.64528	36.64441	60.90234	50.43729	46.13987	42.51528
4/16/2022	5:00:00 AM	44.14055	34.301	57.64694	46.8401	42.85832	39.63215
4/16/2022	6:00:00 AM	55.50381	33.99948	72.45382	49.27368	43.11064	39.44159
4/16/2022	7:00:00 AM	59.42481	35.38642	89.28354	57.14742	46.61755	42.54052
4/16/2022	8:00:00 AM	55.62059	38.02321	75.63916	56.93025	48.89668	44.32197
4/16/2022	9:00:00 AM	49.81028	36.40772	68.01659	52.06091	46.6138	42.44383
4/16/2022	10:00:00 AM	70.19475	34.0838	88.42048	74.28927	48.60552	40.69943
4/16/2022	11:00:00 AM	79.03202	45.59289	90.9368	83.22983	75.61507	65.49345
4/16/2022	12:00:00 PM	80.78138	50.83414	92.42989	84.54802	78.52314	69.80362
4/16/2022	1:00:00 PM	82.1902	54.46869	92.14475	85.72464	80.59244	73.38407
4/16/2022	2:00:00 PM	82.62886	57.77497	92.2573	86.16931	81.07643	73.7971
4/16/2022	3:00:00 PM	80.82629	45.45825	92.63857	84.87973	78.22334	67.92639
4/16/2022	4:00:00 PM	80.20646	47.41234	91.7987	84.36806	77.09578	66.80708
4/16/2022	5:00:00 PM	80.77087	49.5192	92.54104	84.86387	78.07107	66.10806
4/16/2022	6:00:00 PM	77.56777	42.90643	90.18659	81.94774	73.21621	62.41871
4/16/2022	7:00:00 PM	72.418	32.91194	88.86611	76.56833	63.75671	50.10938
4/16/2022	8:00:00 PM	73.83775	33.14092	89.7247	78.17457	64.39234	47.14368
4/16/2022	9:00:00 PM	79.13444	44.15844	91.58558	83.43482	75.38687	63.8892
4/16/2022	10:00:00 PM	77.33593	42.90961	90.57871	81.74193	72.56504	60.90414
4/16/2022	11:00:00 PM	77.12029	41.93703	91.94824	81.44402	72.11167	61.08478
4/17/2022	12:00:00 AM	75.43202	43.10789	89.74826	79.77011	70.30027	59.30395
4/17/2022	1:00:00 AM	72.37751	35.48822	88.65949	76.37133	65.44889	52.37327
4/17/2022	2:00:00 AM	70.09334	33.65391	87.57172	73.7343	62.36261	49.56545
4/17/2022	3:00:00 AM	69.14105	37.3134	87.64502	72.8419	62.30663	51.81755
4/17/2022	4:00:00 AM	59.94558	35.58675	78.90728	62.99381	54.34394	46.69379
4/17/2022	5:00:00 AM	57.29931	35.17984	79.50035	60.27837	52.40571	45.28874
4/17/2022	6:00:00 AM	59.34625	33.31679	77.79658	57.70672	46.30681	40.16204
4/17/2022	7:00:00 AM	55.70073	34.39563	74.94454	58.73304	45.09955	40.82994
4/17/2022	8:00:00 AM	56.89202	35.14361	75.8875	60.17439	49.1835	42.70096
4/17/2022	9:00:00 AM	66.27206	34.68623	85.4597	69.87708	55.86459	43.49726
4/17/2022	10:00:00 AM	67.25585	33.23157	85.7522	70.705	57.3818	43.34833
4/17/2022	11:00:00 AM	69.84451	33.84853	86.76259	73.66111	61.25088	46.138
4/17/2022	12:00:00 PM	69.728	34.29805	87.58172	73.63675	59.22397	43.70888
4/17/2022	1:00:00 PM	70.12289	33.16814	87.43205	74.17477	54.3609	40.76353
4/17/2022	2:00:00 PM	71.32496	34.52803	88.41748	75.38919	62.68248	48.43464
4/17/2022	3:00:00 PM	72.52891	35.17897	88.30254	76.67626	65.55736	50.01217
4/17/2022	4:00:00 PM	65.62048	30.43906	84.20187	69.10914	53.93405	39.64562

4/17/2022	5:00:00 PM	65.47836	33.83373	82.68741	69.46851	59.1595	47.94519
4/17/2022	6:00:00 PM	61.71832	31.81673	80.84631	64.95396	53.94557	43.85479
4/17/2022	7:00:00 PM	60.81546	31.54943	80.19976	64.10375	54.09602	44.67928
4/17/2022	8:00:00 PM	58.29321	36.17495	75.77727	61.70935	53.83513	46.46371
4/17/2022	9:00:00 PM	57.936	32.85927	77.79952	60.81669	47.77573	39.81456
4/17/2022	10:00:00 PM	52.53659	35.24777	68.50081	56.47393	47.53525	41.48783
4/17/2022	11:00:00 PM	51.88183	33.40359	72.5782	54.94711	44.91264	39.59315
4/18/2022	12:00:00 AM	49.29477	36.08789	67.57608	52.65323	46.37546	42.10116
4/18/2022	1:00:00 AM	49.92377	37.17992	65.29743	52.93361	47.7982	43.41867
4/18/2022	2:00:00 AM	48.2978	35.33882	60.89448	51.68934	46.01871	41.75479
4/18/2022	3:00:00 AM	48.77599	37.41138	68.36218	51.46666	47.41494	43.5709
4/18/2022	4:00:00 AM	53.29643	41.05692	69.29457	56.64448	51.30452	46.73109
4/18/2022	5:00:00 AM	58.14473	42.10208	81.06119	56.4731	51.82171	47.60701
4/18/2022	6:00:00 AM	61.74694	43.32699	86.06407	61.88351	53.46052	48.82761
4/18/2022	7:00:00 AM	59.30544	46.12551	84.31908	60.50706	55.14172	51.31739
4/18/2022	8:00:00 AM	55.90297	42.51	73.02785	58.2745	53.25003	48.70415
4/18/2022	9:00:00 AM	56.06607	40.49355	80.09775	58.19952	50.7199	46.29721
4/18/2022	10:00:00 AM	58.30628	36.59464	78.47161	61.3447	50.44246	43.5207
4/18/2022	11:00:00 AM	63.24836	34.11144	80.22373	66.9863	55.44741	44.61807
4/18/2022	12:00:00 PM	73.58892	36.61532	88.92884	77.96417	67.55389	53.36981
4/18/2022	1:00:00 PM	75.36569	35.73091	89.28785	79.90477	69.88891	55.50819
4/18/2022	2:00:00 PM	76.52089	35.92802	89.56504	80.88331	72.1823	59.68271
4/18/2022	3:00:00 PM	71.8405	36.60508	88.05712	75.77025	64.61309	52.21304
4/18/2022	4:00:00 PM	74.52673	35.07187	89.31566	78.95416	68.68621	53.64084
4/18/2022	5:00:00 PM	71.97033	36.47094	88.16348	75.71207	65.65024	54.38526
4/18/2022	6:00:00 PM	74.48109	36.26672	90.5951	78.90788	67.4776	54.41965
4/18/2022	7:00:00 PM	77.29787	41.88206	90.65277	81.68895	72.62162	61.0902
4/18/2022	8:00:00 PM	78.22718	46.51138	90.61375	82.42189	74.76897	65.15814
4/18/2022	9:00:00 PM	79.60859	54.28212	91.09657	83.47409	77.25931	69.24839
4/18/2022	10:00:00 PM	80.95809	56.78899	90.912	84.54816	79.19804	72.41997
4/18/2022	11:00:00 PM	76.81822	44.86178	89.96081	81.06567	73.06043	61.49701
4/19/2022	12:00:00 AM	75.41097	46.54176	88.68019	79.56658	71.38871	62.54278
4/19/2022	1:00:00 AM	63.647	34.42331	83.15249	66.94982	56.0916	45.91319
4/19/2022	2:00:00 AM	59.87731	33.24023	83.35192	61.00941	50.0225	42.46392
4/19/2022	3:00:00 AM	71.75691	38.15034	87.36119	75.64251	66.46802	56.75563
4/19/2022	4:00:00 AM	75.35743	40.59276	90.08414	79.76942	68.63362	58.17758
4/19/2022	5:00:00 AM	75.83327	34.6085	91.21997	80.31447	69.11605	53.21571
4/19/2022	6:00:00 AM	71.90071	33.36558	90.87004	75.21646	60.88754	47.75824

WM16: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
4/5/2022	7:49:34 AM	65.4	62.6	60.6	57.9	54.7	50.4	47.4	44.8	42.8	40.9	39	36.3	39.8	42.4	42.2	39.5	34.2	37.7	31.5	32	28	33.5	34.1	31.9	33.5	35.7	35.7	31.6	32	29.7	26	26.4	24	21.7	19.8	18.3
4/5/2022	8:00:00 AM	72.5	70.2	67.4	64.9	62.1	59.2	56.5	53.8	50.8	48	44.9	42.3	40	37.5	35.4	33.3	31	28.7	27	24.8	23.4	23.1	25	26.7	27	30	31.7	32.4	31.4	24.5	12.5	8.1	6.5	5.5	6.8	10.7
4/5/2022	9:00:00 AM	70.6	68.5	66.1	63.6	61	58.1	55.2	52	48.7	45.6	42.8	39.9	37.6	35.4	33.3	31.1	28.8	26.5	24.7	22.5	21.1	20.7	22	23.7	24.4	33.7	37.9	42.6	39.8	33.4	20.1	14.3	12	9.2	6.4	7.8
4/5/2022	10:00:00 AM	71.2	69.3	67.1	64.8	62.4	59.6	56.9	53.9	50.7	47.9	44.9	42.4	39.9	37.3	35.1	32.7	30.1	27.7	25.9	23.8	22.3	22	24.1	25.9	34.4	45	52.2	55.1	50.7	44.9	32	26.5	28.2	21.1	18	14.9
4/5/2022	11:00:00 AM	70.8	69.1	67	64.6	62.3	59.9	56.8	54.2	51.3	48.5	46	43.4	40.8	38.1	35.9	33.2	30.4	27.8	25.6	23.4	21.6	20.9	22.6	24.2	25.4	34.2	39.2	44.1	39.5	34.7	21.6	15.5	14.8	10.4	7.2	9
4/5/2022	12:00:00 PM	71	69.4	67.5	65.2	62.8	60.3	57.7	54.4	51.4	48.4	45.5	42.7	39.9	37.5	35.2	33.6	31.3	28.7	26.2	25.9	24	22.4	22.9	24.2	24.9	36.1	34.9	37.1	34.3	29	15.1	11.2	9	6.8	6.4	8.3
4/5/2022	1:00:00 PM	70.6	68.8	66.7	64.3	62	59.2	56.4	53.2	50	47.4	44.2	41.4	38.7	35.8	33.4	30.9	28.5	26.3	24.5	22.3	20.6	20.2	21.9	23.3	24.5	31	34.9	34.4	36.3	29.2	11.1	9.2	6.7	5.6	4.3	6.6
4/5/2022	2:00:00 PM	70.4	68.9	67.1	64.9	62.7	60	57.2	54.2	51	48.1	45	42.2	39.3	36.6	34.1	31.6	28.9	26.3	24.4	22	20.2	19.8	21.5	22.8	24	23.8	33.6	35.6	34.6	26.5	14.9	11.7	9.9	8.5	4.6	6
4/5/2022	3:00:00 PM	69.8	68.1	66.2	64.1	61.6	59.1	55.8	52.8	49.5	46.6	43.7	40.8	42.5	42.3	34.5	33.5	30.8	26.2	24.8	22.5	20.8	19.9	21	22.2	21.9	25.6	31.8	29.5	34.2	20.5	7	8.2	6.6	6.1	3.2	5
4/5/2022	4:00:00 PM	71.1	69.5	67.7	65.3	62.6	59.8	56.8	53.6	50.4	47.6	44.5	41.5	38.9	36.1	33.7	31.1	28.6	26.2	24.3	22.1	20.5	20.3	22.2	23.5	22	23.1	24.3	27.4	25.2	18.3	9	4.3	3.4	5.2	4	6.1
4/5/2022	5:00:00 PM	71.3	69.8	68.1	65.7	63.3	60.4	57.3	54.1	50.9	47.8	45	42.1	40.8	39.6	34.9	32	30.2	26.9	25.2	22.6	20.8	20.7	22.7	23.9	25	31.6	38.4	41.4	37.1	29.7	15.5	10.7	8.8	7.6	4.9	5.7
4/5/2022	6:00:00 PM	67	65.2	63	60.5	57.6	54.6	51.6	48.5	44.9	42.1	39.3	36.7	34.9	33.2	31.5	28.4	25.3	22.2	19.9	17.4	15.6	15.4	17.1	18.6	23.2	35.7	39.4	41.6	37.5	27.7	15.8	13.2	12.5	8.5	2.8	2.8
4/5/2022	7:00:00 PM	56.2	54.8	51.8	49.4	46.4	43.7	42.8	43.6	40.5	40.5	38.6	38.7	38.1	37.1	34.4	31	27.3	22.9	17.5	14	10.3	4.8	3.2	3.2	16.7	26.8	30.2	31.7	29.2	22.6	10	7.7	9.1	3.8	0.9	0.4
4/5/2022	8:00:00 PM	54.1	52.1	49.5	46.6	44.7	43.7	43.4	45.8	42.6	40.9	40.3	40.4	38.9	37.7	35	34.8	30.3	25.3	20.8	16	11.5	4.3	1.1	-0.6	-3.7	-5.8	-5.8	-6.4	-5.9	-5.5	-5	-4.6	-4.6	-4.4	-3	0.1
4/5/2022	9:00:00 PM	53.1	50.2	48.4	44.9	42.7	41	43.4	49.1	45.1	43.7	42.6	43.2	41.1	38.6	37.1	36.5	31.9	27.3	22.8	18.2	12.7	5.5	0.4	-2.4	-5.1	-6.9	-7.1	-7.1	-6.6	-6.1	-5.8	-5.6	-5.4	-4.8	-3.1	0.1
4/5/2022	10:00:00 PM	47.6	45.3	43.5	41.7	42.4	41.3	41.8	45.8	42.2	41.2	39.6	38.6	38.6	36.4	34.8	34.5	30.1	25.7	20.9	16.7	11.8	4.3	3.8	-8.2	-8.2	-5	-2.3	3.1	3.2	5.3	-6	5.8	5.5	-5.3	3.3	0
4/5/2022	11:00:00 PM	49.1	46.8	44.6	41.9	40.6	39.8	40.7	45	39.7	39.8	38.6	38.6	36.6	34.4	32.5	32.4	28.3	24.9	20.6	17.5	14.2	7.9	2.2	-5	-7.4	8.1	-7.8	-7.4	6.9	6.3	-6	5.8	5.5	-5.2	3.3	0.1
4/6/2022	12:00:00 AM	50.1	47.8	45.4	43.2	41.9	40.8	43.2	46.1	42	43.1	40.3	38.7	37.6	35.6	34	33.2	29.6	24.3	20.4	17.2	12.8	6	1.2	-6.9	-2.8	8.1	16.5	20.7	11.7	0.8	-1.8	5.6	4.9	-5.3	3.3	0.1
4/6/2022	1:00:00 AM	49.9	47.5	45.1	42.4	40.6	40.3	44	44.9	38.6	39.4	37.4	37.2	36.5	33.3	31.3	31.8	27.4	23.5	20.1	17.2	14.4	7	0	-6.1	-8.3	8.3	-8	-7.5	6.9	6.4	-6.1	5.8	5.5	-5.3	3.3	0.1
4/6/2022	2:00:00 AM	48.9	46.3	44	42	40.4	40.5	42.4	43.9	40.8	40.1	38	38.8	37.7	36	34	33.2	28.9	24.7	20.4	16.1	11.4	4.8	1.5	-6.9	-4.9	10.1	17.4	24.3	22.2	11.5	-2.5	4.9	4.5	-5.3	3.3	0.1
4/6/2022	3:00:00 AM	42.9	40.5	38.9	38.2	37.9	40.2	43.7	45.3	39.5	38.4	35.8	36.4	34.2	31.7	30.9	30.5	25.7	22.3	19.9	13.7	9.1	1.7	3.8	-7.5	-8.5	8.4	-8	-7.6	-7	6.4	-6.1	5.8	5.5	-5.4	3.3	0.1
4/6/2022	4:00:00 AM	36.3	35.4	35.4	37.9	38.8	39.6	41.9	46.8	41.1	40.8	38.9	40.2	38.1	37.1	35.1	33.2	28.6	25.9	24	16.7	10	1.6	4.9	-4.5	0.7	18.9	25.1	25.4	13.1	2.1	-2.7	5.4	4.3	-5.3	3.3	0.1
4/6/2022	5:00:00 AM	38.1	37.2	37.2	37.3	38.4	38.9	40.4	44.5	38.3	37.5	35.7	36.2	33.4	31.8	31.1	29.5	24.5	21.9	20.2	13.1	7	0.5	1.4	2.8	14.2	31.1	32.7	39	35.1	26.5	12.4	9.3	8.4	2.7	0.5	0.5
4/6/2022	6:00:00 AM	38.2	37.1	38.4	37.5	38.8	38	41.1	43.5	38.5	37.6	35.4	34.7	33.2	30.6	28.7	27.4	23	19.2	16.6	12.1	8.1	1.4	2.2	13.1	25.6	38	41.8	44.8	39.7	31.9	15.5	13.2	13.1	8.1	2.3	0.7
4/6/2022	7:00:00 AM	39.6	38.8	41.2	40.5	41	42	43	48.3	44.2	43.5	42.9	40.7	39.6	37	34.6	34.9	29.4	25.4	22.2	18.2	11.9	5.6	8.5	19.6	26.9	40.2	44.5	48.8	42.9	36.1	21	14.8	16.4	9.8	5.3	2.5
4/6/2022	8:00:00 AM	43.9	42.4	43	43.3	42.6	45	45.9	50.3	45.9	44.5	43.7	44.4	41.7	39.1	37.5	36.2	31.2	27.5	24.7	18.7	13	7	11.9	22.1	31.1	44.1	48.6	51.8	45.3	38.3	24.9	17.9	19.9	13.8	9.2	4.6
4/6/2022	9:00:00 AM	54.3	50.9	51.1	47.5	46.4	44.7	44.7	43.1	40.1	39.7	37.7	39	34.7	34	34.7	28.5	21.6	16.8	13.2	9.6	6	4.3	6.8	16.2	26.1	39.7	44.1	45.8	38.8	32.2	19.2	14.4	13.5	7	3.6	1.7
4/6/2022	10:00:00 AM	53.9	51.9	49.8	47.7	45	43.4	44.5	42.2	38.7	37.5	35.3	34.1	32.5	30	26.9	24.3	20	15.2	13	9.7	4.5	4.9	8.2	18.3	25.6	38.4	42.2	47.1	40.4	35.2	23.7	14.6	14.1	10.2	5.6	2.5
4/6/2022	11:00:00 AM	58.9	56.5	54.1	51.8	49.1	46.1	45	43	39.5	38.6	38.3	38.8	34.7	32.5	32	27.8	24.4	18.9	15.3	12.8	7.2	5.2	5.5	6.3	9.9	20.9	26.6	30.7	25.8	19	4.6	1.3	0.9	-2	1.6	0.4

4/6/2022	12:00:00 PM	61.5	59.4	56.9	54.8	51.6	48.1	46.4	43.9	40.9	39.5	37.8	37	35.7	34.9	37.1	32.8	25.6	20.2	16	13	9.2	7.8	7.9	7.4	5.5	8.9	11.2	10.9	5.6	1.4	-2.2	-3.1	-3.6	-2.7	-1.9	0.3
4/6/2022	1:00:00 PM	61.5	59.6	57.3	55.1	52.6	49.2	47.1	44.1	40.8	38.8	37.2	42	42	39.2	35.1	34.9	31.3	24.1	20.6	18.7	21.3	19.2	14.8	10.1	8.5	14.9	19.1	20.3	15.3	3.9	-1.7	-2.6	-3.1	-1.8	-1.1	1.3
4/6/2022	2:00:00 PM	56.7	54.9	52.9	50.4	48	45	44	41.2	38.5	37.9	35.6	34.2	33.9	33.6	29.6	26	23.3	16.8	15	14.4	7.2	7.2	6.5	6.8	6.6	9.2	13.7	14.1	13.5	7.9	1.1	-2.4	-2.8	-2.1	-1.3	0.5
4/6/2022	3:00:00 PM	55.1	54.3	52.2	50.1	46.9	44.1	42.5	40.4	38.2	36.2	34.8	34.3	33	33.1	32.1	28.9	23.3	17.3	13.6	9.8	5.1	3.6	3.7	7.1	15.3	29.9	33.2	34.4	26.3	13.9	8	1.9	4.3	1	0.1	1.2
4/6/2022	4:00:00 PM	52.2	50.1	47.6	44.8	42.9	40.9	42	38.7	35.8	34.5	32.1	31	29.4	26.9	24.5	21.4	17	13.4	10.6	5.4	1.8	0.7	4.3	1.9	21.1	32	36.9	38.5	37.3	29	7.7	3.9	6.1	5.4	2	0.6
4/6/2022	5:00:00 PM	48	46	43.9	41.4	39.8	38.3	40.1	37.6	34.6	34.1	33.2	32.7	31.6	42.3	41.6	37.4	19.3	17.8	13.1	12	9.9	4.4	1.9	11.4	19.7	32.2	36.5	38.1	31.1	21.5	10.7	3.8	3.7	0.2	-1.3	0.4
4/6/2022	6:00:00 PM	46.8	45.2	42.8	40.8	40.4	37.9	39.3	37	33.3	32.5	31.2	30.6	31	31.5	27.4	24.9	20.9	13.3	8.9	3.9	0.8	-3	8.4	6.8	31.2	42.1	46.7	49.8	43.9	36.8	23.2	21.1	19.1	16.1	10.2	7.3
4/6/2022	7:00:00 PM	58.6	56.9	54.5	51.9	49	46	44.4	41.8	38.2	35.4	33.3	32	29.9	28	26.3	24.3	20.3	15.4	11	6.3	3.3	1.6	1.8	6.5	17.5	28.6	33.1	36.7	30.2	25.9	12.6	6.8	6.7	0.2	-1.7	0.3
4/6/2022	8:00:00 PM	58.4	56.7	54.6	51.9	48.7	46.3	44.3	41.6	38.2	36	34.2	33.6	33.3	30.7	29.5	27.6	22.8	17.4	13.3	9.1	4.6	1.8	1.1	-0.3	-3.6	-6.3	-6.5	-6.5	-6	-5.4	-5.2	-5.2	-5.1	-3.6	-2.8	0.1
4/6/2022	9:00:00 PM	55.7	53.7	51.4	48.5	45.5	42.9	41.2	40.9	35.7	33.6	31.6	30.7	30	28.5	27.7	25.2	20.2	15.9	12.5	8.3	3.7	-1.1	-2.4	-3.8	-6.2	-7.4	-7.2	-6.9	-6.4	-5.8	-5.5	-5.4	-5.3	-4.4	-3	0.1
4/6/2022	10:00:00 PM	47.7	46	43.5	41.3	39.6	37.7	41.5	42.9	38.5	38	37	39.4	34.8	32.3	31.6	30.7	25.5	21.1	17	13.1	7.1	-0.9	-5.8	-7.8	-8.4	-8.2	-7.8	-7.4	-6.8	-6.3	-5.9	-5.8	-5.5	-5.1	-3.1	0
4/6/2022	11:00:00 PM	48.6	46	43.1	40.7	38.8	37.7	39.2	45	40.7	40.5	37.7	39	36	32.6	31.6	30.7	25.4	20.6	16.3	11	5.4	-2.5	-6.7	-7.7	-8.1	-7.9	-7.5	-7.2	-6.6	-6	-5.7	-5.6	-5.4	-5	-3.1	0.1
4/7/2022	12:00:00 AM	45.9	43.2	40.8	39.1	38.5	37.7	38.6	48.1	40.5	40.9	38.2	39.6	35.9	34.2	33.4	33.5	26.8	22	18.5	10.5	3.9	-5.6	-8.3	-8.5	-8.5	-8.3	-7.9	-7.4	-6.9	-6.3	-6	-5.8	-5.5	-5.1	-3.1	0
4/7/2022	1:00:00 AM	43.8	41.6	40.2	39	39.7	37.5	37.7	43.2	35.6	34.8	33	32.3	30.9	28.2	26.8	26.4	21	16.8	13.3	6.7	1.4	-5.3	-8.3	-8.7	-8.5	-5.7	-7.1	-6.9	-6.3	-6.3	-6	-5.8	-5.5	-5.2	-3.2	0
4/7/2022	2:00:00 AM	39.8	38.1	37.6	38.8	40.8	40.4	41.7	47.9	42.6	41.9	40.5	40.3	38.3	35.3	32.8	32.3	27.4	22.7	18.4	11.2	4.3	-3.4	-7.8	-8.9	-8.6	-8.3	-7.7	-7.5	-6.9	-6.4	-6.1	-5.8	-5.5	-5.3	-3.3	0.1
4/7/2022	3:00:00 AM	38.8	38.4	40.3	42.1	44.8	43.7	44.1	51.7	46.6	45.7	42.7	41.5	39.9	36.3	34.2	35.7	29.2	24.9	21.6	15.6	8.6	-1.8	-8	-8.9	-8.7	-8.3	-7.9	-7.5	-6.9	-6.4	-6	-5.8	-5.5	-5.3	-3.3	0
4/7/2022	4:00:00 AM	34.7	34.4	39	39.8	43.4	41.7	43.4	49.7	46	44.9	42.5	42.8	40.8	36.3	35.1	35.6	29.5	25.3	22	15.6	8.7	-1.1	-7.5	-8.6	-8.4	-8	-7.7	-7.3	-6.7	-6.2	-5.7	-5.6	-5.3	-5.2	-3.2	0.1
4/7/2022	5:00:00 AM	36.6	35.5	37.8	41.8	42.5	42.6	44.7	52.5	47.7	47.2	43.6	41.7	42	37.6	36.5	36.1	31	26.7	23.1	16.2	9.3	-0.1	-3	4.1	13	24.7	27.6	30.6	28.5	22.9	8.3	1.3	2.4	-1.6	-2.5	0.1
4/7/2022	6:00:00 AM	35.2	36.1	41.3	43.2	44.4	42.9	45	52.3	48.4	46.4	43.5	43.4	42.1	38	36.8	36.2	31.5	26.5	22.7	16.5	10.3	8.6	13.3	23.9	32.2	43.9	49.4	54.3	46.8	37.3	25.2	17.2	19	9.5	6	3.8
4/7/2022	7:00:00 AM	34.7	35.4	39.5	41.5	41.8	41.9	43.4	51.7	46.3	46.1	45.1	44.5	43.5	39.7	37.9	36.7	31.9	27.4	22.9	18	11.3	5.2	8	16.7	27.4	40.5	45.7	48.2	42.6	34.2	19.1	13.2	14.8	8.3	4.8	2.9
4/7/2022	8:00:00 AM	44.2	42.1	42.9	42.5	42.8	41.8	41.9	47.6	45.2	43.4	44.4	44.8	43	38	36.7	34.3	29.9	25.4	21.3	17	12	8.5	18.8	17.5	30.1	38.9	43.8	47.7	43.8	38.2	23.5	20.9	30	23.5	21.8	18.3
4/7/2022	9:00:00 AM	48.6	46.6	44.9	43.8	41.8	43.6	43.2	43.9	40.7	40.7	39.9	40	43.9	38.8	34.5	31.7	26.6	21.4	17.1	10	3.5	-0.2	2.9	12.9	23.7	36.6	41.8	44.2	37.4	30.7	14.3	10.4	10	4.6	1.2	1
4/7/2022	10:00:00 AM	49.4	47.1	44.8	42.2	40	38.1	36.3	36.3	34.4	34	34.4	46.8	43.4	42	42.2	32.1	31.7	24.2	21.8	20.9	19.7	18	14.4	12.8	20.3	32	37.5	40.6	34.3	27.3	10.8	7.3	6.2	2.5	-0.3	0.8
4/7/2022	11:00:00 AM	51.2	49.6	47.3	44.6	41.8	39.4	37.1	35.6	33.2	32.8	31.9	31.3	29.8	28.2	26.3	24.1	19.7	13	11.1	10.3	6.7	4.9	11.3	16.9	20	30.6	34.7	36.7	33.5	22.9	4.4	0.6	-1.8	-2.3	-1.6	0.4
4/7/2022	12:00:00 PM	52.8	50.7	48.1	45.3	42.6	39.8	37.4	35.8	33.6	32.5	31.5	31	37.2	41.4	32.3	25.2	26.9	20.3	17.6	13.6	7.6	6.9	7.5	8.1	8.4	18.5	24	32	25.1	18.7	3.4	1.1	-1.9	-1.5	-0.9	0.7
4/7/2022	1:00:00 PM	54.6	52.5	50.1	47.2	44.1	41.2	38.5	36.3	34.2	33.3	31.8	31.1	29.6	27.5	25.8	23.6	19.9	14.5	15.6	12.6	7.1	7.3	8.2	7.6	5.4	5.6	7.2	12	19.1	13.6	3.2	0.1	-1.5	-1	-0.6	0.7
4/7/2022	2:00:00 PM	55.4	54	51.7	48.9	45.7	42.8	40.2	38	35.4	34.6	34.4	41.2	36.5	30.4	32.7	33.2	29.3	24.9	19.9	16.9	11.8	9.6	9.3	9.1	8.4	20.2	22.8	26.7	19.9	10.7	3.5	1.9	1.8	1.1	0.6	1
4/7/2022	3:00:00 PM	55.7	53.4	50.3	47.6	44.4	41.1	38.6	36	33.4	32.3	30.8	36	46.3	42.8	33.1	29.6	30.8	21.8	15.8	13.8	11.3	7.2	6	7.1	18.7	30.6	35.2	36.2	34.4	24.8	7.5	4.7	4.1	1.9	-0.6	0.6
4/7/2022	4:00:00 PM	50.9	48.2	45.7	42.8	40.9	37.6	36	34.4	31.9	31.3	30.3	39.2	46.7	37.2	30.7	31.2	27.1	24.1	21	21.1	16.2	14.2	10.9	10.8	18.2	29.2	34.7	38.7	31.5	25	8.7	4	2.3	-0.1	-0.5	0.7
4/7/2022	5:00:00 PM	44.7	42.1	39.5	36.7	34.6	32.1	32.6	31.3	30.2	31.3	36	39.5	45.1	45.7	38.3	34.4	35.6	28.8	22.1	18.2	19	16.9	11.4	16.1	25.6	37.6	41.8	44.8	39.9	31.7	17.9	12.5	12.7	9.6	3.2	1.3
4/7/2022	6:00:00 PM	47.3	45	42.9	40	37.7	35.4	34.5	33.1	31.5	31.9	30.7	29.8	28.6	26.8	24.8	24.2	21.7	15.1	9.1	2.7	1.8	4.5	10	19.6	31.2	43.2	47.2	49.6	45.7	36.5	22.2	18.3	19.3	14.6	9.7	6.5

4/7/2022	7:00:00 PM	51.4	49.3	46.9	44	41.2	38.8	36.9	36.3	32.8	32.3	31.3	30.6	29.7	28.7	27.6	25.1	19.9	14	11	7.7	1.7	-0.4	1.4	11.1	22.4	37	39.6	41.8	36.9	29.8	14.3	7.6	7	2.7	-0.6	0.5
4/7/2022	8:00:00 PM	49.4	47	44.6	41.9	39.4	38.1	36	38.9	32.3	32.3	30.2	29.1	28.4	26.4	24.2	24.7	18.6	14.3	10.4	5	0.3	-4.5	-7.4	-8.3	-8.4	-8.1	-7.7	-7.2	-6.6	-6	-5.7	-5.6	-5.5	-4.6	-2.9	0.1
4/7/2022	9:00:00 PM	45.5	43.3	41.6	39.1	37.2	36.6	35.4	40.8	34.9	31.8	30.4	32.6	32	26.9	24.8	24.7	21.7	15.9	12.4	7.1	2.2	-3.4	-7.4	-8.3	-8.3	-8	-7.6	-7.1	-6.5	-6	-5.6	-5.6	-5.4	-4.7	-2.9	0.1
4/7/2022	10:00:00 PM	45.6	43.6	42.3	39.8	38.2	37.9	37.9	46.1	39.1	36	34.5	35	33.8	29.7	27.8	26.7	22	18.9	16.1	11.2	7.3	0.2	-6.1	-8.5	-8.5	-8.1	-7.8	-7.3	-6.7	-6.2	-5.8	-5.7	-5.5	-4.8	-3	0
4/7/2022	11:00:00 PM	44.7	42.8	41.2	38.4	36.8	37.5	37.1	42.1	35.3	33.6	32.6	31.2	30.6	29.3	27	25.7	21.2	17.5	15.1	9.5	4.1	-3.7	-8.1	-8.6	-8.5	-8.1	-7.7	-7.3	-6.7	-6.2	-5.8	-5.7	-5.5	-4.8	-3	0
4/8/2022	12:00:00 AM	42.2	40.2	38.6	37	36.4	37.2	38.5	46.4	38.7	38.9	36.5	36.9	34.1	30.8	29.8	28.5	24.4	21.5	18.3	13.1	8.5	1.1	-4.4	-8.2	-8.4	-7.7	-7.3	-7.2	-6.7	-6.2	-5.9	-5.7	-5.5	-4.9	-3	0
4/8/2022	1:00:00 AM	36.6	35.2	36.9	36.5	38.1	40	40.3	47.4	40.1	38.9	37.9	38	37.1	32.7	31.3	30.7	26.7	23.7	21.7	19	15.6	9.7	2.6	-5.8	-8.4	-7.9	-7.7	-7.3	-6.8	-6.3	-5.9	-5.8	-5.5	-5.1	-3.1	0
4/8/2022	2:00:00 AM	39.2	37.7	37	37.3	38.8	38.6	40.9	50.9	45.5	43.5	45.2	40.6	39.4	35.6	35.7	34.3	29.6	26.3	23.3	19.8	16.9	10.4	-8.1	-4.9	-8.4	-7.8	-7.3	-6.7	-6.1	-5.9	-5.7	-5.4	-5	-3.1	0
4/8/2022	3:00:00 AM	38.9	37.5	37.5	38.3	39.7	40	41.2	50.2	47.3	44.9	47.2	43	41	36.7	35.3	35.5	31.1	27.3	24.4	21.1	17.3	10.2	2.4	-5.7	-6.7	11.3	17.8	27.2	16.3	14.1	-3.9	-5.3	-5.2	-5	-3.1	0.1
4/8/2022	4:00:00 AM	40.2	39.2	39.5	39.6	40.4	43.1	44.2	50.4	46.9	46.7	46.3	44.6	41.9	38.3	38.1	36.5	32	29.1	26.5	23.6	19.7	13.4	6.6	-3.1	-7.9	6.7	-7.2	-6.8	-6.5	-6.1	-5.8	-5.5	-5.3	-5	-3.1	0.1
4/8/2022	5:00:00 AM	37.2	37.3	40.2	40	40.6	41.2	43.2	47.8	43.8	42.9	40.6	40.4	39.2	34.6	33.6	33	28.6	25.5	23.1	19.4	15.3	7.8	0	7.3	16.1	30.3	35.2	38.6	30.5	20.6	11.1	0.5	0.1	-3.7	-2.7	0.1
4/8/2022	6:00:00 AM	34.4	35.4	37.3	38.8	40.9	42.7	42.6	46.6	41.3	42.1	40.6	41.6	40.1	36.1	33.4	32.9	28.6	25.5	22.8	20.9	17.4	11.8	9.4	16.9	27.2	41.1	44.4	47	40.3	32	17	8.5	10.6	4.2	2.2	1.5
4/8/2022	7:00:00 AM	33.8	34.9	40.6	39.4	39.6	39.7	40.7	47.2	45.4	43.1	43.2	42.2	40.4	37.4	35	34.2	30.2	26.1	22.9	19	15	7.3	0.1	0.9	16.5	26.7	35.7	42.5	35.3	29.1	14.5	7.4	10.3	1.9	2.5	0.9
4/8/2022	8:00:00 AM	40.8	39.7	42.2	39.7	39.7	40.5	38	42.7	39.6	38.6	38.8	38	37.3	39.7	36.5	32.9	31.4	25.2	22.1	17.4	12.8	6.6	9.3	19.6	28.2	41.4	45.9	50.4	44.6	38.1	22.7	13.9	16.3	10.3	6.4	3.1
4/8/2022	9:00:00 AM	51	49.1	47.3	45.2	43.1	42.6	42.3	43.4	40.3	39.7	42.1	38.1	39.7	38.4	34.3	32	28.5	24.4	19.4	15.2	11.5	5.6	8.1	17	26.1	39.4	43.7	46.7	40.5	33.6	18.9	11.2	11.1	4.3	1.9	1
4/8/2022	10:00:00 AM	56.4	54.5	52.4	49.8	47	45	42.4	41.1	39.7	38.2	36.7	36.2	34.9	32.9	31.2	29	25	20.5	17.6	14	10.2	6.1	18	17.8	33	42.5	49.3	49.5	45.7	37.5	20.7	17.6	19.4	14.8	10.5	6.4
4/8/2022	11:00:00 AM	58.8	56.6	54.3	51.8	48.9	45.7	42.9	40.3	38.3	36.7	35.4	34.1	33.1	31.2	29.3	27.7	24.3	19.4	16.7	14.6	9.7	8.1	9.7	12.5	21.8	35	38.5	41.3	34.7	26.4	11.7	5.8	4.6	0.7	-0.2	0.8
4/8/2022	12:00:00 PM	66.9	65.5	63.4	61.3	58.8	56	53	50.1	47.3	44.3	44.4	42.3	37.5	38.7	36.9	34.2	31.8	27.3	24.7	24.2	22	19.7	19.4	19.8	18.9	22.2	27.2	34.8	30.6	27.9	13.4	8.4	8.4	5.9	4.3	4.9
4/8/2022	1:00:00 PM	66.3	64.8	63.1	61	58.7	55.8	52.8	49.8	46.6	43.5	40.7	37.8	35.1	32.4	29.8	27.6	25	21.7	20.1	19.2	15.5	15.3	16.3	21.1	25.6	39.2	43.1	46.9	42.1	32.9	18.8	12.5	12	8.5	5.6	4.8
4/8/2022	2:00:00 PM	70.8	69.5	68.2	66.1	64	61.7	59.2	56.3	53.2	50.3	47.4	44.2	41.2	38.8	35.7	35	32.5	28.3	25.7	23.6	21.6	21.1	22.3	25.4	26.7	42.5	41.9	47.3	40.4	34.3	22.8	17.2	18	12.9	11.1	9.6
4/8/2022	3:00:00 PM	74.1	72.8	71.5	69.7	67.9	65.9	63.5	60.9	58.3	55.5	52.6	49.7	46.7	43.6	40.7	38.4	35.5	32.9	30.7	28.9	27.3	26.7	27.5	29.7	32.6	46.9	48.7	54.4	48.4	43.6	34.3	28.6	31.3	25.6	23.5	19.7
4/8/2022	4:00:00 PM	72.5	71.2	69.7	68	66.1	63.9	61.3	58.8	55.9	52.9	50	47.2	44.4	40.9	38	35.4	32.5	30	27.7	25.3	23.6	23.2	24.9	27.2	30.5	39.7	42.6	47.2	43.6	34.4	28.8	19.7	20.8	17.2	14.1	13
4/8/2022	5:00:00 PM	69.6	68.3	66.8	65	62.8	60.2	57.4	54.4	51.2	48.3	45.2	42.2	39.5	38.5	34.3	31.3	28.9	26.2	23.8	21	19	18.6	19.8	21.5	21.2	24.7	31.1	32.5	33.1	21.4	6.4	7	6.4	5.1	3.9	6.3
4/8/2022	6:00:00 PM	71.4	70.5	68.6	66.6	64.3	61.8	58.9	55.7	52.7	49.7	46.7	43.5	40.2	37.2	34.5	32.1	29.6	27.2	25.1	22.9	21.3	21.2	23.2	25	24.4	32.4	35.2	36.5	28.7	19.6	6.8	4.4	3.3	6.9	5.7	6.3
4/8/2022	7:00:00 PM	67.9	66.5	64.6	62.5	59.8	56.9	53.7	50.7	47.4	44.6	41.6	38.9	36.4	34.4	32.4	30.8	31.1	28.5	21.9	19.6	17.2	16.3	17.6	18.7	17.1	23	25.7	29.4	23.7	16.6	7.4	2.5	0.9	3.4	2.6	3
4/8/2022	8:00:00 PM	62.6	60.9	58.9	56.8	53.9	51.3	48.2	44.9	42	39.4	35.9	33.4	31.7	29.4	26.6	24.3	21.5	17.5	14.7	12	10.3	8.6	9.2	9.6	6.7	2.4	0.2	-2.6	-3.9	-4	-4.1	-4.1	-4.2	-2	-1.3	0.9
4/8/2022	9:00:00 PM	62.9	61.4	59.5	57.3	54.7	51.7	48.9	45.7	42.6	39.9	36.6	34.4	41.7	43.5	38.1	28	30.4	25.7	19.8	17.5	14.6	11	10.3	10.8	8.7	5.1	2.9	-0.3	-2.7	-3.6	-3.8	-3.9	-4.1	-2.4	-1.5	0.8
4/8/2022	10:00:00 PM	69.5	68.2	66.7	64.6	62.1	59.6	56.7	53.6	50.3	47.3	44.3	41.4	38.8	36.5	34.3	31.8	28.9	26.2	24.2	22.2	21	20.1	20.6	21.9	20.2	16.6	14.5	10.3	6.7	3.4	1.8	0.8	0.3	3.8	3.1	5.7
4/8/2022	11:00:00 PM	71.5	70.1	68.6	66.5	64.2	61.5	58.5	55.7	52.6	49.9	47.1	44.4	42	38.6	36.4	35	31.9	29.2	26.7	24.4	22.7	21.7	23.2	24.6	22.8	19.2	17.4	13.2	9.7	6.2	4.2	2.8	1.8	4.6	3.3	5.5
4/9/2022	12:00:00 AM	66	64.1	61.9	59.2	56.2	53.3	50.2	47.6	44.7	42.7	40.3	38.3	36.7	34.6	32.9	30.8	27.7	23.8	21.2	19.3	17.8	15.9	16.6	17.4	15.4	11.8	9.6	5.7	2.5	-0.4	-1.5	-2.1	-2.4	-0.7	-0.9	2
4/9/2022	1:00:00 AM	64.7	63	60.6	58	55	51.8	48.5	47.2	43.6	42.8	42.4	42.1	39.2	38.4	34.4	33.9	30.1	26.6	23.2	20.7	18.2	15.4	14.5	13.9	11	7.4	5.2	1.5	-1	-2.3	-2.5	-3.1	-2.6	-0.1	-1.2	1.7

4/9/2022	2:00:00 AM	66.7	64.7	62.5	59.3	56.1	52.8	49.7	47.9	43.9	41.8	39.5	38.5	36.4	34.7	32.7	32	28	24.7	22	19.2	16.9	15.4	15.9	16.1	13.5	9.6	7.4	3.6	1	-0.8	-1.1	-1.8	-1.7	0.7	-0.5	2
4/9/2022	3:00:00 AM	64.1	61.9	59.2	56.1	52.4	48.9	46	46.6	41.4	40.1	37.5	37.8	35.5	33.5	33.3	32.6	28.3	24.4	21.6	18.4	15.9	12.7	11.9	11.2	8.1	4	2	-1.2	-2.5	-3.2	-3.1	-3.4	-3.2	-1.4	-1.6	0.6
4/9/2022	4:00:00 AM	68.7	66.5	63.9	60.8	57.5	54.1	50.7	50.2	45.3	43.8	41.3	40.5	39.1	36.6	36.5	35.4	31.2	27.9	25	22.3	19.9	18.3	19.1	19.6	17.2	13.6	11.4	7.2	4.5	2	1.2	0.7	1	2.7	0.9	3.1
4/9/2022	5:00:00 AM	71.6	69.9	67.7	65.1	62.2	59.2	56.2	54	50.1	48.9	45.9	46.3	45.2	41.5	41.5	39.2	34.9	31.7	28.8	26.3	24	21.8	22.9	23.6	21.8	22	23.5	29.2	25.8	19.5	7.1	3.8	4.8	3.9	2.8	5.2
4/9/2022	6:00:00 AM	69.3	67.3	65.3	62.4	59.4	56.1	53.3	53	47.8	46.9	44.3	44.6	43.6	40	39.5	38.5	33.7	30.2	27	24.2	21.3	19.3	20.2	20.7	24.6	37	38.1	44.5	39	34.1	22	13	14.3	9.9	5.6	4.9
4/9/2022	7:00:00 AM	71.5	69.5	67.2	64.7	61.7	58.7	55.7	53.9	49.7	47.4	45.3	43.7	41.5	39.5	37.3	36.9	32	29	26.8	24.1	23	23.5	30.9	34.8	39	53.5	57.2	59.8	55.3	51.2	41.5	39.9	38.2	33.1	29.6	27.8
4/9/2022	8:00:00 AM	65.9	63.6	61	58.3	54.9	51.5	48.2	45.6	42.6	40.4	38.1	37.8	35.5	34	32.1	30.3	27.2	24.5	22.6	21	20.4	24.3	33.4	40	43.3	57.5	62.3	64.1	60.1	56.1	44.4	43.1	45.9	38.8	35.1	32.9
4/9/2022	9:00:00 AM	61	59.4	56.8	53.7	51.3	48.5	45.5	43	40.8	39.1	36.9	37.3	35.9	31.9	30.8	29.1	25.9	21.2	18.7	14.7	11.1	8.9	11.6	17.3	28.4	41.5	46.1	50.8	45.7	39	21.9	15.3	15.6	9.4	4.8	2.6
4/9/2022	10:00:00 AM	69.4	67.9	65.7	63.2	60.5	57.5	54.3	50.9	47.7	44.8	42.9	40.6	38.2	38.5	38.6	32.5	28.8	25.8	23	20.1	18.4	17.9	19.5	20.6	19.6	26.4	30.5	34.2	28.5	21.2	10.4	1.8	1.9	2.6	1.3	3.1
4/9/2022	11:00:00 AM	75.6	74.1	72.1	70.3	68.2	66	63.6	60.8	58.1	55.2	52.4	49.6	46.5	43.7	40.8	38.3	35.7	33.2	31.3	29.3	27.9	27.3	28.8	35.2	36.3	44.1	51	46	37.8	30.5	26.8	25.9	21.8	18	16.7	15.7
4/9/2022	12:00:00 PM	73.3	71.9	70.1	68.1	65.9	63.4	60.5	57.7	54.7	51.5	48.4	45.5	44.7	42.4	38.7	35.9	34.1	31	28.4	26.3	24.7	25.3	26	29.8	34.1	46.9	47.3	53.4	48.3	41.5	37.8	34.1	33.6	31.3	27.6	25.5
4/9/2022	1:00:00 PM	73	71.3	69.1	67.1	64.7	62.2	59.4	56.4	53.6	50.8	48	45.2	42.8	40.8	37.4	34.8	33.1	29.8	29	27.1	26.5	25.1	25.8	26.7	27.1	26	34.6	36.6	33.6	24.8	15.3	12.5	9.7	9.5	8	10.4
4/9/2022	2:00:00 PM	71.1	69.4	67.4	65.1	62.7	59.8	57.1	54.3	51.5	48.4	45.2	42.4	39.5	36.9	34.5	32.2	29.7	27.2	25.1	22.8	21.2	20.6	22.4	24.1	23.7	26.6	30.1	36.4	31.8	25.6	12.1	9.9	11.4	6.3	5.4	7.2
4/9/2022	3:00:00 PM	69.7	67.9	65.9	63.8	61.2	58.4	55.3	52.4	49.5	46.5	43.7	40.9	41.7	37.5	34.4	32.8	32.4	28.2	24.8	21.5	19.5	19	20.5	22.1	20.9	22.3	25.4	27.8	28.2	18.8	8.3	3.9	3.8	3.8	3.3	5.3
4/9/2022	4:00:00 PM	70.7	69.1	67.2	64.7	62.1	59.5	56.5	53.5	50.4	47.5	44.4	41.8	39.5	37.3	35.4	33.5	30.9	27.8	24.9	22.3	20.9	20.3	21.7	23.2	22.5	28.1	31.6	42.2	35.5	32.4	19.4	13.8	9.8	8.6	6.4	7.1
4/9/2022	5:00:00 PM	73.8	72.6	71.2	69.4	67.6	65.3	62.9	60.3	57.5	54.6	51.8	48.9	45.7	42.6	39.7	36.9	34.4	31.9	29.7	27.3	25.6	25.2	27.1	29	28.2	28	26.4	26.9	24	15.7	13.2	10.1	9.5	9	9	11.1
4/9/2022	6:00:00 PM	74.2	72.9	71.4	69.7	67.6	65.5	63	60.3	57.5	54.6	51.8	48.7	45.7	42.5	39.8	37	34.6	32.1	30	27.6	25.9	25.5	27.6	29.5	28.7	26.3	25.3	22.2	19.1	15.4	12.9	10.5	8.3	8.4	8.3	10.3
4/9/2022	7:00:00 PM	70	68.9	67.3	65.4	63.1	60.7	57.8	54.9	51.7	48.9	45.8	42.8	39.9	36.7	34.5	31.7	29.1	26.9	24.8	22.4	20.8	20.7	22.8	24.3	26.7	37.6	39.4	44.5	40.4	34.7	24.3	14.6	15.7	10.7	7.8	6.8
4/9/2022	8:00:00 PM	64	62.4	60.4	58.1	55.3	52.4	49.4	47.1	43.5	41.4	39.2	38.6	37.2	35.2	34.9	32.1	27.5	23.5	18.8	15.3	13.1	12.5	13.9	14.6	12.1	8.2	6.1	2.1	-0.5	-2.1	-2.6	-2.8	-3.2	-1.4	-0.9	1.5
4/9/2022	9:00:00 PM	49.6	48.3	45.5	43	40.6	39.5	40.6	45.2	39.4	40.5	39.4	40.9	39.4	38	38	36.4	34.4	29.4	21.4	13.9	9.4	1.8	-4.5	-6.2	-7.7	-7.8	-7.7	-7.3	-6.8	-6.3	-5.9	-5.8	-5.5	-5.2	-3.2	0
4/9/2022	10:00:00 PM	56.5	54.7	51.9	49.3	46.3	43.8	43.1	45.1	39.5	40.7	39.3	40.4	38.6	36.9	37	34.7	29.9	24.9	18.1	11.6	6.2	1.9	1.7	0.9	-2.4	-5	-5.3	-6	-6.1	-5.9	-5.5	-5.4	-5.2	-4.6	-3.1	0.1
4/9/2022	11:00:00 PM	59.9	57.7	55.7	53.2	50	47.1	45	48.3	41.8	42.3	41.2	41	39.1	37.9	37.7	35.7	29.8	24.5	19.2	13.7	9.6	7	7.9	7.8	4.6	0.2	-1	-3.8	-4.8	-5	-4.7	-4.7	-4.7	-3.4	-2.8	0.2
4/10/2022	12:00:00 AM	60.5	58.8	55.9	53	50	47.1	45	48.7	42.5	42.7	41.2	43	40.1	37.9	37.6	36.1	29.9	25.3	20	13.7	9.2	7.1	7.7	7.1	3.8	0	-0.6	-3	-4.4	-4.5	-4.1	-4.2	-4.2	-3.2	-2.6	0.3
4/10/2022	1:00:00 AM	65.1	63.2	60.7	57.8	54.6	51.4	47.9	47.4	42.9	42.4	40.1	40.2	37.9	36	35.2	33.5	28.6	24.6	20.8	18.5	17.1	14.2	13.5	13.3	10.2	6.2	4.1	0.5	-1.6	-2.4	-2.4	-2.7	-3.2	-1.3	-1.5	0.8
4/10/2022	2:00:00 AM	67.5	65.4	63	60.3	57.2	54.1	50.4	48	44.1	42	39.1	36.8	34.1	31.7	30.3	29.5	25.2	22.3	19.8	16.9	15.3	14.9	16.3	16.4	13.6	9.6	7.7	3.7	1.4	0.3	-0.6	-1.2	-1.8	0.2	-0.3	1.6
4/10/2022	3:00:00 AM	57.3	55.4	53.5	50.9	48	45	41.9	40.4	36.8	35.8	33.7	34.3	30.5	27.7	28.2	26.4	20.7	17.3	13.3	9.7	6.6	4.9	5.9	5.9	3.1	-1	-2.3	-4.8	-5.4	-5.4	-5.2	-5.2	-5	-4.5	-3.1	0.1
4/10/2022	4:00:00 AM	49.4	47.5	45.2	43	41.1	39.1	39.7	40.1	35.3	37.1	35.1	35.1	32.2	30.5	31	28.8	23.4	19.4	14	7.8	3	-4.7	-7.6	-8.1	-8.4	-7.9	-6.1	-5.7	-6.6	-6.5	-6.1	-5.9	-5.5	-5.5	-3.4	0
4/10/2022	5:00:00 AM	47.7	46.2	44.3	41.7	39.6	37.3	38.1	38.9	34.1	36.3	34.1	34.5	31.6	29.2	29.1	27.5	21.7	17.4	13.2	5.4	-1.1	-5.4	-2.5	6.1	17	33.7	31.9	34.2	31.2	22.1	11	3.6	7	-2.2	-1.7	0.3
4/10/2022	6:00:00 AM	36.2	35.1	35.6	36.8	40.5	37.1	37.1	36	34.8	34.1	31.9	30.3	30.4	27.4	24.2	20.5	15.8	10.9	7.1	2.4	7.4	16.6	27.3	25	35.8	47.7	51.6	54.9	51.5	45.5	35.2	23.1	29.8	21.8	18.1	17.5
4/10/2022	7:00:00 AM	39.7	38.2	38.8	38.7	42.4	37.4	36.3	35.9	34.6	34.3	32.8	35.2	32.7	29.6	28.4	22.5	16.6	9.6	3.9	-2.1	-3.7	0.3	7.5	18.4	29	42.5	46	48.9	43.6	37.1	23.3	18.9	18.2	12.5	8.2	3
4/10/2022	8:00:00 AM	53.1	51	48.9	46.1	44.5	41.4	40	38.2	35.9	36.1	34.3	34.4	31.7	29.7	27.4	19.9	14.8	11	7.3	2.8	-0.2	0.9	6.7	17.4	27.6	39.9	43.6	46.1	40.5	33	20	14.4	14	8.5	4.1	1.9

4/10/2022	9:00:00 AM	61.4	59.9	57.6	55.2	52.8	50.1	47.2	44.7	41.9	40.7	37.7	36.7	35.4	33.8	32.2	28.8	23.9	19.3	15.2	11.9	9.8	8.8	9.3	12.8	19.7	33.5	37.6	40.2	34.4	26.3	12.2	5.8	8.5	1.7	0	1.5
4/10/2022	10:00:00 AM	59.3	57.5	55.6	53.7	51.2	49.3	46.8	44	41.3	39.6	37.5	36.5	35.2	33.6	31.5	28.1	23.9	19.5	15.7	12.6	10.7	10.8	26.6	23	44.9	50.5	56.8	57.3	54.6	49.3	34.1	38.6	37.1	35	26.5	27.9
4/10/2022	11:00:00 AM	64	62	60.7	58.5	55.6	53.1	50.3	47.8	45.3	43.6	41.9	39.9	38.3	36.4	34.2	31.8	28.2	23.1	18.5	15.6	13.8	13.2	15.8	25.7	33.2	45	48.6	50.9	44	35.8	25.6	16.6	17.9	12.8	11	6.3
4/10/2022	12:00:00 PM	67.5	65.8	64	62.1	59.4	56.7	53.7	50.9	47.7	44.7	41.7	38.9	36.2	33.9	32.1	29.8	26.8	23.9	21.3	18.7	17.6	16.8	18.4	22.5	23.9	35.3	37.3	44.1	40.6	34.3	23.2	13	12.5	9.8	6.3	5.2
4/10/2022	1:00:00 PM	66.8	65.6	64	62	59.5	56.7	53.7	50.8	47.7	44.8	41.8	39.4	36.9	34.6	32.3	29.8	26.5	23.8	20.9	18.5	16.7	16.3	17.4	20.2	20.8	32.1	35.2	39.3	35.4	21.1	12.8	7.3	8.6	5.9	2.9	4.1
4/10/2022	2:00:00 PM	65	64	62.3	60.2	57.5	54.8	51.9	49.1	45.8	42.7	40	37.3	34.7	32.7	31	27.9	24.7	21.9	19	16.4	14.6	14.1	14.9	15.9	14.4	22.6	28.7	39.7	31.6	28.8	11.4	4.9	2.4	1.5	0.9	3.2
4/10/2022	3:00:00 PM	61.9	60.4	58.5	56.1	53.4	50.7	47.6	44.7	42	39.5	37.2	36	35.4	35.1	31.4	28.3	24.5	20.6	15.8	12.5	10.6	9.7	9.7	10.2	10.1	18.5	22.4	26.6	20	10.7	2.4	-3	-3.2	-2.4	-1.8	0.9
4/10/2022	4:00:00 PM	63.9	62.2	60.6	58.3	55.6	52.4	49.5	46.6	43.5	40.9	38.2	35.9	33.9	32.3	30.3	27.6	24.2	21.2	17	14.1	12.3	11.7	12.7	13.7	15.5	26.9	30.4	34.3	28.6	22.3	3.8	0.7	-0.2	0	-0.2	1.6
4/10/2022	5:00:00 PM	61.1	59.6	58	55.8	52.8	50.3	47.1	44.1	41.3	38.9	36.5	35.1	33.4	31.6	29.9	27.1	23.5	18.9	15.1	12.2	9.7	8.5	8.8	9.2	9.1	13.5	15.5	14.1	12	3.2	-3.6	-3.8	-4.2	-3.1	-2	0.5
4/10/2022	6:00:00 PM	54.2	52.6	50.1	47.6	45.3	42	39.2	37.1	35	33.3	32	31.6	31.3	30.5	29.3	26.5	21.8	16.5	12.4	8.6	5.6	7.1	6.6	35.8	36.9	43.8	50.6	55	47.6	41.5	30.6	34.7	36.2	26	25.2	22.7
4/10/2022	7:00:00 PM	54	51.8	49.8	47.2	43.9	41	38.1	36	32.8	31.3	28.6	29.2	28.2	24.1	23.3	21.7	17.7	13.9	9.3	4.8	1	-1.4	1.9	22.7	26.4	30.1	33.6	36.4	25.6	20.8	14.8	3.1	3.9	4.9	0.1	0.2
4/10/2022	8:00:00 PM	52.5	50.5	48	45.1	42.1	39.7	38	38.9	35.3	35.6	34.9	36	34.7	32.9	31.6	29.4	26.1	21.2	16.3	11.4	7.3	-0.7	5.7	-7.2	-7.9	7.5	-7.6	-7.2	6.7	6.2	-5.8	5.7	-5.5	-4.9	3.1	0
4/10/2022	9:00:00 PM	47.5	45.5	43	40.2	37.7	35.6	34.6	36.2	32.8	34.5	32.8	33.9	33.1	30.6	30.8	28.4	24.1	18.9	14.1	8.3	2.7	4.3	8.1	8.6	8.6	8.1	7.7	7.5	6.9	6.3	5.9	5.8	5.6	5.1	3.1	0
4/10/2022	10:00:00 PM	43.1	41.2	39.1	37	34.7	32.7	31.7	32	29.2	29.9	29.7	29.7	28.8	27.5	26.2	23.4	18.7	12.2	4.9	2.3	6.3	9	9.2	9	8.7	8	7.8	7.4	6.9	6.4	6	5.9	5.6	5.1	3.2	0
4/10/2022	11:00:00 PM	55	53.4	51.3	48.7	46	43.3	40.7	38.4	36.2	34.8	33.5	32.7	32.1	31.4	29.4	26.3	21.8	16.7	12.4	9.4	5.8	0.1	2.7	3.5	5.3	5.6	6.4	6.9	6.6	6.1	5.7	5.6	5.4	4.9	3.1	0
4/11/2022	12:00:00 AM	51.6	49.5	47.4	45.1	42.6	40.3	38.1	37	35.9	35.3	34.9	34.9	33.8	32.9	31.5	28.5	23.6	17.5	10.9	6.2	1.3	4.8	7.3	7.7	8.1	7.8	7.5	7.3	6.8	6.2	5.9	5.5	5.5	5	3.1	0
4/11/2022	1:00:00 AM	34.8	33.5	32.1	31.2	31.9	30.2	30.9	35.4	29	29.6	28.5	30.2	26.2	23.8	22.2	19.5	15.1	11.1	7.5	1.9	1.7	6.7	8.7	9	8.7	7.8	8.8	7.5	7	6.4	6.1	5.5	5.6	5.3	3.3	0
4/11/2022	2:00:00 AM	34.9	33.2	32.6	31.7	32.2	36.2	37	40.4	34.9	35	34.7	35.6	34.4	31.4	27.6	26.6	22.4	18.7	14.8	8.4	3.8	3.8	8.4	9	7.1	7.8	15.9	30.1	25.2	18.1	3.1	0.4	0.4	4.6	3.1	0.1
4/11/2022	3:00:00 AM	39.4	37.4	36.2	34.2	33.8	34.3	34	38.8	32.9	34.3	32.9	34.9	31.9	29.8	27.7	26.3	22.3	18	15.2	11.6	8.1	1.5	3.6	7	8	7	5.8	6.1	6.5	6.1	5.7	5.5	5.2	4.9	3	0.1
4/11/2022	4:00:00 AM	72.2	71	69.4	67.7	65.6	63.5	60.9	58.2	55.3	52.3	49.4	46.3	43.2	40.2	37.4	35.1	32.8	30.1	28	25.4	23.6	23.3	25.1	27.2	26.9	25.3	23.8	20.8	17.2	13.3	10.6	8.3	6.3	6.3	7.5	10.7
4/11/2022	5:00:00 AM	68.4	67.3	65.3	63.3	60.8	58.2	55.2	52.4	49.5	46.2	43.1	40.1	36.9	34.4	32.2	29	26.6	24.2	22.1	19.5	17.8	17.4	18.7	20.1	19.1	21.1	22.9	30.4	25.5	21.7	10.4	4	4.6	1.1	2	4.1
4/11/2022	6:00:00 AM	68.9	67.8	66.2	64.2	62	59.4	56.4	53.3	50.3	47.2	44.1	41	38.3	35.9	33.9	31.5	29.1	26.6	24.4	22.5	20.7	19	19.8	21.2	22.1	27.9	34.1	34.4	37.7	18.7	9.7	10.3	9.3	7.3	2.8	5
4/11/2022	7:00:00 AM	71.8	70.7	69.3	67.6	65.6	63.2	60.6	57.8	55	52.2	49.2	46	43	40	37.4	35.1	32.6	29.9	27.5	25.1	23.2	22.5	23.9	25.8	25.5	28.3	33	37.1	33.9	29.6	13.7	10.5	10	6.9	7.1	10.7
4/11/2022	8:00:00 AM	74.5	73.4	72	70.5	68.7	66.8	64.3	61.8	59.2	56.5	53.5	50.4	47.5	44.4	41.5	38.9	36.3	33.9	31.6	29.4	27.6	26.7	28.2	30.1	29.8	28.1	27.3	24.4	21.2	17.1	14.4	12	10.5	9.7	11	15
4/11/2022	9:00:00 AM	71.7	70.5	69.2	67.6	65.7	63.5	60.8	58.2	55.3	52.4	49.3	46.3	43.3	40.4	37.8	35.5	32.8	30.6	28.7	26.5	24.6	23.5	24.5	26.2	25.8	25.1	26.4	26.1	23.7	14.3	8.5	5.5	3.1	3	5.4	9.2
4/11/2022	10:00:00 AM	72.6	71.4	70.1	68.8	67.4	65.7	63.6	61.6	59.3	57	54.4	51.5	48.8	46.1	42.9	40	37.3	34.8	32.3	29.9	28.3	27.1	28	30.2	30.5	29.6	29.5	27.5	24.6	20.5	17.2	14	10.9	9	9.3	12.4
4/11/2022	11:00:00 AM	73.2	72.1	70.8	69.2	67.5	65.5	63	60.5	58	55.2	52.4	49.7	46.9	43.9	41.3	38.9	36.5	34.4	32.3	30.2	28.3	27.1	28.3	30.8	31.6	30.4	30.2	29.8	29.4	30.2	30.6	31.3	27.4	25.6	25	34.1
4/11/2022	12:00:00 PM	74.2	73.1	71.9	70.4	68.7	66.7	64.5	62	59.6	56.9	54.2	51.3	48.6	45.7	43.2	40.9	38.6	36.5	34.4	32.3	30.5	29.1	29.8	32	32	30.2	30.1	28.5	27.5	26.4	25.8	25.5	22.4	20.2	19.2	28.1
4/11/2022	1:00:00 PM	78.1	77.2	76	74.8	73.3	72	70.4	68.4	66.5	64.4	62.1	59.7	57.3	54.6	52.1	49.5	46.9	44.4	42.1	39.9	38.1	36.6	36.6	38	37.9	36.4	36	33.6	31.3	28.9	27.8	25.5	23.7	22.1	22.1	27.2
4/11/2022	2:00:00 PM	78.7	77.5	76.1	74.7	73.1	71.8	70.1	68.3	66.1	64	61.4	58.8	56.2	53.5	50.8	48.1	45.6	43.4	41.2	39.4	38	36.7	36.7	37	35.9	33.5	29.8	26.8	25.8	26.6	27.8	25.5	24.9	24	24.1	27.5
4/11/2022	3:00:00 PM	77.3	76.5	75.2	74	72.5	71	69.2	67.1	64.7	62	59.1	56.3	53.2	50.3	47.5	44.9	42.7	40.6	38.8	37.4	36	34.8	34.2	34	32.7	30	24.9	21.7	20.7	20.8	21.7	19.3	18.7	18	18.3	21.8

4/11/2022	4:00:00 PM	78.5	77.3	76.2	74.8	73.4	72.1	70.5	68.7	66.7	64.4	61.8	59	56.2	53.5	50.6	47.8	45.2	42.8	40.8	39.2	37.9	36.8	36.3	36.3	35.6	33.8	29.8	26.7	26.5	28.1	30.6	28.4	26.9	25.2	24.7	28.1
4/11/2022	5:00:00 PM	72.2	71.1	70	68.5	67	65.3	63.4	61.2	58.4	56	53	50	47	44.2	41.5	39	36.7	34.6	32.5	30.8	29.4	28.3	27.6	27.3	26.3	24	19.1	14.8	13.9	12.4	9.8	6.2	4.3	3.2	4.9	9.2
4/11/2022	6:00:00 PM	72.3	71.4	70.1	68.9	67.3	65.5	63.1	60.5	57.4	54.6	51.5	48.2	45.2	42.2	39.7	37.3	35.3	33.1	30.9	28.9	27.1	25.6	24.8	24.6	23.6	21.7	17.7	13.3	11.4	7.8	4.6	0.9	0.3	0.7	4.1	8.3
4/11/2022	7:00:00 PM	66.8	65.5	63.9	62.1	59.9	57.5	54.7	51.5	48.2	45.1	42.3	39.3	37.2	35.1	33.4	31.3	29.3	27.1	23.7	20.1	17.2	15.6	14.6	14.2	12.4	9.6	4.9	1	0	1	-0.8	-3.4	-3.5	-4.2	-2.2	1.1
4/11/2022	8:00:00 PM	73.2	72.2	71	69.5	68	66.1	63.9	61.6	58.8	56	53.1	50.2	47.3	44.4	41.7	39.3	36.9	34.5	32.2	30	28	26.6	26.4	26.9	26.3	24.8	20.7	16.1	14.3	12.4	9.5	5.1	3.3	2.5	5.3	9.6
4/11/2022	9:00:00 PM	75.2	74.2	72.9	71.5	70	68.3	66.5	64.4	61.8	59.3	56.7	54	51.2	48.5	45.9	43.4	41	38.5	36.1	33.8	31.8	30.5	30.2	30.8	30.4	29.1	25.2	21.2	19.7	18.5	16.5	13.4	11.3	10	11.3	18.6
4/11/2022	10:00:00 PM	75.4	74.4	73.2	71.7	70.1	68.3	66.3	63.9	61.3	58.4	55.6	52.6	49.6	46.8	44.2	41.6	39.1	36.7	34.2	31.7	29.7	28.6	28.7	29.3	28.6	27	22.7	18.1	16.2	14.2	11.1	6.6	5	4.4	7.2	11.5
4/11/2022	11:00:00 PM	76.3	75.4	74.1	72.8	71.4	69.7	67.8	65.5	63	60.4	57.6	54.6	51.7	49	46.2	43.6	41.1	38.7	36.2	33.8	31.6	30.5	30.7	31.5	31	29.7	25.8	21.5	19.4	17.6	14.9	10.5	8.7	7.3	9.3	15.1
4/12/2022	12:00:00 AM	75.1	74.1	73	71.6	70.1	68.3	66.5	64.2	61.5	58.8	55.9	52.8	50.1	47.2	44.6	41.9	39.5	37.1	34.6	32	29.9	28.7	28.7	29.3	28.7	27.4	23.5	19.1	17.1	15.2	12.1	7.5	6.2	5.3	8.4	12.5
4/12/2022	1:00:00 AM	73.8	72.7	71.6	70.1	68.4	66.6	64.4	62	59.2	56.4	53.4	50.3	47.3	44.4	41.7	39.2	36.8	34.3	31.7	29.2	27.2	26.1	26.1	26.6	25.7	24.2	20.1	15.6	13.3	11.4	8.3	4.2	3.5	3.4	6.4	10.6
4/12/2022	2:00:00 AM	73.5	72.4	71	69.7	67.9	66	63.8	61.2	58.3	55.4	52.3	49.2	46.2	43.5	40.8	38.2	35.7	33.2	30.6	28.1	26.1	25	25	25.5	24.5	22.9	18.9	14.4	12.4	10.2	7	3.4	2.8	3.3	6.3	10.9
4/12/2022	3:00:00 AM	66.5	65.4	63.8	61.9	59.8	57.2	54.6	51.5	48.2	45.1	42.2	38.9	36	33.5	30.7	28	25.2	22.3	19.2	16.6	15	13.9	13.5	13.1	11	8.6	4.7	1.8	1.2	2.8	4	4.1	3.5	2.3	3.2	8.7
4/12/2022	4:00:00 AM	73.2	72.1	70.7	69.3	67.7	65.8	63.6	61.1	58.5	55.4	52.4	49.5	46.5	43.6	40.7	38.2	35.6	33.1	30.5	28	26.2	25.3	25.5	26.1	25.2	23.8	20	16	14	13.1	11.8	11.1	10.2	9	10.5	18.3
4/12/2022	5:00:00 AM	75.9	75	73.6	72.2	70.6	68.8	66.8	64.5	61.7	59.1	56.1	53.1	50.2	47.3	44.6	42	39.4	36.7	34.1	31.6	29.7	29.1	29.8	30.7	29.9	28.5	24.8	20.7	18.2	16.4	13.8	10.9	9.8	8.7	10.8	18.6
4/12/2022	6:00:00 AM	75.5	74.6	73.2	71.8	70.1	68.3	66.3	64.1	61.3	58.5	55.6	52.6	49.6	46.7	43.8	41.2	38.5	35.9	33.3	30.7	29	28.5	29.2	30	29.1	27.7	23.9	19.6	17	15	11.8	8.1	6.8	6	8.7	13.6
4/12/2022	7:00:00 AM	77.8	76.9	75.5	74.3	72.9	71.4	69.6	67.5	65.2	62.7	59.9	57.1	54.2	51.2	48.3	45.6	42.8	40	37.4	34.9	32.9	32.2	33	34.3	33.9	32.9	29.7	26	23.5	21.8	19	16	14.3	13.1	15.2	22.8
4/12/2022	8:00:00 AM	78.7	77.6	76.5	75.2	73.9	72.4	70.8	68.8	66.4	64.2	61.6	58.9	56.1	53.2	50.2	47.5	44.5	41.7	39	36.4	34.4	33.5	34.3	35.8	35.4	34.6	31.6	28.2	25.7	24.3	21.7	18.7	16.8	15.4	17.6	24.8
4/12/2022	9:00:00 AM	77.6	76.5	75.5	74.2	72.8	71.2	69.4	67.3	64.7	62.1	59.3	56.4	53.6	50.6	47.7	44.8	41.9	39.1	36.4	33.9	32	31.3	32.4	33.8	33	31.9	29.1	25.7	22.4	20	17	12.7	10.2	8.5	10.6	15.5
4/12/2022	10:00:00 AM	71.6	70.6	69.2	67.5	65.7	63.6	61.2	58.6	55.7	52.8	49.6	46.7	43.6	40.7	38.3	35.6	32.9	30.3	27.5	24.8	22.9	22.7	23.7	24.5	22.9	21.4	19.2	15.4	11.9	7.7	4.3	1.2	0.2	0.6	3.5	7.1
4/12/2022	11:00:00 AM	69.3	68.5	66.5	64.8	62.9	60.6	57.9	55.1	52.3	49	46.1	43.1	40.3	38.1	36.6	36.9	33.7	28.9	25.3	23.4	21.6	19.7	20.6	21.1	19.1	17.2	15.9	14.2	12.1	6.5	0.9	-0.4	-0.6	-1.4	0.6	4.1
4/12/2022	12:00:00 PM	71.4	70.6	68.6	66.8	64.7	62.7	60.2	57.5	54.5	51.5	48.4	45.1	42.1	39.2	36.8	34.3	31.7	28.8	26.1	23.7	22.5	22.4	23.8	24.7	22.9	21.1	18.6	16.3	12.4	9.1	7	7.6	4.5	3.6	5.2	7.4
4/12/2022	1:00:00 PM	70.9	69.5	67.8	65.8	64	61.5	59.1	56.3	53.1	50.4	47.2	44.2	41.6	39.5	37.5	35.8	32.3	29	25.7	23.6	22.5	21.6	22.9	23.8	21.8	19.4	16.7	13	9.7	9	3.8	4.2	6.2	4.8	4.3	6.5
4/12/2022	2:00:00 PM	69.4	67.9	66.5	64.6	62.4	60	57.3	54.3	51.5	48.7	45.6	42.8	40.3	38.2	36	33.2	30.5	31	26.9	22.3	21	19.7	20.6	21.3	19.1	17.1	15.6	12.4	10.8	3.5	0.1	-0.4	0	-0.4	1	4.3
4/12/2022	3:00:00 PM	66.2	64.8	63.3	61.1	59.2	57.1	54.2	51.4	48.5	45.8	42.8	40.1	37.4	35	33.2	30.7	27.8	24.5	21.4	18.4	16.7	16	17.6	18.3	16.3	13.9	12.9	11.5	6.7	2.2	0	-0.8	-1.1	-0.5	0.9	3.2
4/12/2022	4:00:00 PM	71.8	70.8	69.2	67.6	65.7	63.3	60.9	58.3	55.3	52.5	49.6	46.7	43.7	40.5	37.9	35.3	32.7	30.1	27.5	25	23.3	22.8	24.4	25.6	24.1	22.2	20.1	17.2	13.3	9.3	5.8	3.3	1.5	2	4.4	8.5
4/12/2022	5:00:00 PM	68.5	67.1	65.6	63.9	61.6	59.2	56.6	53.6	50.7	47.8	45.2	42.2	39.4	36.9	34.7	32.1	30	27.8	24.6	22.2	21.2	19.7	20.4	21.2	20	18.8	16.9	14.1	12.6	12.9	10.5	10.6	10.1	9.9	13.3	10
4/12/2022	6:00:00 PM	64.8	63.3	61.7	59.6	57	54.9	52.1	49.3	46.5	43.7	41.7	39	37.5	36.1	34.6	32.5	29.7	26.4	23.7	20.6	18.9	16.4	15.4	15.5	13.2	11.8	10.6	9.7	5.8	0.1	-2.9	-3.6	-4.1	-3.6	-1.7	1.8
4/12/2022	7:00:00 PM	52.9	51.2	48.9	45.9	43.5	40.4	38	36.1	34.5	34	33.3	33.2	33.2	32.2	31.7	29.7	26.3	23.4	19.9	16.2	12.7	8.5	3.6	8.5	23.3	32.1	36.8	39.2	39.6	31.3	15.3	14.9	16.9	13.4	5.6	1
4/12/2022	8:00:00 PM	59.1	57.8	55.7	53.2	50.5	48.1	45.3	42.5	39.9	36.8	33.5	30.8	28.2	25.4	22.5	20	17.1	14	11.1	8.2	6.2	5	4.8	3.9	1.1	-1.5	-3.9	-5.6	-6.1	-5.8	-5.8	-5.6	-5.4	-5.1	-3.1	0.3
4/12/2022	9:00:00 PM	59.7	57.9	56.2	53.9	50.9	47.9	45.1	42	39.1	35.8	33	31	28.8	26.6	24.3	25.9	25.1	19.5	13.5	8.8	6.4	5.3	5.4	4.1	0.2	-2.9	-4.9	-6.1	-5.9	-5.7	-5.7	-5.5	-5.3	-5	-3	0.2
4/12/2022	10:00:00 PM	60.9	59.6	57.4	55.1	52.6	49.5	46.6	43.7	40.7	37.4	34.4	32.1	30	28.1	26.9	25.4	21.4	17.8	13.7	10.3	8.1	7.1	7.5	6.3	2	-1.8	-4.2	-5.8	-6.1	-5.8	-5.6	-5.5	-5.3	-5.1	-3.2	0.1

4/12/2022	11:00:00 PM	65.8	64.3	62.7	60.9	58.6	55.9	53.1	50.2	47.2	44.5	41.7	39	36.5	34.3	32.3	29.7	28.1	25.3	21.2	17.9	15.5	14.1	14.5	14.6	12.1	9.4	6.4	3.3	1	1.3	1.7	2.7	2.7	3.5	6.2	8.2
4/13/2022	12:00:00 AM	70.6	69.5	68	66.3	64.3	62.1	59.4	56.4	53.1	49.8	46.7	43.9	41.1	38.5	35.9	33.3	31.4	30.8	27	24.3	22.3	20.7	21.1	21.3	19.2	16.6	13.7	10.7	8.4	9.4	9.6	10.5	10.7	11.4	14.2	16.3
4/13/2022	1:00:00 AM	70	68.7	67.4	65.7	63.8	61.9	59.3	56.5	53.4	50.1	46.6	43.2	39.8	36.9	34.3	31.7	29	26.5	23.9	21.3	19.5	19.2	19.9	20.3	18.7	16.6	13.7	10.2	6.9	6	4.2	3.9	3.5	3.3	5.1	9
4/13/2022	2:00:00 AM	65.2	63.8	62.1	60.6	58.5	55.9	53.2	50.1	46.8	43.3	39.9	36.4	33.4	30.5	27.6	25	22.2	19.6	17.3	15.2	13.6	12.9	12.6	12	10.4	9.1	6.7	5.3	5.2	6.7	6.7	7.2	7.1	7.6	9	11.2
4/13/2022	3:00:00 AM	68.3	66.9	65.6	63.9	62	60.1	57.6	54.6	51.2	48.1	44.7	41.3	38.3	35.3	32.6	30	27.3	24.6	22.1	19.5	18.1	18	18.5	18.4	16.8	15	12	8.8	6.4	6.5	6.2	6.5	6.4	6.5	8.1	11.8
4/13/2022	4:00:00 AM	68	66.7	65	63.3	61.6	59.6	57.2	54.1	50.7	47.6	44.2	41.1	38	35.1	32.6	29.8	27.2	24.4	21.5	18.7	17.3	17.1	17.4	17	14.7	12.4	9	5.2	2	0.7	-0.4	-0.3	-0.5	-0.3	1.8	5.9
4/13/2022	5:00:00 AM	70.2	69	67.5	65.7	64	62.1	59.7	57.2	54.2	51.1	47.9	44.7	41.7	38.6	35.8	33.3	30.7	28.2	25.5	22.7	21	20.8	21.4	21.4	19.5	17.4	14.3	10.7	7.3	5.8	3.3	3.7	2.6	2.4	4.3	9.6
4/13/2022	6:00:00 AM	65.9	64.2	62.8	61.1	59.2	57	54.7	52.1	49	46.2	43.1	40	37.2	34.5	31.9	29.2	26.4	23.8	21.3	18.5	16.7	15.9	16.1	16.1	15.1	16	19	17.4	15	8.1	1.2	-0.5	-1.7	-2.1	0.2	5
4/13/2022	7:00:00 AM	69.9	68.5	67	65.3	63.4	61.4	59	56.5	53.7	50.8	48	45.2	42.4	39.8	37.3	35	32.7	29.7	26.5	23.6	21.5	20.5	20.8	20.9	20.8	26.9	32.3	36.9	35.9	30.9	16.9	14.2	12	6.7	3	5.8
4/13/2022	8:00:00 AM	69.8	68.9	67.3	65.4	63.5	61.1	58.7	56.1	53.3	50.6	47.8	44.9	41.9	39.1	36.5	34	31.6	29.1	26.1	23.1	20.9	20.4	21	21.2	19.7	21.2	22.3	28.2	27.4	25.2	10.8	5.9	4.2	1.7	2.3	6.1
4/13/2022	9:00:00 AM	70.7	69.5	68.1	66.4	64.4	62.4	59.8	57.2	54.4	51.7	49.1	46.5	43.4	40.6	37.8	35.2	32.8	30.5	28	25.3	23.1	22.3	22.9	23.6	22.4	21.1	19.9	17.2	13.2	8.2	4.7	2	0.5	1.3	3.5	7.8
4/13/2022	10:00:00 AM	67.8	66.6	65.1	63.3	61.1	58.6	56.1	53.1	50.4	47.7	44.8	42.1	39.5	36.7	34.1	31.6	29	26.3	23.4	20.6	18.7	18.3	18.8	18.9	17.2	15.2	13.5	10.5	7	2	-0.1	-1	-1.5	-0.7	1.6	4.8
4/13/2022	11:00:00 AM	72	71	69.9	68.3	66.4	64.3	61.9	59.2	56.2	53.2	50.2	47.2	44.4	43.2	44.2	39.4	38.6	38.9	37.6	35.5	33.6	32.7	33.5	32.7	30.1	30	29	29	27.8	26.5	25.2	22.9	22.6	20.1	17.7	16.7
4/13/2022	12:00:00 PM	70.5	69.2	67.6	65.8	63.7	61.2	58.4	55.5	52.6	49.5	46.4	43.3	40.1	37.3	34.4	31.8	29.1	26.6	24.1	21.7	20.1	20.1	21.6	22.3	21	18.7	16.2	13.3	9.7	6.4	4.9	4.2	3.4	3.8	5.6	9.3
4/13/2022	1:00:00 PM	70	69.1	67.1	65.5	63.3	60.9	58.5	55.6	52.5	49.5	46.4	43.2	40	36.9	34.2	31.7	28.9	26.2	23.9	21.3	19.8	20	21.9	23	28.4	39.4	44.1	42.4	39	29.9	19.1	15.1	15	9.8	8.8	8.7
4/13/2022	2:00:00 PM	70.5	69.2	67.7	65.9	63.7	61.4	58.6	55.6	52.6	49.7	46.7	43.9	41.2	38.7	36.6	33.8	30.6	27.7	25.3	23	21.6	20.7	22	23.2	22.2	20.7	21.3	19.4	16.2	9.4	4.8	2.7	1	1.4	3.7	7.5
4/13/2022	3:00:00 PM	68.5	67.4	65.9	64.1	62	59.3	56.8	53.7	50.8	47.7	44.8	42	39.6	37.5	35.5	33.2	31.1	27.2	23.3	20.5	18.8	18.1	19.2	20.4	21.2	24.4	31.7	28.9	36.2	21.9	8.6	13.8	11.8	10	4.2	5.9
4/13/2022	4:00:00 PM	67.4	66.2	64.5	62.7	60.5	58.2	55.5	52.4	49.3	46.3	43.5	40.9	38.7	36.9	35.1	32.5	32.6	28.2	22.7	19.9	17.6	16.6	17.8	18.9	17.9	25.1	29.1	36.7	35.1	30.8	16.9	14.1	12.9	9.5	4.1	5.1
4/13/2022	5:00:00 PM	66.3	65.1	63.3	61.4	59	56.3	53.7	50.6	47.7	44.9	42.2	40	38.2	36.8	35.1	33.1	32	28.9	24.3	20.1	17.9	15.4	16.2	17.4	16	15.8	16.2	15.4	9.3	2.5	0.2	-0.9	-2	-1.9	-0.2	3.3
4/13/2022	6:00:00 PM	67.4	66.2	64.5	62.7	60.5	58	55.2	52.3	49	46.1	43.4	40.8	40.9	38.6	35.5	34.3	34.3	31.2	24.2	20.2	17.7	16.1	17.1	17.9	16	14.3	12.9	10.3	8.2	2	0.4	0.4	-1.4	-1.2	0	3.1
4/13/2022	7:00:00 PM	64.7	63.3	61.3	59.1	56.9	54.3	51.5	48.6	45.3	42.4	39.5	36.9	34.9	33.2	32.2	30.9	27.9	24.4	19.6	15.7	13.7	12.7	14.9	18	24.2	36.4	40.8	45.6	41.9	34.8	21.3	10.7	16.3	8.2	6.2	4.5
4/13/2022	8:00:00 PM	61.2	59.3	57.8	55.4	53.1	50.3	47.4	44.3	41.6	38.8	36.4	34.5	33	31.4	29.6	27.7	24.8	20.6	16	11.9	9.8	8.2	9	9	6.2	3.1	0.6	-2	-3.7	-4.5	-4.4	-4.3	-4.4	-4.3	-2.6	0.4
4/13/2022	9:00:00 PM	66	64.7	62.5	60.3	57.9	54.7	51.7	48.5	45.8	42.8	40.2	38.2	36.8	35.5	35.1	35.4	33.1	28.2	24.1	19.7	16.7	13.8	15.1	15.2	12.1	8.1	5.2	1.8	-0.6	-1.6	-0.7	-1.4	-2.3	-2.4	-1.3	1.6
4/13/2022	10:00:00 PM	64.2	62.5	60.7	58.3	55.7	53	49.9	46.7	43.6	40.7	38	35.9	35.8	35.4	31.6	29.6	27.5	23.5	19.7	15.5	13	11.2	12.4	12.4	9.5	5.4	2.8	-0.5	-2.5	-3.8	-3.9	-3.7	-4.1	-4.1	-2.3	0.8
4/13/2022	11:00:00 PM	65.4	63.9	62.1	59.9	57.8	54.9	52.1	49	45.9	43.2	40.4	38.2	36.2	34.6	33.2	33.2	35.1	31.3	24.3	18.1	15.3	13.7	14.9	15.6	13.6	10.7	7.8	4.3	1.1	-1.4	-1.9	-2	-2.5	-2.5	-1	2
4/14/2022	12:00:00 AM	69.6	68.5	66.8	64.9	62.6	60.1	57.2	54.1	51.1	48	45	42	39.2	37	35.3	33.4	31	28.2	25.4	22.5	20.8	18.9	19.3	19.9	17.5	14.3	11.3	7.8	4.8	3.6	3.8	4.7	4.1	3.9	5.9	10.4
4/14/2022	1:00:00 AM	62.3	60.7	59	56.8	54.5	52	49	46	43.1	40.2	37.5	35.4	31.9	30.3	30	26	23.5	20.1	17	14.4	12.8	9.7	8.8	8.3	5.7	2.7	0.3	-1.4	-1.9	-0.9	-0.1	0.8	0.4	0	1.5	6.1
4/14/2022	2:00:00 AM	64.2	62.7	60.8	58.6	56.1	53.8	51.2	48	45	42	39.1	36.3	33	29.9	27.1	24.8	22.2	19.7	17.6	15.1	13.7	12.4	13.1	13.7	11.9	9.4	6.7	3.4	-0.1	-1.7	-2.1	-2	-2.4	-2.6	-0.7	3.6
4/14/2022	3:00:00 AM	67	65.7	64	61.8	59.5	56.8	54	51.2	48.1	45.1	42	38.8	35.7	32.7	30.1	28.8	25.9	22.9	20.7	17.9	16	15	16.1	16.5	14	10.8	7.9	4.4	0.8	-1.6	-2.6	-3.4	-3.7	-3.4	-1.5	1.8
4/14/2022	4:00:00 AM	70.5	69.1	67.9	66.1	64	61.4	58.7	55.7	52.7	49.6	46.5	43.5	40.2	37	34.3	31.7	29.3	27.2	25.2	22.6	20.6	19.8	21.4	22.5	20.9	18.4	15.9	12.6	8.7	5.1	2.8	0.9	-0.1	0.4	2.9	6.6
4/14/2022	5:00:00 AM	74.7	73.8	72.6	71.1	69.4	67.4	65.1	62.4	59.6	56.6	53.7	50.5	47.4	44.1	41.2	38.8	36.3	33.8	31.6	29.1	27.1	26.4	28.1	29.9	29.2	27.7	26.2	24.4	20.4	16	12.4	9.2	6.7	6.5	8.8	12.9

4/14/2022	6:00:00 AM	74.1	73	71.7	70.3	68.4	66.4	64	61.1	58.2	55.1	52.2	49	45.8	42.7	39.9	37.2	34.8	32.6	30.3	27.9	26	25.2	26.8	28.3	27.4	25.8	25.5	24.2	20.5	15	11.5	9.9	8.6	8.4	10.7	15.4
4/14/2022	7:00:00 AM	72.1	71.1	69.7	68.2	66.3	64	61.5	58.5	55.5	52.4	49.3	46.3	44	40.2	37.5	35.6	32.7	30.1	27.8	25.3	23.5	22.5	23.9	25	23.7	22.5	22.7	21.8	19.5	14	10.4	10.5	9.5	9	11.6	17.2
4/14/2022	8:00:00 AM	69	67.7	66.1	63.9	61.6	58.7	55.6	52.4	49.2	45.9	42.8	40	37.2	35.3	33.6	30.8	28.4	25.8	23.8	22.2	21.4	20.3	21.2	22.9	22.2	23.1	24.1	25.3	20.6	16.2	9.9	4.3	3.1	2.2	3.1	6.8
4/14/2022	9:00:00 AM	73	71.6	70.1	68.1	66	63.7	60.8	57.9	54.9	51.8	48.7	45.6	42.7	40	37.6	35.2	32.9	30.6	28.7	26.9	26	25.2	26.4	28.6	29.3	35.6	41.3	50.1	41.7	38	26.1	19.3	19.7	14.4	12.6	11.9
4/14/2022	10:00:00 AM	72.6	71.1	69.6	67.7	65.6	63.3	60.7	57.9	55.1	52.2	49.2	46.3	43.5	40.7	38.2	35.7	33.4	31.1	29.2	27.2	25.9	25	26	28.3	29.9	37.2	42.7	47.5	40.4	34	20.9	14.8	13.7	10.8	10.1	13.2
4/14/2022	11:00:00 AM	72.5	71.2	69.9	68.2	66.1	63.9	61.4	58.5	55.7	53	49.9	46.8	44	41	38.6	36.2	33.7	31.4	29.3	27	25.4	24	25	26.9	29.2	37.7	44.6	46.7	46.1	36	22.8	21	18.5	16.5	14.8	20.4
4/14/2022	12:00:00 PM	72.9	71.7	70.4	68.7	66.7	64.5	62.2	59.3	56.2	53.3	50.4	47.2	47.6	46.2	39	36.8	36.1	32.1	29.8	27.5	25.8	24.5	25.5	27.7	28.6	37.7	41.5	48.7	42.8	37.1	25.5	19	18.9	14.1	12.2	11.6
4/14/2022	1:00:00 PM	69.7	68.2	66.6	64.5	62.2	59.7	56.7	53.7	50.7	47.8	44.6	41.7	38.8	36.3	34.5	32	29.8	27.4	25.5	23.2	21.7	20.2	21.5	23.3	23.3	29.2	31.8	35	31.6	23.3	12	4.5	3.5	2.2	3.8	7.3
4/14/2022	2:00:00 PM	67.9	66.3	64.5	62.4	59.8	57.1	54.4	51.4	48.1	45.2	42.4	40.1	37.8	35.7	34.7	32.7	29.6	28	26	25.4	24.4	22.5	22	23.8	25.1	25.6	26.3	26.9	26.1	25.8	25.3	25.4	22.9	20.1	21.7	31
4/14/2022	3:00:00 PM	73.5	72.2	71	69.3	67.4	65.4	63.1	60.7	57.9	55.2	52.3	49.4	46.6	43.7	41	38.2	35.6	33.2	31.1	28.8	27	25.5	27.1	29.1	29	28.7	30.4	30.4	24.5	18.2	14.4	12.6	10.8	9.5	9.6	13.6
4/14/2022	4:00:00 PM	69.5	68.1	66.7	64.8	62.3	59.7	56.8	53.9	50.8	47.8	44.8	41.9	39.3	36.8	36.1	33.1	30.8	27.8	26	24	22	20.2	22.4	24	23.1	22.6	24.2	24.2	21.2	17.1	16.9	15.6	14.2	12.2	11.4	18.1
4/14/2022	5:00:00 PM	66.9	65.6	64.1	62.1	59.9	57.2	54.2	51	47.9	44.8	42	38.8	35.9	33.6	31.8	29.8	27.7	25.2	23	20.6	18.9	17	18.5	20	23.3	27.5	31.7	36.1	33.3	27.8	11.1	4	2	-0.7	0.2	3.6
4/14/2022	6:00:00 PM	68.1	66.3	64.6	62.4	60	56.8	53.9	50.7	47.5	44.7	41.8	39.1	36.8	34.5	33	31	28.9	26.1	23.4	21	19.1	17.2	19.3	20.3	18.3	15	13.9	11.1	12.3	9.9	8.6	7.6	6.9	5.4	5.3	7.5
4/14/2022	7:00:00 PM	63.6	62.4	60.7	58.3	55.7	52.7	49.6	46.1	43	40.2	38.2	36.5	35.7	34	32.4	30.2	28.2	24.8	21.8	19	16.8	14.6	15.9	16.9	17.6	22.5	26.7	32.5	28.8	23.1	16.7	13.7	13.1	11.3	11.2	10.9
4/14/2022	8:00:00 PM	70.6	69.4	68	66.4	64.3	61.9	59.2	56	52.9	49.7	46.9	44	41.4	39.3	37.6	36.2	34.6	32.5	30.2	27.6	25.5	23.6	24.8	26.4	25.6	23.2	22.8	21.7	20.9	21.2	22.1	20.2	20.1	18.6	18.8	18.6
4/14/2022	9:00:00 PM	73.3	72.3	71.1	69.5	67.5	65.1	62.5	59.8	56.8	53.7	50.7	47.9	45.3	43.4	41.3	39.7	38.2	36.1	33.7	31.1	29	26.9	27.8	29.5	28.7	25.7	24.4	21.4	18.7	17.2	17.4	15.3	14.7	13.3	13.5	13.9
4/14/2022	10:00:00 PM	69.3	68.3	66.7	65.1	62.7	59.8	56.9	54.1	50.5	47.5	44.3	41.5	39.2	37.8	36.7	35.1	33.2	30.7	28.1	25.5	23.5	21.6	22.1	23.5	22.5	20.1	19.5	18.2	17.1	17	18.1	16.4	16	14.7	15.3	15.1
4/14/2022	11:00:00 PM	70.4	69.2	67.7	66	63.8	61.1	58.4	55.2	51.9	48.5	45.6	42.7	40.4	38.6	37.3	35.7	34	31.7	29.1	26.4	24.3	22.3	23.6	25.1	23.7	20.1	18.5	14.9	11.8	9.4	9.6	7.6	7.2	5.7	6.2	8.6
4/15/2022	12:00:00 AM	69.7	68.6	67.3	65.6	63.5	60.6	57.6	54.5	50.9	47.7	44.5	41.5	39.2	37.5	36.3	34.9	33.4	31	28.5	25.9	24.2	22.2	22.5	23.9	22.9	19.8	18.5	15.6	12.8	11.1	11.6	9.8	9.5	8.3	8.7	9.4
4/15/2022	1:00:00 AM	69.2	68.2	66.7	65	62.5	59.7	56.5	53	49.5	46.1	43	40.1	38	36.5	35.3	34	32.3	29.8	27.2	24.5	22.7	20.6	21	22.2	20.7	17.4	15.9	13.1	11.5	13.2	13.9	12.8	12.6	11	10.6	15.6
4/15/2022	2:00:00 AM	69.7	68.9	67.5	65.7	63.3	60.6	57.4	54.1	50.7	47.3	44.1	41.2	38.7	36.8	35.5	34.1	32.5	30.1	27.7	25.1	23.3	21.2	22.1	23.4	22.1	18.9	17.4	13.7	9.8	5.7	3	0.3	-1	-2	-0.9	1.9
4/15/2022	3:00:00 AM	64.2	62.7	61.4	59.1	56.3	53.7	50	46.5	43.2	39.9	36.8	34.5	33	31.2	29.6	28.1	26	23.6	21.5	19.3	17.8	15.5	15.7	16.8	15.7	12.8	11.2	8.5	6.5	6.9	8	8.3	6.5	4.8	3.7	11.5
4/15/2022	4:00:00 AM	63.6	62.3	60.8	58.6	56	52.8	49.5	46	42.3	39.5	36.4	34.6	33.8	32.4	31.5	29.4	27.1	24.5	22.3	20.3	18.6	16	16.6	18.1	17.7	15.1	14.6	14.6	15.6	18	20.2	19.2	17.2	15	13.7	22.8
4/15/2022	5:00:00 AM	65.5	64.3	62.8	60.7	58.3	55.5	52.4	49.2	45.8	42.6	39.8	37.5	35.8	33.4	32.4	31.6	29.2	25.8	23.4	21.2	19.3	17	17.8	19.4	19	22.6	29.5	31.1	31.8	26.4	20.2	18.2	15.4	13.3	11.8	18.8
4/15/2022	6:00:00 AM	60.2	58.7	56.4	54.3	51.5	47.9	44.6	41.3	38.7	36.5	34.5	33.6	35.4	32.9	28.4	26.1	23.4	21.7	20.2	20.3	19.3	18.3	19.6	23.7	28.9	39.7	45.1	51.8	44.6	38.1	30.6	28.1	25.8	22.9	22.4	32.4
4/15/2022	7:00:00 AM	50.7	48.6	46.1	43.4	40.2	37.4	34.7	33.5	31.7	31.1	30.4	30.6	29.1	28.2	26.4	24.6	21.7	17.9	13.7	12.6	12.7	12.5	16.9	20.8	26.9	39.2	43.4	47.2	42.3	34.8	22	13.8	13.5	7.3	2.4	1.6
4/15/2022	8:00:00 AM	54.4	52.3	50.3	47.5	44.9	41.8	39.3	36.8	34.7	32.8	31.1	30	29.1	26.6	25.4	22.4	19.1	15.6	12.6	11.4	11	17.8	29.9	35.3	40.7	50.7	54.8	58.6	55.9	47	40.2	37.7	39.2	30.5	28.4	27.7
4/15/2022	9:00:00 AM	58	56.2	54.7	52.1	49.6	46.4	43.7	41.5	39.7	38.6	37.3	36.5	35.9	33.9	31.6	28.2	23.6	19.2	16.1	15.7	14.1	9.4	10.9	11.9	15.6	27.3	32.8	42.8	35.9	31.3	16.1	6.8	7.9	2.3	0.8	1.1
4/15/2022	10:00:00 AM	66.2	64.9	63.1	61.3	58.7	56.1	53.4	51	47.9	44.9	41.9	39.1	36.3	34.8	36.6	32.9	27.9	24.3	22.6	20.7	18.8	16.7	17.1	18.5	21	30	34.3	39.5	34.2	29.2	18.3	14.8	13.4	11.1	9.9	17.9
4/15/2022	11:00:00 AM	62.3	60.6	58.4	56.3	53.6	50.9	47.9	45.2	42.9	40.8	39.8	38.6	37	35.1	34.5	34.6	31.2	26	22.3	17.7	14.3	10.8	9.1	22.1	28	40.6	42.4	47.7	41.7	29.4	18.8	13.9	14.8	10.9	10.3	16.1
4/15/2022	12:00:00 PM	63.2	61.7	59.9	57.6	54.8	52	48.8	45.4	42.5	40.6	50.2	44.9	39.5	39.2	32.1	29.7	26.7	25	20	16.6	14.3	11.7	12	13.3	13.7	24.5	28.7	33.5	26.3	15	4.9	0.2	1	-1.6	-1.1	1.4

4/15/2022	1:00:00 PM	64.7	63.4	61.9	59.5	57	54.5	51.7	48.3	45.5	42.3	39.5	37.1	42.9	44.4	36.1	33.1	34.5	28.9	27.2	26.1	26.6	26.3	24.3	21.2	20.7	29.8	35.1	37.4	32.8	25.5	10.8	7.4	6.9	5.2	3.1	5.9
4/15/2022	2:00:00 PM	67.2	65.9	64.4	62.4	60.3	57.6	54.6	51.7	48.7	45.5	42.5	39.6	37	34.5	32.4	30	27.6	25.1	23.1	20.5	18.7	16.9	18	19.6	19	20.1	21.9	25.2	24.5	13.2	7.1	5.8	4.1	2.1	2.5	4.6
4/15/2022	3:00:00 PM	63.3	61.6	59.9	57.8	55.3	52.3	49.7	46.7	44	41.3	38.9	37.1	35.5	33.5	32	29.8	26.4	22.8	19.6	16.9	14.5	12.4	13.2	14.2	18.3	27.9	34.2	34.6	32.9	25.3	4.5	1.9	2.1	-0.3	-0.1	2.5
4/15/2022	4:00:00 PM	62.3	60.5	58.6	56.1	53.4	50.1	47	43.7	40.7	38	35.6	34.1	33.4	31.8	29.7	28.2	24.8	20.9	17.8	15.1	13.2	9.9	10	10	13.5	24.3	26.5	31.3	27.3	18.4	7.3	0.8	4.7	-0.4	-0.8	0.7
4/15/2022	5:00:00 PM	59.8	58.7	57	54.7	52.7	49.6	46.8	44	40.7	38.1	35.4	34.3	41	38	38.3	30.4	30.7	29.2	21.9	17.5	17.6	18	15.7	17	26.2	38.3	43.1	46.7	40.1	32.9	18.5	10.8	12	6	2.6	1.8
4/15/2022	6:00:00 PM	57.7	55.9	53.2	50.9	48	45.2	42.4	39.7	37.2	35.8	34.5	33.7	33	34.4	31.3	28.2	26.8	21.1	14.6	13.4	12.3	5.4	0.7	0.6	8.5	20.7	23.1	26.9	21.9	14.5	-0.9	-3.9	-4.6	-4.2	-2.7	0.1
4/15/2022	7:00:00 PM	57.9	56	53.8	50.9	48	45.5	42.4	39.5	36.6	34.6	32.6	32.4	30.4	29	27.6	26	23.1	19	15.1	11.1	7.9	4.7	4.7	6.7	14.2	27.3	31.4	39.1	35.7	29.5	14.3	2.6	4.1	-0.1	-0.6	0.2
4/15/2022	8:00:00 PM	66.5	65.1	63.1	61	58.3	55.1	52	48.9	45.6	42.6	39.6	37	34.4	31.8	30.7	29.6	26.2	23.1	20.9	18.4	16	14	16.1	16.3	13.2	7.7	5.6	1.2	-1.3	-2.7	-3.1	-3.3	-3.8	-3.6	-2.1	0.8
4/15/2022	9:00:00 PM	49	47.1	44.6	42.1	39.7	37.3	35.3	35.4	33.4	33.9	33	34.1	35	33	32.6	28.6	25.5	21.7	17.9	17	15.3	10.2	4.3	-1.3	-4.4	-6.8	-7.3	-7.1	-6.6	-6.1	-5.9	-5.8	-5.6	-5	-3	0.1
4/15/2022	10:00:00 PM	46.7	44.9	42.7	40.2	38.7	37.7	38.6	41.6	37.8	38.6	37.1	36.2	38.7	35	33.2	31.5	29	24.6	22.1	19.9	17	12.6	5.7	-1.9	-5.9	-6.3	-6.4	-6.2	-6.6	-6.2	-5.9	-5.8	-5.6	-5	-3	0.1
4/15/2022	11:00:00 PM	56.2	54.2	51.6	49.1	46.7	44	42.6	41.5	39.5	37.8	36.2	35.5	34.3	32.1	30.8	28.6	25.5	21.5	17	14.1	11.8	6.8	1.3	-2.1	-4.4	-5.3	-5.4	-6	-6.1	-5.9	-5.7	-5.7	-5.5	-5	-3	0.1
4/16/2022	12:00:00 AM	52.5	50.7	48.2	45.4	42.9	39.7	36.8	35.9	32.5	30.9	30.6	28.3	28	23.3	21.5	19.7	18.1	14.2	13.1	9.1	6	1.4	-2	-3.2	-5.4	-5.2	-4.9	-6.5	-6.4	-6.1	-5.9	-5.7	-5.6	-5	-3.1	0.1
4/16/2022	1:00:00 AM	40.9	39.1	38.2	35.5	35.4	35.7	35.7	37.9	36.2	36.4	36.6	35.8	35	31.9	30.2	28.6	29.7	26.2	21	18.2	15.9	10.8	2.4	-4	-4.3	6.1	13.5	16.7	6.1	-5.3	-4.6	-5.7	-5.5	-5.1	-3.1	0.1
4/16/2022	2:00:00 AM	34.1	35.2	36.9	35.3	38.2	37.5	38.3	38.3	38.5	37.7	34.6	35.9	36.4	31	29.3	27.3	24.7	22.1	20	15.4	12.5	7	-1.6	-6.2	-6.7	-4.7	-5.1	-6.6	-6.5	-6.2	-6	-5.8	-5.6	-5.1	-3.1	0.1
4/16/2022	3:00:00 AM	29.6	29.8	31.5	30.3	31.6	32.8	32.3	34.9	33.3	35.2	32.8	32.7	29.2	27	27	25.5	20.8	16.4	14.3	11	8.7	4	-4	-7.6	-7.7	-6	-6.4	-6.8	-6.5	-3.7	-2	-2.5	-4.8	-5.1	-3.1	0.1
4/16/2022	4:00:00 AM	31.7	32.2	33.8	33.9	35.6	37.5	38.4	38.1	36.9	39.1	37.6	35	33.2	31.3	29.3	28.5	24.8	21.3	18.1	15.9	12.9	7.7	2.9	-0.4	-5.8	0.1	6.1	8.7	1.3	-5.1	-5.2	-5.7	-5.6	-5.2	-3.2	0.1
4/16/2022	5:00:00 AM	29.4	31.1	33.6	31.2	33.2	33.8	33.2	35.1	34.1	33.3	32.1	30.9	29.8	27.6	25.7	24.6	21.3	17.5	16.3	14.8	11.9	5.9	-1.5	-2.6	4	15.8	19.5	20.8	18.4	6.2	-0.2	2.2	-5.1	-5.2	-3.2	0.1
4/16/2022	6:00:00 AM	32.1	32.8	35.6	33.1	32.9	35.3	34.1	35.4	35.2	37.4	33.4	31.8	30.4	27.7	25.2	24	20.7	18.4	16	12.6	10.7	8.3	13.5	21.1	30.2	42.6	47.7	52.6	47.1	38.8	23.9	17.5	17.9	11.8	8.3	4.6
4/16/2022	7:00:00 AM	38.8	37.7	37.3	38.4	39.3	38.1	36.3	40.4	36.9	38.6	36.6	36.4	35	32.5	32	30.2	26.6	22.7	20	17.2	16.2	11.9	24.9	19.2	31	48.2	54.5	54.2	51	44.9	38.7	33.3	39.4	33.8	30.1	24.8
4/16/2022	8:00:00 AM	47.5	45.4	44.1	41.5	39.7	39.5	37.8	37.8	37.4	37.3	36.5	37.1	35.6	33.5	32.6	29.8	26.6	22.9	19.8	16.3	13.8	10	8	16.9	28.3	41.5	46.4	49.2	44.3	36.9	23.4	16.8	17.5	11.1	7.3	2.6
4/16/2022	9:00:00 AM	41.6	39.5	40	37.6	37.7	37.4	36.1	35.8	35.6	36	34.7	34.6	35	32.1	30.2	29.1	24.6	21.3	18.3	16	13.9	9.3	4	2.2	18.5	30.1	35.5	39.3	34.5	28.3	14.1	7	5.5	1.3	-0.6	0.3
4/16/2022	10:00:00 AM	66.1	64.1	62.1	59.9	57.5	55.1	52.7	49.8	46.8	43.9	41.1	38.4	36.9	34.8	32.7	31.5	29.2	26.4	24.5	22.4	20.9	19.6	20.7	22.8	22.7	21.6	21.1	18.8	15.6	10.2	6.5	3.8	1.9	1.7	2.8	5.5
4/16/2022	11:00:00 AM	73.9	72.6	71.3	69.6	67.8	65.8	63.5	60.9	58.2	55.4	52.4	49.4	46.4	43.4	40.8	38.3	36	33.8	31.8	29.6	28	26.7	27.8	30	30.2	29.8	31.4	31.9	30.6	20.2	14.3	11.6	9.1	8.4	9.9	13.2
4/16/2022	12:00:00 AM	75.4	74.3	72.9	71.6	69.8	68	65.8	63.2	60.5	57.8	55	52	49.1	45.9	43.2	40.6	38.1	35.8	33.7	31.5	29.9	28.5	29.4	31.6	32.3	36.6	39.8	43.2	40.3	33	21	16.1	14.7	12.4	12	14.7
4/16/2022	1:00:00 PM	76.7	75.5	74.3	72.9	71.4	69.7	67.7	65.3	63.1	60.6	57.9	55.2	52.3	49.3	46.2	43.5	41.1	38.8	36.8	34.7	32.9	31.4	31.9	33.9	34.4	33.5	33.5	32.6	28.8	25	22	18.9	19	18	15.5	17.6
4/16/2022	2:00:00 PM	77	75.9	74.8	73.4	71.8	70.2	68.3	66.2	63.8	61.5	58.9	56.3	53.5	50.6	47.7	45	42.4	40	37.5	35.5	33.7	32.2	32.4	34.6	35.3	36.7	40.3	44.8	38.5	30.4	26.1	21.4	20.6	18.4	16.7	20.4
4/16/2022	3:00:00 PM	75.6	74.5	73	71.4	69.6	67.6	65.4	63	60.4	57.7	54.9	52.2	49.2	46.2	43.4	40.6	38.1	35.8	33.5	31.4	29.6	28.1	29.9	32.2	32.3	34.5	38.3	42.3	37.7	24.5	20.1	16	14.4	12.5	11.5	14.3
4/16/2022	4:00:00 PM	75	73.8	72.4	70.9	69	67.1	64.7	62.2	59.5	56.9	53.8	51	48.2	45.8	42.2	39.7	37.2	34.5	32.4	30.1	28.2	26.9	28.8	31.1	30.9	28.9	28.4	26.3	22.8	18	14.1	10.8	8	7.7	8.7	12.4
4/16/2022	5:00:00 PM	75.6	74.2	73	71.4	69.6	67.7	65.6	63	60.6	57.8	55.1	52.2	49.3	46.2	43.2	40.4	38	35.6	33.5	31.2	29.3	28	29.6	31.9	31.8	30	29.5	28.7	26.8	20.7	16.9	15	13.1	11.8	12.1	16.6
4/16/2022	6:00:00 PM	72.4	71.3	70	68.2	66.2	64	61.5	58.8	55.8	53.1	50.1	46.9	43.9	40.8	37.9	35.5	33.1	30.9	29	26.7	24.7	23.4	25.4	27.4	26.9	26.1	30.6	33	23.4	13.4	9.8	7	5	4.6	6.1	9.6
4/16/2022	7:00:00 PM	68	66.4	64.6	62.7	60	57.2	54.1	51	47.8	44.7	41.5	38.4	35.3	32.5	30	28.1	26.2	24.3	22.6	20.4	18.3	17.1	19.5	20.7	19.5	23.6	26.9	31.3	26.5	17.5	6.8	0.6	-0.9	-1.5	-0.2	3

4/16/2022	8:00:00 PM		69	67.9	66.2	64.2	61.9	59.2	56.5	53.5	50.6	47.6	44.7	41.8	39.2	36.6	35.5	33.1		30	27.4	25.3	22.8	20.6	19.4	21.8	23.3	21.8	18.1	16.7	12.4	8.9	5.3	2.7	1.2	-0.2	-0.4	1.7	4.5
4/16/2022	9:00:00 PM	74.1		72.8	71.5	69.8	67.7	65.4	62.9	60.2	57.5	54.6	51.5	48.6	45.6	42.5	39.6	37.1	34.7	32.5	30.6	28.4	26.4	25.3	27.9	29.8	29	26.1	25.1	21.3	17.9	14.1	11	8.5	5.9	5	6	9.2
4/16/2022	10:00:00 PM	72.5		71.2	69.7	67.7	65.6	63.1	60.5	57.6	54.7	51.7	48.7	45.5	42.6	39.4	36.7	34.3	32.2	30.1	28.3	26.1	24.2	23.1	25.7	27.4	26.3	23	21.8	17.7	14.2	10.4	7.4	5.1	3.3	2.7	4	7.1
4/16/2022	11:00:00 PM	72.3		70.9	69.6	67.5	65.4	62.9	60.1	57.3	54.1	51.3	48.1	44.8	41.6	38.7	35.9	33.6	31.5	29.5	27.8	25.6	23.7	22.6	25.2	26.7	25.6	22.4	21.1	17.4	14.2	11.7	10.4	9.8	9.2	7.7	6.9	16.5
4/17/2022	12:00:00 AM	70.6		69.4	67.7	65.9	63.6	61.2	58.3	55.3	52.3	49.2	46.1	43.2	39.9	36.7	33.8	31.6	29.6	27.6	25.9	23.6	21.6	20.4	22.9	24.3	22.9	19.3	17.6	13.5	10	6.6	3.9	2.5	0.9	0.7	2.5	6.1
4/17/2022	1:00:00 AM	67.9		66.5	64.4	62.5	60.1	57.4	54.5	51.3	48.3	45.1	42	38.9	36.1	33.4	31.2	28.9	26.9	24.5	22.4	19.9	17.9	16.5	18.8	20.1	18.5	14.7	12.9	8.7	5.2	2	0.1	-1.1	-1.9	-2.1	0	3.7
4/17/2022	2:00:00 AM	65.6		64.1	62.3	60.2	57.6	55.3	52.8	49.3	46.1	43	39.9	37	33.6	30.7	28.2	25.8	23.9	21.9	20.1	17.5	15.4	13.8	15.9	17	15.3	11.7	10.1	6.2	2.9	0.1	-1.6	-2.5	-3.1	-3	-0.8	2.4
4/17/2022	3:00:00 AM	64.9		63.3	61.2	58.9	56.4	53.6	50.3	47.3	44.1	40.9	38	35.2	32.5	30.7	32.1	34.7	28.5	22.7	19.1	15.8	13.6	11.7	13.4	13.8	11.3	7.2	5.4	1.8	0.9	-3.2	-3.5	-3.8	-4.1	-4.1	-2.4	0.7
4/17/2022	4:00:00 AM	56		53.9	51.8	49.4	46.8	44.1	41.3	39.4	36	33.8	30.7	29.8	26.9	25.6	23	19.8	16.5	13.1	10.3	7.8	5	0.8	-0.6	-1.9	-4.3	-0.6	-1.5	-4.8	-4.7	-5.4	-5.8	-5.6	-5.4	-5.1	-3.1	0
4/17/2022	5:00:00 AM	52.9		50.9	48.4	46.1	43.6	40.9	39	36.8	33.3	31.8	29.3	27.9	25.9	23.6	21	18.4	14.8	11.8	8.9	6.5	4.3	0.7	0.9	21.3	25	38.5	40.6	44.4	38.7	30	19.6	8.8	8.5	4	0.6	0.9
4/17/2022	6:00:00 AM	47.9		45.9	43.6	41.1	39.5	37.3	37.5	36	34.8	35.6	34.6	33.4	31.9	29.5	27.6	25.1	21.2	16.8	12.7	9.2	8.3	8.8	15	22.3	32.8	45.4	50.6	56.1	50.2	43	28.1	21.4	23.5	16.9	13.1	8.9
4/17/2022	7:00:00 AM	40.9		39.4	38.9	37.6	35.8	35.6	37.3	36.2	34.1	33.9	32.5	31.9	31.8	28.9	27	24.7	21.5	18.5	14.6	9	6.9	6.2	11	21.9	30.7	44.4	48.2	52.2	46.1	38	25.2	15.1	17.7	10	7.7	3.5
4/17/2022	8:00:00 AM	50.5		48.6	46.3	43.9	41.7	40.8	42.3	37.7	35.1	33.9	31.3	30.8	30.9	26.5	24.4	23.5	18.6	14.2	11.7	9.7	7.3	4.5	6.8	17	29	42.1	46.3	49.5	43.6	36.8	22.4	15	15	9.1	5.6	2.2
4/17/2022	9:00:00 AM	61.6		60.3	58.6	56.4	53.3	50.7	48	44.9	41.8	39.1	36.7	37.1	34	35	31.8	28.6	26.6	21.4	18.7	15.4	12.7	10.3	11.5	16.1	26.2	39.4	43.7	46.5	41.5	33	17.7	12	14.1	9.2	4.5	2
4/17/2022	10:00:00 AM	63		61.3	59.3	57	54.5	51.5	48.7	46	43.3	40.4	38.4	41.4	36	33.9	36.4	30.3	30.4	24	21.5	18.1	15	12.8	13.5	15.2	19.1	31	35.6	39.4	32.4	25.8	10.1	5.3	4.6	1.3	0.6	1.7
4/17/2022	11:00:00 AM	65.3		64.1	62.1	59.9	57.6	54.4	51.6	48.6	45.4	42.4	39.6	37.6	36.9	35.3	34	31.7	29.5	26	22.2	19.5	17	14.6	15.7	16.4	14.3	14.8	15.6	15.3	14.7	5.8	0.5	0.1	-0.5	-0.6	-0.2	2
4/17/2022	12:00:00 PM	65.1		63.8	61.9	60.1	57.3	54.6	51.7	48.9	45.6	42.9	40.1	39	37	37.9	35.7	32.1	32.7	27.1	24.8	19.8	16.9	14.3	15.2	17.1	21.9	33.8	38.6	43.9	37.5	32	16.3	8.7	7.8	4.3	2.5	3.1
4/17/2022	1:00:00 PM	65.3		64.3	62.3	60.2	57.7	55.2	52.1	48.9	45.7	43.1	39.9	37.4	35	32.8	30.8	28.8	26.2	22.9	21.2	19.1	16.4	15.4	17.3	23.1	30.5	44.9	48.6	53.1	48.8	41.8	27.8	19.2	20.4	16.6	12.5	7.1
4/17/2022	2:00:00 PM	66.7		65.4	63.4	61.4	59.1	56.3	53.6	50.6	47.5	44.6	41.4	41.8	36.4	33.5	32.3	29.2	27.3	24.3	22.6	20.7	18.5	17.4	18.9	22	27.2	40.7	44.2	49	43.7	36.8	24	14.8	14.8	11.8	7.9	6.8
4/17/2022	3:00:00 PM	67.8		66.4	65	62.8	60.7	57.9	55	52.3	48.8	45.8	42.9	39.8	36.8	34.2	31.7	29.4	27.1	24.6	22.7	20.2	18.2	16.8	18.4	20.1	21.3	30.5	34.7	37.4	31.8	23.7	10.1	3.7	2.5	1.9	2	4.7
4/17/2022	4:00:00 PM	61.3		59.7	58	55.3	52.6	49.9	46.4	43.6	40.7	38.3	35.1	32.8	30.7	28.9	27	24.9	22	18.2	15.4	12.6	10.3	8.8	10.1	13.8	20.4	33.1	36.6	40.6	36.1	27.7	15.3	9.2	11.4	5.5	2.9	1.7
4/17/2022	5:00:00 PM	61.4		59.5	57.6	55.8	51.8	49.9	46	42.9	39.8	37.2	33.7	31.5	28.8	26.6	24.2	22	19.1	16.4	14	11	8.7	7.2	8.6	14.8	25	37.5	41.7	44.5	38.1	30.9	17.4	11.2	12.3	6.6	3.9	2.1
4/17/2022	6:00:00 PM	57.6		55.5	53.5	50.8	47.5	44.3	41.5	38.5	35.8	34	31.1	29.7	27.8	25.8	24.5	23.6	20.9	15	10.4	6.4	3.4	3.5	8	18.5	29.8	40	43.9	47.2	38.8	28.5	19	8.7	8.3	1.6	1	1.4
4/17/2022	7:00:00 AM	56.6		55.2	53.1	50	47.1	44	41.1	39.1	35.4	33.2	31.1	31.7	30.1	26.5	24.9	24.8	22.3	17.4	12.3	7.6	3.7	1.1	2.3	2.7	11	24.3	29	34.4	32.9	24.5	10.6	6	5.2	2.1	-1.5	0.4
4/17/2022	8:00:00 PM	54.3		52.2	49.9	46.8	44	41.6	39.8	39.7	36.3	36.2	35.5	38.7	38	34.9	33.7	34.1	31.4	26.3	20.9	15.3	11.5	4.7	-1.1	-4.3	-1.3	8	16	20.9	7.5	-1.7	-2.9	-5.2	-5.1	-4.8	-3	0.1
4/17/2022	9:00:00 PM	53.9		51.9	49.8	47.1	44	41.4	38.7	41	35.2	34.3	33.1	33.7	33.2	31.2	29.2	27.8	24.8	19.1	14.9	10.1	5.3	-0.4	-2.2	-3.7	-6.1	-7.5	-7.4	-7.1	-6.6	-6.1	-5.6	-5.5	-5.4	-4.9	-3	0.1
4/17/2022	10:00:00 PM	48		45.5	43.2	40.6	38.3	37	35.2	42.9	34	33.7	32.1	33.4	31.7	30.6	31.2	28.6	25	19.6	15.6	10.4	5.1	-2.1	-7.1	-8.4	-8.3	-8.1	-7.1	-7.3	-6.8	-6.2	-5.9	-5.7	-5.5	-5	-3.1	0
4/17/2022	11:00:00 PM	47.6		45.2	43.2	40.5	37.9	36.5	35.2	39.7	32.8	33.2	30.6	30.1	29.2	29.2	27.8	26.2	23.9	18.5	15.1	10.6	6.5	1.1	-4	-7.5	-7.6	1.9	9.7	23.6	22.2	17.1	3.8	2.3	3.2	-4.5	-3.1	0.1
4/18/2022	12:00:00 AM	39.7		38.1	37.6	36.6	36.1	35.5	35.8	42.9	36.2	37.7	36.2	36.3	33.9	32.7	32.3	31.2	28.4	23.4	19.7	14.3	10.5	3.4	-5.1	-8.3	-1.2	16.8	22	27.4	25.1	13.4	-4.2	-4.5	-3.4	-5	-3.1	0
4/18/2022	1:00:00 AM	37.9		36.9	35.6	37	35.6	34.1	36.3	45.4	35.9	38.5	36.1	36.5	35.4	33.7	32.2	35.2	33.8	27.4	19.7	16.5	13.7	6.9	1	-6	-8.4	-7.1	-6.9	-7.2	-6.9	-6.3	-6	-5.3	-5.5	-5.2	-3.2	0.1
4/18/2022	2:00:00 AM	38		36.6	35.4	36	34.4	33.6	35.8	43.2	34.4	37.6	33.4	34.4	32.8	31.7	29.2	29.6	28.1	22	19	14.3	9.4	4.1	-2.4	-7	-8.4	-7.5	-7	-7.2	-6.7	-6.3	-6	-5.8	-5.5	-5.2	-3.2	0

4/18/2022	3:00:00 AM	34.2	33.7	33.1	35.3	34.5	33.9	37.1	44.7	36	36.1	34.7	34.1	33.8	32.8	30.7	31.1	28.7	22.7	19.1	14.9	10.4	3.8	-3.2	-2.7	6.1	20.6	27.3	34.2	26	14.8	7.4	-2.9	-2	-4.7	-3.2	0.1
4/18/2022	4:00:00 AM	37.7	37.1	37.4	39.4	39.1	39.9	41.9	49.1	41.5	41.1	40.2	40	39.8	37	34.9	34.2	31.2	26.6	23.4	18.9	14.5	8.2	0.8	-0.8	5.8	24	28.2	33.9	26.2	18	4.9	-1.5	-2.8	-5.1	-3.2	0.1
4/18/2022	5:00:00 AM	38.2	38	38.7	40.7	40.9	41.2	42.2	48.3	41.3	40.8	40.8	40.8	40.4	38	35.8	35.3	32	27	24.3	20	16.4	11	13.2	22.3	33.7	46.9	49.6	53.7	47.1	36.8	27.6	19.6	20.1	15.2	12.6	8.4
4/18/2022	6:00:00 AM	38.4	38.7	40.4	41.9	43.3	41.3	42.7	51.3	43.3	42.4	41.7	41.4	40.1	39	37.4	36.7	32.7	28.7	25.7	21.7	17.9	14.2	21.8	25	37.5	53.9	54.4	57.1	49.9	44.4	31	24.3	24.8	19.1	18	11.2
4/18/2022	7:00:00 AM	37.2	38.8	41.1	43.1	41.4	42	44.3	52.1	43.2	44.4	43.5	44.5	42.6	41.5	39.2	38.5	34.8	30.1	27.2	23	19	12.8	10.6	21	32.5	46.7	49.6	53.6	47.2	41.3	26.1	20.3	22.6	16.4	15.2	9.4
4/18/2022	8:00:00 AM	44.8	43.3	42.8	43.1	41	42.2	42.3	49.5	42.9	44	43.2	42.9	41.4	39.1	38	36.8	32.8	29	26.4	22.7	17.9	11.9	15.4	19	22.5	36.6	39.2	43.5	36.8	30.3	15.9	17.2	9.7	3.1	1.5	0.5
4/18/2022	9:00:00 AM	50.8	47.9	46.6	44.3	42	41.5	40.3	40	39.2	39.3	39.1	43.8	40.7	41.5	41.4	37.5	33.4	28.8	25.1	21.2	17	9.7	1	0.5	8.6	19.3	22.7	28.4	24.4	16.7	5	-2	-2.4	-2.8	-2	0.2
4/18/2022	10:00:00 AM	54.4	52.1	49.7	47.3	44.4	42.4	40.1	38.7	37.8	36.9	36.4	37.1	36.3	33.1	31.2	28.5	25.2	21.2	18	15.5	11	7.8	13.2	16.3	11.8	16.2	18.9	23.1	20	13.2	4.6	0.1	-0.6	-0.8	-0.5	0.7
4/18/2022	11:00:00 AM	59.1	57.6	55.1	52.7	49.7	46.9	44.1	41.8	39.4	38	36.4	35.1	33.6	31.5	29.5	27.5	25.4	21.2	18.2	18.9	13.5	12	16.6	22	17.2	20.3	25	31.9	28.3	20.9	5.5	1.7	1.1	1.1	1.3	1.9
4/18/2022	12:00:00 PM	69.4	67.6	65.6	63.3	60.9	58.2	55.4	52.5	49.5	46.6	43.8	43.3	39.6	36	34.3	32.7	31	27.9	26.3	24.4	22.1	21.3	22.8	24.8	24.4	22.7	21.4	20.4	16.4	11.6	8	6.2	4.4	5	5.7	9
4/18/2022	1:00:00 PM	70.8	69.2	67.5	65.5	63.4	61	58.3	55.4	52.6	49.8	47.1	46.6	42	39.6	39.7	35.7	34.4	29.9	27.7	25.5	23.3	22.4	23.9	26.1	26.1	24.8	24.2	22.1	18.5	14.7	11.1	9.1	6.4	7.1	7.3	10.2
4/18/2022	2:00:00 PM	71.6	70.4	68.8	67	64.9	62.5	59.8	57	54.1	51	47.9	44.9	41.8	38.9	36.3	34.3	31.9	29	27	24.7	22.7	21.5	23.1	25.2	26.1	34.4	38.8	42.6	35	28.3	13.4	9.5	7.5	6.4	6.4	9.7
4/18/2022	3:00:00 PM	67.3	65.7	64.1	61.9	59.7	57	54.1	51.1	48.1	45.1	42.3	39.7	37.6	35.7	33.8	31.7	28.8	24.5	21.9	19.2	17	15.8	17.8	20.2	26.8	39	43.8	47.7	43	34.2	22.7	11.8	13.3	9.2	5.7	4.3
4/18/2022	4:00:00 PM	69.6	68.4	66.9	65	62.9	60.2	57.5	54.4	51.3	48.1	44.8	41.8	38.6	35.7	33.1	30.6	28.1	26	24.2	21.7	19.6	18.5	20.1	22.2	25.4	39.3	42.9	50.5	41.9	38.6	24	19.2	19.2	14.3	14.8	9.5
4/18/2022	5:00:00 PM	67.2	65.9	64.3	62.4	59.9	57.3	54.3	51.2	48.3	45.2	42.3	39.3	36.6	33.9	31.3	28.7	25.8	23.2	21	18.5	16.3	15.2	17.2	19.7	25.9	43.7	44.2	47.1	42.3	34.8	18.2	13.1	15.1	9.7	7.1	4.9
4/18/2022	6:00:00 PM	69.7	68.3	66.7	64.8	62.8	60.5	57.7	54.9	52.2	49.2	46.2	43	40.2	41	37.3	32.2	30.4	27.4	24.9	22.3	20.1	19.1	21	22.8	22.1	25.4	24.9	28	25.1	18.3	6.3	4.4	2.5	3.1	3.7	6.6
4/18/2022	7:00:00 PM	72.4	71.1	69.6	67.8	65.6	63.4	60.7	57.9	55.1	52.1	49.1	46.2	43	42	37	34.5	32.3	30	28.1	25.8	23.9	23.1	25.2	27	26.1	26.3	27.4	31.2	25.7	18.7	10.9	7.2	5.9	5.8	6.4	9.2
4/18/2022	8:00:00 PM	73.2	72.1	70.6	68.8	66.6	64.3	61.7	58.9	55.9	53	50	46.8	43.8	40.6	37.7	35.2	32.8	30.7	28.7	26.4	24.4	23.6	26	28	27.2	24.3	22.9	19.2	16	12.1	9.3	7.7	4.8	5.1	6.9	10.4
4/18/2022	9:00:00 PM	74.4	73.3	71.9	70.4	68.4	66.3	63.6	61	58	55	52.2	48.9	45.8	42.7	39.8	37.2	35	32.7	30.6	28.2	26.1	25.1	27.2	29.3	28.8	26.3	24.7	21.4	18.3	14.8	11.6	10.4	6.6	6.8	8.8	12.2
4/18/2022	10:00:00 PM	75.5	74.6	73.2	71.8	70.1	68	65.6	63.1	60.2	57.3	54.3	51.2	48	44.8	41.8	39.2	36.8	34.5	32.6	30.1	28	26.9	28.6	30.8	30.7	28.6	27.1	24	20.9	16.9	14	13	8.6	8.4	10.2	13.8
4/18/2022	11:00:00 PM	71.8	70.7	69.1	67.4	65.3	63.1	60.2	57.3	54.4	51.3	48.1	45.1	41.9	38.9	36.1	33.9	31.6	29.2	27.2	24.7	22.6	21.5	23.3	25.2	24.5	21.9	20	16.6	13.6	10	7.7	8.3	3.4	3.6	5.5	9.1
4/19/2022	12:00:00 AM	70.5	69.3	67.9	65.9	63.7	61.1	58.3	55.3	52.1	49	46.1	43.1	40.1	37.3	34.7	32.4	29.9	27.5	25.4	22.8	20.6	19.6	21.4	23	21.9	19	16.9	13.2	10	7.1	4.3	4.4	1.2	1.4	3.5	7.2
4/19/2022	1:00:00 AM	59.6	57.8	55.7	53.1	50.6	47.4	44.3	41.5	38.6	35.3	32.4	30.8	27.1	24.1	21.8	19.7	17.1	14.1	11.5	8.4	5.6	3.6	4.3	4.2	1.5	-1.2	-3	-5.5	-4.8	-4.6	-5	-4.7	-5.2	-4.6	-2.9	0.1
4/19/2022	2:00:00 AM	55.5	54.2	52	49.3	46.7	44.2	41.5	38.9	36.7	34.8	33.3	35.6	31.7	26	21.9	19.9	16.6	13.1	10	6.7	4.2	2.8	3.6	3.8	1.7	4.8	10	14.5	7.2	1.4	-2.8	-3.8	-5.2	-4.6	-2.7	0.5
4/19/2022	3:00:00 AM	67.2	65.9	64.1	61.8	59.4	56.5	53.5	50.5	47.4	44.4	41.3	38.2	35.2	32.2	29.7	27.2	25	22.8	20.8	18.1	15.9	14.9	16.7	17.6	15.8	12.1	9.9	5.8	2.8	0.2	-0.8	-1.6	-2.5	-2.2	-0.8	2.4
4/19/2022	4:00:00 AM	70.5	69.1	67.6	65.9	63.8	61.3	58.9	56.1	53.1	50.1	47.1	43.9	40.9	37.8	35.2	34.1	30.9	27.9	26	23.4	21.4	20.6	23	24.8	23.9	21.5	21.8	24	19.5	10.7	7.4	4.4	2.1	1.9	3.7	6.8
4/19/2022	5:00:00 AM	70.8	69.7	68.1	66.4	64.3	62	59.6	56.5	53.9	50.8	47.8	44.7	41.8	38.8	35.7	33.1	30.7	28.5	26.6	24.2	22.1	21.1	23.5	25.4	25	28.7	32.9	38.2	32.6	26.2	13.2	9.2	6.9	3.7	4.4	7.3
4/19/2022	6:00:00 AM	67.1	65.9	64	62	59.8	57.5	55.1	51.9	49.4	46.3	43.5	40.3	37.6	35.6	35.4	36.1	33.7	28.7	26	24.5	23.1	24.1	22.7	24	29.4	43.3	45.7	50.5	42.5	36.9	22.2	18	17	12.3	10.3	6.7

WM18: Overall Hourly Intervals – A-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/4/2022	12:34:51 PM	53.09283	24.87617	72.4539	52.01173	38.06332	31.2196
4/4/2022	1:00:00 PM	52.38848	14.55562	69.88519	53.51816	28.5032	19.44272
4/4/2022	2:00:00 PM	49.62657	18.09046	71.90751	49.89175	36.13887	22.31166
4/4/2022	3:00:00 PM	52.89407	18.5019	69.00367	57.10687	39.99626	24.89991
4/4/2022	4:00:00 PM	49.83035	19.79106	71.61504	50.79817	34.73352	25.88179
4/4/2022	5:00:00 PM	31.64885	15.4017	53.31351	32.33917	21.87529	18.90716
4/4/2022	6:00:00 PM	41.46717	18.98079	64.98391	44.77247	34.28173	25.41069
4/4/2022	7:00:00 PM	41.13597	20.9276	61.017	44.18289	34.54756	26.4092
4/4/2022	8:00:00 PM	46.35488	22.64586	69.96517	47.45483	36.43916	26.80343
4/4/2022	9:00:00 PM	60.14108	19.13278	80.12711	61.6973	45.8758	33.67198
4/4/2022	10:00:00 PM	64.56964	0	85.98486	67.60188	47.5327	32.3386
4/4/2022	11:00:00 PM	51.51738	29.12142	68.41975	55.46095	43.94104	36.7936
4/5/2022	12:00:00 AM	49.31119	29.4757	63.76457	53.80544	42.77135	33.93198
4/5/2022	1:00:00 AM	42.78635	31.04138	57.18841	46.33241	38.63883	34.31326
4/5/2022	2:00:00 AM	45.81647	30.95354	65.02016	49.28683	40.70132	35.20362
4/5/2022	3:00:00 AM	45.86111	31.08354	63.63833	48.71353	40.44669	35.00159
4/5/2022	4:00:00 AM	45.76106	0	61.49174	49.51054	41.4287	35.08911
4/5/2022	5:00:00 AM	43.41197	27.25141	57.01186	47.14416	40.18961	33.95403
4/5/2022	6:00:00 AM	46.59129	28.91217	61.81544	50.23574	42.52332	35.43396
4/5/2022	7:00:00 AM	37.20807	20.91168	52.52638	40.90601	33.34034	27.03713
4/5/2022	8:00:00 AM	40.50865	24.08671	58.74903	43.64407	36.166	30.39455
4/5/2022	9:00:00 AM	39.70202	21.04272	61.97945	41.31558	33.70857	28.24065
4/5/2022	10:00:00 AM	34.50981	20.6352	51.83277	37.67592	30.5758	26.04485
4/5/2022	11:00:00 AM	38.04751	22.93108	53.18282	41.77548	34.35992	28.49793
4/5/2022	12:00:00 PM	41.4424	22.98527	58.52016	45.00055	36.42455	29.40373
4/5/2022	1:00:00 PM	35.39301	14.24323	54.02165	38.99345	30.76047	22.89412
4/5/2022	2:00:00 PM	36.07833	16.80715	54.60116	39.67993	30.95258	23.8923
4/5/2022	3:00:00 PM	38.095	19.25254	54.85748	41.77459	34.28896	27.35918
4/5/2022	4:00:00 PM	43.23316	22.60672	65.88791	45.67418	37.76763	30.62988
4/5/2022	5:00:00 PM	40.51703	23.69112	63.46828	43.67702	36.62515	30.40195
4/5/2022	6:00:00 PM	37.33851	20.73254	63.35932	40.3933	33.15294	26.76037
4/5/2022	7:00:00 PM	35.85821	18.37303	50.13584	39.84788	31.8525	23.6682
4/5/2022	8:00:00 PM	40.77049	9.562853	68.72182	32.11213	24.57334	17.50962
4/5/2022	9:00:00 PM	25.93197	5.880543	51.8362	21.44022	16.53512	11.91084
4/5/2022	10:00:00 PM	14.59822	0	29.24043	18.08442	12.19961	7.415023
4/5/2022	11:00:00 PM	20.37034	4.082429	39.69934	21.70946	15.65879	10.36627
4/6/2022	12:00:00 AM	13.50808	0	27.86171	17.23253	11.14689	6.040846
4/6/2022	1:00:00 AM	10.71732	0	26.2629	13.42604	8.577172	4.670586
4/6/2022	2:00:00 AM	11.95585	0.428478	28.06071	14.55096	9.750101	6.209157
4/6/2022	3:00:00 AM	14.51442	3.884141	25.98989	17.58749	13.26201	9.680561

4/6/2022	4:00:00 AM	12.1182	1.690431	23.25879	14.73327	10.98196	7.641587
4/6/2022	5:00:00 AM	19.30157	0	40.67683	17.21393	8.823731	4.588314
4/6/2022	6:00:00 AM	20.96849	0	44.26984	18.59369	9.872607	5.392128
4/6/2022	7:00:00 AM	38.80084	6.31171	67.21171	24.84562	16.53015	11.03637
4/6/2022	8:00:00 AM	15.09441	6.832912	39.22869	15.93742	12.20455	9.783539
4/6/2022	9:00:00 AM	34.91348	7.939038	63.49716	22.95751	15.17778	10.5771
4/6/2022	10:00:00 AM	26.01819	8.313913	58.95161	22.97932	15.78597	11.38864
4/6/2022	11:00:00 AM	38.672	8.844928	65.53677	27.46959	18.12438	12.80566
4/6/2022	12:00:00 PM	33.85873	8.438128	64.03604	26.12277	17.95874	13.05898
4/6/2022	1:00:00 PM	29.24188	12.68467	61.09035	21.91129	17.83074	15.19977
4/6/2022	2:00:00 PM	24.00921	9.338742	47.03291	24.37333	17.61938	13.60014
4/6/2022	3:00:00 PM	18.08809	2.866181	40.53661	20.35236	14.15246	9.71739
4/6/2022	4:00:00 PM	46.79434	0	69.60601	29.38687	12.90716	6.513823
4/6/2022	5:00:00 PM	51.41222	11.78695	72.74289	46.10853	21.25305	15.79742
4/6/2022	6:00:00 PM	45.18968	9.3936	68.20943	35.90278	17.34307	12.67972
4/6/2022	7:00:00 PM	38.90511	8.79221	68.50278	19.60238	13.68084	11.7745
4/6/2022	8:00:00 PM	36.07525	12.24299	66.32739	20.90923	15.49468	14.27894
4/6/2022	9:00:00 PM	26.97757	13.83954	55.08213	26.57524	17.80758	15.3634
4/6/2022	10:00:00 PM	28.70462	14.3552	59.59665	27.1421	17.89625	15.84613
4/6/2022	11:00:00 PM	19.9021	14.10952	39.14224	18.70898	16.87481	15.53759
4/7/2022	12:00:00 AM	24.91216	13.81213	55.59301	22.47884	16.68027	14.94999
4/7/2022	1:00:00 AM	17.86767	14.10151	27.48447	20.40397	16.79771	15.19952
4/7/2022	2:00:00 AM	16.70024	13.60707	21.68871	17.91094	15.97121	14.85226
4/7/2022	3:00:00 AM	32.88946	9.625255	67.27021	17.36692	12.47339	10.98634
4/7/2022	4:00:00 AM	19.3519	9.191233	44.69248	14.19598	11.43827	10.43685
4/7/2022	5:00:00 AM	18.84831	8.847561	42.49285	15.16486	11.02055	10.08298
4/7/2022	6:00:00 AM	36.57443	8.979946	65.10238	25.71512	13.30099	10.5776
4/7/2022	7:00:00 AM	42.24523	0	72.01168	23.56693	10.35038	0
4/7/2022	8:00:00 AM	26.26707	0	51.34865	19.30664	11.04126	3.11243
4/7/2022	9:00:00 AM	23.36993	0	49.69029	20.00786	12.54101	6.322344
4/7/2022	10:00:00 AM	40.1619	0	61.59318	39.12046	16.50181	9.183867
4/7/2022	11:00:00 AM	40.0515	9.036141	63.57049	25.85252	17.56839	13.73316
4/7/2022	12:00:00 PM	37.62011	12.98843	62.97812	26.07191	20.75725	16.58257
4/7/2022	1:00:00 PM	22.51095	15.23463	44.7298	23.97802	20.31561	18.34152
4/7/2022	2:00:00 PM	22.96305	14.04952	49.43283	22.91668	18.98668	17.01573
4/7/2022	3:00:00 PM	21.89815	13.4927	44.66322	23.06467	19.2842	16.97951
4/7/2022	4:00:00 PM	28.22967	13.0274	53.41541	26.85643	21.30195	17.58292
4/7/2022	5:00:00 PM	52.76069	8.811415	72.70366	48.11647	23.22897	17.82807
4/7/2022	6:00:00 PM	40.66008	0	74.15864	20.81577	13.57685	10.06562
4/7/2022	7:00:00 PM	29.97727	5.092171	61.3668	18.18828	12.4126	8.763271
4/7/2022	8:00:00 PM	19.67227	11.28499	40.12781	18.71242	14.82976	13.26593
4/7/2022	9:00:00 PM	22.15793	14.07475	45.46066	19.50375	17.23615	15.60787
4/7/2022	10:00:00 PM	35.13703	14.38466	65.34106	20.91012	17.99989	15.93343

4/7/2022	11:00:00 PM	27.49762	15.20761	57.11333	22.37791	19.23836	16.99302
4/8/2022	12:00:00 AM	31.4371	3.344389	61.90283	26.10587	16.61087	5.888867
4/8/2022	1:00:00 AM	32.02055	2.704759	59.8272	18.6222	12.14986	6.772028
4/8/2022	2:00:00 AM	6.361386	0	22.54401	8.347785	5.186067	2.837025
4/8/2022	3:00:00 AM	6.922467	0	27.13392	9.120206	5.328154	2.832811
4/8/2022	4:00:00 AM	11.56804	0	29.11205	15.01316	8.123419	4.085036
4/8/2022	5:00:00 AM	17.72767	0	44.65721	17.76994	8.907678	5.196017
4/8/2022	6:00:00 AM	25.86602	0	57.48046	21.54745	10.07899	4.153377
4/8/2022	7:00:00 AM	27.79239	0	60.81868	21.89841	12.30077	6.801565
4/8/2022	8:00:00 AM	32.88274	2.428135	58.9066	25.07161	15.60037	10.16465
4/8/2022	9:00:00 AM	39.96202	9.257865	68.20634	33.24556	25.79908	18.83823
4/8/2022	10:00:00 AM	35.72117	18.56623	63.67853	36.80167	29.28085	23.4732
4/8/2022	11:00:00 AM	29.57212	17.49422	50.54754	31.29969	23.79392	20.13547
4/8/2022	12:00:00 PM	27.64769	17.23335	46.04217	30.1676	22.93136	19.86638
4/8/2022	1:00:00 PM	33.00332	16.99061	50.65804	36.3248	27.27701	21.85648
4/8/2022	2:00:00 PM	35.57354	18.07632	61.95987	37.74303	28.99395	22.49464
4/8/2022	3:00:00 PM	49.37945	15.20073	75.75008	43.1848	29.93206	21.70719
4/8/2022	4:00:00 PM	52.24022	0	74.88863	51.10478	35.43575	25.26241
4/8/2022	5:00:00 PM	52.22277	17.60152	73.58863	53.74447	34.4202	24.96088
4/8/2022	6:00:00 PM	54.46335	13.25899	75.62027	55.72752	38.64525	27.54925
4/8/2022	7:00:00 PM	56.43021	5.190481	73.48741	60.39042	47.77961	33.14661
4/8/2022	8:00:00 PM	48.44082	18.55323	67.62257	51.68973	30.48785	23.07542
4/8/2022	9:00:00 PM	46.02583	19.28727	66.37135	48.42117	32.89705	26.21166
4/8/2022	10:00:00 PM	46.96317	15.12045	68.3999	48.77388	29.39711	20.42298
4/8/2022	11:00:00 PM	43.85323	14.92075	66.90685	37.88893	24.46376	18.60857
4/9/2022	12:00:00 AM	50.16577	20.42599	70.33977	52.41584	36.61153	26.64139
4/9/2022	1:00:00 AM	55.04197	#NUM!	76.99459	57.08533	37.90461	30.43973
4/9/2022	2:00:00 AM	59.80213	#NUM!	74.52315	63.77704	50.75408	35.08874
4/9/2022	3:00:00 AM	54.04089	24.47536	71.59564	57.85523	46.65991	34.29721
4/9/2022	4:00:00 AM	53.09759	25.29268	71.35525	56.04319	43.74261	33.11232
4/9/2022	5:00:00 AM	50.31248	24.6683	72.0661	52.20954	40.03626	31.40961
4/9/2022	6:00:00 AM	39.50461	24.5083	58.01424	42.20199	35.63279	29.46219
4/9/2022	7:00:00 AM	50.63697	24.37823	70.95488	50.79621	37.54857	31.44119
4/9/2022	8:00:00 AM	46.71316	23.89032	70.63658	48.95384	37.00456	31.89536
4/9/2022	9:00:00 AM	49.70222	20.9302	69.48076	50.99995	34.78358	25.80838
4/9/2022	10:00:00 AM	45.3475	22.2611	67.87568	46.75247	32.6184	27.52094
4/9/2022	11:00:00 AM	36.69161	23.08611	55.61528	40.62094	31.75815	27.67347
4/9/2022	12:00:00 PM	33.27651	22.22445	50.1419	35.92087	30.49182	26.81186
4/9/2022	1:00:00 PM	43.66718	23.28229	67.1063	39.547	32.34488	27.93089
4/9/2022	2:00:00 PM	42.73801	21.77826	65.99987	43.88112	35.05968	28.28944
4/9/2022	3:00:00 PM	42.42432	20.2627	66.93845	42.45282	34.02058	26.61032
4/9/2022	4:00:00 PM	45.77387	18.93436	65.99966	45.01133	33.3361	26.29969
4/9/2022	5:00:00 PM	57.61259	28.58472	72.85741	61.93116	52.46215	36.4159

4/9/2022	6:00:00 PM	50.88533	32.84295	67.17631	53.88568	46.51687	40.76341
4/9/2022	7:00:00 PM	50.80657	30.13399	67.31424	53.81793	45.14626	38.13576
4/9/2022	8:00:00 PM	46.37005	27.33877	64.34976	49.25966	41.31265	34.73357
4/9/2022	9:00:00 PM	46.63775	26.25515	61.23676	50.78881	41.65793	33.72862
4/9/2022	10:00:00 PM	42.62687	24.73881	59.2524	46.35786	37.40438	30.74217
4/9/2022	11:00:00 PM	42.33182	23.788	59.82023	46.2976	37.8243	30.19033
4/10/2022	12:00:00 AM	43.31073	24.01895	61.79406	45.67615	38.08715	30.98243
4/10/2022	1:00:00 AM	42.41972	22.99775	62.71242	44.83086	35.62793	28.19783
4/10/2022	2:00:00 AM	43.15924	24.22422	63.03758	45.31419	37.59712	30.69516
4/10/2022	3:00:00 AM	43.60255	23.08333	62.79727	46.44678	37.11776	28.38416
4/10/2022	4:00:00 AM	41.66959	21.72694	61.67223	44.0098	33.29122	25.16666
4/10/2022	5:00:00 AM	36.65263	22.05095	58.04688	39.79228	31.89327	25.39536
4/10/2022	6:00:00 AM	36.37253	21.80127	56.73283	38.96715	30.21582	24.29978
4/10/2022	7:00:00 AM	34.33976	21.54166	51.52897	37.84016	30.3624	24.74482
4/10/2022	8:00:00 AM	39.37351	21.09664	60.85979	41.27931	32.13918	24.6161
4/10/2022	9:00:00 AM	36.92234	21.6826	56.24714	39.69074	30.35984	24.64574
4/10/2022	10:00:00 AM	32.86971	21.5427	51.80992	35.98503	26.80937	23.73863
4/10/2022	11:00:00 AM	30.96141	20.65507	50.03536	34.05637	24.47772	22.42268
4/10/2022	12:00:00 PM	34.96252	20.68047	57.74623	35.87664	25.67193	22.94646
4/10/2022	1:00:00 PM	31.78483	21.17533	51.34471	34.54361	26.5375	23.2926
4/10/2022	2:00:00 PM	34.12512	21.17261	57.23812	35.72757	26.09986	22.78708
4/10/2022	3:00:00 PM	34.86722	20.6261	53.60707	36.47571	26.38584	22.73104
4/10/2022	4:00:00 PM	33.02553	20.11738	53.16291	36.61348	27.28705	22.61228
4/10/2022	5:00:00 PM	41.82067	#NUM!	72.32792	42.45066	29.08255	11.46346
4/10/2022	6:00:00 PM	35.99607	4.661668	62.76842	26.92764	18.50326	11.9376
4/10/2022	7:00:00 PM	41.17701	7.577296	67.61028	28.38664	18.88704	12.44554
4/10/2022	8:00:00 PM	22.26805	8.774971	41.20376	25.09687	18.86044	13.57817
4/10/2022	9:00:00 PM	28.86553	11.2967	61.07246	23.0067	19.29607	15.60065
4/10/2022	10:00:00 PM	26.58309	8.33697	53.99602	27.31032	21.5058	14.35908
4/10/2022	11:00:00 PM	24.33215	4.594343	57.74366	18.07778	11.92765	8.014991
4/11/2022	12:00:00 AM	21.58513	5.341371	46.71616	18.96061	12.00126	9.005508
4/11/2022	1:00:00 AM	48.82817	6.880584	75.85321	36.28031	17.45552	11.2478
4/11/2022	2:00:00 AM	37.34035	11.1816	62.19418	36.7573	25.788	18.11042
4/11/2022	3:00:00 AM	39.94334	21.41537	64.32381	39.567	31.53777	26.85697
4/11/2022	4:00:00 AM	43.19504	20.4949	66.34117	44.24109	29.12186	24.97708
4/11/2022	5:00:00 AM	40.6268	20.15253	67.55336	39.82522	30.70009	24.94408
4/11/2022	6:00:00 AM	40.28018	20.97342	63.07797	43.40584	33.85	27.03992
4/11/2022	7:00:00 AM	42.41949	19.02719	59.13346	46.32926	34.16402	24.3765
4/11/2022	8:00:00 AM	32.27285	5.642484	65.99635	35.74152	25.24116	15.70816
4/11/2022	9:00:00 AM	31.59086	3.131458	52.41727	34.66203	24.02185	14.00245
4/11/2022	10:00:00 AM	27.89667	0	49.85753	30.476	18.93702	8.669249
4/11/2022	11:00:00 AM	39.24204	0	60.12307	38.03443	23.19227	9.353659
4/11/2022	12:00:00 PM	30.76581	4.883507	51.08949	33.48739	22.59448	14.68407

4/11/2022	1:00:00 PM	26.99737	0	45.4154	30.25836	18.90776	8.863466
4/11/2022	2:00:00 PM	35.47442	0	60.12777	29.28487	15.68059	3.140353
4/11/2022	3:00:00 PM	11.08059	0	34.98408	12.54895	3.124459	0
4/11/2022	4:00:00 PM	23.61545	0	50.47863	14.88885	0	0
4/11/2022	5:00:00 PM	25.68314	0	51.69653	18.12888	11.22816	4.412066
4/11/2022	6:00:00 PM	20.8846	0	43.0518	19.03789	11.40043	3.771312
4/11/2022	7:00:00 PM	23.16685	0	46.94987	21.27498	13.65244	7.640805
4/11/2022	8:00:00 PM	17.55514	1.608946	32.23566	20.48647	14.19682	9.308476
4/11/2022	9:00:00 PM	27.11921	0.295964	48.74501	27.46294	18.55646	10.89781
4/11/2022	10:00:00 PM	25.00847	2.523012	44.03047	27.90894	18.31199	10.81359
4/11/2022	11:00:00 PM	26.97379	0	47.25017	29.24052	17.62595	9.296125
4/12/2022	12:00:00 AM	19.554	0	38.9024	21.98427	12.1304	6.839298
4/12/2022	1:00:00 AM	20.96558	0	40.49345	24.31286	12.35909	4.713091
4/12/2022	2:00:00 AM	29.12026	0	55.40376	26.20557	13.35855	7.35511
4/12/2022	3:00:00 AM	21.42339	0	40.69702	24.52688	16.50253	9.172362
4/12/2022	4:00:00 AM	23.28679	4.521819	40.4311	26.88009	18.28597	11.57281
4/12/2022	5:00:00 AM	31.45675	0	56.20658	27.93006	17.52479	8.705858
4/12/2022	6:00:00 AM	35.03441	0	56.80804	36.9127	23.17647	12.19646
4/12/2022	7:00:00 AM	35.41272	5.740592	58.97175	37.58043	27.51636	17.88645
4/12/2022	8:00:00 AM	33.35183	6.87065	53.42058	36.32176	25.87265	15.78289
4/12/2022	9:00:00 AM	34.38335	10.69492	51.76015	38.30409	27.29645	18.57455
4/12/2022	10:00:00 AM	31.54155	12.41355	48.73458	35.0313	25.88633	19.47257
4/12/2022	11:00:00 AM	43.41714	12.78224	65.85371	42.97655	28.59304	20.25411
4/12/2022	12:00:00 PM	43.18058	13.36971	67.96647	39.29827	27.7871	20.00697
4/12/2022	1:00:00 PM	32.95674	6.556682	53.96626	34.85105	23.75963	14.61327
4/12/2022	2:00:00 PM	33.81687	0	57.12191	33.57239	22.16314	13.23117
4/12/2022	3:00:00 PM	20.34557	0	39.62726	22.72677	13.77461	7.653189
4/12/2022	4:00:00 PM	14.20673	0	29.09419	18.67318	9.359105	4.031798
4/12/2022	5:00:00 PM	29.7331	6.760475	55.81453	28.15335	18.44561	13.22521
4/12/2022	6:00:00 PM	26.01712	4.487976	46.4898	28.72148	18.40276	11.03053
4/12/2022	7:00:00 PM	24.9745	11.62017	42.13842	27.75272	21.85509	17.31759
4/12/2022	8:00:00 PM	27.39296	15.26868	46.58411	29.85758	23.39742	19.51208
4/12/2022	9:00:00 PM	24.32427	14.69836	40.44869	26.84239	22.63217	19.47729
4/12/2022	10:00:00 PM	34.75389	14.40143	56.6837	36.94602	26.46157	20.42323
4/12/2022	11:00:00 PM	33.82784	15.88062	52.34184	36.79794	26.97229	21.20436
4/13/2022	12:00:00 AM	31.89227	13.83548	53.59464	34.67302	25.5144	19.68304
4/13/2022	1:00:00 AM	27.36888	11.43526	46.1397	29.75266	20.74127	16.65027
4/13/2022	2:00:00 AM	23.9714	11.11972	40.93392	26.96855	21.57503	16.67376
4/13/2022	3:00:00 AM	25.86045	12.58977	45.20387	28.53463	21.82791	17.21893
4/13/2022	4:00:00 AM	30.77545	15.24157	54.19892	30.43481	23.75374	20.20653
4/13/2022	5:00:00 AM	38.01539	13.09749	61.39348	36.57646	23.74312	18.21424
4/13/2022	6:00:00 AM	47.426	15.48308	67.26569	50.72453	35.60887	22.51324
4/13/2022	7:00:00 AM	35.45883	12.50325	56.44582	37.36915	27.30947	19.70044

4/13/2022	8:00:00 AM	43.76776	8.194745	63.58965	47.17287	24.54965	15.14725
4/13/2022	9:00:00 AM	31.86542	9.862758	51.30058	35.38699	26.73622	18.66134
4/13/2022	10:00:00 AM	33.40279	13.94495	54.97491	36.50012	26.93342	20.42897
4/13/2022	11:00:00 AM	37.08063	12.26287	54.89294	40.60451	31.80611	23.50692
4/13/2022	12:00:00 PM	31.33734	9.215157	50.19824	34.73872	25.24942	16.77848
4/13/2022	1:00:00 PM	25.6569	5.725428	56.45725	27.48943	20.09482	12.78095
4/13/2022	2:00:00 PM	21.34962	2.104425	41.06171	24.25487	17.60619	9.660518
4/13/2022	3:00:00 PM	48.50152	4.292376	67.53091	50.58813	24.63804	11.54203
4/13/2022	4:00:00 PM	44.42816	9.058187	67.65111	46.56117	26.62999	15.53208
4/13/2022	5:00:00 PM	16.96986	0	31.98298	20.15152	14.2469	8.663754
4/13/2022	6:00:00 PM	26.2508	2.442198	48.87178	27.40669	20.556	12.10418
4/13/2022	7:00:00 PM	21.19861	4.89111	38.11845	24.43714	18.40329	12.27512
4/13/2022	8:00:00 PM	19.73911	0	36.50244	22.85529	14.95242	8.822785
4/13/2022	9:00:00 PM	21.41983	5.563335	37.29088	24.27775	18.9275	13.81828
4/13/2022	10:00:00 PM	22.56349	9.810772	41.13293	25.06536	19.3159	14.93357
4/13/2022	11:00:00 PM	29.1942	11.03759	53.6238	28.70613	22.16473	17.76134
4/14/2022	12:00:00 AM	19.93445	8.383971	36.97591	22.60833	18.17516	13.83835
4/14/2022	1:00:00 AM	20.55415	7.284158	36.57206	23.69337	17.14297	12.61307
4/14/2022	2:00:00 AM	23.84304	3.26445	49.45772	25.69274	19.74907	12.52803
4/14/2022	3:00:00 AM	24.7488	3.86536	47.65505	26.8085	20.91082	14.42679
4/14/2022	4:00:00 AM	31.5663	10.03821	58.94495	27.81192	19.0056	14.31436
4/14/2022	5:00:00 AM	44.85622	5.877935	66.38825	47.09884	18.74454	11.64174
4/14/2022	6:00:00 AM	39.72742	5.241276	61.92682	39.42937	23.14148	11.70714
4/14/2022	7:00:00 AM	44.11497	10.28593	68.38073	46.30924	32.7101	18.52708
4/14/2022	8:00:00 AM	24.15634	4.618272	47.01497	26.32398	18.28567	11.53212
4/14/2022	9:00:00 AM	47.25275	8.656426	68.52407	47.36615	22.82236	15.24469
4/14/2022	10:00:00 AM	29.0228	4.354003	49.63224	29.11373	18.65328	11.65416
4/14/2022	11:00:00 AM	26.22269	5.699136	44.157	29.72484	20.00915	12.61777
4/14/2022	12:00:00 PM	34.08597	3.685189	58.67163	32.23159	19.04813	10.51756
4/14/2022	1:00:00 PM	43.67741	0	66.16191	41.5363	18.53581	4.727288
4/14/2022	2:00:00 PM	27.7199	0	54.32344	25.82514	11.77528	0
4/14/2022	3:00:00 PM	18.10638	0	42.88557	15.16799	0	0
4/14/2022	4:00:00 PM	28.26532	0	54.08394	20.31549	9.673148	0
4/14/2022	5:00:00 PM	18.52455	0	40.22687	17.16004	6.364683	0
4/14/2022	6:00:00 PM	21.12484	0	42.56649	15.03197	8.301681	2.153028
4/14/2022	7:00:00 PM	9.903863	0	26.59877	13.48785	5.982502	0
4/14/2022	8:00:00 PM	18.73071	0	41.30728	13.50354	3.512104	0
4/14/2022	9:00:00 PM	12.59163	0	29.4029	16.72322	8.135543	0
4/14/2022	10:00:00 PM	20.29085	0	43.87788	21.33945	14.65911	8.400324
4/14/2022	11:00:00 PM	21.69274	0	44.84178	21.14448	14.6626	9.31588
4/15/2022	12:00:00 AM	13.32305	0	30.89173	17.12528	8.042685	1.428544
4/15/2022	1:00:00 AM	15.68302	0	36.69579	19.06111	9.106585	0
4/15/2022	2:00:00 AM	20.15228	0	43.18086	21.15372	11.10402	5.295449

4/15/2022	3:00:00 AM	25.79039	9.538374	51.01176	25.60502	19.57252	14.43823
4/15/2022	4:00:00 AM	31.32674	14.54622	56.92748	30.26554	24.01692	19.80349
4/15/2022	5:00:00 AM	37.38639	0	61.06733	36.43467	25.49165	18.2423
4/15/2022	6:00:00 AM	47.02139	12.48828	68.27361	46.59885	34.84373	21.18218
4/15/2022	7:00:00 AM	53.69986	0	70.89235	57.59156	29.63022	20.00773
4/15/2022	8:00:00 AM	41.12786	0	67.64508	43.95776	33.91637	23.86386
4/15/2022	9:00:00 AM	37.10072	13.6371	57.95512	39.82759	28.1282	19.6841
4/15/2022	10:00:00 AM	41.80927	20.00049	61.01406	45.62038	35.78934	26.3886
4/15/2022	11:00:00 AM	42.33218	19.55122	58.64212	46.09039	37.10838	28.14126
4/15/2022	12:00:00 PM	40.32168	15.58191	66.08095	42.97251	32.91543	24.37447
4/15/2022	1:00:00 PM	35.98184	16.82234	53.0473	39.64881	29.94232	22.00368
4/15/2022	2:00:00 PM	32.24301	12.27031	50.25609	35.86812	26.67291	18.49484
4/15/2022	3:00:00 PM	34.03854	11.81813	50.95541	37.59102	27.39191	18.63371
4/15/2022	4:00:00 PM	30.68177	12.27681	52.47546	33.82879	24.32376	17.7722
4/15/2022	5:00:00 PM	24.69208	5.645159	43.64571	27.84723	18.28953	11.29756
4/15/2022	6:00:00 PM	27.34208	0.762438	49.18521	26.55801	15.38923	9.04731
4/15/2022	7:00:00 PM	24.67388	0	42.14707	28.1157	19.59857	9.544394
4/15/2022	8:00:00 PM	16.02871	0	34.60179	19.91221	10.34689	4.402505
4/15/2022	9:00:00 PM	25.89209	8.139816	50.72419	26.90062	22.18301	15.66046
4/15/2022	10:00:00 PM	20.7265	6.546077	38.01214	23.76122	18.22641	13.2903
4/15/2022	11:00:00 PM	15.34151	1.740267	30.87803	18.77906	12.45823	8.232751
4/16/2022	12:00:00 AM	14.48743	0	32.24984	17.64715	11.48611	7.326623
4/16/2022	1:00:00 AM	26.06696	0	51.87154	23.51744	14.33883	6.738433
4/16/2022	2:00:00 AM	27.67276	0	55.08994	24.08203	13.04889	6.331811
4/16/2022	3:00:00 AM	23.15143	0	43.11455	24.67053	15.11914	8.231785
4/16/2022	4:00:00 AM	21.35816	4.354272	46.32028	22.51762	16.54809	11.1785
4/16/2022	5:00:00 AM	25.73938	8.340153	46.80573	27.67323	18.94329	13.73252
4/16/2022	6:00:00 AM	28.42095	7.509344	51.49121	31.27841	22.06289	14.54981
4/16/2022	7:00:00 AM	30.74897	13.20375	48.32419	33.922	25.58915	18.87976
4/16/2022	8:00:00 AM	28.70489	14.85665	47.29861	31.86362	24.0106	19.01559
4/16/2022	9:00:00 AM	28.6816	13.52005	50.15551	31.66541	22.95891	18.05891
4/16/2022	10:00:00 AM	27.72844	12.08786	47.42559	30.19011	21.30068	16.59342
4/16/2022	11:00:00 AM	23.86157	8.801418	48.0611	26.88063	18.88787	13.51698
4/16/2022	12:00:00 PM	21.9185	0	43.85773	24.08374	13.55252	6.742782
4/16/2022	1:00:00 PM	13.07091	0	36.60138	14.35272	4.427262	0
4/16/2022	2:00:00 PM	11.53781	0	33.47627	14.30307	5.125108	0
4/16/2022	3:00:00 PM	12.45309	0	32.34932	15.39354	8.461212	1.833452
4/16/2022	4:00:00 PM	15.24691	0	38.55961	15.58998	6.876494	0
4/16/2022	5:00:00 PM	38.23478	0	67.03428	28.25115	15.32452	6.348645
4/16/2022	6:00:00 PM	48.1986	5.094927	71.6071	28.39627	19.19793	11.22194
4/16/2022	7:00:00 PM	53.12656	0	73.01304	53.6339	36.41533	19.08878
4/16/2022	8:00:00 PM	46.97856	0	71.07591	44.53866	24.62463	15.0466
4/16/2022	9:00:00 PM	33.48207	0	54.86052	33.6385	22.7995	0

4/16/2022	10:00:00 PM	31.71313	17.78652	51.17096	33.80341	30.11707	25.31809
4/16/2022	11:00:00 PM	31.85817	15.54765	43.93767	35.06467	30.12975	25.38967
4/17/2022	12:00:00 AM	31.65015	13.87717	46.57952	34.6904	29.48123	22.82374
4/17/2022	1:00:00 AM	29.91245	13.71281	45.73178	32.60937	28.06538	23.2681
4/17/2022	2:00:00 AM	26.24395	9.172876	39.16127	29.43629	24.8324	18.62642
4/17/2022	3:00:00 AM	31.14262	0	47.7362	34.51123	28.03212	19.63902
4/17/2022	4:00:00 AM	30.4939	0	47.27641	33.51998	28.19776	23.41172
4/17/2022	5:00:00 AM	27.55566	0	46.74321	30.81454	20.52259	2.543464
4/17/2022	6:00:00 AM	24.06605	0	41.38178	27.77043	17.88664	0
4/17/2022	7:00:00 AM	18.33021	0	40.79892	18.95441	0	0
4/17/2022	8:00:00 AM	0	0	24.72671	0	0	0
4/17/2022	9:00:00 AM	9.298253	0	37.23327	6.076655	0	0
4/17/2022	10:00:00 AM	11.31156	0	36.86261	14.74812	0	0
4/17/2022	11:00:00 AM	0	0	25.5494	0.483942	0	0
4/17/2022	12:00:00 PM	0	0	23.76903	0	0	0
4/17/2022	1:00:00 PM	19.99207	0	43.81457	14.35369	0	0
4/17/2022	2:00:00 PM	12.45953	0	43.80596	14.91665	0	0
4/17/2022	3:00:00 PM	10.97117	0	29.71458	15.33733	0	0
4/17/2022	4:00:00 PM	21.96642	0	35.56377	25.11725	20.30033	8.134592
4/17/2022	5:00:00 PM	18.55461	0	31.67644	22.59679	13.98663	0
4/17/2022	6:00:00 PM	9.896817	0	25.74059	14.97828	3.438923	0
4/17/2022	7:00:00 PM	0.100255	0	29.05783	7.424845	0	0
4/17/2022	8:00:00 PM	17.9746	0	38.54908	20.93641	3.218427	0
4/17/2022	9:00:00 PM	27.073	0	49.48264	30.97197	15.16299	0
4/17/2022	10:00:00 PM	23.27473	0	41.08826	26.8114	20.90731	0
4/17/2022	11:00:00 PM	28.12965	18.0509	37.6383	30.97053	27.02759	23.32468
4/18/2022	12:00:00 AM	26.27659	15.76571	36.97004	28.62364	25.53631	22.09245
4/18/2022	1:00:00 AM	27.1417	11.38432	34.66849	29.19332	26.68795	23.99955
4/18/2022	2:00:00 AM	29.80651	0	47.6302	32.31702	28.85369	6.655257

WM18: Overall Hourly Intervals – C-Weighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/4/2022	12:34:51 PM	71.43494	44.04917	83.65924	75.52748	67.88899	57.97252
4/4/2022	1:00:00 PM	64.49074	31.98078	81.72722	68.34764	48.48562	37.54931
4/4/2022	2:00:00 PM	70.14422	32.46656	84.27703	74.99208	60.8847	40.83794
4/4/2022	3:00:00 PM	69.22811	34.43132	83.02671	73.64085	62.90523	48.30325
4/4/2022	4:00:00 PM	68.82	37.11787	84.53987	72.98334	63.02897	50.57632
4/4/2022	5:00:00 PM	62.01774	34.11754	81.83124	64.19579	44.75629	38.74989
4/4/2022	6:00:00 PM	70.35979	37.07544	84.08623	74.81438	65.15146	49.88317
4/4/2022	7:00:00 PM	70.19357	38.76938	84.62909	74.5948	64.91389	50.8412
4/4/2022	8:00:00 PM	71.75797	39.38469	85.19939	76.33803	66.58387	50.35796
4/4/2022	9:00:00 PM	68.29147	36.21701	86.62556	71.71366	58.99741	48.24357
4/4/2022	10:00:00 PM	72.28123	35.67449	90.17618	76.34371	65.93208	51.02794
4/4/2022	11:00:00 PM	61.59235	36.8426	79.14988	65.4777	53.10051	44.57699
4/5/2022	12:00:00 AM	63.70004	36.82828	79.8974	67.70703	57.46258	46.82765
4/5/2022	1:00:00 AM	64.68541	35.97532	79.3066	68.9268	58.7404	46.71462
4/5/2022	2:00:00 AM	69.6684	39.52011	83.86267	73.90008	65.32955	54.55444
4/5/2022	3:00:00 AM	70.69166	41.55326	83.38792	74.93438	66.91942	56.52949
4/5/2022	4:00:00 AM	72.57375	31.23823	84.54424	76.77019	69.05226	58.22067
4/5/2022	5:00:00 AM	73.12452	48.31491	84.2037	76.89928	70.94058	62.71172
4/5/2022	6:00:00 AM	74.57486	48.3254	84.79532	78.33974	72.48687	64.55715
4/5/2022	7:00:00 AM	68.58113	39.81777	81.75131	72.72978	64.68033	54.84323
4/5/2022	8:00:00 AM	70.63515	43.64383	83.04843	74.5931	67.47882	58.71654
4/5/2022	9:00:00 AM	67.60613	39.84482	83.27761	71.444	63.66226	53.84702
4/5/2022	10:00:00 AM	66.06321	39.09268	81.31956	70.1956	60.89471	50.84356
4/5/2022	11:00:00 AM	69.45457	42.10918	82.61115	73.61045	65.88213	56.23878
4/5/2022	12:00:00 PM	70.81514	42.17199	84.05327	74.90592	67.56209	58.093
4/5/2022	1:00:00 PM	67.25613	35.58927	81.97982	71.43634	62.68097	51.35931
4/5/2022	2:00:00 PM	67.67479	36.62983	83.11802	71.81765	62.90356	52.51043
4/5/2022	3:00:00 PM	69.60753	38.08084	82.56799	73.76096	66.35062	56.54036
4/5/2022	4:00:00 PM	71.96836	44.03817	86.47829	75.83281	69.06916	60.20255
4/5/2022	5:00:00 PM	71.03269	41.09294	82.51241	74.96628	68.43693	59.59507
4/5/2022	6:00:00 PM	68.51528	39.78965	81.1264	72.67884	65.11556	55.66377
4/5/2022	7:00:00 PM	67.95982	38.24148	80.77883	72.28909	63.78637	52.53284
4/5/2022	8:00:00 PM	60.98759	31.36392	78.77282	64.99891	54.66098	42.46159
4/5/2022	9:00:00 PM	48.18474	29.4624	70.9104	50.62318	42.40718	36.27927
4/5/2022	10:00:00 PM	44.18036	26.26645	61.777	47.48119	39.46241	33.6724
4/5/2022	11:00:00 PM	47.051	27.59367	65.69069	50.52245	41.83872	34.91197
4/6/2022	12:00:00 AM	42.38714	26.37444	59.3919	45.77314	38.65849	33.2553
4/6/2022	1:00:00 AM	40.07399	24.23875	57.43266	43.23701	36.4797	31.32797
4/6/2022	2:00:00 AM	40.00487	25.97605	53.41087	43.20082	37.83531	32.96542
4/6/2022	3:00:00 AM	41.56534	30.4501	55.52294	44.44822	40.04886	36.13246

4/6/2022	4:00:00 AM	40.11954	28.86847	51.65157	42.96811	38.76973	34.95516
4/6/2022	5:00:00 AM	39.91672	27.83636	54.05311	42.35827	37.88613	33.98787
4/6/2022	6:00:00 AM	40.19028	27.67262	54.17504	42.94251	37.61324	33.78771
4/6/2022	7:00:00 AM	46.78747	27.55665	76.21068	42.21827	37.23074	33.47051
4/6/2022	8:00:00 AM	40.35765	28.72202	58.28047	42.41495	37.70615	34.14731
4/6/2022	9:00:00 AM	52.70183	29.17422	79.32768	50.57428	41.69287	35.61335
4/6/2022	10:00:00 AM	52.11141	27.55204	77.63865	55.05082	44.30591	34.62759
4/6/2022	11:00:00 AM	51.37155	27.80284	72.82047	54.44122	43.04034	34.41112
4/6/2022	12:00:00 PM	53.39558	28.42136	76.80154	54.33037	42.41912	34.96186
4/6/2022	1:00:00 PM	50.95781	27.88888	79.28098	51.87371	40.79625	34.04369
4/6/2022	2:00:00 PM	51.92239	27.96197	75.37694	55.05026	42.4507	34.53168
4/6/2022	3:00:00 PM	49.29788	26.85917	70.16131	52.79655	41.65123	33.82874
4/6/2022	4:00:00 PM	56.24745	27.04309	78.44186	53.72867	42.10458	33.89825
4/6/2022	5:00:00 PM	59.04496	26.63293	80.26129	55.97341	42.06708	34.11511
4/6/2022	6:00:00 PM	53.57545	23.14667	77.61563	49.48926	34.80874	29.61341
4/6/2022	7:00:00 PM	47.34827	23.72904	75.76855	41.19954	34.43988	29.86691
4/6/2022	8:00:00 PM	44.41065	21.72959	72.45958	41.20202	32.489	27.56631
4/6/2022	9:00:00 PM	37.86471	21.98239	62.36625	39.15983	31.49945	27.58233
4/6/2022	10:00:00 PM	40.15295	21.48697	65.82148	42.0078	34.21599	28.7895
4/6/2022	11:00:00 PM	37.57325	21.16806	53.94394	40.5348	33.26635	27.58486
4/7/2022	12:00:00 AM	36.99024	20.56334	62.9634	37.04304	29.37449	25.38415
4/7/2022	1:00:00 AM	32.54543	22.23112	45.02869	35.29572	30.89615	27.54703
4/7/2022	2:00:00 AM	31.12585	21.33472	42.68994	34.10829	29.6746	26.26924
4/7/2022	3:00:00 AM	37.94913	21.19076	69.91288	35.83756	30.57107	26.85769
4/7/2022	4:00:00 AM	34.49325	24.20539	48.10193	37.06438	33.30211	29.91923
4/7/2022	5:00:00 AM	33.51208	23.84255	48.3949	36.19411	32.11591	28.72058
4/7/2022	6:00:00 AM	43.32831	23.41919	72.98663	38.33852	32.68232	29.00222
4/7/2022	7:00:00 AM	48.93056	23.40562	77.71024	43.96183	35.1005	29.58626
4/7/2022	8:00:00 AM	47.99492	26.51903	69.48687	50.51547	41.03213	33.35733
4/7/2022	9:00:00 AM	49.18412	26.56646	64.94037	53.13468	44.19295	35.14297
4/7/2022	10:00:00 AM	57.12757	26.01076	76.7839	58.75531	43.59293	33.93935
4/7/2022	11:00:00 AM	56.70349	24.25195	78.94734	54.44506	41.79597	30.89381
4/7/2022	12:00:00 PM	51.71683	23.75366	76.24964	52.8966	40.26161	29.91425
4/7/2022	1:00:00 PM	46.8984	22.00305	68.09634	49.71399	33.64659	26.07557
4/7/2022	2:00:00 PM	50.89568	21.80502	76.87645	49.88226	36.17122	27.21397
4/7/2022	3:00:00 PM	47.45303	21.25442	75.44154	49.16287	36.63801	27.0761
4/7/2022	4:00:00 PM	46.8723	21.33517	67.02326	49.91812	39.48157	28.71863
4/7/2022	5:00:00 PM	60.02647	21.05572	81.67549	56.40602	38.9485	30.12362
4/7/2022	6:00:00 PM	46.35038	16.91029	78.18859	40.63748	31.95109	25.14187
4/7/2022	7:00:00 PM	38.96598	14.73951	68.57869	34.86234	27.11563	21.77049
4/7/2022	8:00:00 PM	34.05349	16.76091	54.2383	35.06847	26.20695	21.5298
4/7/2022	9:00:00 PM	36.64728	18.1098	60.99602	33.36211	25.83551	22.01376
4/7/2022	10:00:00 PM	41.18619	18.10819	70.51681	35.10537	26.80959	22.22654

4/7/2022	11:00:00 PM	37.28691	18.59074	65.02102	36.06941	27.13785	22.46648
4/8/2022	12:00:00 AM	38.78872	14.08671	67.08216	37.09411	26.647	20.0615
4/8/2022	1:00:00 AM	42.34355	15.78614	69.2893	43.47166	34.59326	26.14476
4/8/2022	2:00:00 AM	37.72707	16.65559	56.44287	41.38468	32.69278	24.80905
4/8/2022	3:00:00 AM	38.98061	17.18526	57.22951	42.37825	32.87965	24.89761
4/8/2022	4:00:00 AM	43.74954	18.51036	65.62827	46.27376	32.52607	25.31074
4/8/2022	5:00:00 AM	35.3722	20.57264	54.46866	38.56761	31.43264	26.52594
4/8/2022	6:00:00 AM	38.5249	20.65706	65.0652	40.34535	32.95562	27.34855
4/8/2022	7:00:00 AM	39.30812	24.45237	66.50969	41.38482	34.68612	30.28816
4/8/2022	8:00:00 AM	52.26164	24.77183	75.97996	52.01089	40.05637	32.36609
4/8/2022	9:00:00 AM	62.5448	29.86576	78.10498	66.6115	57.75511	47.29228
4/8/2022	10:00:00 AM	66.02043	32.12757	80.83511	70.1236	61.85048	51.27251
4/8/2022	11:00:00 AM	59.27193	24.81341	76.94835	63.10097	49.14275	33.32883
4/8/2022	12:00:00 PM	59.71648	24.41245	77.75563	63.27121	48.34841	31.1112
4/8/2022	1:00:00 PM	65.04436	29.03707	81.1143	69.20017	58.19168	44.53716
4/8/2022	2:00:00 PM	66.14312	29.84189	81.07657	70.43265	59.7485	46.31253
4/8/2022	3:00:00 PM	66.7628	29.36039	83.42957	71.00855	60.0639	45.73407
4/8/2022	4:00:00 PM	69.9608	25.6347	85.17905	74.29523	64.6122	51.12354
4/8/2022	5:00:00 PM	66.18479	29.86822	83.48009	70.13826	58.95385	45.97029
4/8/2022	6:00:00 PM	65.82586	27.88135	83.61021	69.66415	57.31245	43.93934
4/8/2022	7:00:00 PM	63.92473	23.73443	80.4626	67.73142	55.17096	39.55752
4/8/2022	8:00:00 PM	57.53314	24.86716	76.80375	59.91677	40.40795	31.58812
4/8/2022	9:00:00 PM	55.83496	25.21833	75.89809	58.41479	44.05348	33.5318
4/8/2022	10:00:00 PM	61.1822	28.50161	79.82335	64.79982	53.66296	41.42607
4/8/2022	11:00:00 PM	62.68206	29.61058	80.79398	66.07901	54.54945	42.81993
4/9/2022	12:00:00 AM	65.68915	35.73474	80.84253	69.54917	61.49673	51.82615
4/9/2022	1:00:00 AM	65.57482	34.56721	83.02408	69.03973	60.43741	51.90692
4/9/2022	2:00:00 AM	67.52571	29.46198	82.67962	71.3384	62.75694	53.99775
4/9/2022	3:00:00 AM	66.67849	42.244	81.80054	70.52078	62.96514	54.65107
4/9/2022	4:00:00 AM	66.80152	42.95495	81.99696	70.52079	62.83587	54.90918
4/9/2022	5:00:00 AM	61.95363	38.78119	80.26014	65.18901	56.68754	48.63467
4/9/2022	6:00:00 AM	62.65673	37.20219	78.24724	66.88394	56.26259	46.57529
4/9/2022	7:00:00 AM	66.69802	40.74274	81.93856	70.44471	62.86375	54.19471
4/9/2022	8:00:00 AM	61.76888	40.84784	79.6992	65.24991	57.53074	50.0986
4/9/2022	9:00:00 AM	60.14055	38.65683	79.33066	62.55156	53.25235	46.13252
4/9/2022	10:00:00 AM	62.16031	39.11091	78.62015	66.113	56.78343	47.42512
4/9/2022	11:00:00 AM	63.314	40.99825	78.19068	67.21135	59.2571	50.58176
4/9/2022	12:00:00 PM	63.01366	40.35034	77.96316	67.01366	58.02265	48.61918
4/9/2022	1:00:00 PM	65.68195	40.92586	81.29192	69.73445	60.86507	51.09143
4/9/2022	2:00:00 PM	70.21282	39.9497	82.74124	74.43838	66.31458	55.70326
4/9/2022	3:00:00 PM	69.12292	37.09365	82.91424	73.33672	64.98046	54.06106
4/9/2022	4:00:00 PM	68.97562	38.58156	82.46714	73.08554	64.92966	55.1183
4/9/2022	5:00:00 PM	72.3245	46.89427	83.91805	76.21468	69.85297	61.78238

4/9/2022	6:00:00 PM	73.25918	49.08688	83.99655	76.93522	71.37234	63.527
4/9/2022	7:00:00 PM	72.26444	45.03721	84.51928	76.13306	69.82283	61.35723
4/9/2022	8:00:00 PM	70.61951	43.86215	83.27253	74.57039	67.76805	59.43257
4/9/2022	9:00:00 PM	68.10571	40.48084	81.93798	72.3315	64.20184	55.14878
4/9/2022	10:00:00 PM	65.93714	40.15363	79.13681	70.0775	61.90162	52.46284
4/9/2022	11:00:00 PM	65.15964	38.50042	80.5689	69.30559	59.93642	50.28669
4/10/2022	12:00:00 AM	66.4752	38.89375	81.22156	70.51401	62.32237	52.83441
4/10/2022	1:00:00 AM	60.85011	33.39862	76.31285	64.74796	56.25356	47.18569
4/10/2022	2:00:00 AM	63.59188	37.24318	79.09958	67.52599	59.04849	49.98377
4/10/2022	3:00:00 AM	57.77008	35.67211	73.66911	61.48171	53.61975	46.05365
4/10/2022	4:00:00 AM	51.617	31.46625	71.15457	53.71021	45.26966	39.12185
4/10/2022	5:00:00 AM	46.06499	30.10406	63.87003	49.67444	42.50892	36.5497
4/10/2022	6:00:00 AM	45.03466	30.60212	63.33901	48.07525	41.51252	36.435
4/10/2022	7:00:00 AM	45.43459	31.09373	59.69625	48.55366	43.2509	38.43436
4/10/2022	8:00:00 AM	47.92853	31.1774	68.71879	50.38883	42.70047	37.26457
4/10/2022	9:00:00 AM	48.88291	31.67536	67.55352	52.08223	43.68332	37.94521
4/10/2022	10:00:00 AM	48.06675	28.09479	71.8771	50.83934	40.23375	33.21133
4/10/2022	11:00:00 AM	49.37846	27.32507	72.8488	50.1414	38.45521	32.85175
4/10/2022	12:00:00 PM	50.39638	27.60519	71.81351	52.80715	39.97648	33.00991
4/10/2022	1:00:00 PM	53.79956	28.23508	74.47989	56.68967	43.37096	34.67549
4/10/2022	2:00:00 PM	56.25149	28.18885	79.92269	59.14024	45.83145	35.02979
4/10/2022	3:00:00 PM	58.24762	27.37409	77.11298	61.6944	47.49304	34.14579
4/10/2022	4:00:00 PM	55.86666	26.91456	74.42639	59.5542	45.35145	33.55311
4/10/2022	5:00:00 PM	54.82148	17.8544	80.06463	56.58295	43.60315	32.47167
4/10/2022	6:00:00 PM	56.29031	25.89006	75.40664	59.74446	48.56192	36.56896
4/10/2022	7:00:00 PM	57.2007	26.12423	75.92922	60.7106	49.92486	37.71418
4/10/2022	8:00:00 PM	54.11167	27.50045	74.4573	57.08308	44.90103	35.71835
4/10/2022	9:00:00 PM	43.33592	29.1283	65.42206	46.20829	39.96213	35.12769
4/10/2022	10:00:00 PM	44.51308	25.73629	63.09089	47.73878	40.96815	33.5252
4/10/2022	11:00:00 PM	41.97586	21.49379	67.7417	40.00552	31.16342	27.16898
4/11/2022	12:00:00 AM	49.18221	23.49733	73.29745	49.04663	34.73504	29.09173
4/11/2022	1:00:00 AM	58.80051	25.64346	80.85473	60.17785	42.10778	31.42519
4/11/2022	2:00:00 AM	63.50993	29.06663	81.6034	67.37484	54.64075	40.71349
4/11/2022	3:00:00 AM	66.17505	39.03439	82.11036	70.25196	60.00696	48.22403
4/11/2022	4:00:00 AM	61.47751	37.9592	77.87098	65.42075	55.09514	45.57149
4/11/2022	5:00:00 AM	67.15038	37.37092	82.70513	71.41414	60.96206	49.49066
4/11/2022	6:00:00 AM	69.35348	37.72414	83.3853	73.73651	64.06168	51.87196
4/11/2022	7:00:00 AM	71.2328	35.93139	84.47878	75.85928	65.21087	50.19914
4/11/2022	8:00:00 AM	63.07254	29.29421	80.99464	68.26818	57.21176	42.77045
4/11/2022	9:00:00 AM	63.93852	28.42968	81.07284	67.83869	57.23804	43.61735
4/11/2022	10:00:00 AM	59.68095	24.67497	78.84362	63.04104	51.03801	37.10789
4/11/2022	11:00:00 AM	61.42149	26.50234	81.03215	64.36273	52.55341	37.95304
4/11/2022	12:00:00 PM	57.61449	28.43742	77.09486	61.07926	48.38859	37.08252

4/11/2022	1:00:00 PM	59.02438	26.20279	77.11448	62.85376	50.28424	37.86714
4/11/2022	2:00:00 PM	59.47579	22.94807	81.50657	61.14773	48.18372	33.19703
4/11/2022	3:00:00 PM	39.07429	21.08399	61.33647	39.13224	31.09327	27.10973
4/11/2022	4:00:00 PM	38.2668	21.87404	62.80535	36.99532	31.54557	27.80236
4/11/2022	5:00:00 PM	41.25841	23.85632	66.45599	39.45477	33.9882	29.89282
4/11/2022	6:00:00 PM	40.14221	23.18656	62.20395	40.85953	33.97871	29.22645
4/11/2022	7:00:00 PM	46.96845	25.00492	66.85509	49.56164	36.04015	30.71766
4/11/2022	8:00:00 PM	48.36641	26.37046	67.11167	51.21649	38.31404	32.33041
4/11/2022	9:00:00 PM	54.61745	27.16553	71.82484	58.45523	48.22688	37.69421
4/11/2022	10:00:00 PM	58.36155	27.02097	76.94611	61.7473	50.58681	37.71851
4/11/2022	11:00:00 PM	56.23525	27.55	74.64544	59.72566	48.33106	37.43969
4/12/2022	12:00:00 AM	50.95557	25.12925	71.19216	53.31677	37.97581	31.34567
4/12/2022	1:00:00 AM	53.82221	25.262	73.14139	57.48073	45.08354	32.66949
4/12/2022	2:00:00 AM	52.98119	26.62331	74.81299	55.9706	43.49109	33.7953
4/12/2022	3:00:00 AM	52.55578	28.93132	71.53183	56.37355	46.87249	37.12805
4/12/2022	4:00:00 AM	56.27578	30.89285	72.87819	60.16729	50.84251	41.06935
4/12/2022	5:00:00 AM	58.10637	29.54106	79.37163	60.69617	49.96199	39.06135
4/12/2022	6:00:00 AM	61.87377	29.82354	81.4123	65.21685	54.46458	42.5131
4/12/2022	7:00:00 AM	65.16086	30.67725	81.54516	69.28519	59.40076	47.2538
4/12/2022	8:00:00 AM	65.56952	30.21558	82.02743	69.5993	58.72978	44.56859
4/12/2022	9:00:00 AM	66.75534	33.38542	81.25579	71.23666	60.18321	47.18814
4/12/2022	10:00:00 AM	64.34084	32.77245	79.78074	68.53343	57.83912	45.31269
4/12/2022	11:00:00 AM	64.76889	34.07892	82.05611	68.68489	57.7301	45.37634
4/12/2022	12:00:00 PM	64.78849	33.51054	82.8377	68.51945	57.98372	45.64689
4/12/2022	1:00:00 PM	62.23698	29.08859	80.17946	66.08552	53.84268	40.47681
4/12/2022	2:00:00 PM	62.11168	24.81244	80.17804	65.56813	52.71136	38.9144
4/12/2022	3:00:00 PM	52.31722	24.55502	71.58543	55.47118	43.49758	33.02057
4/12/2022	4:00:00 PM	39.6453	23.10383	59.03848	42.19211	33.63423	28.88487
4/12/2022	5:00:00 PM	57.5981	26.78194	79.14342	58.95706	39.46395	33.62929
4/12/2022	6:00:00 PM	57.67206	24.43916	76.82883	60.63706	46.5998	33.16043
4/12/2022	7:00:00 PM	56.62113	29.02516	76.1203	59.61798	48.42577	37.44828
4/12/2022	8:00:00 PM	58.57608	32.08885	76.49453	62.35266	51.32498	40.45355
4/12/2022	9:00:00 PM	53.51101	31.99517	73.45984	56.76682	45.80323	38.3718
4/12/2022	10:00:00 PM	65.08466	32.69275	82.43933	69.05685	55.19415	41.6653
4/12/2022	11:00:00 PM	65.17407	33.80694	80.7506	69.24848	56.51018	43.4718
4/13/2022	12:00:00 AM	63.3937	31.57033	80.10501	67.46389	55.79686	42.83656
4/13/2022	1:00:00 AM	59.99585	29.82686	78.44868	62.98413	48.36056	37.30645
4/13/2022	2:00:00 AM	52.08004	29.7341	71.69387	54.91754	42.86846	36.19746
4/13/2022	3:00:00 AM	56.45688	31.84529	75.65118	59.65552	47.03688	38.16853
4/13/2022	4:00:00 AM	59.3907	33.5829	79.975	62.05153	51.17987	41.78461
4/13/2022	5:00:00 AM	62.60988	31.04561	82.36265	65.54379	54.26332	42.53629
4/13/2022	6:00:00 AM	67.41252	32.91516	84.34063	71.19922	60.62214	48.11022
4/13/2022	7:00:00 AM	65.33036	29.9123	81.87516	69.32478	57.75073	44.51533

4/13/2022	8:00:00 AM	64.18659	27.35617	83.08523	68.06096	53.00752	36.27567
4/13/2022	9:00:00 AM	64.10668	30.56216	79.89675	68.36682	57.57594	44.58392
4/13/2022	10:00:00 AM	65.0906	31.72523	81.6655	69.15068	58.45771	46.2871
4/13/2022	11:00:00 AM	68.08115	31.24268	82.42845	72.41955	63.03763	50.31321
4/13/2022	12:00:00 PM	63.5798	27.40263	80.14884	67.65546	56.16797	41.98515
4/13/2022	1:00:00 PM	56.83524	25.87005	73.57831	60.81348	50.03153	37.14585
4/13/2022	2:00:00 PM	53.49036	23.20448	72.7538	56.95028	45.7917	32.83293
4/13/2022	3:00:00 PM	62.70722	23.99824	82.04473	65.29338	47.982	34.93247
4/13/2022	4:00:00 PM	58.55793	29.40082	79.49496	61.21295	47.35162	36.47317
4/13/2022	5:00:00 PM	39.5298	20.69445	62.44581	41.50022	32.9133	27.80388
4/13/2022	6:00:00 PM	42.69301	20.77384	64.25225	44.83011	33.76415	27.15296
4/13/2022	7:00:00 PM	46.68375	25.42192	68.62915	49.59955	39.20823	32.83484
4/13/2022	8:00:00 PM	38.28689	22.40324	62.05169	40.19156	33.08356	28.26243
4/13/2022	9:00:00 PM	48.64876	26.33942	68.77929	51.62645	41.17156	34.45771
4/13/2022	10:00:00 PM	52.27546	28.87387	73.10304	54.62539	43.21499	35.68802
4/13/2022	11:00:00 PM	53.08279	29.19026	77.67314	56.06667	45.83807	37.85182
4/14/2022	12:00:00 AM	46.07841	26.76966	67.98783	48.53409	38.84125	33.37461
4/14/2022	1:00:00 AM	44.39063	26.50362	65.27927	47.26113	37.41218	32.10119
4/14/2022	2:00:00 AM	44.46785	25.77095	66.00404	47.08144	39.05973	32.90621
4/14/2022	3:00:00 AM	51.13423	26.87715	77.28688	51.9518	40.9253	34.87582
4/14/2022	4:00:00 AM	52.55526	27.94459	77.89645	53.40642	41.67773	34.21995
4/14/2022	5:00:00 AM	61.66596	25.17326	84.07126	63.62214	43.07426	32.52256
4/14/2022	6:00:00 AM	60.0903	25.04139	82.53886	61.92632	48.60791	33.54301
4/14/2022	7:00:00 AM	62.85351	29.24901	81.87992	66.46652	55.16042	42.16188
4/14/2022	8:00:00 AM	55.59242	23.47291	77.45345	58.30892	44.42597	31.07417
4/14/2022	9:00:00 AM	63.0645	27.05615	83.78422	64.86848	49.70462	37.04455
4/14/2022	10:00:00 AM	57.22288	24.53302	76.92549	59.69688	44.30258	31.82104
4/14/2022	11:00:00 AM	58.91094	25.23119	76.67512	62.70055	48.91727	33.24002
4/14/2022	12:00:00 PM	60.45548	23.07499	79.43762	64.06312	48.61191	33.22254
4/14/2022	1:00:00 PM	61.97084	20.56608	84.96076	62.65031	47.1128	30.85153
4/14/2022	2:00:00 PM	48.74326	15.85522	70.70034	51.64058	37.63952	23.5641
4/14/2022	3:00:00 PM	34.25431	14.99917	54.89396	35.35947	26.49418	21.91843
4/14/2022	4:00:00 PM	46.90802	20.3289	68.72884	48.89275	37.54998	28.58367
4/14/2022	5:00:00 PM	45.55209	20.78055	66.56881	47.5875	35.21422	27.26591
4/14/2022	6:00:00 PM	39.82227	21.21161	57.86694	42.19115	33.56408	27.64556
4/14/2022	7:00:00 PM	33.23677	19.79259	46.98923	36.57865	30.66708	25.73132
4/14/2022	8:00:00 PM	34.49002	18.31259	54.18768	35.71807	29.4386	24.44731
4/14/2022	9:00:00 PM	35.34037	19.62077	49.21886	38.89149	32.09888	26.22199
4/14/2022	10:00:00 PM	39.6477	23.16106	55.13056	43.1164	37.04244	31.16904
4/14/2022	11:00:00 PM	38.39809	22.72085	57.15516	40.99231	35.01229	29.74446
4/15/2022	12:00:00 AM	33.13693	19.13785	49.90816	36.35794	29.26705	24.76661
4/15/2022	1:00:00 AM	33.90421	17.59916	52.99899	36.84344	29.33868	24.07971
4/15/2022	2:00:00 AM	35.9725	21.01492	53.21744	39.59839	31.40902	26.73948

4/15/2022	3:00:00 AM	48.59689	27.68494	65.90359	52.18303	41.79575	34.89532
4/15/2022	4:00:00 AM	59.03331	33.40021	75.58001	62.65172	54.22193	45.10365
4/15/2022	5:00:00 AM	64.51893	20.71624	80.81723	68.21827	56.78493	44.26612
4/15/2022	6:00:00 AM	67.49082	29.73916	83.56247	71.76617	59.93866	45.27026
4/15/2022	7:00:00 AM	66.48786	25.61118	81.93192	70.80394	58.41997	42.90057
4/15/2022	8:00:00 AM	69.89338	18.49754	83.43478	74.40932	64.76093	49.76321
4/15/2022	9:00:00 AM	66.74034	30.12322	83.12018	71.03188	57.24798	40.88552
4/15/2022	10:00:00 AM	71.13179	35.07246	84.33765	75.62261	66.76614	52.9927
4/15/2022	11:00:00 AM	71.69047	36.17121	84.53558	75.94236	68.00978	55.70772
4/15/2022	12:00:00 PM	69.42208	33.00603	83.31519	73.8978	64.08561	51.00417
4/15/2022	1:00:00 PM	67.07641	32.97728	81.60496	71.42722	61.02321	48.03438
4/15/2022	2:00:00 PM	64.14779	29.87304	80.00436	68.44354	57.27068	43.98596
4/15/2022	3:00:00 PM	65.54437	29.48197	80.8671	69.75101	58.45033	44.90265
4/15/2022	4:00:00 PM	62.51408	30.26116	78.73139	66.69568	55.27137	43.29657
4/15/2022	5:00:00 PM	57.58978	25.80322	76.53235	60.93958	47.61266	34.44689
4/15/2022	6:00:00 PM	54.16592	24.67672	75.78836	55.95461	43.25575	32.1607
4/15/2022	7:00:00 PM	57.45703	23.90129	74.80643	61.35108	49.51985	35.77422
4/15/2022	8:00:00 PM	48.52038	21.95485	69.34792	51.51547	36.01913	28.2589
4/15/2022	9:00:00 PM	43.97147	27.66959	63.27966	46.66656	41.62998	35.4433
4/15/2022	10:00:00 PM	48.13105	27.33433	71.23896	49.84897	39.13385	33.79361
4/15/2022	11:00:00 PM	44.56104	24.85581	66.11801	46.50093	35.86814	31.06254
4/16/2022	12:00:00 AM	38.37807	23.83203	61.79059	39.82698	33.37765	29.2538
4/16/2022	1:00:00 AM	39.83414	23.51646	63.88445	38.65842	33.10431	29.13697
4/16/2022	2:00:00 AM	37.45057	23.02548	58.19966	38.04948	32.16896	28.26371
4/16/2022	3:00:00 AM	42.59535	23.37963	59.99529	46.01018	36.88888	30.73654
4/16/2022	4:00:00 AM	49.54393	26.20601	67.64235	52.87072	42.2026	33.57477
4/16/2022	5:00:00 AM	54.46351	28.27368	73.22365	57.6299	44.80108	35.43813
4/16/2022	6:00:00 AM	59.47932	26.28369	76.90755	63.52484	50.46303	35.83483
4/16/2022	7:00:00 AM	62.6141	26.52127	78.19853	66.83666	56.08267	41.71775
4/16/2022	8:00:00 AM	61.09159	27.33822	77.46935	65.08522	52.6289	36.10623
4/16/2022	9:00:00 AM	60.56838	25.53552	78.51019	64.15931	51.13255	35.19797
4/16/2022	10:00:00 AM	59.28483	24.08772	77.90156	62.62228	47.84208	31.88287
4/16/2022	11:00:00 AM	54.94133	23.61067	74.12471	58.29838	42.12942	30.11547
4/16/2022	12:00:00 PM	51.26893	20.02717	70.23662	54.73878	39.84656	26.84612
4/16/2022	1:00:00 PM	44.05793	14.5561	69.08238	45.08229	30.03499	21.17284
4/16/2022	2:00:00 PM	44.86914	15.48195	65.11702	47.8155	36.11748	25.00611
4/16/2022	3:00:00 PM	43.60123	21.29869	60.57552	47.31126	39.0979	31.02115
4/16/2022	4:00:00 PM	42.9878	20.30485	60.09829	46.77347	37.738	27.93457
4/16/2022	5:00:00 PM	48.86593	24.63164	72.27745	51.65801	43.66005	35.18796
4/16/2022	6:00:00 PM	55.66484	20.99411	80.42431	45.49336	35.06515	27.90445
4/16/2022	7:00:00 PM	60.09466	19.46532	81.19692	59.30284	44.1319	32.71464
4/16/2022	8:00:00 PM	54.61793	0	82.10583	50.34693	36.21169	26.54619
4/16/2022	9:00:00 PM	38.86285	0	61.92423	38.8399	27.47924	11.32866

4/16/2022	10:00:00 PM	36.07825	20.91665	53.6626	38.64856	34.45539	29.38139
4/16/2022	11:00:00 PM	36.71479	20.78229	50.56987	39.88934	34.53863	29.87989
4/17/2022	12:00:00 AM	36.82261	20.7599	51.25212	39.77806	35.0717	29.90326
4/17/2022	1:00:00 AM	35.48015	19.00533	51.98995	38.54086	32.78976	27.9139
4/17/2022	2:00:00 AM	32.09918	15.14425	50.63878	34.99462	29.90159	24.16743
4/17/2022	3:00:00 AM	36.53176	11.85482	54.10907	39.50606	33.80345	25.45215
4/17/2022	4:00:00 AM	35.1548	11.05003	52.24667	38.1389	32.62769	27.44343
4/17/2022	5:00:00 AM	33.34454	0	54.02293	36.36272	26.06041	14.24164
4/17/2022	6:00:00 AM	29.51662	0	48.05258	32.8437	22.78121	9.978005
4/17/2022	7:00:00 AM	23.82462	0	46.93463	24.93472	9.855873	4.2293
4/17/2022	8:00:00 AM	10.56109	0	32.52451	12.16752	6.872038	2.070086
4/17/2022	9:00:00 AM	17.34797	0	43.80411	15.37277	6.698471	1.758021
4/17/2022	10:00:00 AM	18.16315	0	42.24106	21.05404	7.483182	2.01076
4/17/2022	11:00:00 AM	12.15049	0	30.97497	14.27993	6.44595	1.310807
4/17/2022	12:00:00 PM	9.554209	0	28.45844	11.4852	6.008883	0.736463
4/17/2022	1:00:00 PM	31.27801	0	53.62405	20.04831	7.454153	2.109582
4/17/2022	2:00:00 PM	18.13454	0	45.94142	20.36803	6.944513	1.876927
4/17/2022	3:00:00 PM	18.51863	0	35.88795	21.49542	13.2542	4.843959
4/17/2022	4:00:00 PM	27.03673	0	42.28145	30.29549	24.86598	14.83952
4/17/2022	5:00:00 PM	22.59505	0	37.02874	26.39648	19.16417	9.647767
4/17/2022	6:00:00 PM	16.8229	0	31.90873	20.27956	13.14339	6.447521
4/17/2022	7:00:00 PM	13.08201	0	34.72404	15.3662	9.460902	5.038429
4/17/2022	8:00:00 PM	23.85618	0	44.73887	26.18977	13.3779	6.603965
4/17/2022	9:00:00 PM	32.46497	0	51.97412	36.45782	21.68865	8.92361
4/17/2022	10:00:00 PM	29.14775	0	45.82042	32.78386	25.39455	10.45122
4/17/2022	11:00:00 PM	32.41126	22.03764	44.38112	35.32236	31.13294	27.28863
4/18/2022	12:00:00 AM	32.73191	22.392	45.32105	35.05758	31.87155	28.49951
4/18/2022	1:00:00 AM	34.77299	21.51253	42.57188	36.95276	34.29154	31.28869
4/18/2022	2:00:00 AM	37.16464	0	52.73135	39.97317	36.81287	14.68052

WM18: Overall Hourly Intervals – Unweighted							
Date	Time	Leq	Lmin	Lmax	L10	L50	L90
4/4/2022	12:34:51 PM	82.52112	56.85394	92.58947	86.33409	80.28718	71.71357
4/4/2022	1:00:00 PM	75.18116	35.99215	91.02611	79.62854	61.14281	43.92468
4/4/2022	2:00:00 PM	80.6918	37.77464	93.71918	85.4546	74.18019	52.43235
4/4/2022	3:00:00 PM	80.27233	44.07167	93.18929	84.67425	75.65178	62.47404
4/4/2022	4:00:00 PM	80.04841	44.30631	92.75339	84.3719	75.95585	64.39448
4/4/2022	5:00:00 PM	73.97243	37.55081	92.14458	77.38757	58.0785	45.20981
4/4/2022	6:00:00 PM	81.52167	43.44002	93.05137	85.81806	78.02989	64.16272
4/4/2022	7:00:00 PM	81.3294	45.34507	94.09987	85.66325	77.74647	64.80127
4/4/2022	8:00:00 PM	82.34168	44.66953	93.87791	86.65324	78.81107	63.85692
4/4/2022	9:00:00 PM	77.47806	43.25409	92.79119	81.80038	70.05871	58.19406
4/4/2022	10:00:00 PM	81.15993	43.4977	94.53278	85.46048	77.33174	63.67984
4/4/2022	11:00:00 PM	71.99274	40.40577	89.30312	75.86957	64.58473	52.2899
4/5/2022	12:00:00 AM	75.89403	42.69179	90.39322	79.98534	70.74395	59.48934
4/5/2022	1:00:00 AM	76.92736	41.25287	90.86942	81.17178	72.30785	60.51076
4/5/2022	2:00:00 AM	80.81761	49.70131	92.5751	84.8938	77.82154	68.18762
4/5/2022	3:00:00 AM	81.48866	52.26476	92.9961	85.53184	78.78952	69.61262
4/5/2022	4:00:00 AM	82.72083	50.19538	93.36803	86.61305	80.32226	71.07572
4/5/2022	5:00:00 AM	83.54353	61.12204	93.21101	87.01269	81.94374	74.98579
4/5/2022	6:00:00 AM	84.5306	60.93829	93.86772	88.00028	83.03282	76.36334
4/5/2022	7:00:00 AM	79.71797	51.11453	91.90881	83.71308	76.77779	68.15301
4/5/2022	8:00:00 AM	81.25169	53.0763	92.3177	85.14313	78.86041	71.2309
4/5/2022	9:00:00 AM	78.38393	47.29238	91.2109	82.29749	75.44083	66.69321
4/5/2022	10:00:00 AM	77.40038	46.4378	91.05107	81.57154	73.44855	64.1355
4/5/2022	11:00:00 AM	80.31608	52.16741	92.29381	84.19839	77.66881	69.15464
4/5/2022	12:00:00 PM	81.38713	54.66563	93.91827	85.25692	78.96083	70.83611
4/5/2022	1:00:00 PM	78.52716	47.06205	91.39063	82.62868	75.13892	65.19017
4/5/2022	2:00:00 PM	78.81607	47.84393	92.54861	82.89693	75.32303	66.25715
4/5/2022	3:00:00 PM	80.62379	48.19426	92.1526	84.55726	78.10615	69.75263
4/5/2022	4:00:00 PM	82.46367	55.42477	93.64686	86.16675	80.33653	72.73157
4/5/2022	5:00:00 PM	81.93947	53.84761	92.20089	85.644	79.95202	72.36232
4/5/2022	6:00:00 PM	79.88273	53.13493	91.5921	83.76818	77.31355	68.94453
4/5/2022	7:00:00 PM	79.36108	51.50912	91.41745	83.55425	76.14489	66.40117
4/5/2022	8:00:00 PM	73.37261	38.67292	88.56924	77.52242	68.52614	56.07252
4/5/2022	9:00:00 PM	61.14314	35.22484	81.44564	64.89918	55.89858	46.09854
4/5/2022	10:00:00 PM	58.19994	33.41915	75.90258	61.86406	52.72553	44.30293
4/5/2022	11:00:00 PM	60.61564	34.05472	77.35785	64.6384	55.36094	45.63476
4/6/2022	12:00:00 AM	56.59739	33.43153	73.42839	60.2558	51.99024	44.09351
4/6/2022	1:00:00 AM	54.29472	31.88097	71.84636	57.80056	49.82518	42.33106
4/6/2022	2:00:00 AM	52.04053	31.87854	67.44392	55.60172	48.25253	41.50086
4/6/2022	3:00:00 AM	52.25551	34.96433	69.03407	55.75002	48.79099	42.82948

4/6/2022	4:00:00 AM	50.21932	33.89914	63.89871	53.6802	47.64818	42.22891
4/6/2022	5:00:00 AM	48.00359	32.75584	60.38694	51.23761	45.87123	41.112
4/6/2022	6:00:00 AM	46.47802	32.49932	60.44567	49.62838	43.97472	39.66452
4/6/2022	7:00:00 AM	51.60667	32.23884	80.87965	48.93242	42.88585	38.94351
4/6/2022	8:00:00 AM	50.27492	33.86114	68.19081	53.63149	45.42726	40.50055
4/6/2022	9:00:00 AM	60.95453	34.16949	82.4964	63.96577	54.03737	43.43654
4/6/2022	10:00:00 AM	65.20492	33.08574	86.57244	68.90698	58.79122	45.66402
4/6/2022	11:00:00 AM	64.13843	33.44593	81.64276	68.16579	57.16639	43.40552
4/6/2022	12:00:00 PM	63.34248	33.49444	84.43689	66.68678	55.31997	42.80689
4/6/2022	1:00:00 PM	62.92819	32.32716	88.64085	65.74091	53.59375	40.94248
4/6/2022	2:00:00 PM	64.65546	32.6997	84.58446	68.58572	56.02457	41.50195
4/6/2022	3:00:00 PM	62.92044	32.21947	82.03741	66.9027	55.74282	42.83631
4/6/2022	4:00:00 PM	64.05488	32.55703	82.90702	67.19849	56.37813	44.07672
4/6/2022	5:00:00 PM	65.32458	33.01118	84.98255	66.72263	56.17232	45.92506
4/6/2022	6:00:00 PM	58.49127	28.5477	82.17879	57.34197	46.2139	37.57702
4/6/2022	7:00:00 PM	53.92741	30.19874	80.9568	53.77737	46.44117	39.5831
4/6/2022	8:00:00 PM	51.88667	28.09366	76.07526	53.81122	45.47738	38.06845
4/6/2022	9:00:00 PM	44.82632	28.26609	67.60009	47.52844	41.39617	36.18243
4/6/2022	10:00:00 PM	51.11798	29.39688	70.30769	54.53937	47.84014	40.93183
4/6/2022	11:00:00 PM	51.67068	29.21755	66.34014	55.47251	47.78977	40.41351
4/7/2022	12:00:00 AM	44.02075	25.73393	67.05601	46.78165	39.38912	33.07092
4/7/2022	1:00:00 AM	44.27598	28.1983	58.72106	47.77521	41.50283	36.26612
4/7/2022	2:00:00 AM	42.79672	26.61215	56.85479	46.40056	39.98419	34.68306
4/7/2022	3:00:00 AM	44.98658	26.1646	73.42183	46.72977	39.99963	34.47805
4/7/2022	4:00:00 AM	46.34104	30.49187	59.23094	49.80133	44.00434	38.50469
4/7/2022	5:00:00 AM	45.66855	30.09198	60.68198	49.23793	43.16929	37.4824
4/7/2022	6:00:00 AM	48.99912	29.09236	76.12913	49.35632	42.37094	36.62925
4/7/2022	7:00:00 AM	54.5734	27.96118	81.04314	55.36694	43.86045	35.92946
4/7/2022	8:00:00 AM	60.91245	31.88003	78.26764	64.89452	54.41378	43.6894
4/7/2022	9:00:00 AM	63.49104	32.97122	79.22594	67.45796	59.00521	48.28652
4/7/2022	10:00:00 AM	64.46499	32.00727	81.79654	67.94127	57.35558	45.69252
4/7/2022	11:00:00 AM	64.5764	28.89665	83.99825	67.97222	56.19883	40.19493
4/7/2022	12:00:00 PM	63.38773	27.79866	83.01851	66.86803	54.71494	38.34849
4/7/2022	1:00:00 PM	60.93734	24.5795	81.30907	64.37364	48.31452	32.38504
4/7/2022	2:00:00 PM	63.36411	24.972	87.42448	64.55764	50.25801	34.6772
4/7/2022	3:00:00 PM	60.50412	25.35088	84.38051	63.69219	51.36192	37.37345
4/7/2022	4:00:00 PM	60.23816	25.9519	76.90017	64.13286	54.01279	38.97514
4/7/2022	5:00:00 PM	64.86671	29.70892	86.30755	64.42228	53.28329	43.34905
4/7/2022	6:00:00 PM	53.82201	23.99471	81.91069	55.43161	46.1228	37.28642
4/7/2022	7:00:00 PM	46.13628	22.92133	72.57867	47.55032	40.3078	33.47832
4/7/2022	8:00:00 PM	41.7882	21.45399	59.45068	44.74739	37.54973	30.74048
4/7/2022	9:00:00 PM	43.23535	22.19977	63.15496	45.94843	37.84205	30.67872
4/7/2022	10:00:00 PM	47.79877	21.96377	73.58951	49.30687	40.12956	31.87092

4/7/2022	11:00:00 PM	46.70468	22.84866	71.10847	48.91902	40.52245	32.60011
4/8/2022	12:00:00 AM	49.06892	19.3839	72.4008	51.86668	40.85687	30.997
4/8/2022	1:00:00 AM	55.72104	26.20077	76.00458	58.99209	50.40887	41.60575
4/8/2022	2:00:00 AM	53.42734	24.80431	71.94385	57.06456	48.5748	39.73316
4/8/2022	3:00:00 AM	54.59422	23.55565	72.55361	58.09695	48.57634	38.55717
4/8/2022	4:00:00 AM	58.45458	23.18054	79.61326	61.57518	45.74313	33.6942
4/8/2022	5:00:00 AM	49.22962	24.44996	68.18068	52.91649	42.99357	33.90287
4/8/2022	6:00:00 AM	50.20799	25.50106	73.13539	52.39825	42.29894	34.09811
4/8/2022	7:00:00 AM	48.59472	27.87017	72.3203	50.96921	41.00736	34.85961
4/8/2022	8:00:00 AM	62.36406	30.14395	80.52251	66.12344	53.95151	41.93756
4/8/2022	9:00:00 AM	74.95821	40.98685	88.47884	78.97503	71.25841	61.86564
4/8/2022	10:00:00 AM	77.81259	46.28088	90.68629	81.8469	74.68164	65.51401
4/8/2022	11:00:00 AM	72.12104	28.35121	88.26898	76.36776	64.22052	47.60049
4/8/2022	12:00:00 PM	72.49853	27.17679	89.37997	76.75364	63.49172	44.06997
4/8/2022	1:00:00 PM	77.26616	39.71513	91.21456	81.60001	72.18993	60.00268
4/8/2022	2:00:00 PM	78.2318	40.75585	91.28411	82.55135	73.43951	61.66246
4/8/2022	3:00:00 PM	78.47835	36.54929	91.97936	82.86794	73.59551	60.70332
4/8/2022	4:00:00 PM	81.02589	43.69876	93.52798	85.34931	77.29464	65.43212
4/8/2022	5:00:00 PM	77.47421	38.91578	91.29642	81.85668	72.08876	59.84349
4/8/2022	6:00:00 PM	76.63006	39.01992	91.98217	81.08272	69.95185	57.15551
4/8/2022	7:00:00 PM	68.92025	31.76884	86.00526	72.7049	60.8889	45.08353
4/8/2022	8:00:00 PM	62.63915	27.50355	82.57545	64.47574	46.43858	36.04078
4/8/2022	9:00:00 PM	64.80187	29.25735	83.80157	68.14986	56.09614	42.66604
4/8/2022	10:00:00 PM	72.99532	37.714	88.64219	77.08558	67.34472	55.71363
4/8/2022	11:00:00 PM	74.32674	38.79992	91.73335	78.29636	68.27854	57.43664
4/9/2022	12:00:00 AM	77.16215	49.89428	90.18096	80.99399	74.16143	65.60907
4/9/2022	1:00:00 AM	76.07906	49.6133	89.93613	79.79159	72.93016	65.32195
4/9/2022	2:00:00 AM	76.4225	47.71408	89.66133	80.17607	73.34992	65.76943
4/9/2022	3:00:00 AM	77.3307	51.62001	90.76458	81.07076	74.55938	66.94044
4/9/2022	4:00:00 AM	77.711	53.41314	90.85895	81.49465	74.94326	67.54526
4/9/2022	5:00:00 AM	73.06084	46.38514	88.71897	76.78501	69.27525	61.20289
4/9/2022	6:00:00 AM	74.7286	44.70308	89.3402	78.8947	69.558	59.40564
4/9/2022	7:00:00 AM	77.70916	51.22107	89.99149	81.62242	74.92961	67.08684
4/9/2022	8:00:00 AM	73.37033	47.51265	88.14815	77.16435	70.1731	62.33675
4/9/2022	9:00:00 AM	70.05889	41.86743	86.00816	73.76562	65.39284	56.14628
4/9/2022	10:00:00 AM	73.75506	42.70511	88.74032	77.89421	69.14851	57.44998
4/9/2022	11:00:00 AM	75.14305	47.65206	88.94293	79.07364	71.78771	62.94401
4/9/2022	12:00:00 PM	74.90115	44.17165	88.6134	78.9445	70.73582	60.39132
4/9/2022	1:00:00 PM	77.08102	45.98215	90.43736	81.24284	73.3733	63.68839
4/9/2022	2:00:00 PM	80.9218	49.94301	92.55814	84.995	78.04527	68.72987
4/9/2022	3:00:00 PM	79.98741	45.9803	91.95795	84.04654	76.89013	67.58702
4/9/2022	4:00:00 PM	79.92395	51.75477	91.95918	84.00479	76.90386	68.43202
4/9/2022	5:00:00 PM	82.56179	59.82991	92.81378	86.20088	80.66733	73.56425

4/9/2022	6:00:00 PM	83.66247	61.63624	93.51572	87.1427	82.17825	75.45067
4/9/2022	7:00:00 PM	82.80586	57.08064	93.204	86.40697	81.03432	73.6767
4/9/2022	8:00:00 PM	81.57228	57.63847	92.43943	85.28795	79.46006	72.19014
4/9/2022	9:00:00 PM	79.39655	53.04323	91.47859	83.40758	76.49238	68.32695
4/9/2022	10:00:00 PM	77.73974	51.72755	90.04926	81.72013	74.58911	65.77884
4/9/2022	11:00:00 PM	76.97837	50.23066	90.39847	81.13188	72.82206	63.45398
4/10/2022	12:00:00 AM	78.06867	49.22056	90.8136	82.09384	74.87386	66.13655
4/10/2022	1:00:00 AM	73.16145	43.05227	86.88195	77.05366	69.49188	60.91264
4/10/2022	2:00:00 AM	75.39413	46.63388	88.82535	79.28143	71.84511	63.36478
4/10/2022	3:00:00 AM	70.32445	44.35963	84.37225	74.21281	66.78862	58.45505
4/10/2022	4:00:00 AM	60.07953	35.45785	78.34385	63.45372	52.57027	44.8234
4/10/2022	5:00:00 AM	52.86919	33.95389	69.35927	56.48012	49.52481	43.12606
4/10/2022	6:00:00 AM	49.62822	33.40487	67.17859	52.83922	46.0452	40.54824
4/10/2022	7:00:00 AM	50.18475	33.8966	65.88871	53.53023	46.85109	41.77419
4/10/2022	8:00:00 AM	58.15958	35.41158	76.71493	61.51268	52.18042	44.17727
4/10/2022	9:00:00 AM	61.49059	36.53684	79.37719	65.35051	55.42006	46.04704
4/10/2022	10:00:00 AM	61.13262	31.80805	81.55541	64.64227	52.2943	39.14001
4/10/2022	11:00:00 AM	62.2236	30.94573	85.46702	63.21587	47.9002	38.90076
4/10/2022	12:00:00 PM	63.17354	31.53744	83.00646	66.53774	52.97566	39.79436
4/10/2022	1:00:00 PM	67.15063	32.03853	86.08271	70.64805	57.23061	42.31507
4/10/2022	2:00:00 PM	68.96215	32.06238	87.40211	72.72707	59.94888	43.76772
4/10/2022	3:00:00 PM	70.97547	31.1238	88.62317	74.97976	62.02972	44.0209
4/10/2022	4:00:00 PM	69.17825	30.68798	85.98172	73.32091	59.83439	43.94048
4/10/2022	5:00:00 PM	66.75287	27.95946	87.30576	69.84952	56.90419	42.17895
4/10/2022	6:00:00 PM	69.40246	31.44368	86.93852	73.13257	63.05698	50.96265
4/10/2022	7:00:00 PM	69.88669	35.5305	86.8779	73.84886	64.09689	52.41559
4/10/2022	8:00:00 PM	67.05077	32.68915	85.74197	70.6755	58.61889	46.25819
4/10/2022	9:00:00 PM	53.99206	31.86523	73.37665	57.26466	47.49785	39.77471
4/10/2022	10:00:00 PM	53.76024	29.41163	74.45582	56.11308	45.86004	38.13779
4/10/2022	11:00:00 PM	55.9795	26.1888	81.32651	54.47119	41.8661	34.42981
4/11/2022	12:00:00 AM	62.68857	27.83513	85.80564	64.02999	47.45421	36.11669
4/11/2022	1:00:00 AM	70.26526	30.20601	90.24903	73.06816	55.96177	38.71894
4/11/2022	2:00:00 AM	75.79526	34.04296	91.70541	79.96659	68.86521	55.07659
4/11/2022	3:00:00 AM	77.91765	43.48878	91.21499	82.20245	73.34421	60.58474
4/11/2022	4:00:00 AM	73.40487	41.59634	88.2571	77.51501	68.37757	57.3885
4/11/2022	5:00:00 AM	78.61352	43.35126	91.85504	82.9142	74.19477	63.52966
4/11/2022	6:00:00 AM	80.61892	43.42697	92.70282	84.86406	76.9013	65.85259
4/11/2022	7:00:00 AM	81.88226	42.07635	93.62401	86.29898	77.98812	64.75983
4/11/2022	8:00:00 AM	80.46776	37.12497	89.84581	79.36206	69.92386	56.03126
4/11/2022	9:00:00 AM	74.98035	37.01559	90.36224	79.06685	70.06523	57.51289
4/11/2022	10:00:00 AM	71.43369	31.16336	88.03732	75.19303	64.90951	51.53609
4/11/2022	11:00:00 AM	71.9665	35.0593	88.05386	75.877	65.61139	51.15036
4/11/2022	12:00:00 PM	69.45872	33.03667	86.74023	73.30309	61.11128	45.1493

4/11/2022	1:00:00 PM	70.71612	33.4349	87.02749	74.86984	63.87666	51.48319
4/11/2022	2:00:00 PM	69.86001	29.24401	89.08716	73.31755	62.12341	46.06263
4/11/2022	3:00:00 PM	52.1513	26.65104	73.38703	52.31936	38.74851	33.83928
4/11/2022	4:00:00 PM	44.5975	28.5542	65.44918	46.9967	41.04629	36.17126
4/11/2022	5:00:00 PM	47.09495	28.6111	72.60965	48.10276	40.74074	35.80511
4/11/2022	6:00:00 PM	51.91165	27.59659	75.36603	50.8266	39.85542	34.82411
4/11/2022	7:00:00 PM	60.40683	28.72881	79.27091	63.71501	43.8923	36.12017
4/11/2022	8:00:00 PM	61.84443	30.8328	79.7597	65.35592	50.01476	39.04681
4/11/2022	9:00:00 PM	67.06978	35.92436	83.64865	71.00149	61.69679	50.88725
4/11/2022	10:00:00 PM	70.46169	33.04779	88.04477	74.20816	64.05701	51.18119
4/11/2022	11:00:00 PM	68.59565	33.83924	85.74063	72.35008	62.03171	50.76553
4/12/2022	12:00:00 AM	63.48357	29.54801	82.94096	66.54114	50.46224	37.92278
4/12/2022	1:00:00 AM	66.277	29.94207	83.7345	70.10252	58.7406	42.21051
4/12/2022	2:00:00 AM	64.90897	32.09958	83.67645	68.65577	56.75753	44.11254
4/12/2022	3:00:00 AM	65.13123	35.40166	85.47254	68.89834	60.14274	49.42654
4/12/2022	4:00:00 AM	68.64963	38.23467	83.90826	72.58113	64.0273	54.21721
4/12/2022	5:00:00 AM	68.84438	37.82602	86.97916	72.57627	62.92875	51.67367
4/12/2022	6:00:00 AM	73.09068	36.85226	90.12908	76.91504	67.43854	55.82255
4/12/2022	7:00:00 AM	76.67526	41.09631	90.61097	80.87601	72.27123	61.2467
4/12/2022	8:00:00 AM	77.24861	38.93432	92.21432	81.49026	72.11674	59.2101
4/12/2022	9:00:00 AM	78.44971	43.97733	91.82597	82.9376	73.54626	61.76065
4/12/2022	10:00:00 AM	76.50647	41.05275	91.30076	80.77849	71.57896	59.85146
4/12/2022	11:00:00 AM	76.25746	37.81991	90.82948	80.55945	71.02886	58.53677
4/12/2022	12:00:00 PM	76.51569	40.98348	91.07693	80.70536	71.52337	59.74813
4/12/2022	1:00:00 PM	74.49915	36.66745	89.92838	78.74095	67.90561	54.91536
4/12/2022	2:00:00 PM	74.2446	31.86434	89.97572	78.3949	67.14929	54.29626
4/12/2022	3:00:00 PM	66.03424	30.99166	83.67617	69.73221	58.57922	46.68443
4/12/2022	4:00:00 PM	52.9765	27.49934	73.39618	55.46503	42.21519	35.34371
4/12/2022	5:00:00 PM	69.97109	30.3097	89.55056	72.69632	49.09256	38.4529
4/12/2022	6:00:00 PM	70.62007	30.01221	88.08299	74.43247	61.71138	46.40768
4/12/2022	7:00:00 PM	70.08956	33.96839	87.64364	73.63498	63.16827	49.8811
4/12/2022	8:00:00 PM	71.85825	35.80102	88.83029	75.93945	65.98269	53.75561
4/12/2022	9:00:00 PM	67.2178	35.67467	85.66602	70.99366	59.64095	46.27089
4/12/2022	10:00:00 PM	76.81842	36.84754	91.66301	81.27119	69.48652	54.09856
4/12/2022	11:00:00 PM	77.07959	38.06212	90.90623	81.5378	70.74051	57.2138
4/13/2022	12:00:00 AM	75.76803	38.04958	91.03311	80.09454	70.1196	57.40541
4/13/2022	1:00:00 AM	72.70368	34.34232	90.10777	76.35535	63.16615	48.67865
4/13/2022	2:00:00 AM	65.72105	32.35297	84.70989	69.21275	55.30739	41.2597
4/13/2022	3:00:00 AM	69.25153	34.99286	86.43343	72.99228	60.78456	46.81907
4/13/2022	4:00:00 AM	71.67431	36.80518	90.39943	75.16173	65.17096	53.38166
4/13/2022	5:00:00 AM	73.72479	39.75387	89.54414	77.65019	68.34447	57.21324
4/13/2022	6:00:00 AM	77.60531	41.10991	92.13101	81.69479	72.83319	61.48492
4/13/2022	7:00:00 AM	77.23829	37.76467	92.07353	81.51429	71.64911	59.38194

4/13/2022	8:00:00 AM	75.07577	33.70479	90.90447	79.38952	67.17837	49.59037
4/13/2022	9:00:00 AM	76.55856	39.4743	91.5096	80.86343	71.52217	59.0523
4/13/2022	10:00:00 AM	77.24991	41.66945	91.07913	81.40257	72.39837	61.52885
4/13/2022	11:00:00 AM	79.77971	43.48234	92.26114	84.03238	76.15636	65.17014
4/13/2022	12:00:00 PM	76.02146	36.24234	90.2366	80.30155	70.39069	56.99282
4/13/2022	1:00:00 PM	70.38476	33.27286	85.86859	74.47079	64.79163	52.07371
4/13/2022	2:00:00 PM	67.32665	29.07426	85.092	71.10414	60.85672	46.4223
4/13/2022	3:00:00 PM	67.96154	30.26929	87.03145	71.27947	58.71163	45.95771
4/13/2022	4:00:00 PM	63.48664	32.05293	84.61218	66.65521	54.00532	41.21352
4/13/2022	5:00:00 PM	53.21117	24.71331	77.46919	55.11826	39.37006	32.48559
4/13/2022	6:00:00 PM	56.12087	24.86	77.05518	59.13361	45.64659	33.74586
4/13/2022	7:00:00 PM	60.04818	28.99901	81.3732	63.35325	50.24371	38.56756
4/13/2022	8:00:00 PM	50.70074	25.97045	74.94929	52.05843	40.39369	33.25019
4/13/2022	9:00:00 PM	61.92741	29.85308	81.03726	65.30733	52.89073	40.49647
4/13/2022	10:00:00 PM	65.64592	32.23321	85.23571	68.51454	56.61323	44.26966
4/13/2022	11:00:00 PM	66.00409	32.88348	87.65622	69.51145	58.99203	47.13607
4/14/2022	12:00:00 AM	59.59813	29.90683	81.16817	62.48239	49.61385	38.96711
4/14/2022	1:00:00 AM	57.12694	29.61264	78.36855	60.35439	47.41784	37.04436
4/14/2022	2:00:00 AM	56.59902	29.76297	76.94229	59.55334	47.62253	38.02796
4/14/2022	3:00:00 AM	62.91978	30.60764	87.52856	64.73371	48.33739	39.22332
4/14/2022	4:00:00 AM	64.17923	31.47679	85.88671	66.31061	53.75255	41.63696
4/14/2022	5:00:00 AM	66.11803	29.837	86.84358	69.11473	55.39748	42.02818
4/14/2022	6:00:00 AM	69.44035	30.59894	89.18161	72.95778	60.99245	45.26254
4/14/2022	7:00:00 AM	74.01126	35.93316	89.60435	78.16654	67.58402	54.67982
4/14/2022	8:00:00 AM	68.87168	28.62392	87.93435	72.29087	59.63373	42.36616
4/14/2022	9:00:00 AM	71.48214	31.95543	89.35702	75.21119	63.25826	48.65769
4/14/2022	10:00:00 AM	69.76033	29.24335	88.33562	73.04651	58.95172	41.43948
4/14/2022	11:00:00 AM	72.00584	30.48126	88.82752	76.17395	63.77411	44.5962
4/14/2022	12:00:00 PM	72.73079	29.01102	88.87777	76.92882	63.63638	47.67156
4/14/2022	1:00:00 PM	68.96784	27.09115	88.9585	72.16106	60.53123	44.22337
4/14/2022	2:00:00 PM	62.28477	22.42289	82.31597	65.99841	52.53231	33.61783
4/14/2022	3:00:00 PM	44.58297	21.59409	64.79158	47.44887	37.49999	30.17868
4/14/2022	4:00:00 PM	59.63424	28.53648	78.08934	63.06168	51.8286	41.11768
4/14/2022	5:00:00 PM	59.24161	26.32229	78.98999	62.18231	49.81246	37.75425
4/14/2022	6:00:00 PM	52.20332	25.89702	69.11684	55.95093	45.99915	36.06243
4/14/2022	7:00:00 PM	44.91896	24.49301	60.93248	48.51188	40.76739	33.93074
4/14/2022	8:00:00 PM	42.46084	22.82698	59.56073	45.80139	38.11967	31.0701
4/14/2022	9:00:00 PM	43.01627	23.62068	59.61222	46.65958	38.26388	31.5408
4/14/2022	10:00:00 PM	44.9893	25.73405	61.16485	48.57097	41.08342	34.77808
4/14/2022	11:00:00 PM	45.27196	25.17781	69.04226	46.25511	38.73768	32.91206
4/15/2022	12:00:00 AM	46.81798	22.49715	64.86482	50.3946	38.3059	29.35766
4/15/2022	1:00:00 AM	48.73095	22.3914	68.47678	51.85332	42.28732	33.30058
4/15/2022	2:00:00 AM	45.92753	24.43881	65.4253	49.11052	39.20413	31.75315

4/15/2022	3:00:00 AM	62.0174	30.72529	78.53726	66.01955	53.41911	41.80938
4/15/2022	4:00:00 AM	71.97956	43.61556	86.55451	75.7452	68.21426	59.3768
4/15/2022	5:00:00 AM	76.31607	38.83656	90.72486	80.43805	70.62165	59.1286
4/15/2022	6:00:00 AM	78.88935	35.98587	92.65971	83.36131	73.48065	59.92717
4/15/2022	7:00:00 AM	77.59122	32.8589	91.58407	82.09338	71.87413	57.7245
4/15/2022	8:00:00 AM	81.2076	34.61483	92.87804	85.47707	77.56939	64.45769
4/15/2022	9:00:00 AM	78.09754	37.89956	92.37215	82.77533	71.2289	55.33804
4/15/2022	10:00:00 AM	82.17582	41.95134	93.00291	86.42895	79.20002	67.19604
4/15/2022	11:00:00 AM	82.70518	47.23032	93.69269	86.65961	80.22741	69.94257
4/15/2022	12:00:00 PM	80.87899	42.78213	93.15448	85.23409	77.18932	65.86993
4/15/2022	1:00:00 PM	78.90557	42.33694	92.06443	83.23788	74.30311	62.62824
4/15/2022	2:00:00 PM	76.53014	38.14575	91.31903	80.83687	71.15826	58.80208
4/15/2022	3:00:00 PM	77.35292	38.40335	91.58804	81.67024	71.97662	59.66143
4/15/2022	4:00:00 PM	74.67346	38.70347	89.62427	78.95763	69.01369	57.8458
4/15/2022	5:00:00 PM	70.47404	31.5002	88.89853	74.19974	62.10014	47.57384
4/15/2022	6:00:00 PM	66.78061	30.44578	86.7949	69.56941	57.61661	43.84448
4/15/2022	7:00:00 PM	70.17543	30.87786	86.38225	74.31866	63.98862	50.38254
4/15/2022	8:00:00 PM	62.24361	26.01132	81.68245	65.86893	49.73174	36.55692
4/15/2022	9:00:00 PM	49.92539	30.2696	70.29468	52.33138	44.85001	38.67616
4/15/2022	10:00:00 PM	61.64706	30.25547	83.17698	64.25484	48.57059	38.36785
4/15/2022	11:00:00 PM	58.75401	28.71355	80.01291	61.02333	45.62242	36.74315
4/16/2022	12:00:00 AM	50.71544	27.14804	73.26758	51.44196	39.32	33.75777
4/16/2022	1:00:00 AM	46.81889	28.10915	69.80417	48.29276	40.88671	35.30659
4/16/2022	2:00:00 AM	44.91775	26.76284	69.54003	46.949	38.79832	33.66477
4/16/2022	3:00:00 AM	54.55899	27.00185	72.28659	58.30938	45.30123	35.53604
4/16/2022	4:00:00 AM	63.81963	30.2819	80.55709	67.45255	56.67984	42.94781
4/16/2022	5:00:00 AM	67.89614	32.25828	85.88653	71.52751	58.96183	44.17487
4/16/2022	6:00:00 AM	72.46473	31.63429	88.81849	76.59062	65.12816	49.66314
4/16/2022	7:00:00 AM	75.20541	32.06863	89.46651	79.44613	70.04867	56.75582
4/16/2022	8:00:00 AM	74.01412	31.13064	89.12096	78.27861	67.31281	48.98622
4/16/2022	9:00:00 AM	73.4272	29.45696	89.29984	77.39188	65.83134	49.01084
4/16/2022	10:00:00 AM	72.12772	28.16411	88.77064	76.0946	62.99087	43.28454
4/16/2022	11:00:00 AM	68.22033	26.57737	85.6456	72.06693	56.87477	36.68329
4/16/2022	12:00:00 PM	65.18572	24.39483	83.04735	69.01756	54.99148	37.06155
4/16/2022	1:00:00 PM	58.39496	20.07394	81.81533	60.36934	44.77615	29.18449
4/16/2022	2:00:00 PM	59.2566	22.04902	78.40324	62.62318	51.50968	38.61993
4/16/2022	3:00:00 PM	58.03604	31.16455	75.26213	61.86955	53.65065	45.0359
4/16/2022	4:00:00 PM	57.13549	23.89663	72.97665	61.16588	51.83702	33.60673
4/16/2022	5:00:00 PM	61.61964	35.22827	78.01989	65.62077	57.95348	48.40834
4/16/2022	6:00:00 PM	60.58618	24.66699	85.07488	57.38607	43.74818	34.38095
4/16/2022	7:00:00 PM	64.81575	26.18644	86.33227	64.65688	53.15254	43.50656
4/16/2022	8:00:00 PM	59.34453	#NUM!	85.51105	56.77185	46.42603	34.65555
4/16/2022	9:00:00 PM	42.24791	7.411844	64.52078	42.80859	30.55003	18.36085

4/16/2022	10:00:00 PM	39.15852	22.52018	56.08831	42.04733	37.1176	31.74862
4/16/2022	11:00:00 PM	39.76277	22.8516	53.82412	42.9971	37.28516	32.21608
4/17/2022	12:00:00 AM	39.8763	23.06649	55.02695	42.87164	38.03852	32.83933
4/17/2022	1:00:00 AM	38.90851	21.37304	55.57057	42.03368	35.57057	30.43017
4/17/2022	2:00:00 AM	35.43972	18.17501	55.40407	38.09238	32.83582	27.22754
4/17/2022	3:00:00 AM	40.00161	16.81918	58.50915	42.62143	36.64603	28.77986
4/17/2022	4:00:00 AM	38.2339	14.75639	56.87099	41.09269	35.01173	29.51794
4/17/2022	5:00:00 AM	37.24394	7.614473	58.3648	40.04592	29.68451	19.84659
4/17/2022	6:00:00 AM	32.96683	5.953712	53.43643	35.95708	26.03277	17.33709
4/17/2022	7:00:00 AM	27.77774	2.321619	52.93403	28.45339	18.47197	13.79199
4/17/2022	8:00:00 AM	18.43292	0	35.65461	20.528	17.01968	12.7827
4/17/2022	9:00:00 AM	21.89345	0.446348	47.78877	21.57784	17.0588	12.77857
4/17/2022	10:00:00 AM	22.24216	0	45.52786	24.88159	17.54611	13.05922
4/17/2022	11:00:00 AM	19.28191	0	35.77177	21.32607	16.98168	12.72183
4/17/2022	12:00:00 PM	17.94731	0	32.61866	20.15072	16.73058	12.50908
4/17/2022	1:00:00 PM	36.40247	0	58.25653	23.91532	17.41071	13.09321
4/17/2022	2:00:00 PM	22.7627	0.671849	48.93493	23.80495	17.32119	13.02288
4/17/2022	3:00:00 PM	22.15785	2.500528	39.3315	24.87888	19.12725	13.93879
4/17/2022	4:00:00 PM	30.95204	5.597072	47.1614	34.34229	28.21531	19.92042
4/17/2022	5:00:00 PM	26.39449	6.379709	41.93799	30.03257	23.15133	16.88592
4/17/2022	6:00:00 PM	21.85551	4.047484	36.40884	24.9142	19.62363	14.73296
4/17/2022	7:00:00 PM	19.71459	3.553258	37.98834	21.90264	18.09169	13.90928
4/17/2022	8:00:00 PM	27.95518	3.5592	48.83311	29.92896	20.00908	14.94815
4/17/2022	9:00:00 PM	36.19108	5.345501	55.96505	39.95329	25.96471	17.11549
4/17/2022	10:00:00 PM	33.02181	7.063452	49.3793	36.7399	28.12226	18.22683
4/17/2022	11:00:00 PM	35.17219	23.05533	48.17156	38.33829	33.37644	29.00173
4/18/2022	12:00:00 AM	35.86924	24.16052	50.04632	38.42672	34.58111	30.75711
4/18/2022	1:00:00 AM	38.09809	24.08862	47.78664	40.63819	37.31963	33.74137
4/18/2022	2:00:00 AM	40.70707	8.481341	57.13776	43.8148	39.96424	20.41888

WM18: Hourly Unweighted 1/3 Octave Data

Date	Time	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1k Hz	1.25 kHz	1.6 kHz	2k Hz	2.5 kHz	3.15 kHz	4k Hz	5k Hz	6.3 kHz	8k Hz	10 kHz	12.5 kHz	16 kHz	20 kHz
4/4/2022	12:34:51 PM	77.2	76.1	74.8	73.3	71.5	69.2	66.7	64.6	62.1	59.3	56.7	54.2	51.9	50.1	49	47.8	46.5	45.6	45.1	44.2	43.7	43	42.7	41.6	40.9	40.4	39.7	38.9	38.2	38	37.4	36.6	35.7	35.2	34.6	33.8
4/4/2022	1:00:00 PM	69.8	69	67.4	65.8	63.8	61.5	59	56.6	54.5	52.1	50.7	49.4	48.3	47.4	47	46.1	45.5	45.1	44.4	43.8	43.2	42.4	41.9	41.1	40.4	39.7	39.1	38.4	38.1	37.7	37	36.2	35.5	34.9	34.3	33.5
4/4/2022	2:00:00 PM	75.1	74.1	72.9	71.5	69.9	68.1	65.9	63.6	61.3	58.9	56.2	53.5	51	48.5	46.6	45	43.4	42.5	41.8	41.1	40.1	39.4	38.6	37.9	37	36.4	35.7	35.2	34.7	34.1	33.4	32.6	31.7	31.2	30.5	29.6
4/4/2022	3:00:00 PM	74.9	74	72.5	71	69.1	67	64.6	62.1	59.5	57	54.5	52.3	50.6	49	47.8	46.9	46.2	45.6	44.8	44.2	43.5	42.9	42.3	41.6	40.9	40.2	39.5	38.9	38.5	38.1	37.5	36.6	35.9	35.4	34.8	34
4/4/2022	4:00:00 PM	74.8	73.7	72.4	70.8	68.8	66.4	63.9	61.6	59.1	56.8	54.6	52.9	51.5	49.4	47.2	45.4	43.7	42.5	41.8	40.8	40	39.6	38.7	38.1	37.4	36.9	36.1	35.5	35.1	34.9	34.2	33.3	32.7	32.4	32	31.3
4/4/2022	5:00:00 PM	68.9	67.9	66.4	64.5	62.3	60	57.3	54.8	51.9	48.9	45.9	42.9	39.5	37.2	34.2	30.5	28.5	26.4	24.6	21.9	19.4	17.4	15.1	13.7	12.4	12.2	11.5	10.1	8	5.9	4.7	4	2.6	2.3	2.6	4
4/4/2022	6:00:00 PM	76.1	75.1	73.9	72.3	70.5	68.5	66.1	63.7	61	58.2	55.4	52.3	49.3	46.1	43.1	41.4	38.9	36.4	34.1	31.5	29	26.9	24.7	23.5	22.8	22.2	22.3	22.1	21.9	19.3	21.8	21.8	19.7	16.9	17.1	14.7
4/4/2022	7:00:00 PM	75.9	74.9	73.7	72.1	70.4	68.3	65.9	63.4	60.8	58.1	55.3	52.3	49.6	46.3	43.7	40.3	37.8	35.9	33.9	31.4	28.9	26.9	24.7	23.5	22.1	22	22	20.9	19.3	16.6	14.8	13.3	11.4	10.6	9.9	10.9
4/4/2022	8:00:00 PM	76.7	75.8	74.5	73.2	71.6	69.7	67.7	65.5	63	60.5	57.8	54.8	51.8	48.8	46	43.4	41.5	39.8	38.5	37.2	36.1	34.8	33.3	32.3	32.2	31.7	31.7	30.9	30.4	29.8	29.1	28.3	27.8	27.2	26.8	26.4
4/4/2022	9:00:00 PM	71.8	70.7	69.6	68.2	66.2	64.2	62.1	60.2	58.1	56.4	55	54.1	53.8	53.2	52.5	52.2	51.8	51.4	51.1	50.7	50.2	49.8	49.4	48.9	48.4	47.9	47.4	47.1	46.8	46.6	46.2	45.6	45	44.8	44.4	43.9
4/4/2022	10:00:00 PM	75.3	74.3	73.2	71.8	70.1	68.2	66.2	64.2	62.2	60.7	59.2	58.2	57.6	57	56.6	56.2	55.8	55.4	55	54.7	54.5	54.2	53.8	53.3	52.9	52.3	51.9	51.6	51.3	51.2	50.9	50.4	50	49.8	49.6	49.2
4/4/2022	11:00:00 PM	66.8	65.8	64.4	62.2	60	57.5	55.1	53.1	50.9	49.7	48.7	47.7	47.1	46.6	46	45.3	44.8	44.1	43.5	42.9	42.3	41.6	41	40.3	39.6	38.8	38.2	37.7	37.3	36.9	36.3	35.6	34.9	34.4	33.9	33.2
4/5/2022	12:00:00 AM	71	69.8	68.4	66.5	64	61.2	58.1	55.1	52.1	49.2	47	45.1	43.9	43.1	42.6	42.3	41.7	41.1	40.6	40.2	39.7	39.2	38.7	38.2	37.6	37	36.4	35.9	35.6	35.2	34.6	33.8	33.1	32.7	32.1	31.3
4/5/2022	1:00:00 AM	71.9	70.8	69.4	67.7	65.3	62.7	59.9	56.8	53.6	50.2	47.1	44.1	41.4	39.4	38	37	36.2	35.5	34.8	33.9	33.1	32.5	31.9	31.3	30.6	29.8	29.3	28.7	28.4	28.1	27.6	27	26.3	26	25.5	24.9
4/5/2022	2:00:00 AM	75.2	74.4	73.3	71.9	69.9	67.8	65.3	62.8	60	57.2	54.1	51	48.2	45.5	43.2	41.6	40.3	39.1	38.1	37	36.1	35.4	34.5	33.6	32.9	32.2	31.6	31	30.5	30.1	29.5	28.8	28	27.6	27.1	26.4
4/5/2022	3:00:00 AM	75.8	74.9	73.8	72.5	70.8	69	66.8	64.2	61.3	58.5	55.6	52.4	49.1	46.2	43.7	41.8	40.4	39.3	38.2	37	36.1	35.1	34.2	33.4	32.7	32.1	31.4	30.7	30.1	29.7	29.1	28.4	27.6	27.3	26.7	26
4/5/2022	4:00:00 AM	76.7	75.9	75	73.8	72.3	70.7	68.7	66.4	63.9	61.5	58.5	55.5	52.5	49.3	46.1	43.4	41.5	39.6	38	36.1	34.4	33.2	32.3	31.5	30.4	30	29.6	29	28.5	28.1	27.8	27.7	27.2	26.6	26.1	25.4
4/5/2022	5:00:00 AM	77.5	76.7	75.9	74.7	73.4	71.6	69.3	66.8	64.1	61.2	58	54.7	51.2	47.6	44.4	41.6	39.5	37.9	36.2	33.7	31.2	29.5	28.5	27.5	25.2	24.8	24.2	23.1	21.8	20.8	20.8	21.6	20.7	20	17.9	18.5
4/5/2022	6:00:00 AM	78.3	77.6	76.7	75.7	74.4	72.9	70.8	68.6	66.1	63.4	60.5	57.4	54.1	50.7	47.3	44.4	42	40.2	38.4	35.9	33.5	31.8	30.9	30.3	29.3	29.2	29.4	29.7	29.5	29.7	30.7	31.3	30.6	30.2	28.4	31.1
4/5/2022	7:00:00 AM	73.8	73.2	72.3	71	69.3	67.2	64.5	61.6	58.2	55	51.4	47.9	44.5	41.3	38.4	35.9	34.1	32.3	30.5	27.8	25.4	23.8	22.4	20.9	18.3	17.3	15.9	14.5	12.7	10.9	8.8	8.5	7.4	5.7	4.8	4.9
4/5/2022	8:00:00 AM	75	74.5	73.8	72.7	71.1	69.3	66.7	63.9	60.9	57.9	54.8	51.8	48.9	46	43.2	39.9	37.6	35.1	32.8	30.1	27.6	26.1	24.8	23.5	21.1	19.8	18.6	17.1	15.5	13.8	11.6	12	10.4	9.3	8.3	7.1
4/5/2022	9:00:00 AM	72.5	71.7	70.9	69.7	68.1	65.7	63	60.1	57.4	55.6	53.9	51.9	49.9	48.2	44.9	41.2	36.1	31.5	28.5	25.6	23.1	21.5	19.7	17.9	15.4	13.1	11.7	10.2	9.5	8.2	6.5	7.3	5.8	4.6	3.5	3
4/5/2022	10:00:00 AM	71.6	70.9	70	68.8	66.9	64.5	61.7	58.9	55.4	51.9	48.6	45.2	42.3	39.8	36.9	33.4	31.6	29.4	27.5	24.7	22.3	20.6	18.8	17.2	14.7	12.6	11.1	9.7	8.2	6.6	6.3	6.5	5	4.1	3.3	2.6
4/5/2022	11:00:00 AM	74.2	73.7	72.9	71.6	70.1	68.1	65.6	62.8	59.4	56.1	52.8	49.1	45.7	42.4	39.5	36.4	34.6	32.7	30.9	28.4	26	24.4	22.8	21.4	19.2	17.3	15.4	14	13.7	13.2	10.6	10	8.6	7.3	7.5	6.8
4/5/2022	12:00:00 PM	75.4	74.7	73.7	72.6	71.1	69.3	66.9	64.2	61.3	58.5	55.8	53.1	50.6	48.1	45.2	41.6	38.3	35.1	32.7	30	27.6	25.9	24.6	23.3	20.7	19.4	17.9	15.9	14.3	12.8	11.4	11.4	10.6	9.1	8.7	8.3
4/5/2022	1:00:00 PM	72.7	72.1	71	69.8	68.2	65.8	63	60.7	56.7	53.2	49.9	46.4	42.7	39.3	36.3	33.9	32.1	30.5	28.7	26.2	23.6	21.9	20.5	19	16.3	14.5	12.7	10.7	9.5	8.5	7.1	7.4	6.8	5.6	5.2	4.8
4/5/2022	2:00:00 PM	72.9	72.3	71.4	70.1	68.5	66.1	63.6	60.6	57.4	54.2	50.7	47.2	43.5	40.3	37.1	34.7	32.9	31	29.2	26.7	24.1	22.4	20.9	19.4	16.9	15.3	13.6	11.6	10.5	9.6	8.2	7.7	6.8	5.9	5.3	5.2
4/5/2022	3:00:00 PM	74.7	74.1	73.1	72	70.3	68.3	65.6	62.6	59.4	56.1	52.8	49.1	45.5	42	38.9	36.6	34.8	33	31.3	28.7	26.1	24.4	23.1	21.6	19	17.8	16.2	14.1	13.2	12.5	10.5	9.6	8.5	7.5	6.6	6.9
4/5/2022	4:00:00 PM	76.4	75.8	74.8	73.7	72.2	70.3	67.9	65.3	62.6	60	57.6	55.7	53.1	50.4	46.8	42.9	39.5	37.1	34.3	31.5	28.9	27.2	26	24.7	22.2	21.3	20.1	18.1	16.3	15.4	13.3	12.9	11.2	10.2	9.9	9.8

4/5/2022	5:00:00 PM		76	75.3	74.4	73.2	71.7	69.6	67.1	64.3	61.1		58	54.5	51	47.2	43.5	40.4	38.1	36.3	35	33.5	31.1	29	27.8	26.8	25.7	23.7	23.1	22.2	21.1	20.5	20.3	19.5	19.1	18.5	18.4	18.2	17.8
4/5/2022	6:00:00 PM	74.1		73.5	72.4	71.1	69.4	67.1	64.3	61.3	57.8	54.5	50.9	47.1	43.3	39.9	37	34.9	33.3	32.2	30.6	28.1	25.8	24.4	23.5	23.1	20.9	20.3	19.2	18.2	17.4	18.1	17.6	17.2	16.8	16.2	15.7	15.4
4/5/2022	7:00:00 PM	73.6		72.9	72	70.6	68.8	66.5	63.8	60.7	57.2	53.8	50.3	46.5	42.6	39.3	36.3	34.1	32.5	31.1	29.5	26.9	24.3	22.6	21.3	19.5	17	15.9	14.1	11.9	10.2	8.5	7.7	7.4	6.4	4.9	4.5	5.3
4/5/2022	8:00:00 PM	68.3		67.2	66	64.3	61.8	59.1	55.9	52.2	49	45.7	42.4	39.4	37.5	36.9	35.7	34	33.9	33.8	33.1	32.2	31.6	30.5	29.3	29.2	28.7	28	27.2	26.8	26.5	26.6	26.2	25	24.3	23.8	23.5	22.8
4/5/2022	9:00:00 PM	57.1		55.3	53.5	50.3	47.4	43.8	40.4	38.9	34.3	31.9	30.5	30.7	36.9	38.4	32.7	23.2	23.7	15.2	9.1	4.7	1.2	-1.4	-3.6	-4.7	-5.3	-5.4	-5.4	-5.1	-4.6	-4.3	-4.1	-4.1	-4.1	-3.7	-2.1	0.5
4/5/2022	10:00:00 PM	54.4		52.5	50.1	47.3	44.4	40.6	37.1	35.2	31.2	29.2	27.1	27.5	23.7	24.8	20.7	15.2	10.5	6.6	4	0.5	-2.6	-4.5	-5.6	-6	-6.1	-6	-5.9	-5.6	-5.1	-4.6	-4.4	-4.4	-4.3	-3.8	-2.2	0.5
4/5/2022	11:00:00 PM	56.7		55	52.5	49.7	46.8	43.1	40	38.4	36.1	32.9	32.2	32.3	30.1	29.2	26.7	22.6	17.9	12.6	8	3.3	-0.1	-2.6	-4.7	-5.5	-5.8	-5.7	-5.5	-5.2	-4.5	-3.6	-3.7	-4.1	-4.1	-3.6	-2	0.5
4/6/2022	12:00:00 AM	53.1		50.9	48.1	45.1	42.3	38.4	35.2	33.9	29.6	27.6	26.8	26.6	24.2	23.1	19.2	14	10.1	5.3	2.4	-1.1	-3.8	-5.1	-5.6	-5.8	-5.9	-5.8	-5.7	-5.4	-5	-4.6	-4.4	-4.3	-4.3	-3.8	-2.2	0.5
4/6/2022	1:00:00 AM	50.9		48.4	45.8	42.9	39.9	36	32.9	32.6	27.7	24.8	24	22.3	19.7	19.7	16.7	11.6	7.9	3.1	0.5	-2.4	-4	-4.6	-4.9	-5	-5.1	-4.9	-5.2	-4.6	-4.2	-4.1	-4.1	-3.6	-2	0.6
4/6/2022	2:00:00 AM	48.4		46	43	40.5	38.1	35.4	31.9	37.5	29.2	28.4	27	25	21.9	20.9	18.4	10.5	5.9	1.4	-1.5	-3.5	-4.3	-4.6	-4.7	-4.8	-5	-5	-5	-4.8	-4.5	-4.1	-4	-4.1	-4	-3.6	-2	0.6
4/6/2022	3:00:00 AM	48.3		45.7	43	40.6	41	36.5	34	37.8	33.1	31.7	31.4	28.5	25	24.1	19.7	11.7	5.5	1.3	-1.3	-3.2	-3.9	-4.2	-4.4	-4.6	-4.7	-4.8	-4.8	-4.6	-4.3	-4	-3.8	-3.9	-3.9	-3.5	-1.9	0.7
4/6/2022	4:00:00 AM	45.7		43.5	40.9	39.1	40.4	35.1	33.8	36.6	31.7	30.3	28.1	26.9	22.1	21.3	15.9	6.6	1.3	-0.3	-1.8	-3.2	-3.5	-3.7	-3.9	-4.1	-4.2	-4.3	-4.3	-4.2	-3.9	-3.7	-3.6	-3.7	-3.7	-3.3	-1.8	0.7
4/6/2022	5:00:00 AM	42.4		40.7	37.7	36.8	40.4	34.4	34.2	35.9	31.7	29.8	28.4	27.7	25.8	25.1	23.4	20.4	17.7	12.3	3.7	-0.6	-4.2	-5.3	-5.2	-4.7	-4.8	-1.3	2.2	8.5	9.9	6.4	1.1	-4.4	-4.5	-4	-2.3	0.5
4/6/2022	6:00:00 AM	38.7		36.6	35.5	35.5	39.8	34.4	34.2	36.2	33	32.4	29.3	27.9	24.9	24.5	23.2	20.9	17.3	12.4	6.1	0.8	-1.6	-1.7	-1.9	3.2	3.7	9.4	12.7	11.2	8.1	0.9	-2.7	-3	-3.1	-2.8	-1.5	0.9
4/6/2022	7:00:00 AM	43.7		42.8	41.1	40.7	40.8	39.2	39	38.8	38.2	37.1	36.2	36.1	35.2	35	34.2	32.4	31.9	31.1	30.3	29.9	29.6	29	28.2	27.8	27.1	25.8	25.4	25.3	24.4	24	23.6	22.7	22.3	22.1	21	20.6
4/6/2022	8:00:00 AM	45.8		43.7	41.2	39.1	37.9	37	34.9	36.9	32.3	31	29.1	26.3	23	20.6	14.9	13.5	8.5	3.9	2.7	1.6	1.3	0.2	0.3	6.1	1.4	0.7	0.4	0.1	0.1	0.4	-0.6	0.8	-1.1	-0.8	0.1	1.4
4/6/2022	9:00:00 AM	56.3		54.5	52.3	49.5	47.2	44.9	43.9	43.3	42.2	41.1	39.3	45.2	46.3	41.9	36	40.7	34	30.3	25.3	20.6	16	14.5	10.9	8.3	5.7	5.2	4.9	4.6	5	4.7	4.3	3.9	3.6	3.7	3.8	4.2
4/6/2022	10:00:00 AM	60.6		59.5	57.8	55.1	52.3	49.5	46.4	43.2	39.8	37.2	35.9	34.5	31.7	31.1	28.4	25.3	24	22.5	19.8	17.6	14.4	12.8	12.6	11.5	8.7	8.6	8.4	7.7	5.4	4.6	4.3	3.6	2.9	2.8	3	3.8
4/6/2022	11:00:00 AM	59.8		58.4	56.3	53.9	51	48.1	44.6	42.5	38.8	37	35.8	34.3	32.9	32.7	33	31.8	31.7	30.9	31.1	30	29.1	28.5	28.2	27.6	26.8	25.7	24.9	24.8	24.9	24.5	24.1	23.3	22.3	22.2	21.6	20.7
4/6/2022	12:00:00 PM	58.6		56.8	55.3	53.2	50.6	48.3	46.2	46.3	46.7	45.7	44.3	41.7	38.7	35.2	31.3	27.7	27.4	25.3	24.4	24.6	23.6	23.2	22.5	21.9	21.3	20.6	19.7	19.4	18.7	19	17.8	17.3	16.3	16.2	15.6	15.3
4/6/2022	1:00:00 PM	58.1		57.3	55.5	52.9	49.1	47.4	44.6	43	38.9	38.6	39	38.7	37.4	36.4	33.9	30.7	26.7	23.8	22.7	20.4	17.5	13.4	14.3	12.4	10	10.4	9.3	5.2	4.3	3.4	2.8	1.6	1.1	1.4	1.7	2.4
4/6/2022	2:00:00 PM	59.9		59	57	54.8	52.4	49	45.9	43.4	40.2	38.7	37.6	36.1	33.6	30.9	27.9	24.3	18.9	16.8	16	13	9.2	8.2	8.5	10.5	4.7	2.9	2.2	1.5	1.2	0.9	0.5	0.4	-0.1	0.2	0.7	1.6
4/6/2022	3:00:00 PM	58.5		57.4	55.2	52.6	50.1	46.8	43	39.8	36.4	33.1	30.4	27.4	24.5	22.7	19.8	16.8	14.1	13.5	12.2	10.4	5.2	5	4.3	2.6	1.1	0.7	-1	-2.3	1.9	2.2	-2.8	2.9	3.2	-2.6	1.5	0.3
4/6/2022	4:00:00 PM	58.7		57.3	55.5	53.5	51.6	49.8	48.2	47.5	46.5	45.7	44.9	45.2	46.5	44.4	42.2	42.4	40.7	40.1	39.3	38.3	37.8	36.9	36.2	35.4	34.7	33.8	33.2	32.3	31.7	31.3	30.7	29.7	28.9	28.4	27.6	27
4/6/2022	5:00:00 PM	59.1		57.7	56.3	54.6	53.1	52.4	51.7	50.4	49.4	48.5	48.1	47.8	47.1	46.4	45.9	45.3	44.7	44	43.6	42.9	42.2	41.7	41	40.4	39.6	38.8	38.1	37.3	36.8	36.4	35.7	35	34.1	33.7	32.9	32.2
4/6/2022	6:00:00 PM	50.7		49.8	48.8	47.5	46.6	46	46	46	44.9	43.8	43.7	42.9	41.4	41.3	40.4	39.9	39.1	38.4	37.5	36.8	36.1	35.3	34.7	33.7	33.1	32.5	31.7	30.9	30.6	30	29.3	28.6	27.7	27.3	26.6	25.9
4/6/2022	7:00:00 PM	48		46.4	44.8	43.5	42	40.7	39.3	38.7	37.8	36.7	36.8	36.8	35.3	34.8	34.6	33.7	33.2	32.6	31.6	30.7	30.1	29.2	28.4	27.7	26.7	25.7	24.9	24.6	23.8	23.2	22.7	21.7	20.8	19.9	19.1	18.6
4/6/2022	8:00:00 PM	46.9		45.6	42.6	40.2	39	38.4	37	35.1	35.2	33.7	33.1	33.3	32.4	32.6	30.8	31.2	30	29.2	28.2	27.5	27	26.2	25.6	24.3	24.4	23.2	22.8	21.8	21.6	20.6	20.2	19.4	18.5	18.1	17.3	16.4
4/6/2022	9:00:00 PM	39.5		37.5	35.3	33.6	32.8	31.6	30.6	29.4	27.4	26.9	26	25.2	28.9	30.3	25.2	21.3	20.8	19.4	18.7	18.3	17.5	16.6	16	14.7	13.9	13.3	13.2	12.4	12.8	11.9	11.9	11.8	10.9	10.6	10.7	10.1
4/6/2022	10:00:00 PM	47.5		44.8	42.2	39.5	36.8	34.3	32.9	31.7	31.7	30.3	28.6	27.5	26.8	26	25.6	25.5	22.9	21.2	20.7	19.7	18.3	17.6	16.3	17.4	17.2	16.3	15.2	15.2	15.1	14.5	13.4	12.3	11.8	12.3	11	11
4/6/2022	11:00:00 PM	48.4		46	42.9	39.6	36.3	32.8	29.6	27.1	24.3	23.3	22.8	22.8	23	22.4	21.8	21.3	19.4	14.6	9.5	6.5	6.1	5.9	5.7	5.5	5.3	5.1	4.9	4.9	5	5.2	5.2	5	4.8	5.1	5.3	5.7

4/7/2022	12:00:00 AM	39.2	36.7	34.1	32.5	30.6	30	29.4	28.7	27.9	27.4	27.2	27.2	26.4	25.8	25.4	24.2	21.4	18.9	16.9	14.7	14.1	13.5	12.4	11	12.3	11.4	9.5	9.7	11.1	10.8	10.1	8.9	9.1	8.4	8.4	8.3
4/7/2022	1:00:00 AM	40.5	38	35.2	32.9	31.4	29.1	28.7	26.5	22.6	21.5	19.8	16.9	13.5	10.5	8.7	7.6	7.2	7	6.8	6.6	6.5	6.3	6.1	6	5.8	5.6	5.4	5.4	5.5	5.7	5.7	5.5	5.4	5.6	5.8	6.1
4/7/2022	2:00:00 AM	39	36.5	33.6	31.5	29.8	27.8	28	25.5	21.5	19.3	16.4	14.2	10.9	8	6.2	5.5	5.3	5.2	5.1	5	5	4.9	4.8	4.7	4.6	4.5	4.4	4.4	4.6	4.8	4.8	4.6	4.5	4.7	5	5.4
4/7/2022	3:00:00 AM	40.1	37.5	35.2	33.2	33	30.5	30.2	29.7	28.1	26.5	24.7	25.4	24.4	23.6	22.5	25.3	23.2	22.1	22.1	22	22.6	22.5	20.2	21.7	20.4	21.2	22.3	19.4	21.2	21	18.8	19.5	16.7	17.3	16.7	16.3
4/7/2022	4:00:00 AM	42.6	39.9	37.2	35.1	34.1	31.4	30.4	28.9	25	22.1	19.2	18.6	15.5	10.9	7.2	4.6	3.2	2.7	2.3	3	8.3	13.6	15.9	5.7	4.6	1.4	0.6	0.4	0.6	0.7	0.6	0.4	0.2	0.4	1	2.3
4/7/2022	5:00:00 AM	42	39.4	36.7	34.2	32.7	30.2	29	28.8	23.7	20.4	18.2	15.6	12.5	10.3	8.7	5.5	2.7	2.3	4.3	1.9	1.3	1.1	0.5	0.8	0.7	1.8	4.6	10.7	13.8	9.9	1.8	0.2	0.2	0	0.6	2
4/7/2022	6:00:00 AM	43.2	41.1	38.4	37.3	36.4	36.1	35.4	34.1	33.6	33.2	33.3	32	31.4	32	30.9	29.6	27.1	26.3	27.1	27.2	26.9	26.8	25.6	26	25	24.4	25.2	24.1	23.4	21.3	19.8	19.4	19	18.1	17.4	16.4
4/7/2022	7:00:00 AM	48.5	46.5	45	43.5	42.3	41	39.3	39.7	38.4	38.5	38.7	37.1	37.6	36.6	37	36.1	35.1	34.5	33.1	33.2	32.8	32.1	31.7	30.8	30.5	29.8	29.3	28.6	28.2	28.3	27.8	26.8	25.9	25.6	25.1	24.2
4/7/2022	8:00:00 AM	57	55.2	52.9	49.9	46.8	43.2	40.2	38.5	34.2	32.1	30.5	32.8	39.8	35.1	30.2	29.4	25.4	19.7	13.7	6.5	-0.7	-1.1	-2.6	-2.7	-4	-1.7	-0.6	1	4.9	3.7	0.7	-3.7	-4	-3.5	-2.3	-0.1
4/7/2022	9:00:00 AM	59.6	57.9	55.5	52.7	49.7	45.9	42.2	39.1	35.5	32.5	29.5	27.1	24.4	22	19	17.6	14.2	11.9	13.8	7.9	4.5	3.7	3.3	4.1	2.1	2.4	3	7.3	16.2	18.5	12.1	-2.4	-3.3	-2.9	-1.9	0
4/7/2022	10:00:00 AM	59.5	58.1	55.8	53	50.1	46.9	44.2	43.9	45.3	47	48.5	49.1	49.3	48.3	46.6	44.1	40.6	36.5	28.6	17.1	9.4	7.1	7.4	7.4	6.9	1.6	0.9	1	0.3	0.2	-1.9	-2.5	-3	-2.4	-1.4	0.2
4/7/2022	11:00:00 AM	59.5	58.3	56.2	53.6	50.8	47.7	45.3	44.7	45.8	47.4	48	47.8	47.2	47.7	45.8	44.2	41.7	36.3	30.7	23.7	17	13.3	10.7	9.5	7.7	7	5.4	5.6	4.9	3.7	3.7	4.1	3.3	3.4	2.8	2.7
4/7/2022	12:00:00 PM	58.8	57.6	55.8	53.1	50	47.1	44	42.1	40.7	39.4	40.1	40.6	39.8	37.3	35.2	32.9	31.1	30.1	29.8	29.2	27.8	27.5	26.3	26	25.3	24.5	23.8	23.3	23	22.7	21.8	21.1	20.7	20.3	19.8	19.2
4/7/2022	1:00:00 PM	56.8	55.3	53.2	50.5	47.6	44.1	40.2	36.6	32.9	28.9	25.8	22.9	20.2	18.3	19.9	20.4	15.2	17.9	18.9	14.9	11.5	10.9	11	9.9	8.3	7.3	7	6.7	6.8	7	7.1	7	7.1	7.1	7.2	7
4/7/2022	2:00:00 PM	58.5	57.1	56	54	51.5	49.2	46.3	42.1	39.4	35.9	32.7	28.4	25.8	22.6	22.2	20.9	17.8	19.3	18.6	15.2	11.7	11.3	11.2	12.1	7.3	5.6	4.8	4.2	3.9	3.9	3.9	3.7	3.3	3.6	3.6	3.9
4/7/2022	3:00:00 PM	56.4	54.6	52.4	49.8	47.6	45.5	42.7	40	35.7	32.8	28.1	24.8	22.6	19.5	19.7	17.7	14.5	17.4	15.7	13.9	10.6	10.6	10.4	9.2	8.2	7.6	7.4	7.1	6.9	6.9	6.8	6.5	6.1	6.3	6.3	6.3
4/7/2022	4:00:00 PM	56.4	54.4	52.2	49.5	46.3	42.7	39.1	36.3	35.9	36.4	33.8	32.1	30.6	28.2	26.5	24	21.5	19.9	18.6	18	17.4	16.8	16.5	16	15.5	15.1	14.8	14.6	14.6	14.5	14.4	14.1	13.7	13.8	13.7	13.4
4/7/2022	5:00:00 PM	57.4	56.2	54.8	53.8	53.2	52.7	51.4	51	50.7	50.1	49.5	49.1	48.6	47.7	47.1	46.6	46.1	45.5	44.9	44.2	43.5	42.8	42.2	41.6	40.9	40.1	39.3	38.8	38.4	38	37.4	36.6	35.9	35.4	34.8	34.1
4/7/2022	6:00:00 PM	49.2	46.9	44.7	41.4	40.5	38.8	37.6	36.6	35.3	35.4	35.2	33.6	34.1	32.6	32.6	32.3	31.6	33.1	31.8	30.8	31.3	31	30.8	30	29.4	27.7	27.8	26.8	26.3	26.4	25.5	25.5	24.5	24.6	24	22.7
4/7/2022	7:00:00 PM	41.2	38.7	36.3	34.4	33.9	32.9	32.7	30.6	28.3	29.3	27.2	29.3	28.1	26.2	25.9	24.6	22.9	22.3	21.5	21.3	20.2	19.4	19.1	17.8	20.2	17.7	16	16	15.3	14.8	14.2	14.1	12.9	13	12.7	11.6
4/7/2022	8:00:00 PM	37.3	34.8	32.3	29.4	29	28.1	24.7	24.4	24.5	24.8	25.3	24.9	24.2	23.1	21.9	20.5	18	14.8	10.4	8.3	7.2	6.8	6	5.5	5.1	4.6	4.3	4	4	4	3.8	3.5	3.2	3.3	3.5	4
4/7/2022	9:00:00 PM	39	36.2	33.2	30.3	28.8	26.3	22.9	21.7	20.3	19.7	19.2	19.8	31.6	32.6	25.7	16.7	19.7	14.6	10.1	8.7	8	7.4	7.1	6.7	6.2	5.8	5.4	5.2	5.2	5.2	5	4.7	4.3	4.4	4.5	4.9
4/7/2022	10:00:00 PM	42.9	40.2	38.1	35.6	34.8	33.9	33	31.1	30.6	30.8	29.3	29.2	29.2	29.1	28.7	27	27.9	26	25.7	25.4	25.4	25.5	24.7	24.5	23.2	22.3	22.4	22.2	22.2	20.8	20	19.5	19.2	18.8	18.8	18
4/7/2022	11:00:00 PM	42.9	40.5	36.9	34.5	32.1	30.6	29.6	28	27.7	27.5	26.9	26.4	25.9	25.3	24	22.8	20.9	20.1	20.3	18.5	17	16.2	16.2	15.1	15.3	14.8	14.3	13.8	13.5	14	13.3	12.7	12.2	12.1	11.2	10.6
4/8/2022	12:00:00 AM	45.5	42.7	40	37.1	34.3	31.5	30.4	29.4	28.5	27.1	27.2	26.4	26.1	25.4	24.6	24.6	24	22.7	22.1	20.6	21.7	21.1	20.7	21.6	20.9	19.8	18.8	17.6	16.7	16.1	15.3	15.4	16	15.3	14.4	14.1
4/8/2022	1:00:00 AM	52.3	50.1	47	43.7	40.2	37.4	34.9	33	30.2	27.9	28.4	27.8	25.9	26.3	25.2	23.8	24.3	23.3	23.5	22.6	21.8	21.6	20.8	20.3	19	21.1	19.3	18.3	19	18.5	18.5	17.8	17.5	16.3	15.7	15.7
4/8/2022	2:00:00 AM	50.4	47.8	44.6	41	37	33.1	29.6	26.5	22.9	19.6	16.8	14.4	12.3	10.1	8.3	6	3.7	1.6	-0.4	-2.4	-3.5	-4.1	-4.3	-4.4	-4.4	-4.1	-4.1	-4.3	-4	-3.7	-3.6	-3.6	-3.6	-3.1	-1.7	0.5
4/8/2022	3:00:00 AM	51.5	49	45.9	42.1	38.5	34.5	30.7	27.9	24.1	20.6	17.7	15.2	12.7	10.7	8.9	6.9	4.7	2.7	0.6	-1	-3.2	-4.1	-4.4	-4.4	-4.6	-3.8	-3.8	-4.5	-4.2	-3.9	-3.8	-3.8	-3.9	-3.3	-1.8	0.4
4/8/2022	4:00:00 AM	54.7	52.8	50.7	47.4	43.9	40.1	35.9	33.1	28.9	25.8	23.2	21.2	19.5	19.1	17.1	11.8	8.7	6.3	4	1.1	-1.3	-2.8	-4	-4.5	-4.6	-3.7	-3.5	-4.3	-4.1	-3.7	-3.6	-3.7	-3.7	-3.1	-1.8	0.4
4/8/2022	5:00:00 AM	46	43.5	40.2	36.9	34.6	30.1	27	29.3	23.7	22.1	21.1	20.4	18.8	19.6	17.5	10.8	4.9	0.7	-1.1	-2.3	-3.5	-2.2	3.9	7.9	5.5	8.7	7	7	7.9	3.2	-0.6	-2.9	-3.7	-3.2	-1.8	0.5
4/8/2022	6:00:00 AM	46.9	43.9	41	37.9	36.2	32.9	30.5	31.9	29	28.2	27	26.2	25.5	25.2	23.5	20.9	18	15.3	14	13.1	12.6	10.7	12.3	10.3	10.3	13	18.5	15.7	14.7	10.9	10.7	10	8.9	8.8	8	7.9

4/8/2022	7:00:00 AM	44.6	42.1	39.4	36.6	35	32	30.3	32.9	30.4	29.7	29.3	29.6	29	27.2	24.7	21.7	19.3	16.7	17.4	14.2	16.7	11.3	16.5	18.9	14.5	16.4	15.8	14	15.2	15.1	14.9	13.1	10.9	11.3	9.3	10.5
4/8/2022	8:00:00 AM	58.1	56.4	54	51.5	48.3	44.9	41.5	40.7	40.6	41.6	41.9	44.2	45.6	39.7	37	35.7	31.7	27.1	23.5	17.1	10.6	6.6	8.9	9.7	11	10.3	11.3	9.7	10.2	9.6	8.2	4.9	5	3.8	4.3	5.1
4/8/2022	9:00:00 AM	69.7	68.9	67.7	65.8	63.7	60.7	57.5	53.9	50.1	46.5	43.1	40.1	38.3	35.9	34.7	33.5	33	32.1	31.7	31.2	30.8	29.5	28.4	27.9	27.6	27.3	26.8	26.2	26.4	25.7	25.6	25	24.1	23.7	22.7	22.2
4/8/2022	10:00:00 AM	72.2	71.5	70.5	69	67.1	64.5	61.5	58.3	54.6	50.9	47.1	43.5	39.8	36.9	35.2	33	32	30.9	29.7	26	24.5	24.1	22.6	21.4	21.2	19.7	19.7	18.4	19.1	18.3	17.1	16.3	16	15.6	15.2	13.6
4/8/2022	11:00:00 AM	67.2	66.2	64.7	62.8	60.1	57.5	53.9	50.4	46.7	42.7	39.2	35.8	32.4	29.6	27.9	26.7	25	24.1	23.5	21.3	19.3	18.3	17.3	16.2	15.3	14.5	13.9	13.4	13.2	13	12.7	12.3	11.8	11.7	11.5	11.2
4/8/2022	12:00:00 PM	67.6	66.5	65.1	63.1	60.7	57.9	54.1	51.1	47.4	44	40.3	36.8	33.1	29.8	27.9	26.2	24.1	23.2	22.5	19.7	16.4	14.7	13.5	12.1	10.1	8.7	7.8	7	7	7.3	7.3	7	6.4	6.7	6.8	6.9
4/8/2022	1:00:00 PM	72.2	71.1	69.7	68.1	65.9	63.3	60.1	57.2	53.9	50.3	46.8	43.4	39.8	36.3	33.4	31.2	29.3	27.8	26.6	23.9	21.3	19.6	18.1	17	15.6	14.6	13.5	12.5	11.9	11.7	11.7	11.4	11	10.9	10.8	10.7
4/8/2022	2:00:00 PM	73.2	72	70.7	68.9	66.8	64.4	61.5	58.6	55.2	52	48.6	45	41.5	37.9	35.1	33	31.1	30.1	28.3	26	24.1	22.7	21.7	21.8	21.9	20.8	18.4	16.7	17	16.5	16.3	15.3	15.2	14.8	14.5	13.8
4/8/2022	3:00:00 PM	73.3	72.3	70.9	69.2	67.1	64.6	62	59.1	56.2	53.2	50.5	48.2	46.3	45	44.1	43.2	42.5	41.8	41.2	40.7	40	39.4	38.9	37.9	37.4	36.8	36.2	35.4	35	34.6	34	33.1	32.4	32.1	31.4	30.6
4/8/2022	4:00:00 PM	75.7	74.5	73.4	71.8	70	67.8	65.5	63.1	60.3	57.6	55.1	52.7	50.6	48.6	47.2	46.4	45.4	44.6	44.1	43.4	42.7	42.1	41.4	41.2	40.3	39.6	38.9	38.3	37.8	37.4	36.8	36	35.2	34.9	34.4	33.6
4/8/2022	5:00:00 PM	72.2	71.4	69.9	68.1	65.9	63.4	60.8	58.2	55.6	53.3	51.7	49.9	49.3	48.4	47.4	46.8	45.9	45.3	44.5	43.9	43.2	42.4	41.5	40.9	40.1	39.4	38.7	38	37.5	37.1	36.4	35.6	34.8	34.4	33.8	32.9
4/8/2022	6:00:00 PM	71.3	70.4	69	67.1	65.4	62.8	60.2	57.8	55.2	53.1	51.5	50.4	49.5	48.7	48.1	47.8	47.3	46.7	46.2	45.5	45	44.4	44	43.2	42.7	41.9	41.3	40.8	40.4	40.1	39.6	38.9	38.2	37.9	37.3	36.6
4/8/2022	7:00:00 PM	61.1	60.4	59.3	58.4	57.4	56.6	55.8	55.1	54.6	54	53.4	52.8	52.3	51.6	51.1	50.5	49.9	49.2	48.6	47.9	47.3	46.6	45.9	45.2	44.4	43.8	43	42.4	42	41.6	40.9	40.1	39.3	38.8	38.2	37.4
4/8/2022	8:00:00 PM	54.6	54	52.6	52.5	51.6	51	50.2	49.3	48.8	48	47.2	46.3	46.4	45.7	44.6	43.7	42.9	41.9	41.2	40.3	39.7	38.7	38	37.1	36.2	35.3	34.5	33.8	33.1	32.5	31.7	30.7	29.8	29.2	28.4	27.4
4/8/2022	9:00:00 PM	59.7	58.5	56.6	54.3	52.1	50.1	48.4	47.5	46.4	45.5	44.7	44	43.4	42.6	41.7	41.1	40.2	39.4	38.7	38	37.4	36.6	35.6	34.7	33.8	32.8	32	31.3	30.6	30.1	29.4	28.5	27.6	27	26.2	25.3
4/8/2022	10:00:00 PM	68	67	65.5	63.4	61	58.4	55.4	52.6	49.9	48	46.3	45.1	43.9	43.6	42.4	42	41.4	40.4	39.6	38.7	38	37.2	36.3	35.7	34.6	34.1	33.1	32.5	32	31.4	30.7	29.8	29	28.5	27.8	26.8
4/8/2022	11:00:00 PM	69.1	68	66.8	65.2	63.1	60.7	57.9	55.1	51.9	49	46.1	44.1	42.4	41.3	40.3	39.6	38.3	37.7	36.4	35.5	35	34.4	33.1	32.5	31.4	30.5	29.9	28.9	28.5	27.7	27.1	26.1	25.1	24.4	23.6	22.7
4/9/2022	12:00:00 AM	71.7	70.8	69.9	68.2	66	63.5	60.6	57.5	54.5	51.9	49.8	47.8	46.9	45.9	45.1	44.7	44.1	43.5	42.7	41.9	41.2	40.5	39.8	39	38	37.2	36.4	35.7	35.2	34.7	33.9	33	32.2	31.6	31	30
4/9/2022	1:00:00 AM	70.4	69.8	68.6	67	65	62.2	59.6	57	54.6	52.9	51.5	50.8	50.1	49.4	48.7	48.2	47.7	47	46.5	46	45.3	44.7	44.2	43.6	43	42.4	42	41.6	41.4	41.3	40.9	40.5	40	39.9	39.6	39.1
4/9/2022	2:00:00 AM	70.4	69.8	68.6	67.2	65.4	63	60.7	58.6	56.8	55.6	54.7	54	53.6	53.2	52.6	52.2	51.8	51.2	50.8	50.4	49.9	49.5	49	48.4	47.9	47.4	47	46.6	46.4	46.3	45.9	45.4	44.9	44.8	44.5	44
4/9/2022	3:00:00 AM	71.6	70.9	69.9	68.5	66.3	64	61.2	58.4	56	53.9	52.4	51.3	50.4	49.8	49	48.3	47.8	47	46.3	45.7	45	44.3	43.6	42.9	42	41.2	40.5	39.8	39.3	38.8	38.1	37.2	36.4	35.9	35.2	34.3
4/9/2022	4:00:00 AM	72	71.5	70.2	68.7	66.8	64.2	61.6	58.8	56.1	53.9	52.2	50.9	49.9	49.2	48.2	47.5	46.9	46.2	45.5	44.8	44	43.4	42.6	41.9	41.1	40.3	39.5	38.8	38.3	37.7	37	36	35.2	34.6	33.9	32.9
4/9/2022	5:00:00 AM	67.9	67	65.5	63.5	61.3	58.5	55.6	53.2	50.9	49.3	48.1	47	46.7	46.4	45.7	44.5	43.9	43.3	42.7	42	41.3	40.6	39.8	39.1	38.3	37.5	36.7	36.1	35.5	35.2	34.4	33.5	32.6	32	31.4	30.5
4/9/2022	6:00:00 AM	69.3	68.6	67.4	65.8	63.6	60.9	57.8	54.5	50.8	47.5	44.3	41.2	38.8	37.3	35.9	33.9	32.9	31.9	31.2	30.4	29.7	29.1	28.4	27.9	27.2	26.6	26	25.6	25.3	25.1	24.5	23.9	23.3	23	22.5	21.8
4/9/2022	7:00:00 AM	71.9	71.2	70.3	69	67.2	64.7	61.9	58.7	55.9	53.3	51.1	49.5	48	47.3	46.4	45.4	44.5	43.5	42.9	42.3	41.6	40.9	40.1	39.4	38.5	37.7	37	36.4	35.7	35.3	34.6	33.8	33.1	32.5	31.9	31.1
4/9/2022	8:00:00 AM	67.9	67.3	66.1	64.3	62	59	56.1	53.4	50.4	48.3	46.3	45.6	44.8	44.5	43.5	41.6	40.6	39.8	39	38.1	37.4	36.9	35.9	35.2	34.7	33.9	33	32.4	31.9	31.5	31	30.1	29.2	28.9	28.3	27.5
4/9/2022	9:00:00 AM	64.7	63.8	62.4	60.4	58.2	55.5	53.2	51.6	49.7	48.7	48	47.5	46.9	46.4	45.6	44.5	43.3	42.8	41.9	41.1	40.5	39.8	39.1	38.3	37.7	37	36.2	35.6	35.1	34.7	34	33.1	32.1	31.7	31	30.2
4/9/2022	10:00:00 AM	68.2	67.7	66.5	64.6	62.5	59.9	56.8	54.3	50.8	48.1	46.1	45	44.5	44.2	42.6	40.4	39.2	38.4	37.7	37.1	36.1	35.4	34.7	33.8	33.1	32.2	31.6	30.9	30.3	30	29.3	28.3	27.6	27.1	26.5	25.6
4/9/2022	11:00:00 AM	69.6	68.9	67.8	66.4	64.2	61.5	58.4	55.7	51.6	48.1	45	42.6	41.2	40.8	38.5	35.8	33.6	31.6	29.1	27	25.8	24.8	24.1	23.1	22.3	21.4	20.7	20.1	19.7	19.7	18.5	17.6	16.7	16.3	15.6	14.9
4/9/2022	12:00:00 PM	69.4	68.6	67.6	66.1	63.9	61.4	58.3	55.4	51.3	47.8	44.6	42.2	40.4	39.7	37.2	33.3	30.5	27.6	25.1	22.4	20.5	19.2	18.1	17.1	15.9	15.2	14.4	13.8	13.6	13.3	13	12.3	11.8	11.5	11.2	10.7
4/9/2022	1:00:00 PM	71.3	70.6	69.9	68.4	66.3	64	61.1	58.3	54.6	51.5	48.6	46.2	44.5	43.8	42.3	39.8	38.6	37.6	36.7	35.5	34.1	33.7	32.6	32.2	30.8	29.9	29.2	28.1	27.9	27.5	26.4	25.5	24.5	23.8	23	22.1

4/9/2022	2:00:00 PM	74.9	74.3	73.3	72.2	70.6	68.8	66.3	63.6	60.5	57.5	54.4	51	47.7	44.9	42.2	39.8	38.3	36.9	35.4	33.6	32.4	31.6	30.6	29.4	28.6	27.7	26.7	26.1	25.4	25	24.2	23.2	22.5	21.8	21.3	20.2
4/9/2022	3:00:00 PM	74	73.3	72.4	71.4	69.8	67.7	65.2	62.4	59	55.9	52.4	49.1	45.9	43.3	40.9	38.6	37.1	36	34.8	33.5	32.3	31.7	30.9	30.1	29.1	28.2	27.4	26.8	26.3	25.6	25	24.2	23.3	22.7	22	21
4/9/2022	4:00:00 PM	74	73.3	72.5	71.2	69.6	67.4	64.8	62.1	58.7	55.7	52.5	49.4	46.7	44.4	43	41.5	40.3	39.4	38.5	37.4	36.5	35.7	34.8	33.9	33.1	32.4	31.6	30.7	30.1	29.5	28.6	27.7	26.9	26.3	25.5	24.6
4/9/2022	5:00:00 PM	76.5	75.8	74.9	73.8	72.3	70.3	68	65.4	62.6	60	57.6	55.6	54	52.8	51.9	51.2	50.7	50	49.4	48.8	48.2	47.6	46.9	46.3	45.6	45	44.4	43.8	43.5	43.1	42.6	41.9	41.2	40.8	40.3	39.5
4/9/2022	6:00:00 PM	77.6	76.9	76	74.9	73.4	71.6	69.4	66.9	64	61.1	58	54.9	51.8	49.1	47	45.6	44.5	43.6	42.7	41.9	41.1	40.4	39.9	39.2	38.5	37.9	37.2	36.6	36.2	35.7	35.1	34.3	33.6	33.2	32.6	31.8
4/9/2022	7:00:00 PM	76.8	76.1	75.2	73.9	72.6	70.7	68.3	65.7	62.8	60	57	54	51	48.7	47	45.5	44.7	43.9	42.9	42.1	41.3	40.5	39.9	39.2	38.3	37.7	36.9	36.5	36	35.7	35.1	34.4	33.7	33.3	32.8	32.1
4/9/2022	8:00:00 PM	75.7	75	74	72.8	71.2	69.1	66.7	63.8	60.6	57.5	54.3	50.8	47.7	45	43.1	41.6	40.4	39.5	38.6	37.6	36.8	36	35.3	34.5	33.7	33	32.3	31.6	31.2	30.8	30.1	29.4	28.6	28.2	27.6	26.8
4/9/2022	9:00:00 PM	73.6	73	72	70.6	68.8	66.5	63.8	60.8	57.5	54.3	51.2	48.2	45.4	43.4	42	41	40.2	39.5	38.7	37.9	37.2	36.5	35.8	35.3	34.4	33.7	33.1	32.5	32.1	31.7	31.1	30.3	29.6	29.2	28.7	27.9
4/9/2022	10:00:00 PM	72.3	71.4	70.3	68.9	66.9	64.3	61.3	58.1	54.6	51.2	47.8	44.7	42.1	40.6	38.9	37.4	36.4	35.7	34.9	33.9	33.2	32.6	31.8	31	30.3	29.5	28.7	28.2	27.8	27.3	26.8	25.9	25.2	24.8	24.2	23.5
4/9/2022	11:00:00 PM	71.5	70.8	69.6	68	65.9	63.4	60.5	57.6	54	50.7	47.5	44.5	41.8	40.2	38.7	37.1	36.2	35.4	34.6	33.7	32.8	32.1	31.5	30.7	30	29.3	28.5	27.9	27.5	27.2	26.5	25.8	25.1	24.6	24.1	23.3
4/10/2022	12:00:00 AM	72.6	71.6	70.7	69.2	67.1	65	62	59	55.5	52.2	48.9	45.6	42.9	41	39.4	38	37.2	36.4	35.5	34.6	33.9	33.2	32.5	31.8	31	30.2	29.5	28.8	28.3	27.9	27.3	26.5	25.8	25.3	24.7	23.8
4/10/2022	1:00:00 AM	67.9	67.2	65.9	64	61.6	58.7	55.4	52.2	48.6	45.7	42.9	40.6	39.5	38.4	37.4	36.7	35.9	35.3	34.6	34	33.3	32.6	31.9	31.2	30.3	29.6	28.8	28.3	27.8	27.3	26.6	25.8	25	24.6	24	23.1
4/10/2022	2:00:00 AM	69.9	69.1	68.1	66.5	64.4	61.9	58.8	55.7	52.1	49	46	43.3	41	40	38.8	37.6	37	36.2	35.4	34.7	34	33.2	32.3	31.6	31	30.3	29.5	28.9	28.5	28	27.4	26.5	25.7	25.3	24.7	23.8
4/10/2022	3:00:00 AM	65.7	64.4	62.8	60.5	57.8	54.9	51.5	49.2	45.4	43.2	41.7	40.4	39.5	38.9	37.8	37.2	36.6	36	35.6	34.8	34.2	33.7	32.9	32.4	31.7	31.1	30.3	29.7	29.5	29.1	28.4	27.8	27	26.6	26.1	25.3
4/10/2022	4:00:00 AM	54.9	53.7	51.5	49.4	47.2	45.2	43.6	46.2	41.8	41.1	40.7	39.9	39	38.3	37.2	36.4	35.5	35.1	34.3	33.5	32.9	32	31.1	30.3	29.4	28.5	27.8	27.2	26.7	26.2	25.5	24.6	23.8	23.3	22.6	21.9
4/10/2022	5:00:00 AM	47.5	45.3	43.2	41.1	39.1	37.6	36.3	44.7	35.1	34.2	34	32.8	32.1	31.6	30.7	29.8	29.2	28.7	28.2	27.6	27.1	26.5	25.9	25.3	24.7	24.1	23.7	23.2	23.1	22.8	22	21.2	20.5	20.2	19.7	19.2
4/10/2022	6:00:00 AM	41.9	40.1	38.5	37.7	38.1	36.2	35.4	42	35.1	34.4	35.1	33.4	32.3	32.2	31.1	29.6	29	28.7	27.9	27.4	27	26.3	25.9	25.2	24.5	23.7	23.1	22.6	22.3	22	21.5	20.8	20.1	19.7	19.2	18.6
4/10/2022	7:00:00 AM	42.5	40.5	39.2	38.2	38.5	36.8	36.4	43	36.3	35.7	36.8	33.7	32.7	32.6	30.2	27.8	27	26.4	25.7	25.1	24.6	24.1	23.5	22.9	22.4	21.7	21.1	20.7	20.4	20.1	19.6	19	18.4	18.1	17.7	17.1
4/10/2022	8:00:00 AM	54	52	49.7	47	44.2	41.4	39.6	41.3	37.1	36.5	36.1	35.3	34.3	34.2	33.4	32.6	32	31.6	30.9	30.6	29.8	29.2	28.9	28.2	27.6	26.9	26.5	25.8	25.3	24.9	24.4	23.8	23	22.4	21.9	21.2
4/10/2022	9:00:00 AM	57.3	55.8	53.5	50.8	48.1	44.8	42.4	40.2	37.5	35.6	34.2	32.8	31.7	31	30.5	29.7	29.3	28.9	28.5	27.8	27.4	27	26.3	25.6	25.1	24.6	23.9	23.3	23.2	22.9	22.1	21.4	20.7	20.4	19.9	19.2
4/10/2022	10:00:00 AM	56.7	55.7	53.2	50.9	47.7	44.6	41.8	39.4	36.4	34.3	32.3	30.7	29.2	28.2	27.3	26.3	25.8	24.9	24.4	24	23.3	22.6	22.2	21.9	20.8	20.2	19.7	19.1	18.9	18.6	18.1	17.5	17	16.7	16.3	15.8
4/10/2022	11:00:00 AM	57.6	56.8	54.4	52	49.2	46.7	43.1	40.2	37	35	34.2	33.4	32.4	31.5	30.3	28.7	26.2	24.5	22.4	21.1	20.6	19.8	19.7	19.5	18.1	17.5	17	16.6	16.2	15.9	15.3	14.8	14.3	14.1	13.7	13.2
4/10/2022	12:00:00 PM	58.9	57.3	55.5	53.1	49.8	46.6	42.8	40.3	37.3	35.5	34.4	33.9	33.8	33.6	34.2	37.1	35.7	29.3	25.4	24.1	23.3	22.7	22.4	22.7	21	20.4	19.7	19.2	18.8	18.6	18.1	17.5	16.9	16.6	16.2	15.6
4/10/2022	1:00:00 AM	62.6	61.5	59.7	57	54.3	51.2	47.9	44.5	41.1	37.8	35.4	33.4	31.8	30.6	29.3	28	27.7	27.2	24.1	21.9	21	20.6	20.1	19.7	19	18.5	17.9	17.5	17.2	16.9	16.6	16.1	15.5	15.3	15	14.5
4/10/2022	2:00:00 PM	64.2	63	61.5	59.4	56.8	54.1	50.2	47.1	45	41.2	39.6	36.8	35.3	34.1	32.8	31.1	32.4	32.6	28.7	23.8	22.4	21.8	21.4	21.6	20	19.2	18.5	17.9	17.7	17.4	16.9	16.3	15.7	15.4	15	14.4
4/10/2022	3:00:00 PM	66	65.1	63.5	61.7	59.1	56.1	52.9	49.5	45.9	42.5	39	36.1	33.8	32.4	30.7	30	28	26.4	25.7	25	24.2	23.9	23.5	23	22.7	22.2	21.7	21.5	21.3	21.3	20.8	20.3	19.8	19.6	19.2	18.6
4/10/2022	4:00:00 PM	64.6	63.4	61.7	59.4	56.5	53.6	49.7	46.3	42.7	39.4	36.4	34.4	32.7	31.6	30.2	28.9	27.1	25.8	24.5	23.7	22.9	22.3	21.9	21.2	20.7	20.1	19.5	19.1	18.8	18.6	18.2	17.4	16.8	16.5	16	15.5
4/10/2022	5:00:00 PM	61.7	60.8	59.4	57.3	54.7	51.7	48.8	45.5	42.8	40.6	40.4	38.7	37.9	36.7	36.5	35.7	35.8	34.2	34.3	33.4	32.5	31.9	31.3	30.4	30.2	29.2	28.3	27.5	27.3	26.8	26.2	25.4	24.6	24.3	23.6	22.8
4/10/2022	6:00:00 PM	64.7	63.5	62.1	59.8	56.9	53.9	50.5	46.8	43.7	40	36.9	34.6	32.9	31.6	30.8	30.1	28.9	28.2	27.1	27.3	26.2	26.3	24.3	24.5	24.2	23.3	22.3	22.8	21.9	21.7	21.3	20.9	20.7	20.3	19.7	19.3
4/10/2022	7:00:00 PM	65	64.1	62.3	60.5	57.7	54.8	51.6	48.2	44.8	41.8	38.9	36.7	35.8	35.3	34.1	33.1	33.3	32.9	32.5	31.8	31.6	31.3	30.5	29.6	29.2	29.2	27.7	27.7	27.6	27.6	27	26.5	26	25.5	25.1	24.3
4/10/2022	8:00:00 PM	62.2	61.1	59.7	57.8	54.8	51.7	48.5	45.9	41.5	38	34.4	31.7	30	30	27.1	22.2	19.1	16.8	14.6	11.6	8.6	6.2	4.6	2.8	0.6	-0.6	-1.6	-1.9	-1.4	-1.2	-1.1	-1	-1.4	-1.5	-0.6	1.1

4/10/2022	9:00:00 PM		50	47.8	45.5	42.4	39.5	36.9	33.6	41	32.2	29.4	29.3	30.1	30.5	31.8	28.7	23.1	20.2	19.2	17.8	19.6	20.3	19.2	19	17.8	14.7	14	16.5	13.1	13.6	15.4	12.8	12.2	12.1	12.2	11.2	10
4/10/2022	10:00:00 PM	49.6		47.2	44.9	42.1	39.3	35.8	34.4	42.4	33.9	31.4		32.1	33.1	34.9	33.1	23.6	18.2	14.3	13.1	13	11.9	13.8	14	12.4	13.2	12.6	9.8	10	10.6	9.2	8.5	8	7.5	8.2	7.4	7
4/10/2022	11:00:00 PM	52		50.7	47.8	44.9	41.5	38.7	34.9	32.6	28	26.5	24.9	22	27.6	20.1	18.9	16.7	14.9	13.1	11.7	11.2	9.8	11.4	16.8	14.5	15.4	12.2	12.9	8.5	8.5	9	7.6	6.7	6.8	6	5.5	6.5
4/11/2022	12:00:00 AM	58.3		56.9	55.3	52.5	49.7	46.3	42.7	39.6	35.8	32.7	30.8	31	30.6	27.6	27.1	25.5	21.2	16.9	11.9	7.1	4.5	2.5	0.6	-0.3	-1.3	-1.9	-2.4	-2.6	-2.4	-2.1	-2	-2.1	-2.1	-1.9	-0.8	1
4/11/2022	1:00:00 AM	65.5		64.5	62.5	60.6	58.5	55.8	52.6	49.9	47.1	45	43.4	42.4	41.6	41.2	40.6	40.8	40.3	39.7	39.6	39	39	38.6	37.9	37.9	37	37	36.4	35.8	35.7	35.1	34.7	34	33.1	32.8	32.2	31.4
4/11/2022	2:00:00 AM	70.9		69.7	68.2	66.2	64.3	61.6	58.6	55.6	52.3	49.1	46.1	43	40	37.6	35.9	34	32.5	31.1	30.1	29	28.3	26.7	25.6	24.8	23.3	22.8	22.7	22.1	21.2	20.8	20.5	19.3	18.6	18.7	17.9	17.1
4/11/2022	3:00:00 AM	72.6		71.7	70.4	68.8	66.7	64.4	61.6	58.7	55.7	52.4	49.3	46.5	44.2	42.9	41	37.5	35.6	34.3	32.9	31.4	30.1	29.4	27.9	27	25.8	24.9	23.9	22.8	22.2	21.6	21	19.7	19	18.2	17.6	16.9
4/11/2022	4:00:00 AM	68.2		67.3	66.1	64.2	61.7	59	56.2	53	50.3	47.7	45.7	44.2	43	42.8	41.8	40.3	40.1	37.9	35.9	34.9	33.9	32.9	32.4	31.4	30.1	29.2	28.4	27.6	27.1	26.6	26.1	25	24.5	24	23.5	22.9
4/11/2022	5:00:00 AM	73.1		72.3	71.2	69.4	67.7	65.5	62.9	60.1	56.8	53.8	50.6	47.6	44.7	42.4	39.8	36.9	35.2	34	32.5	31.1	29.6	29.1	28.5	28.2	27.5	26.9	26.1	25.5	25	25	24.2	22.9	22.7	22.1	21.2	20.5
4/11/2022	6:00:00 AM	75.3		74.2	72.9	71.4	69.5	67.7	65.2	62.5	59.9	56.8	53.7	50.8	47.5	45	42.3	38.9	36.7	34.7	32.6	30.2	28.4	26.7	25.5	24.5	23.9	23.4	22.7	21.7	20.5	19.2	18.9	17.7	17	15.9	15.8	14.8
4/11/2022	7:00:00 AM	76.4		75.3	74	72.6	71	69.4	67.2	65	62.3	59.8	57.1	54.1	51.3	48.1	44.9	41.9	39.1	36.8	34.6	31.8	29.1	27	25.2	24.3	23.3	23.1	22.8	21.8	20.1	17.8	16.5	15.5	13.7	12.4	11.9	12.8
4/11/2022	8:00:00 AM	78.6		74.4	67.8	65.4	59.2	56.5	55.2	50.2	46.5	48.9	45.1	40.7	36.6	34.2	32.1	30.9	29	27	22.7	20	18.6	17.5	19	18.7	18.1	19	17.7	16.5	17.3	16.7	17.2	14.4	14.4	12	10.3	7.8
4/11/2022	9:00:00 AM	68.9		68.4	67.5	66.5	64.8	62.5	59.9	57.1	53.6	50.2	46.9	43.2	39.3	35.6	33	30.6	28.5	26.3	23.7	20.3	17.5	15.7	15.1	15.4	13	11.8	9.7	7.6	5.3	3.2	2.4	1.9	2.3	2.1	2.7	2.7
4/11/2022	10:00:00 AM	65.8		65.1	64.2	62.6	60.6	58.2	55.2	52	48.5	44.8	41.2	37.5	33.7	30.5	27.9	25.9	24.1	21.9	19.5	16.6	14.6	13.8	13.8	13.3	13.4	13.5	11.7	9.8	9.1	8.9	9	10.2	10.9	10.7	10.4	9.6
4/11/2022	11:00:00 AM	66.4		65.6	64.6	62.9	60.6	57.9	55	52.5	50.9	50.8	50.5	49.6	48.8	47.1	45.1	42.9	39.8	34.3	26.8	18.2	12.3	9.9	9.2	8.1	7.6	7.2	5.4	4.3	3.6	3.2	3.5	4.4	5.4	5.8	6.6	5.7
4/11/2022	12:00:00 PM	64.1		63.3	62.2	60.4	58.1	55.3	52.2	49	46.2	44.3	43.4	42.1	40.4	38.9	36.7	33.9	29.9	23.8	18.3	12.6	8.8	6.6	5.6	4.4	3.3	2.3	0.7	0	-1.5	-1.9	-1.6	-0.8	-0.1	0.7	1.2	1.8
4/11/2022	1:00:00 AM	65.1		64.5	63.4	61.7	59.9	57.4	54.5	51.2	48.1	45.1	42.4	39.2	36.3	33.2	30.2	27.1	24	20.9	18	14.4	11.2	9.2	8.1	6.5	5.3	3.6	1	-1.2	-2.7	-2.2	-3.3	-3.1	-3	-2.3	-1.7	0.5
4/11/2022	2:00:00 PM	64.2		63.4	62.3	60.7	58.9	56.5	53.8	52	49.7	49.3	47.9	46.7	45.6	43.6	40.8	38.7	35.5	30	22.9	14.9	10.5	8.4	7.3	5.7	4.4	2.8	0.7	-1.1	-2.7	-3.4	-3.6	-3.4	-3.4	-2.8	-1.9	0.6
4/11/2022	3:00:00 PM	47.9		46.2	44.8	41.5	38.9	35.8	32.4	31.2	27.8	25.8	24.4	24.3	21.3	18.6	16.5	12.3	9.7	4.6	0.1	-3.9	-5.6	-7.5	-7.7	-6.7	-6.3	-6.5	-5.8	-4.7	-1.9	-2.6	-3.8	-3.9	-4.3	-4.4	-2.6	0.4
4/11/2022	4:00:00 PM	39.2		36.8	34.8	32.9	33.8	31	28.2	28.3	27.5	27.9	29.7	28.1	27.9	27.3	27.7	27.3	26.5	23.2	16.7	9.7	2.5	-2.4	-7.2	-8.3	-8.2	-8.1	-7.9	-7.5	-7	-6.5	-6.2	-6.1	-5.9	-5.3	-3	0.4
4/11/2022	5:00:00 PM	40.9		39.7	37.7	35.6	35.7	34.1	30.2	32	27.8	27.6	26.9	28.1	32.2	35.4	34.3	27.2	24.5	22.6	13.6	7.4	0.3	-4.8	-7.2	-8.4	-8.3	-8.2	-7.9	-7.5	-7	-6.5	-6.2	-6.1	-5.8	-5.3	-3	0.3
4/11/2022	6:00:00 PM	47.8		46.2	44.2	40	37.4	34.4	30.9	34.1	28.7	28.1	28	28	27.5	28.5	27.9	24.1	20.9	17.2	12.8	8.2	3.4	0.8	-3.8	-8.4	-8.4	-8.2	-7.9	-7.4	-6.9	-6.4	-6.2	-6.1	-5.8	-5.3	-3	0.4
4/11/2022	7:00:00 PM	56.1		54.9	52.8	49.9	46.6	43.5	39.4	38.1	34.5	31.8	30.3	30.6	29.8	29.6	29.3	27.5	24.9	19.4	13.1	8.4	3.4	-1.4	-4.5	-6.3	-7.3	-7.6	-7.6	-7.2	-6.7	-6.2	-5.8	-5.5	-5.1	-4.6	-2.5	0.5
4/11/2022	8:00:00 PM	57.3		56.2	54.5	51.7	48.8	45.6	42.2	39.4	35.6	32.4	29.2	27.8	26.2	26.3	23.7	18.1	14.7	11.2	7.4	2.9	-0.7	-2.9	-4.2	-5.2	-6.3	-6.9	-6.8	-6.5	-5.8	-5.2	-4.2	-2.9	-1.8	-0.6	0.6	1.9
4/11/2022	9:00:00 PM	61.9		61.2	59.6	57.9	55.5	52.5	49.3	46	42.2	38.7	36.5	34.6	33.9	34	32.1	29.7	26.9	23.1	19	14.5	12.8	9.1	4	2.1	2.6	3.5	3.7	3.9	3.9	5	7.6	9.3	11.1	12.1	12.7	12.4
4/11/2022	10:00:00 PM	65.2		64.3	63.1	61.1	59.4	56.8	53.8	50.7	46.7	43	38.9	35.3	32.3	29.7	27.5	25.2	23.1	20.7	17.7	14.1	10.5	7.9	6.6	5.5	4.6	3.4	1.2	-1	-2.3	-2.7	-1.8	-1.2	-0.1	-0.1	1.3	2.7
4/11/2022	11:00:00 PM	63.6		62.5	61	59.4	57	54.5	51.5	47.9	44.2	40.5	37.1	34.5	32.8	32.2	31	29.3	26.6	24.5	20.3	16.1	12.7	9.7	6.3	4.4	4.3	3.8	3	2.8	2.7	3.7	5.8	7.2	9	9.9	10.2	10.5
4/12/2022	12:00:00 AM	58.5		57.5	55.9	54.2	51.8	49.2	46	43	38.8	34.7	31	28.1	26	25.1	23.7	19.3	16.8	14.1	10.7	6.9	3.8	1.3	0	-0.7	0	0.3	-0.4	0.3	0.1	1.5	3.6	4.8	6.7	7.3	7.9	8.7
4/12/2022	1:00:00 AM	61.4		60.1	58.8	56.8	54.7	52.2	48.9	45.7	41.7	37.8	34.4	31.1	28.2	26.1	24.1	21.7	19.6	16.9	13.8	9.5	5.2	2.2	1.2	0.3	-1	-2.7	-4	-3.4	1.5	0.7	-2.7	-2.8	-2	-1.4	-0.2	1.8
4/12/2022	2:00:00 AM	59.9		58.8	57.3	55.5	53.3	51	47.7	44.3	40.3	36.5	33.3	30.8	36	42.1	35.6	25.3	27.9	21.4	15.5	10.4	6.3	2.9	0.8	-0.3	-0.4	-0.5	-0.8	-0.6	0.2	1	3	4.8	6.6	7.7	8.5	8.2
4/12/2022	3:00:00 AM	60.4		59.1	57.4	55.5	53.4	50.8	47.5	44.5	40.4	37.1	34.2	31.2	29.3	27.7	25.3	22.6	20	16.4	13	12	7.1	0.3	1.7	-1.9	-2	-1.8	-1.9	-1.3	-2.1	-1.6	0.2	1.9	3.8	5.1	5.9	5.4

4/12/2022	4:00:00 AM	63.7	62.6	61.1	59.2	56.9	54.5	51.6	48.5	45	41.3	37.6	34.5	31.5	28.7	26.2	23.2	20.5	17.7	14.4	10.6	6.8	4.2	3.1	2.2	1.2	1.4	0.1	-0.9	-0.3	0.3	2.2	4.2	6.1	7.8	8.2	7.4
4/12/2022	5:00:00 AM	63.3	62.4	61.5	59.7	57.4	55.2	52.6	51	49.4	48.4	45.7	44	42.3	40	36.9	33.2	28.8	23.6	17.2	11.5	7	4.8	4.2	3.3	2.2	1.4	0.7	0.5	0.2	-1.9	-2.7	-3.4	-4	-3.5	-1.9	0.5
4/12/2022	6:00:00 AM	67.5	66.7	65.7	64.2	62.1	59.7	57	54	51.6	49.8	48.2	46.4	44.6	43.2	40.4	37.3	34.2	29.8	23.5	17.5	13.5	11.4	10.9	10.4	9.9	9.7	8.8	6.9	4.1	1.7	0.5	-0.1	-1.3	-2	-1.4	0.8
4/12/2022	7:00:00 AM	71.2	70.2	69.4	67.7	65.7	63.3	60.7	57.7	54.5	51.8	49.4	47	44.9	42.8	39.8	36.9	33.8	29.9	25	20.6	17.2	15.1	14.5	14.6	13.9	12.6	11.4	8.2	6.3	5.2	3.4	2.8	1.4	0.6	0.7	2.4
4/12/2022	8:00:00 AM	71.8	70.9	69.8	68.3	66.3	64	61.2	58.1	54.9	51.7	48.2	44.6	41.5	38.4	35.5	32.7	30.3	27.9	25.4	22	19	16.9	16	15.1	14.5	14.3	13.5	11.3	9.5	6.9	4.4	3.5	2.2	1.4	1.9	3.8
4/12/2022	9:00:00 AM	73	72.1	71	69.5	67.6	65.2	62.2	59.2	56.1	52.8	49.2	45.6	42	38.8	35.6	33.1	31.2	29.3	27.1	24.1	21.3	19.2	18.1	16.8	16	15.7	14.8	12.3	9.8	7.1	6	5.3	3.8	3	3.2	5.4
4/12/2022	10:00:00 AM	71.2	70.3	69.3	67.4	65.2	62.6	59.6	56.5	52.7	49.2	45.8	42.3	38.7	35.7	33.5	30.2	28.4	26.8	24.9	21.9	19.2	17	15.9	14.4	13	12	10.4	7.4	4.8	3	2.7	2.6	1.7	1.3	2.1	4.4
4/12/2022	11:00:00 AM	71	70.2	68.7	67.1	64.6	62.1	59.1	56	53.3	51.5	50.6	49.6	49.4	49.4	48.9	47.5	45.6	41.4	35.1	25.7	20.2	17.6	15.6	13.9	12.2	10.6	8.5	5.8	4.3	3.3	2.2	2.1	1.3	1.2	1.6	3.2
4/12/2022	12:00:00 PM	71.4	70.3	69.1	67.2	65	62.4	59.3	56	53.1	50.6	49.1	48.5	48.2	48.3	48.4	47.6	45.5	41.6	35.1	25.7	20.5	18.1	16.4	14.7	13	11.5	9.6	6.9	4.8	3.5	3.3	3.4	1.8	2	2.3	3.5
4/12/2022	1:00:00 PM	69.4	68.5	67.1	65.2	62.8	59.9	57.1	53.8	51.1	48.6	46.6	44.3	42.4	40.5	38.1	34.5	30.7	25.9	23.3	20.3	17.7	15.6	14.1	12.5	10.6	9.1	7.4	4.8	2.5	1.2	0.7	0.8	0	0.2	0.8	2.3
4/12/2022	2:00:00 PM	69.3	68.1	66.7	64.9	62.5	59.9	57.1	53.9	51.1	48.6	46.6	45	42.4	41.3	39.1	36.3	32.7	27.2	23.8	20.6	17.9	15.8	14.3	12.7	10.9	9.6	8.1	5.4	3.8	2.7	1.2	0.7	-0.3	-0.7	0.3	2.3
4/12/2022	3:00:00 PM	61.4	60.6	58.7	55.9	52.7	49.6	46.4	42.6	38.8	35.1	31.8	28.9	26.4	24.7	23.5	21.8	20	17.2	14.3	10.7	7.6	4.9	2.4	-0.3	-2.6	-4.1	-4.6	-3.8	0	-1.5	-4.1	-4.1	-4.4	-4.2	-2.4	0.2
4/12/2022	4:00:00 PM	49.2	47.3	44.7	41.7	39	35.4	32.4	31.3	29.1	27.3	25.1	25.8	23.7	24.1	22	15.9	11.9	6.2	1.8	-2	-5.7	-7.4	-8	-7.9	-7.7	-7.3	-6.8	-6.8	-6	-5.4	-5.7	-5.5	-5.4	-4.8	-2.8	0.2
4/12/2022	5:00:00 PM	65	64	62.4	60.5	58.3	55.7	52.5	49.3	45.8	42.5	38.7	37.7	37.9	39	35.2	29.6	30.3	25.7	21.4	15.9	12.9	11.2	9.2	7.3	5.4	3.5	2.2	0.3	-1.4	-2.2	-2.5	-2.6	-2.9	-2.9	-1.5	0.9
4/12/2022	6:00:00 PM	65.6	65	63.1	61.2	58.5	55.7	52.4	48.6	44.7	41.2	37.8	34.4	31.9	29.7	28.2	26.2	27	24.1	19.3	15.8	13.1	11	8.9	6.8	4.8	2.9	1.6	-0.3	-1.9	-2.4	-2.5	-2.6	-3	-3.2	-1.8	0.6
4/12/2022	7:00:00 PM	65.6	64.3	62.6	60.2	57.4	54.1	50.8	46.9	43.4	39.6	36.6	34.1	32.5	32.5	29.9	24.9	22.9	20.4	18	14.6	11.9	9.7	7.4	5.2	2.7	0.8	-0.8	-2.2	-2.6	-2.1	-1.1	0.6	1.8	2.9	4.2	3.7
4/12/2022	8:00:00 PM	67.3	66	64.3	62.2	59.4	56.2	52.9	49.3	45.4	42	38.4	36.4	34.1	32.9	32	28.1	26.6	24.2	21.3	17.1	14.4	12.2	9.6	7.1	4.7	2.6	1	-0.6	-1.1	-1.1	0.1	2.1	2.8	4.3	5.2	4.6
4/12/2022	9:00:00 PM	63.1	61.4	59.5	56.9	53.9	50.7	47	44.3	40.2	37	34.2	33.9	32.9	33.2	31.1	24.4	21.9	18.5	15.7	11.8	8.7	6.3	3.3	0.5	-1.7	-3	-3.3	-3.4	-2.6	-1.5	0.4	2.6	3.8	5.4	6	5.2
4/12/2022	10:00:00 PM	71.5	70.5	69.4	67.7	65.7	63.2	60.5	57.7	55	51.6	48.5	45.5	42.4	40.1	37.5	34.5	32.3	30.2	27.9	24.7	22.3	20.2	18.1	16.5	15.3	14.7	14.5	12.9	10.5	7.6	5.7	4.7	2.7	2	2.4	4.8
4/12/2022	11:00:00 PM	71.8	70.9	69.6	67.9	65.9	63.4	60.5	57.7	54.5	51.1	47.9	44.6	41.4	39	36.2	32.9	31	28.9	26.9	23.9	21.6	19.4	17.6	16.2	14.9	14.3	13.8	11.7	9.1	6.2	4.6	4.1	2.8	1.6	2.5	4.9
4/13/2022	12:00:00 AM	70.7	69.7	68.3	66.6	64.2	61.4	58.5	55.2	51.8	48.1	44.7	41.5	38.3	36.2	33.6	31.3	31.1	29.4	26	22.1	19.4	17.2	15.2	13.4	11.8	10.6	9.4	7.1	4.8	2.9	2.5	2.6	2.4	2.4	3	4.1
4/13/2022	1:00:00 AM	67.9	66.5	65.3	63.4	60.9	58	55.1	51.2	47.8	44.4	40.7	37.1	34.1	32.2	29.5	26.3	24.6	22.8	21	18	15.4	13.3	11.4	9.7	7.9	7	6.4	4.7	7.2	5.3	1.6	1.9	2.8	3.2	3.6	3.8
4/13/2022	2:00:00 AM	61.4	60.1	58.1	55.4	52.6	49.2	45.1	42.9	38.8	36	33.6	32.1	30.7	32.8	30.9	23.9	21.3	17.9	14.7	10.6	7.2	4.6	2.1	0.4	0.9	1.7	3.8	3.4	3.3	3.2	4.8	6.9	7.9	9	9.1	7.4
4/13/2022	3:00:00 AM	64.3	63.4	61.9	59.8	57.1	54.4	51.3	47.9	43.6	40.4	37.7	35.3	33.4	32.3	29.7	26.3	24.2	21.4	18.6	14.4	10.8	8.4	6.8	7.9	4.9	5.4	9.2	7.7	7.1	2.7	3.1	4.8	4.7	5.4	5.4	4.7
4/13/2022	4:00:00 AM	66.6	65.6	64.2	62.5	60.1	57.2	54.2	51.6	47.9	44.7	41.8	40.2	38.7	37.9	36.2	33.1	28.7	24.6	21.3	17.5	14.1	11.9	9.9	7.9	7.1	11.3	14.6	14.8	11.8	5.8	4.6	6	6.3	6.9	6.6	5.2
4/13/2022	5:00:00 AM	68.6	67.5	66.2	64.3	61.9	59.1	56.4	54.4	53.5	52.7	51	49.6	48.3	45.9	43.3	40.7	37.4	32.7	26.5	20.6	16.9	14.9	12.3	9.9	7.6	6.3	6.2	5	4.4	4.1	4.6	5.7	6	6.7	6.1	5.6
4/13/2022	6:00:00 AM	72.3	71.1	69.9	68.3	66.1	63.7	61	58.8	57	56.5	56.3	55.8	54.9	54.1	53.1	51.4	49	44.7	38.4	30.7	25.3	22.3	19.4	17.6	15.3	13.9	12.9	12	9.8	8	7.8	7.3	5.7	5.2	4.1	4.8
4/13/2022	7:00:00 AM	72	71	69.8	68.1	66	63.4	60.6	57.7	54.6	51.6	48.6	45.8	43.3	41	38.9	36.7	34.1	30.7	28	24.9	22.2	20.7	18.9	17.4	15.3	13.4	12	10.8	9	7.2	6.5	7.1	6.8	6.2	4.5	5.5
4/13/2022	8:00:00 AM	69.9	68.9	67.3	65.7	63.6	60.7	58.2	55.1	53.6	52.4	51.7	51.4	50.8	50.1	49.2	47.8	45.4	41.7	35.3	28.1	23.4	20.2	16.7	14.4	12.1	10.9	9.8	9.2	6.9	4.9	4.4	4.2	3.7	3.8	2.6	3.1
4/13/2022	9:00:00 AM	71.5	70.5	69.2	67.3	64.8	62.3	59	56.1	52.3	49.2	45.7	41.9	38.7	35.2	32.3	30.2	28.7	27.2	25.8	23.5	21.1	19.4	17.4	15.7	13.2	11.6	10.4	8.5	6.9	6	4.8	4.4	4.4	4.2	3	3.4
4/13/2022	10:00:00 AM	72.1	71.2	69.7	68	65.7	63.4	60.5	57.3	54.2	50.7	47.2	44.1	40.6	37	34.1	31.8	30.1	28.5	27	24.7	22.3	20.7	18.7	17.2	14.9	13.4	12.3	10.6	9.2	7.7	6.2	5.5	5	4.4	4.5	4.5

4/13/2022	11:00:00 AM	74.5	73.4	72.3	70.7	68.6	66.3	63.7	61	57.8	54.6	51.3	48	44.7	41.1	38	35.5	33.6	32	30.5	28.1	25.7	24	22.1	20.7	18.7	17.5	16.5	14.6	12.4	11	10.5	10.2	9.4	9.4	8.5	8.2
4/13/2022	12:00:00 PM	71	69.9	68.7	66.7	64.3	61.7	58.7	55.4	52.2	48.5	45.1	41.6	38	34.6	31.7	29.5	28.1	26.7	25.4	22.9	20.5	18.8	16.9	15.1	12.8	11.2	10.1	8.4	6.1	4.2	4	4.4	3.7	3.4	2.7	3.3
4/13/2022	1:00:00 PM	66	64.6	62.7	60.4	57.9	54.5	50.7	47	43.1	39.3	35.7	32.3	29.2	26.8	24.5	22.6	21.4	20.2	19.1	17.8	13.6	12	15.4	14.6	13.7	10.1	9	8.4	8.2	4.5	0.4	-1.1	-1.7	-1.8	-1.5	0.2
4/13/2022	2:00:00 PM	63.1	61.4	59.9	57.2	54.3	50.8	47.1	43.3	39.6	36	32.7	29.3	27	25.2	22.2	20.4	19.4	17.4	15.8	12.9	10	7.7	4.7	1.5	-0.1	3.2	4.1	7.7	4.6	0.4	-3.5	-3.6	-3.7	-3.4	-2.2	0.1
4/13/2022	3:00:00 PM	61.9	60.5	58.9	56.4	53.8	51.1	49.7	49.8	50.8	52.4	53.7	53.9	53.8	53.7	52.8	52.2	51	48	42.1	33.4	26.7	22.9	14.4	4.3	0	4.5	1.1	3	4.5	1.4	-3.4	-3.1	-2.6	-2.9	-2.2	0.2
4/13/2022	4:00:00 PM	57.3	56.2	53.8	51.6	48.7	45.8	45.1	45.6	47.2	48.7	49.6	49.7	49.7	49.3	48.9	48.2	46.6	44.2	38	29.9	18.5	12.9	3.2	-0.3	0.5	0.6	1.5	2.7	3.7	4.4	5.5	6.8	6.9	7	6.9	5.7
4/13/2022	5:00:00 PM	50	46.9	44.7	41.7	38.7	35.1	31.4	32.4	27.5	25.7	24	25.5	25.7	24.6	21.3	15.1	11.3	7.7	4.4	0.3	-2.6	-3.9	-3.9	-2.2	-0.9	-0.6	0.6	1.9	2.5	3	4.2	5.3	5.3	5.3	5.1	4.6
4/13/2022	6:00:00 PM	52.6	50.2	47.9	44.6	41.6	38.2	34.6	33.1	29.3	28.1	28	28.4	28	28.1	27.8	27.1	25.7	23.1	18.8	9.8	8.2	6.8	6.5	8.4	7.9	7.6	9	10.5	11.2	12.2	14.9	15.1	15.6	14.8	15	17.4
4/13/2022	7:00:00 PM	56	54.2	52	49.7	47	43.6	40	38.4	34.4	31.5	29.5	29.3	28.6	29.7	26.1	20.5	17.7	14.7	11.5	7.3	3.7	1.3	-0.1	0.4	0.1	0.5	1.7	2.9	2.9	5	8.2	7.5	9.2	8.4	9.3	11.9
4/13/2022	8:00:00 PM	46.6	45	42.6	39.8	36.9	33.7	30.1	32.4	27.1	25.4	24.5	25.1	24.7	25.5	21.5	15.7	12.3	8.2	4.5	-0.3	-2.3	-1.8	-0.4	0.9	1.4	2.5	4.3	5.2	5.2	7.6	11.1	10	11.5	10.4	11.2	13.9
4/13/2022	9:00:00 PM	57.7	56.2	54	51.6	49	45.7	42.2	41	35.8	32.8	31	30.8	30.4	31.1	27.2	22	19.3	15.9	12.2	7.7	3.9	1.1	2.1	-4	-5.1	4.8	-3.8	-3.4	2.5	0.7	1.9	1.1	2.6	2.4	4.1	7.2
4/13/2022	10:00:00 PM	61.4	60	57.5	55.4	52.9	49.8	46.8	43.1	39.6	36.4	33.4	32.3	31.9	30.9	27.6	22.8	20.3	17.4	14.8	11.2	7.8	4.9	2.1	-0.4	-2.4	2.9	-2.5	-2.2	1.9	0	2.2	1.1	2.5	2.3	3.7	6.4
4/13/2022	11:00:00 PM	61.7	59.9	58.2	56.2	53.5	50.5	47.3	44	40.4	38.2	35.8	35.2	35.1	35.1	31.9	29.3	30.9	29.2	24.5	17.5	11.6	8.3	4	0.8	-1.9	1.1	-1.7	-4.5	11.4	12.1	-2.3	3.9	3.2	-4.1	2.3	0.3
4/14/2022	12:00:00 AM	55.8	53.7	51.4	48.9	46.1	42.5	39.6	37.7	33.7	30.9	28.7	29.6	29.9	29.9	26.3	20.2	17.4	13.5	10.5	5.8	1.2	1.9	4.4	-5.6	-5.9	2.1	-0.4	-3.5	6.1	5.5	-4.8	5	4.4	-4.2	2.3	0.4
4/14/2022	1:00:00 AM	53	51	49.1	47.2	44.4	41.1	37.2	36.2	32.7	30.4	27.7	28.8	29.9	30.4	26.6	19.4	17.2	12.7	9.5	4.6	1.2	4.2	5.5	4.9	4.4	1.5	0.3	2.2	9	6.3	1.6	3.9	4.4	4.2	2.3	0.5
4/14/2022	2:00:00 AM	52.5	50.5	48.7	46	43.3	40.3	37.4	36.6	33.5	31.8	31.1	31.2	30.8	32.4	30.3	23.2	21.4	17.5	13.1	7.6	2.2	0.2	2.4	2.3	0.2	8.8	13.2	9.7	7.3	2.7	3.9	5.8	5.4	4.8	2.7	0.2
4/14/2022	3:00:00 AM	58	56.5	55.4	53.7	51.2	48.5	45.9	44.3	41.3	37.8	35.6	34.2	32.9	33.3	30.1	24.6	21.9	18.6	15.4	11.4	8	5.5	3.8	1.9	0.6	6.4	7.4	8	10.3	8.5	0.4	3.2	-3	-3.4	1.9	0.3
4/14/2022	4:00:00 AM	59.7	58.3	56.1	53.9	51.4	48.9	46.3	43.5	41.3	40.6	39.7	40.1	40	39.6	37.4	35.2	31.8	27.4	22.9	15.5	13	11.3	7.2	1	0.6	6.6	6.6	7	4.3	0.3	-4.2	4.6	3.8	-3.3	2.2	0.3
4/14/2022	5:00:00 AM	59.5	58.1	55.9	53.6	51.3	49.9	49.5	50.5	52.1	53.6	54.3	53.6	53.3	52.2	50.5	48.1	45.3	41.9	35.8	27.4	22.3	19.1	17.5	18.4	20	19.4	19.5	20.2	21.3	21.7	22.6	22.5	22.4	21.3	20	23
4/14/2022	6:00:00 AM	64.5	63.3	61.3	59.1	56.3	53.8	51.3	50.4	51	51.7	51.7	51	49.3	47.8	45.6	42.9	39.4	34.9	29.6	22.7	17.6	13.6	9.4	6.8	4.1	4	4.8	3.9	3.9	2.3	-1.4	2.2	-3	-2.8	1.7	0.4
4/14/2022	7:00:00 AM	69	67.9	66.5	64.5	62	59	55.8	52.9	50.5	49.7	49.6	49.9	50.4	50.4	49.5	48.4	46.3	41.9	36.1	27.4	23.2	20.2	15.8	12.6	9.3	8	9.9	11	8.6	3.3	2.7	3.7	1	0.6	0.8	1.7
4/14/2022	8:00:00 AM	64.1	63.4	61.2	59.1	56.4	53.2	49.9	46.4	43	39.1	35.8	32.5	29.4	26.7	25.1	22.9	21.3	19.9	18.7	16.6	13.3	11.9	11.2	10.7	8.2	4.2	3.2	2.4	1.7	0.6	0.7	1	0.5	-0.4	0.1	0.9
4/14/2022	9:00:00 AM	66	65.2	63.4	61.6	58.8	56.4	53.7	51.8	51.7	52.8	53.4	53	52.9	52.3	52	51.3	49.6	46.2	40.3	32.1	26.8	23.4	15.7	10.3	6.8	4.2	3.1	1.9	1.8	1.3	1.2	1	0.2	-0.1	0.3	1.6
4/14/2022	10:00:00 AM	64.8	64.1	62.2	60	57.7	54.9	51.6	48.5	45.3	43.4	42.2	40.3	39	36.7	33.5	30.4	26.7	23.1	20.1	17.6	14.1	12.7	11.2	9.3	6.2	4.4	3.4	2.3	1.9	1.1	0.7	0.8	0.3	-0.4	0.2	0.8
4/14/2022	11:00:00 AM	67.2	66.2	64.6	62.5	59.7	56.6	53.5	50.1	46.3	42.4	38.7	35.3	31.7	29.1	26.9	24.9	23.4	22.2	20.9	18.6	15.9	14.3	12.2	9.9	7	4.7	2.9	1.4	2.5	2.1	1.8	1.7	0.5	0.4	0.3	1.1
4/14/2022	12:00:00 PM	67.6	66.7	65.4	63.5	61	58.4	55	51.9	48.4	46.1	43.4	42	41.6	40.7	39.8	37.5	34.6	30.2	26.1	21.3	17.5	15.6	13.5	11.6	8.8	6.8	5.2	4.3	4.2	2.8	1.7	1.8	0.5	0.5	0.9	1.8
4/14/2022	1:00:00 PM	63.4	62.1	60.5	58.1	55.6	53.3	51.7	52.2	52.8	53.5	54.1	53.8	52.8	51.5	49.3	46.7	44.1	40.9	34.8	27.4	17.1	12.8	7.7	3.8	0.4	0.5	-1.7	-2.1	1.5	2.7	-3	2.7	3.2	-2.6	1.3	0.5
4/14/2022	2:00:00 PM	58.2	56.9	54.2	51.5	48.5	44.7	41.2	37.7	34.3	31.4	29.4	28.4	31	38	35	28.5	27.9	26	16.9	10.6	8.5	5.1	0.5	-4.3	-4.8	-2	3.1	-0.6	1.4	0.8	-4.2	4.5	4.6	-3.9	2.3	0.1
4/14/2022	3:00:00 PM	41	38.2	35.5	32.3	30.4	28.3	25.5	25	24	23.6	23.6	23.8	23.7	23.7	22.9	19.8	18.5	15.4	9.9	4.7	2.8	4.4	2.1	3.3	3.3	1.3	-0.3	0.4	1.9	0.5	-4.9	4.8	4.9	-4.3	2.6	0
4/14/2022	4:00:00 PM	55.6	53.7	51.8	49.2	45.9	42.7	39.2	36.3	33.4	31.3	30.1	30	35.2	34.4	32.2	33.1	30.8	26.4	19.6	12.7	7.1	2	4.3	-5.6	-6.3	6.7	-6.8	-6.3	-1	1.9	-4.9	5.3	5.3	-4.5	2.5	0.1
4/14/2022	5:00:00 PM	55.1	53.5	51.6	48.5	46.1	42.9	39.3	35.3	32.1	29.7	27.9	27	25.5	24.7	23.7	21.4	18.6	15.5	11.7	7	3.1	0.2	3.7	-5.5	-6.5	6.8	-6.9	-6.8	6.4	5.7	-5.4	5.3	5.3	-4.5	2.6	0.1

4/14/2022	6:00:00 PM	48.6	46.4	43.7	40.4	37.6	33.9	31.1	30.7	29.4	28.8	28.2	27.4	27	27	27	24.1	22.6	19.6	14	6.5	3.6	1.3	-5.5	-6.8	-5.5	-7	-7.1	-7.1	-6.6	-6.2	-5.8	-5.6	-5.7	-4.9	-2.9	0
4/14/2022	7:00:00 PM	41.4	38.7	35.6	32.9	32.5	27.7	26	26.5	23.7	23.2	21.6	21.7	20.8	19.6	17.6	10.8	6.1	2.1	-1	-6.1	-8.5	-8.6	-8.3	-8.2	-7.7	-3	-2.7	-5.5	-6.6	-6.2	-6	-5.7	-5.7	-5	-2.9	0.1
4/14/2022	8:00:00 PM	38.1	35.5	32.8	30.2	28.8	27.7	25.4	30.1	25.2	24.7	23.7	23.6	23	21.6	20.3	21.6	22.4	18.1	11.8	4.8	-3.8	-7.9	-7.9	-7.7	-7.2	-0.5	0	-4.7	-6.6	-6.3	-6	-5.5	-5.7	-5	-2.9	0.1
4/14/2022	9:00:00 PM	38.5	35.4	32.2	29.5	31.2	29.3	25.5	34.7	25.6	24.8	22.2	22.5	22	21.4	20.5	12.8	8.6	3.4	0.3	-4.8	-8	-8.2	-7.7	-7.3	-6.4	0.3	1.7	-4	-5.9	-6.2	-6	-5.9	-5.7	-5	-2.9	0.1
4/14/2022	10:00:00 PM	38.5	35.8	33.1	31.9	33.3	33.7	27.1	38.2	29.8	29.2	27.9	29.4	29.7	27.8	25.6	20.8	18	17.2	16.3	10.3	3.4	-3.1	-8	-8.3	-7.3	-2	0.1	-2.6	-4.6	-5.4	-6	-5.7	-5.7	-5	-2.9	0.1
4/14/2022	11:00:00 PM	40.4	37.7	35	32.7	34.4	30	26.8	32.8	30.6	29.3	29.3	28.1	27.8	28.5	25.7	21.4	19.5	21.7	18.4	11.2	5.1	-2.1	-8.1	-8.2	-7.3	0.4	1.9	-1.7	3.9	3	-4.3	-5.8	-5.7	-5	-2.9	0.1
4/15/2022	12:00:00 AM	43.9	40.9	37.3	33.7	31.2	28	25	27.4	21.9	21	19.9	19.3	18.3	18.3	16.4	11.6	7.6	3.1	0.5	-2.3	-7.2	-7.9	-7.7	-7.5	-6.5	1.8	4	0.4	6.3	4.2	-2.9	-5.6	-5.7	-5	-2.9	0.1
4/15/2022	1:00:00 AM	45.7	43.1	39.6	36	32.5	29.4	26	27.3	21.1	18.6	16.6	14.8	14.5	15	13.5	9.2	4	0.5	-0.8	-2.8	-6.7	-7.6	-6.6	-4.8	-4.4	1.3	3.2	4.6	10.9	9.3	0.8	-4.5	-5.7	-5	-2.9	0.1
4/15/2022	2:00:00 AM	42.4	39.7	35.8	32.9	31.3	28.6	25.6	32.9	25.9	25.7	25.8	25.3	25.2	23.1	21.1	17.8	14.2	10.4	4.9	-1.2	-4.5	-6.1	-5	1.5	2.1	9	10.9	12.1	11.2	2.4	-3.4	-5.6	5.6	-4.9	-2.9	0.1
4/15/2022	3:00:00 AM	57.9	56.2	54.4	51.5	48.6	44.8	41	40.2	36.4	34.5	32.6	32.1	31.9	31.9	29.6	25.5	22.5	18.5	13.7	7.7	3.5	0.2	0.9	5.1	3.8	9.7	15.2	16.8	14.9	9.7	0.7	-4	-4.4	-3.7	-2.2	0.1
4/15/2022	4:00:00 AM	67.1	66	64.6	62.8	59.9	57	53.5	49.8	45.8	42.3	39	36.4	34.6	33.5	32.2	30.4	29	27.1	24.6	21.5	19.7	18	19.7	21	17.1	14.8	14.3	14.1	14	13.2	12.5	11.2	11	10.6	10.7	10.4
4/15/2022	5:00:00 AM	70.9	70.1	68.9	67.2	65.2	62.9	60.3	57	53.6	50.2	46.9	43.7	40.2	37.6	35.3	33.5	32.4	31	29.8	28.8	27.5	27.1	25.8	24.3	23.7	22.8	22.4	22.4	21.7	21.5	20.8	19.8	19.2	18.6	18.4	17.7
4/15/2022	6:00:00 AM	73.5	72.6	71.4	69.7	67.6	65.5	63	60.4	57.7	54.8	51.9	49.1	46.9	44.8	43.3	42.3	41.4	40.2	39.2	38.4	37.6	37	36.3	35.5	34.8	33.9	33.2	32.5	32	31.7	30.8	29.9	29	28.4	27.6	26.6
4/15/2022	7:00:00 AM	72.4	71.3	69.9	68.3	66.2	63.7	61.2	58.4	55.8	53.6	51.8	50.5	49.6	48.9	48	47.5	46.9	46.3	45.8	45	44.4	43.8	43.3	42.6	41.9	41.1	40.4	39.8	39.3	38.8	38.1	37.2	36.4	35.8	35	34
4/15/2022	8:00:00 AM	75.8	74.8	73.6	72.1	70.2	68.1	65.6	63	60.4	57.4	54.2	51	47.7	44.2	41.2	38.6	36.7	35.1	33.9	31.9	29.9	28.7	28.1	27.1	25.3	24.7	24.2	23.9	23	22.7	21.6	21.5	20.6	20.3	20.3	19.3
4/15/2022	9:00:00 AM	72.7	71.7	70.5	69	67.1	64.9	62.4	60	57	54	50.8	48	44.6	41.4	38.6	36.1	34	32.1	30.1	27.6	25.3	23.8	22.1	21.3	19.3	18.4	17.9	16.9	15.3	13.8	12.5	11.7	10.7	10.1	9.6	9.3
4/15/2022	10:00:00 AM	76.7	75.7	74.5	73	71.3	69.3	67	64.5	61.9	59	56	53.1	49.9	46.7	43.4	40.6	38.3	36.3	34.6	32.3	30	28.3	26.6	25.2	23.4	22.7	22.4	21.5	19.8	17.6	15.9	15.2	14.1	13.1	12.7	13
4/15/2022	11:00:00 AM	77.2	76.2	75.1	73.5	71.8	69.9	67.5	65.1	62.6	59.8	57	53.8	50.8	47.2	44.2	41.3	38.8	36.8	35	32.7	30.2	28.4	26.5	25.2	23.4	22.6	22.4	21.4	19.6	17	15.3	14.7	12.3	12.5	11.3	12.5
4/15/2022	12:00:00 PM	75.5	74.6	73.3	71.6	69.8	67.7	65.1	62.5	59.6	56.7	53.6	50.3	47.1	43.9	40.9	38.2	36.2	34.5	33	31.1	29.4	27.9	26.2	25.8	24.2	23.9	23.3	22.5	21.7	20.9	19.7	19.1	18.4	18	17	16.6
4/15/2022	1:00:00 PM	73.6	72.7	71.4	69.8	67.7	65.3	62.5	59.6	56.6	53.4	50.2	46.9	43.3	39.9	36.9	34.5	32.5	31.1	29.5	27.1	24.6	22.9	20.9	19.5	17.4	16.5	15.9	14.3	12.3	10.3	9.3	9.7	7.7	7.3	6.7	6.9
4/15/2022	2:00:00 PM	71.5	70.5	69	67.2	64.9	62.4	59.2	56.4	52.7	49.4	45.9	42.5	38.6	35.4	32.6	30.6	29.1	27.7	26.4	23.9	21.4	19.6	17.6	16	13.8	12.8	11.8	9.8	7.8	6.4	6	7.1	5.4	4.8	4.7	4.3
4/15/2022	3:00:00 PM	72.1	70.9	70	68.3	66.2	63.8	61	58.3	54.9	51.7	48.2	44.5	41	37.5	34.5	32.3	30.7	29.2	27.8	25.3	22.7	20.9	19.4	17.9	15.2	14.4	13.5	11.6	11.2	9.7	7.6	8.1	6.7	5.9	5.7	4.4
4/15/2022	4:00:00 PM	69.4	68.5	67.3	65.6	63.5	60.8	57.7	54.5	51	47.3	43.7	40.1	38.3	38.2	31.6	28.7	27.4	25.8	24.3	21.7	19	17.1	15.6	13.7	10.4	8.9	7.3	5.2	4.4	3.7	3.4	4.4	3.4	2.4	2.3	1.6
4/15/2022	5:00:00 PM	65.5	64.7	63	61.2	58.3	55.6	52.2	48.8	45.1	41.8	37.9	34.5	31.1	28	25.7	23.8	22	20.7	19.1	16.4	13.6	11.6	9.5	7.1	4	2.1	0.8	-0.8	0.7	0.4	-0.3	1	0.1	-0.5	0	0.6
4/15/2022	6:00:00 PM	62.1	60.6	59.3	57.4	54.7	51.7	48.4	45.8	42.2	39.3	37.2	36.2	34.9	33.8	32.6	31	28.2	23.5	18.4	13.4	10.4	7.9	5.9	3.7	0.6	0.8	-1.6	-2.2	0.2	1.2	-2	0.5	1.9	-1.8	-1	0.2
4/15/2022	7:00:00 PM	65.2	64.1	62.9	60.9	58.4	55.6	52.2	48.6	45.1	41.3	37.6	34	30.9	28.1	25.7	23.8	22.2	20.7	19.3	16.5	13.5	11.5	9.6	7.2	3.9	2.2	0.9	-1.3	0.1	1.5	0.7	2.3	0.2	-0.2	0.6	0.5
4/15/2022	8:00:00 PM	58	56.7	54.3	51.7	49.5	45.9	42.6	39	35.1	31.6	27.9	26.5	24.7	22	20.1	16.3	13.9	12	10.3	7.1	3.8	1.1	-1.7	-4	-6	-6.3	-6.3	-6.6	-5.4	-4.2	-4.5	-3.5	-4.2	-3.8	-2	0.2
4/15/2022	9:00:00 PM	44.2	42.1	39.7	37.8	39.3	33.4	32.4	38.3	36.3	34.8	32.5	34.5	33.7	35.4	33.1	30.4	24.6	18.4	13.4	4.4	-3.6	-8.9	-9.4	-9.2	-8.8	-6.8	-7.3	-6.6	-0.7	-3	-5.9	-5.8	-5.7	-5	-2.9	0
4/15/2022	10:00:00 PM	57.7	55.5	54	51.1	48.8	44.6	41.3	39	35.8	33	30.3	31	31.4	30.8	26.7	20	17.2	14	11.6	8	4.5	2.1	-0.9	-3.3	-5.1	-6	-6.6	-6.9	-6.2	-5.7	-5.5	-5.3	-5.3	-4.8	-2.7	0
4/15/2022	11:00:00 PM	55	53.1	50.6	47.8	44.9	40.6	36.7	36.2	31.7	28.7	26.4	26.1	25.1	24.9	20.2	15.5	13	10.2	7.7	4.2	1	-1.5	-4.6	-6.9	-8	-8	-7.8	-6	-0.8	-2.1	-5.6	-5.4	-5.6	-5	-2.9	0
4/16/2022	12:00:00 AM	46.8	44.9	42	39.6	38.1	33.5	30.1	33.4	28.2	26.6	24.9	24.4	22.9	23.1	19.8	15	12.7	7.2	4.9	1.7	-4.4	-6.4	-7.8	-7.7	-7.3	-5.6	-4.5	-3.6	4.4	3.2	-3.9	-5.5	-5.7	-5.1	-3	0

4/16/2022	1:00:00 AM	42.5	39.7	37.1	34.3	33.7	28.9	26.8	30.2	27.7	27	23.5	25	36	28.1	30.9	25.5	26.6	15.9	10	4.1	-4.4	-7.2	-6.9	-2.6	3.9	12.6	12.6	14.5	17.2	11.8	0.4	-5.5	-5.7	-5.2	-3	0.1
4/16/2022	2:00:00 AM	40.6	37.6	35	32.6	32.4	28.4	27.1	31.3	27.8	27.8	27.7	28.1	27.3	26.9	26	22	18.7	13.3	7.5	0.5	-5.6	-7.9	-6.8	-3.3	3.5	12	19.7	22.2	20	11.3	-3.1	-4.9	-5.3	-5.1	-3	0
4/16/2022	3:00:00 AM	50.9	48.7	46	42.9	40.1	36.4	33.5	33.5	32.2	31.8	31.6	32	31.3	30.5	28.9	26.2	22.6	17.6	10.6	1	-4.7	-6.7	-5.9	-3.7	-0.4	4.9	8.8	8.9	7.2	1.2	-4.4	-5	-5	-4.5	-2.7	-0.1
4/16/2022	4:00:00 AM	59.9	58.2	56	53	50	46.1	41.9	39	35.2	32.2	30.3	30.7	29.3	30.9	26.6	20	15.9	12.9	11.1	8.4	5.3	3	1.8	9.3	3.8	1.9	4.9	5.7	4.6	0.6	-3	3.2	-3.4	-3.3	-2	0
4/16/2022	5:00:00 AM	63.4	62.2	60.4	57.9	55	51.8	48.2	45.3	41.4	38.2	35.6	34.1	32.9	31.6	30.7	28.2	25.8	21.6	18.3	15.3	11.1	9.4	7.5	6	2.8	1.4	2.7	5.6	4.4	0.2	-1.4	-1	-1.6	-1.8	-1.4	0.2
4/16/2022	6:00:00 AM	67.6	66.7	65	62.9	60.4	57.4	53.9	50.5	46.9	43.3	39.8	37.1	33.8	31	29.4	28	26.1	23.3	23.9	20.8	17.8	15.9	15.4	14	10.4	7.5	6.8	6.4	4.9	4.1	3.1	4.6	2.4	1.7	0.8	1
4/16/2022	7:00:00 AM	70.2	69.2	67.8	65.9	63.5	60.7	57.5	54.2	50.6	47	43.6	40.1	37	34.2	31.7	30.8	29.2	26.4	24.9	22.4	19.2	17.5	15.8	14.2	11.8	9.3	7.9	7.5	6.1	6	4.7	7.8	5.2	4.8	3.1	2.4
4/16/2022	8:00:00 AM	69.1	68.1	66.7	64.7	61.9	58.8	55.8	52.3	48.6	44.9	41.3	37.9	34.5	31.7	29.1	27.3	25.5	24.4	23.8	21.1	18.1	16.4	14.7	12.6	10.4	7.6	6.1	6.3	5.1	4.5	3.8	5	3.2	2.9	2.3	1.9
4/16/2022	9:00:00 AM	68.7	67.5	65.8	64	61.2	58.5	55.5	52	48.3	44.9	41.4	37.8	34.4	31.7	29.4	27.8	25.7	24.2	24	20.6	17.7	16.2	14.7	12.7	10.6	7.7	6.4	6.9	5.3	4.7	3.6	4.8	3	3	2.2	1.9
4/16/2022	10:00:00 AM	67.4	66.2	64.5	62.6	60.1	57.2	54.1	50.8	46.9	43.5	40	36.4	33.7	36.5	28.5	25.5	23.9	22.8	21.6	19.3	16	14.3	12.8	10.9	9	5.8	4.2	5	3.6	3.6	2	3.7	1.9	2.1	1.1	1.1
4/16/2022	11:00:00 AM	63.7	62.2	60.8	58.6	55.8	52.5	49.3	45.4	41.9	38.2	35.3	32	29.5	27.9	25.9	23.7	21.1	19.8	19.5	15.9	12.9	11.1	9.5	7.5	5.2	1.8	0.7	0.8	1.6	1.2	-0.7	0.3	-0.9	-0.2	-0.7	0.5
4/16/2022	12:00:00 PM	61	59.4	57.6	55	52	48.3	44.4	41.1	37.6	34	31.2	29.2	27.8	26.5	25.5	22.8	21.3	21.3	16.8	11.7	7.7	6	4	2.3	0.7	-1.8	-2.8	-1.9	-2	-1.7	-3.1	-2.1	-3	-2.3	-1.7	0
4/16/2022	1:00:00 PM	54.5	52.9	50.4	47	45.1	40.8	37.6	33.8	29.8	26.3	23.2	20.7	18	16.3	14.3	13.2	10.7	8.5	9.4	5.9	1.8	1	0.6	-0.6	-2.2	-2.7	-2.7	-2.8	-3.6	-4	-4.3	-4	-4.5	-3.5	-2.1	-0.1
4/16/2022	2:00:00 PM	55.5	53.4	51.4	48.5	45.2	42	37.9	34.5	31	27.2	23.6	20.9	18.2	15.8	13.6	11.5	9.7	7.8	5.8	2.8	-0.9	-3.3	-5.3	-5.8	-5.4	-0.9	-1.3	-2.3	-2.9	-4	-4.9	-4.8	-4.9	-4	-2.4	-0.1
4/16/2022	3:00:00 PM	54.4	52.4	49.8	46.9	43.6	39.8	36.1	35.7	29.7	26.8	25.6	22.8	21.2	20.2	16.3	12.2	9.2	6.7	5.1	1.6	-3.7	-6.6	-8.1	-7.5	-6.4	-0.2	-2.4	-0.9	-0.2	-2.6	-5.1	-5.3	-5.3	-4.5	-2.7	-0.1
4/16/2022	4:00:00 PM	53.4	51.6	48.9	46	42.7	39	35.5	34.9	30.3	27.5	26.1	25.3	23.8	23.7	21	18.4	15.8	11.5	5.9	0.6	-4.7	-7.4	-8.4	-8.1	-8	-7.7	-7.6	-6.8	-5.7	-5.3	-5.4	-5.3	-5.3	-4.6	-2.8	-0.1
4/16/2022	5:00:00 PM	57.6	55.9	53.5	50.9	48	44.5	41.2	39.3	36.5	34.8	33.6	33.6	32.6	32.6	31.7	30.8	30.2	29.5	30	30	28.5	27.8	27.5	27.7	26.9	26.1	25.2	24.6	23.9	23.8	23	22.4	21.8	20.8	20.2	19.6
4/16/2022	6:00:00 PM	53	52.1	50.5	49.1	49.1	48.8	47.8	46.8	46.4	45.6	45.2	45.1	44.1	43.4	42.9	41.8	41.3	40.7	39.9	39.2	38.5	37.9	37.6	36.7	36.2	35.6	34.9	34.4	34.4	34.2	33.6	33	32.3	32	31.8	31.1
4/16/2022	7:00:00 PM	57.2	56	54.6	53.8	53.1	52.4	51.7	51.3	50.4	50.4	49.4	49.2	48.5	47.9	47.2	46.8	45.8	45.4	44.7	44	43.4	42.9	42.4	41.6	41.1	40.5	40	39.6	39.4	39.2	38.8	38.3	37.8	37.5	37.2	36.6
4/16/2022	8:00:00 PM	51.3	50.1	49.1	49.6	48.2	47.3	45.5	45.3	45.2	44.4	44.3	45.7	43.3	41.8	41.8	40.6	40.2	39.5	38.9	38	37.8	36.7	35.9	35.7	34.8	34.3	34	33.4	32.9	32.8	32.1	31.6	30.8	30.4	29.9	29.2
4/16/2022	9:00:00 PM	32.3	31.7	31.3	30.7	30.4	29.9	29.3	29.1	28.5	28.2	27.9	27.5	26.9	26.6	26.1	25.8	25.4	24.9	24.5	24.2	23.8	23.3	23	22.6	21.9	21.4	20.8	20.2	19.8	19.4	18.9	18	17.4	16.9	16.3	15.5
4/16/2022	10:00:00 PM	28.8	28.2	27.8	27.3	26.8	26.3	26	25.6	25.1	24.8	24.5	24	23.7	23.4	23.1	23	22.8	22.7	22.5	22.1	21.7	21.2	20.8	20.3	19.9	19.5	19.1	18.9	18.7	18.6	18.2	17.5	16.9	16.4	15.7	14.7
4/16/2022	11:00:00 PM	28.9	28.5	28.3	27.9	27.5	27.2	27	26.6	26.3	26	25.6	25.2	24.8	24.4	23.9	23.6	23.1	22.8	22.4	22	21.6	21.3	20.9	20.5	20.1	19.6	19.2	19	18.9	18.8	18.4	17.9	17.4	17.2	16.7	15.9
4/17/2022	12:00:00 AM	28.9	28.6	28.5	28.1	27.9	27.6	27.3	26.9	26.5	26.1	25.8	25.4	25	24.6	24.2	23.8	23.4	22.9	22.4	22	21.6	21.2	20.8	20.5	20	19.6	19.2	18.8	18.6	18.3	17.6	16.7	15.7	14.9	13.7	12.2
4/17/2022	1:00:00 AM	28.7	28.3	27.8	27.5	27.2	26.7	26.5	26	25.6	25.1	24.7	24.2	23.7	23.2	22.7	22.2	21.6	21.1	20.6	20.2	19.8	19.3	18.9	18.6	18.3	17.8	17.4	17.1	16.9	16.7	16.2	15.4	14.5	13.9	13.1	11.7
4/17/2022	2:00:00 AM	25.4	24.8	24.4	23.8	23.7	23.2	22.7	22.4	22.1	21.6	21.4	20.8	20.4	19.9	19.6	19	18.5	18.2	17.8	17.5	17	16.5	15.9	15.3	14.6	13.9	13.2	12.7	12.2	11.7	11	9.9	8.8	7.8	6.6	4.9
4/17/2022	3:00:00 AM	30	29.7	29	28.7	28.2	27.4	27.2	26.7	26.3	25.8	25.4	25.1	24.8	24.4	24.1	23.6	23.1	22.6	22	21.5	21	20.6	20.2	19.8	19.3	18.9	18.5	18.2	18	17.9	17.5	16.9	16.2	15.7	15	13.9
4/17/2022	4:00:00 AM	28.3	27.4	26.8	26.4	25.8	25.3	24.9	24.5	24.2	24	23.6	23.2	23.1	22.9	22.6	22.3	22	21.7	21.4	21.1	20.7	20.3	19.8	19.4	18.9	18.4	17.9	17.5	17.2	16.8	16.2	15.3	14.5	13.7	12.7	11.3
4/17/2022	5:00:00 AM	27.8	27.1	27	26.5	25.7	25.2	24.6	23.9	23.6	22.8	22.2	22	21.3	21	20.4	19.9	19.6	19.1	18.8	18.3	17.8	17.3	16.8	16.3	15.8	15.3	14.8	14.4	14.1	13.9	13.3	12.6	12	11.3	10.5	9.5
4/17/2022	6:00:00 AM	22.7	22.4	22.1	21.7	21.4	20.9	20.4	19.7	19.3	19	18.3	18.1	17.7	17.2	16.7	16.3	16	15.6	15.1	14.7	14.3	13.8	13.4	12.9	12.4	12	11.4	11	10.7	10.4	9.8	8.8	8	7.3	6.1	4.7
4/17/2022	7:00:00 AM	19.1	17.9	17.7	16.6	15.7	15.2	14.4	14.5	13.7	13.4	12.7	12.4	11.9	11.4	11.1	10.5	10.2	9.6	9.1	8.7	8.4	8	7.5	7.3	6.8	6.4	5.8	5.4	5.2	4.7	4	3	2.1	1.1	0.1	-1.2

4/17/2022	8:00:00 AM	11.9	10.7	9.5	8.1	7	5.9	4.9	4.1	3	2.1	1.3	0.5	-0.2	-1	-1.7	-2.5	-3.4	-4	-4.6	-5.4	-5.9	-6.5	-6.7	-7.3	-7.9	-8.7	-9	-9.5	-10	-10.2	-10.8	-11.5	-12.3	-12.6	-13	-13.5
4/17/2022	9:00:00 AM	14	12.7	11.6	11	10.8	9.7	8.8	8	7.3	6.6	6	5.7	5.5	5.5	4.8	4.3	3.4	3.4	2.6	1.8	1.5	1.3	0.8	0.1	-0.5	-1.2	-2.3	-2.7	-2.9	-2.9	-3.9	-4.7	-5.5	-6	-6.6	-7.6
4/17/2022	10:00:00 AM	13.7	12.8	12.1	11.3	10.3	9.3	9	8.4	7.8	7.4	7.2	6.7	6.1	6.1	5.8	5.3	4.4	4	3.6	3.3	2.8	2.2	1.9	1.2	0.8	0.3	-0.3	-0.6	-0.8	-1.1	-1.7	-2.4	-3.5	-4.1	-4.8	-5.7
4/17/2022	11:00:00 AM	12.4	11.4	10.2	9	7.9	6.9	6.1	5	4.1	3.4	2.5	1.8	1.2	0.3	-0.6	-1	-1.8	-2.3	-3	-3.8	-4.5	-5.1	-5.8	-6.5	-7	-7.5	-8.3	-8.6	-8.8	-9.1	-9.4	-10.2	-10.8	-10.8	-11	-11.8
4/17/2022	12:00:00 PM	11.5	10.3	9.1	7.8	6.6	5.4	4.3	3.3	2.2	1.4	0.5	0.3	-1.2	-2	-2.8	-3.4	-4	-4.6	-5.3	-6	-6.7	-7.2	-7.8	-8.4	-8.9	-9.5	-9.9	-10.3	-10.4	-10.6	-11	-11.5	-12	-12.1	-12.4	-12.8
4/17/2022	1:00:00 PM	27.6	27.7	26.9	26.1	25.6	25	24.4	23.8	23.3	22.5	21.5	20.9	19.9	18.9	17.8	17	15.7	14.7	13.3	12.6	11.5	10.1	9.4	8.2	6.7	5.6	4.7	4.8	3.1	2.8	1.7	0.9	0.2	-0.8	-1.4	-3
4/17/2022	2:00:00 PM	14.8	14.1	12.9	12	11.3	9.7	8.8	7.7	7.6	6.8	6.4	5.8	4.9	5.4	5	4.6	4.9	4.6	4.1	3.4	3.2	2.6	3.1	1.4	1.3	1.3	0.5	0.8	0.1	0.7	1	-0.4	-1.4	-1.5	-1.6	-3.2
4/17/2022	3:00:00 PM	13.1	12.1	11.3	10.7	10	9.8	9.4	8.9	8.4	8	7.7	7.3	7	6.7	6.1	5.7	5.3	4.8	4.2	3.6	3	2.3	1.7	1	0.4	-0.2	-0.8	-1.3	-1.7	-2.1	-2.9	-3.9	-5	-6	-7.2	-8.6
4/17/2022	4:00:00 PM	22.6	21.7	20.4	19.2	18.4	17.9	17.6	17.2	16.8	16.3	15.9	15.4	15	14.5	14.1	13.7	13.3	13	12.7	12.4	12	11.7	11.3	10.8	10.4	9.9	9.5	9.1	8.8	8.5	7.9	7	6	5.1	3.9	2.3
4/17/2022	5:00:00 PM	18.1	17.5	15.7	14.1	13.4	13	12.5	12	11.4	11.1	10.7	10.3	10	9.7	9.5	9.3	9	8.8	8.6	8.4	8.2	8	7.7	7.4	7.1	6.7	6.4	6.1	5.9	5.6	5	4	2.9	2	0.7	-1
4/17/2022	6:00:00 PM	14.4	13.7	12.5	10.7	9.7	9	8.2	7.4	6.7	6.1	5.5	4.9	4.4	3.9	3.4	3.1	2.8	2.4	2.1	1.7	1.4	1	0.7	0.3	-0.1	-0.5	-0.9	-1.2	-1.5	-1.8	-2.4	-3.3	-4.2	-5.1	-6.2	-7.7
4/17/2022	7:00:00 PM	12.8	11.5	10.6	9.3	8.3	7.2	6.3	5.4	4.5	3.6	2.8	2	1.4	1	0.4	-0.1	-0.6	-1.2	-1.6	-2.1	-2.6	-3.1	-3.5	-3.9	-4.5	-4.9	-5.3	-5.7	-5.9	-6.2	-6.7	-7.5	-8.4	-9.1	-9.9	-11
4/17/2022	8:00:00 PM	19.4	18.4	17.5	17.1	16	15.8	14.8	14.5	14	13.3	13	12.3	12.1	11.5	10.9	10.6	10.3	9.7	9.2	8.8	8.3	7.8	7.3	6.8	6.3	5.7	5.3	4.8	4.5	4.2	3.5	2.6	1.6	0.7	-0.5	-2.2
4/17/2022	9:00:00 PM	26.9	26.4	25.4	25	24.4	23.7	23.3	22.7	22.3	21.8	21.5	20.9	20.5	20.1	19.7	19.2	18.7	18.4	18.1	17.6	17.2	16.8	16.3	15.8	15.4	15	14.6	14.2	13.9	13.5	12.9	11.9	10.9	10	8.7	7
4/17/2022	10:00:00 PM	23.9	23.2	22.7	22	21.3	20.8	20.2	19.5	19.1	18.6	18.1	17.6	17.3	16.8	16.3	16	15.6	15.3	14.9	14.5	14	13.5	12.9	12.4	11.7	11	10.4	9.6	9.1	8.6	7.8	6.8	5.6	4.6	3.3	1.5
4/17/2022	11:00:00 PM	24.5	24.1	23.5	22.9	22.5	22.2	21.8	21.5	21.1	20.9	20.6	20.3	20	19.7	19.5	19.4	19.3	19.1	19	18.9	18.6	18.3	18	17.5	17	16.4	15.6	15	14.3	13.6	12.6	11.3	10	8.8	7.4	5.5
4/18/2022	12:00:00 AM	25.5	25	24.7	24.3	23.8	23.5	23	22.8	22.5	22.3	22	21.7	21.4	21	20.6	20.1	19.6	19.2	18.8	18.3	17.8	17.2	16.4	15.6	14.6	13.5	12.4	11.4	10.5	9.7	8.7	7.5	6.3	5.4	4.2	2.6
4/18/2022	1:00:00 AM	28.2	27.6	27.1	26.6	26.1	25.8	25.3	25	24.7	24.4	24.2	24	23.8	23.4	23.1	22.6	22.1	21.4	20.7	19.9	19.1	18.2	17.2	16.1	14.8	13.3	12	10.7	9.8	9	8	7	5.9	5.1	4	2.5
4/18/2022	2:00:00 AM	31.2	30.4	30	29.4	28.8	28.4	28.1	27.6	27.2	26.8	26.5	26.2	25.9	25.5	25.2	24.8	24.3	23.7	23.1	22.3	21.4	20.6	19.7	18.6	17.6	16.4	15.3	14.4	13.6	12.8	12.1	11.3	10.3	9.9	9.4	8.6

APPENDIX E DAILY SUMMARY DATA FOR WILDLIFE NOISE MONITORING LOCATIONS

WM1: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	42.15469	21.57978	67.55175	39.21302	29.34593	25.13385
2/9/2022	43.68115	21.57697	64.14347	46.37481	30.72547	25.35415
2/10/2022	37.33054	20.83488	62.02412	39.56216	28.75309	24.32494
2/11/2022	40.86095	23.03457	62.44367	43.08941	32.06267	27.46293
2/12/2022	35.96658	21.15188	60.10727	37.30664	30.03895	25.67982
2/13/2022	40.89989	22.02112	62.71344	43.28521	32.12686	26.75708
2/14/2022	34.42176	22.26731	60.27024	36.09193	30.50787	26.30887
2/15/2022	33.92711	21.51949	55.03666	37.15414	30.20682	25.90813
2/16/2022	33.83644	22.09769	54.85062	36.54019	31.31062	26.65261
2/17/2022	31.74417	19.80974	59.13567	32.98179	27.69704	23.69583
2/18/2022	32.39911	21.37339	48.18807	35.29211	30.02783	26.04484
2/19/2022	43.36321	22.06778	65.11527	45.45931	32.51455	26.13254

WM1: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	61.05583	34.91306	79.41338	64.99774	52.43439	40.95323
2/9/2022	66.61267	35.49598	82.59095	70.98038	56.96736	42.99148
2/10/2022	62.22669	34.78065	80.14866	66.1759	52.96244	41.60828
2/11/2022	64.62152	37.32354	81.59263	68.74462	55.43619	43.92819
2/12/2022	60.81154	35.53983	79.99991	64.29845	52.43003	42.90662
2/13/2022	65.00686	36.69963	81.79474	69.0276	56.72225	44.50079
2/14/2022	55.34724	35.76419	76.43002	57.5817	47.33481	41.65231
2/15/2022	51.62677	34.64571	72.78379	54.00192	45.56241	40.46597
2/16/2022	50.70276	36.04321	70.40196	53.52248	46.39442	41.6846
2/17/2022	47.24271	34.1266	67.20007	49.86951	44.02907	39.67925
2/18/2022	49.3016	35.71308	68.46581	52.10607	46.0007	41.56126
2/19/2022	66.6795	35.45383	82.61666	70.89258	58.67708	44.56539

WM1: 00:00-24:00 Intervals – Unweighted						
Date	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
2/8/2022	68.4242	37.29588	85.60617	72.56616	60.85466	47.03431
2/9/2022	73.52296	39.04691	89.14255	77.95225	65.71096	51.4469
2/10/2022	69.60264	38.24827	87.02183	73.59856	61.93213	49.1841
2/11/2022	71.82931	39.44231	88.30197	76.02416	64.21329	50.3787
2/12/2022	68.72979	37.61257	86.9733	72.45932	61.49669	49.98505
2/13/2022	72.28635	38.56839	88.64261	76.37561	65.07837	51.39488
2/14/2022	66.47654	37.59105	86.47348	69.48864	56.0848	45.65065
2/15/2022	63.59002	37.05545	84.26185	66.34876	52.91392	44.51355
2/16/2022	61.15777	38.46894	80.60032	64.58792	51.958	45.06825
2/17/2022	56.08619	37.22417	77.91489	58.29154	49.03665	43.87118
2/18/2022	58.64119	37.91028	79.40564	61.60054	50.8977	44.57786
2/19/2022	73.74682	37.88771	89.26727	78.01994	66.82169	52.85748

WM2: 00:00-24:00 Intervals – A-Weighted						
Date	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
4/2/2022	30.36271	15.89337	56.1402	31.47334	25.26485	20.85673
4/3/2022	27.64107	14.11867	51.26401	29.50188	23.89428	19.42908
4/4/2022	38.77537	24.4667	62.63915	39.9389	33.83654	29.50638
4/5/2022	39.94325	20.54663	62.13853	37.52229	29.42195	25.32892
4/6/2022	31.88542	10.36609	61.55364	27.30599	21.14261	15.71494
4/7/2022	30.482	13.95029	53.6519	30.69787	23.80111	19.2143
4/8/2022	34.05309	19.818	59.83634	36.1646	30.00808	25.13224
4/9/2022	30.60111	16.87738	59.36461	30.97386	25.1239	21.14444
4/10/2022	28.70896	14.00917	52.17529	30.14817	24.24145	19.75639
4/11/2022	40.50861	25.71655	59.5472	43.33326	36.31215	31.01517
4/12/2022	37.98513	20.08819	60.63998	37.91032	29.27619	24.90483
4/13/2022	35.36226	20.37737	57.55061	36.54576	29.60533	25.26176
4/14/2022	38.02676	21.91927	59.86831	40.45676	31.2812	26.67778

WM2: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	49.34612	32.97217	69.11017	52.16505	43.58826	38.60385
4/3/2022	46.56647	31.04835	66.90911	49.10174	41.65307	36.84193
4/4/2022	63.14528	39.76117	79.15754	67.45405	57.39176	46.86789
4/5/2022	59.4875	36.01172	80.61035	61.45572	49.41768	42.14425
4/6/2022	49.15286	29.14409	74.2748	47.57706	39.40712	34.67058
4/7/2022	46.90941	31.71728	67.69607	48.82821	41.77882	37.28856
4/8/2022	58.82094	36.02186	75.2719	63.01451	52.93386	43.07899
4/9/2022	54.3754	33.03396	73.84107	57.61662	46.06676	39.06969
4/10/2022	48.41617	32.37616	68.93697	50.87812	43.36596	38.61679
4/11/2022	65.06071	40.36657	79.35252	69.25753	60.80629	49.94947
4/12/2022	58.67083	35.96224	79.0354	61.61615	49.69944	42.24156
4/13/2022	59.22658	36.07877	78.07946	62.998	51.39629	42.46941
4/14/2022	60.93365	37.12405	78.53261	64.93612	54.41631	43.94829

WM2: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	62.35682	35.17867	81.8001	65.69051	52.70623	42.55173
4/3/2022	58.6673	33.48808	79.03884	61.56824	48.44334	40.55577
4/4/2022	75.90197	43.44654	89.49554	80.2441	71.68676	59.22673
4/5/2022	70.86057	38.80094	88.87449	74.74725	62.65692	49.68052
4/6/2022	56.87253	33.07597	79.5249	58.97552	46.87914	40.09798
4/7/2022	53.69226	34.2972	75.49448	55.90347	46.05487	40.83265
4/8/2022	71.76958	38.78294	86.26059	76.07894	67.17096	54.40494
4/9/2022	68.36997	36.10814	86.34714	72.27294	59.65746	46.70453
4/10/2022	60.27302	35.17152	80.93562	62.96483	49.84198	42.60496
4/11/2022	76.869	45.66864	90.04254	80.92635	73.66315	63.44992
4/12/2022	70.60365	38.9343	87.47204	74.8035	63.00282	49.46166
4/13/2022	72.051	39.11873	87.79179	76.43073	65.80431	52.35401
4/14/2022	73.33675	40.54558	87.84073	77.59358	68.60819	55.79735

WM3: 00:00-24:00 Intervals – A-Weighted						
Date	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
2/9/2022	24.35605	12.65548	44.07788	26.224	21.96608	17.82938
2/10/2022	24.30188	12.04218	45.96528	26.29835	20.90251	16.93018
2/11/2022	30.55393	12.02552	55.42472	26.85405	20.84803	17.0158
2/12/2022	24.85837	12.03211	45.3488	26.92159	20.70022	16.84117
2/13/2022	30.53192	10.03056	55.52987	27.49314	20.3869	14.78062
2/14/2022	30.19888	11.91194	58.63006	32.30874	24.46149	18.67172
2/15/2022	27.62599	13.46533	59.83375	27.70419	22.10346	18.21898
2/16/2022	22.15229	10.47434	42.55975	24.29709	19.1356	14.98739
2/17/2022	25.76748	11.99866	48.39207	26.54003	21.09383	17.24845
2/18/2022	27.36515	11.96066	48.53448	29.80098	22.68002	17.60832
2/19/2022	33.09297	19.32445	51.13295	36.18956	30.51076	25.45917
2/20/2022	34.88002	12.80568	59.16937	32.25344	23.62513	17.79775
*Data summarizing 2/20/2022 goes from 00:00-21:00 (missing 3 hours) due to measurement ending						

WM3: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	46.72165	30.64428	68.2667	49.05236	40.323	36.14065
2/10/2022	50.51854	31.58551	70.56414	53.62644	43.63257	37.4057
2/11/2022	49.61642	30.54391	70.32267	52.30991	42.24557	36.12502
2/12/2022	47.99002	29.98744	67.20444	51.04021	41.70714	35.95438
2/13/2022	48.60633	28.85679	70.75385	50.58971	41.03056	34.87588
2/14/2022	55.54342	29.89272	74.35621	59.17961	47.19177	37.67603
2/15/2022	46.49571	30.74327	68.44991	48.52218	40.64707	36.25208
2/16/2022	47.34669	31.22288	67.50691	50.04762	41.42598	36.86439
2/17/2022	50.13038	29.00053	70.33144	53.28812	42.16596	34.98108
2/18/2022	52.71552	29.37817	72.99838	55.73989	43.99735	36.16599
2/19/2022	57.8715	35.20203	73.96916	61.87491	51.96823	43.2035
2/20/2022	52.90839	29.53549	73.31828	55.56713	43.87249	36.15093
*Data summarizing 2/20/2022 goes from 00:00-21:00 (missing 3 hours) due to measurement ending						

WM3: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	59.3028	35.0093	80.98645	62.2082	49.81979	42.42186
2/10/2022	63.86206	35.84097	82.54516	67.43807	56.27565	45.61631
2/11/2022	62.44271	34.04005	81.07792	66.01963	54.58372	43.12002
2/12/2022	60.57417	32.84394	79.24929	64.1254	52.56356	41.56999
2/13/2022	60.36127	31.96181	80.86522	63.35392	51.24078	40.66278
2/14/2022	67.96937	34.49246	85.25479	71.92448	60.49522	48.24812
2/15/2022	58.34775	34.27682	79.62355	60.97976	48.39124	41.24963
2/16/2022	60.42841	35.65196	80.36663	63.61383	52.04774	43.5898
2/17/2022	63.59845	33.19122	82.16036	67.28576	55.41	43.52217
2/18/2022	65.42711	33.61506	84.443	68.87296	56.72425	44.45165
2/19/2022	69.84776	39.4425	84.83908	73.9616	64.59684	53.56377
2/20/2022	65.69481	34.20087	84.71659	69.01116	55.78546	44.41401
*Data summarizing 2/20/2022 goes from 00:00-21:00 (missing 3 hours) due to measurement ending						

WM4: 00:00-24:00 Intervals – A-Weighted						
Date	Overall Leq	Lmin (overall)	Lmax (overall)	L10 (overall)	L50 (overall)	L90 (overall)
7/13/2021	44.94918	26.59183	59.61678	49.44308	40.52454	31.68947
7/14/2021	46.7554	26.57102	60.66309	51.20138	37.20541	31.55982
7/15/2021	42.09203	25.04958	57.65083	44.37173	36.46844	30.35047
7/16/2021	42.12189	22.02156	60.0811	43.43094	32.30551	28.36244
7/17/2021	41.13684	28.99774	54.56338	43.4345	36.33277	33.17961
7/18/2021	40.41713	28.65145	57.86669	42.45457	36.56753	33.46412
7/19/2021	42.04625	32.05065	55.86648	45.42463	40.05595	35.60868
7/20/2021	41.42314	30.71943	57.45314	44.34773	37.77413	34.41267
7/21/2021	43.57069	33.91045	58.91022	45.05411	40.17023	37.30017

WM4: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	61.67962	32.60694	76.04952	65.94768	57.1874	44.73895
7/14/2021	50.8979	28.04031	72.02699	53.42983	39.81558	33.65009
7/15/2021	49.4066	26.40691	71.66919	51.21074	39.01459	32.18912
7/16/2021	48.43564	24.88484	73.71475	48.0029	36.01494	30.9048
7/17/2021	46.74404	30.90862	66.35785	49.66537	42.203	36.80328
7/18/2021	60.38355	31.35707	76.46226	64.67228	54.18283	41.84873
7/19/2021	60.79044	32.58514	77.03931	65.05964	53.82653	41.48057
7/20/2021	54.34542	34.23333	74.44652	57.75622	41.432	37.58559
7/21/2021	50.24296	38.21556	73.8918	50.44032	43.57843	41.2263

WM4: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	72.57206	38.80706	85.67369	76.61323	69.37464	58.14043
7/14/2021	61.69319	32.08678	81.93665	64.67793	49.22627	39.35406
7/15/2021	60.97511	30.26182	81.61214	63.79209	49.05729	38.2665
7/16/2021	57.66641	28.66682	81.31178	58.83236	44.13162	36.43925
7/17/2021	55.32085	32.43424	77.3254	57.31873	45.68517	38.97506
7/18/2021	71.87439	36.43147	86.15831	76.14976	67.23884	55.50376
7/19/2021	72.64625	36.27693	87.02961	77.02773	67.30113	54.69257
7/20/2021	65.24424	34.96756	83.44372	69.70844	49.34339	39.45903
7/21/2021	57.43032	38.62268	80.01577	58.31915	45.86371	42.12848

WM5: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	22.70811	3.631509	44.17315	26.43396622	22.33713	21.8795823
8/26/2021	25.67112	4.60241	46.97347	28.61313203	23.4569	21.922164
8/27/2021	24.94174	4.433987	57.23922	23.99319829	22.09068	21.9024359
8/28/2021	22.39483	4.000737	49.88028	23.51393917	22.11681	21.9091625
8/29/2021	18.07828	3.879389	43.78221	22.97907831	22.01909	21.8939246
8/30/2021	27.37464	7.771469	45.92404	31.25370693	25.26093	22.1392806
8/31/2021	22.29389	4.34058	51.12116	24.26362897	22.02143	21.8861509
9/1/2021	23.14498	3.301279	47.26486	22.92558155	21.99909	21.8829214
9/2/2021	24.72037	4.534244	53.11949	25.56503597	22.22425	21.8908798
9/3/2021	22.11671	2.044526	48.10869	23.28362543	21.88908	21.8408439
9/4/2021	19.0506	3.340475	45.65026	22.4522693	21.91436	21.8568639

WM5: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	42.71784	22.06067	67.15996	42.96491	33.92357	29.17743
8/26/2021	44.65409	21.69164	67.31041	45.63132	33.69769	28.94609
8/27/2021	38.89799	23.94552	63.19784	41.04457	34.86704	30.65387
8/28/2021	45.35915	23.48591	66.03806	42.58871	35.82089	30.79676
8/29/2021	38.1979	23.85991	57.30961	41.0418	35.25903	30.80144
8/30/2021	47.20317	23.16802	71.33958	49.13423	36.42518	30.27469
8/31/2021	37.8723	23.02516	60.22092	39.88614	33.51668	29.63757
9/1/2021	38.64127	22.47545	60.6226	39.94477	33.98363	29.71398
9/2/2021	40.24082	23.86296	64.90977	41.16207	34.58127	30.50067
9/3/2021	36.34714	17.19602	59.96978	37.13266	28.71593	25.60678
9/4/2021	36.34405	20.97962	59.04705	37.76683	31.54933	28.00352

WM5: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	53.05703	26.23682	77.85787	54.03489	40.72021	34.19586
8/26/2021	57.73327	26.4953	79.30911	59.88966	44.09923	34.74045
8/27/2021	44.84198	27.46573	68.61032	46.41415	39.37239	34.78716
8/28/2021	49.8352	26.41366	71.29429	46.71078	39.45083	34.20276
8/29/2021	43.47175	27.19255	66.84923	45.6489	39.42968	34.61211
8/30/2021	61.19948	27.16794	81.63659	64.21505	48.50532	35.85444
8/31/2021	46.70488	26.54082	71.29531	47.40869	38.50388	33.91627
9/1/2021	43.32517	26.06953	66.46685	44.99827	38.49705	33.83987
9/2/2021	50.35027	27.85529	74.28235	50.5968	40.08586	35.25311
9/3/2021	42.41726	21.25128	68.31651	42.97478	34.02295	29.66907
9/4/2021	42.08262	24.18026	66.33522	43.58554	35.95171	31.56227

WM6: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	46.00001	15.82787	63.10627	35.76167842	23.67763	18.72674646
7/10/2021	38.83249	16.63605	56.98874	42.8289632	29.91732	20.06062155
7/11/2021	41.64301	17.7398	59.7281	45.64925891	34.73262	24.74425379
7/12/2021	47.0715	19.7726	64.61091	47.22393454	35.63254	25.92017132
7/13/2021	42.64887	21.04211	60.08629	46.75263803	37.19859	28.15117369
7/14/2021	37.50337	18.09689	59.28833	40.00756054	29.65432	22.15642741
7/15/2021	37.74507	17.65026	59.01822	40.75299386	30.40887	22.33523613
7/16/2021	39.72672	17.67318	58.6099	43.27405181	33.20337	23.56558254
7/17/2021	35.71434	16.55399	56.51963	38.79753	28.6604	20.68270795
7/18/2021	38.99203	17.4523	56.99166	42.4918116	34.41763	25.48801066

WM6: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	58.20674	30.91935	81.00796	60.04566	47.5992	37.76459
7/10/2021	64.61273	30.86623	81.50774	69.22529	54.29493	38.6069
7/11/2021	69.5232	32.81823	84.33112	74.04189	63.12687	49.94477
7/12/2021	70.06727	35.4267	86.26949	74.41964	61.56587	44.0649
7/13/2021	70.10993	37.34541	85.18974	74.68533	63.49944	48.30814
7/14/2021	65.28137	34.84445	82.17018	69.39295	57.05263	42.61849
7/15/2021	64.91014	33.22369	83.48618	68.5934	56.09031	41.93508
7/16/2021	68.05622	32.90769	83.53993	72.34944	61.43417	47.97804
7/17/2021	64.06902	32.51234	81.45302	67.85094	57.73079	45.50551
7/18/2021	63.43534	32.45909	81.65533	67.65067	52.86411	41.42728

WM6: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	69.23081	36.4448	88.87722	72.81254	60.19691	46.13284
7/10/2021	75.83507	36.06786	92.31184	80.34755	68.02613	48.5331
7/11/2021	80.67069	38.70226	94.36321	85.20087	75.56675	63.85024
7/12/2021	81.60366	40.38167	96.20739	86.17017	75.33524	56.44827
7/13/2021	81.76789	45.24643	95.86165	86.17472	77.1385	62.27288
7/14/2021	76.86058	40.13602	92.78154	81.17895	70.40786	53.91152
7/15/2021	76.93335	39.15667	93.46686	81.06365	69.76431	53.96428
7/16/2021	79.39403	39.75307	93.56116	83.83555	74.13414	62.16581
7/17/2021	75.97326	39.92424	92.11172	79.98193	70.51165	58.67802
7/18/2021	76.46442	37.75603	92.87313	80.92688	68.35084	52.64354

WM8: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	37.31677	11.27456	60.3864	39.50602	28.82372	19.92429
8/25/2021	36.36268	12.14537	58.1505	38.42283	29.22245	20.12205
8/26/2021	34.20817	9.84315	55.12102	36.89296	26.54182	18.3207
8/27/2021	35.38982	7.631718	60.03113	37.41121	26.38455	17.50664
8/28/2021	32.55244	4.767007	54.3497	34.29619	20.58845	11.33195
8/29/2021	32.84158	6.085631	52.40415	36.23323	23.3285	13.69419
8/30/2021	39.31177	12.82852	60.98171	41.93635	31.53823	23.31989
*Data summarizing 8/30/2021 goes from 00:00-10:00 (missing 14 hours) due to measurement ending						

WM8: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	55.65269	30.8899	73.72727	58.85325	47.86986	39.63921
8/25/2021	55.83602	32.14457	74.04873	58.67393	48.57785	40.44826
8/26/2021	55.25707	30.82029	73.95168	58.40079	47.86829	39.24431
8/27/2021	53.86493	28.79065	72.53452	56.19248	44.81826	36.88606
8/28/2021	50.65181	26.97428	69.51915	52.27992	40.68546	33.87819
8/29/2021	52.09501	28.42726	70.19339	55.32697	43.00713	35.73898
8/30/2021	55.9417	31.9081	74.51291	57.90746	45.97831	39.56102
*Data summarizing 8/30/2021 goes from 00:00-10:00 (missing 14 hours) due to measurement ending						

WM8: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	64.35371	35.18819	81.88089	68.093	57.88819	47.9561
8/25/2021	65.53943	36.60233	82.55608	69.40571	59.47663	49.18225
8/26/2021	65.5592	35.39388	82.98676	69.45239	59.20904	47.99811
8/27/2021	62.37194	33.29082	80.59064	65.72243	53.4568	43.45947
8/28/2021	57.52352	31.36183	76.93525	60.04479	48.26568	39.86887
8/29/2021	59.23942	32.69116	77.89482	62.78574	50.90524	42.23675
8/30/2021	60.09169	35.44	78.15603	62.15665	50.04216	43.67314
*Data summarizing 8/30/2021 goes from 00:00-10:00 (missing 14 hours) due to measurement ending						

WM10: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	46.49919	11.2403	68.01193	44.48874	27.08192	22.48773
8/25/2021	45.53561	12.91194	66.05605	42.62767	26.74799	23.17717
8/26/2021	41.66295	9.794417	62.91716	39.78692	26.54435	22.4748
8/27/2021	46.38495	7.754891	66.65232	40.62748	25.20507	21.78458
8/28/2021	45.38707	4.32111	66.10571	34.07589	22.15483	21.34414
8/29/2021	43.73949	4.918283	63.76278	40.55474	22.71437	21.41924
8/30/2021	46.37481	12.4456	66.11223	45.46049	29.40085	23.2897
8/31/2021	44.1847	10.47577	64.02847	41.38407	26.75588	22.64785
9/1/2021	45.80048	9.833892	66.17691	42.39484	25.63707	22.31537
9/2/2021	43.8874	10.68619	67.41652	38.8117	26.61618	22.52452

WM10: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	62.51892	28.20574	82.14114	63.71976	44.14573	35.63899
8/25/2021	61.17133	29.72126	81.67155	59.41597	43.6415	36.80618
8/26/2021	59.40577	28.23821	80.09945	58.06292	43.47203	35.66276
8/27/2021	60.96406	26.53409	81.20852	58.10427	40.46004	33.50748
8/28/2021	59.80811	23.85093	80.66015	52.9791	35.97125	30.67927
8/29/2021	60.42129	25.95798	80.14146	58.30932	38.44013	32.49376
8/30/2021	63.17026	29.77303	81.70367	65.82554	51.39947	39.80693
8/31/2021	59.85865	28.85895	80.01299	58.02508	43.59044	36.19823
9/1/2021	61.17016	28.17967	81.04688	58.60043	41.41876	35.1954
9/2/2021	60.95587	28.83118	80.98533	60.90217	47.10684	37.17017

WM10: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	65.76396	31.90698	85.1578	67.46565	51.03419	41.02981
8/25/2021	65.05606	33.20545	84.84502	65.87805	52.64038	42.79199
8/26/2021	64.41375	32.23292	84.49327	65.82786	53.00565	41.80199
8/27/2021	63.89243	30.38587	84.46626	62.65852	46.50158	38.4662
8/28/2021	62.48182	27.89824	83.42384	58.02864	41.82268	35.68023
8/29/2021	62.98218	29.86803	82.72071	62.16208	44.13649	37.38041
8/30/2021	70.04031	34.55665	86.32626	73.82386	63.57961	51.02533
8/31/2021	64.14999	32.44394	83.82217	65.1588	52.48841	41.68668
9/1/2021	64.13946	31.92793	83.94307	63.09268	46.84666	39.70801
9/2/2021	67.36506	32.97207	85.41656	70.37406	59.07591	45.80883

WM11: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	27.51794	0.581881	59.143	25.97597	22.08774	21.65303
8/25/2021	31.94556	8.771007	53.97379	33.3162	25.56128	22.36011
8/26/2021	27.51489	5.572554	50.3669	29.81126	23.54533	21.88382
8/27/2021	29.34213	4.240166	59.77746	29.13726	23.25741	21.80926
8/28/2021	22.90823	2.966129	49.16786	25.04571	22.01591	21.70626
8/29/2021	24.95919	1.836753	50.57392	25.68239	22.04931	21.69366
8/30/2021	25.43801	3.478449	50.35553	27.67403	22.67216	21.76554
8/31/2021	23.68235	1.627227	48.08416	26.9131	22.26163	21.69042
9/1/2021	27.08129	4.69948	51.08326	28.91438	22.90206	21.82055
9/2/2021	45.47096	13.71343	71.69224	39.41271	29.15173	23.79444
9/3/2021	45.27562	4.076577	71.95885	33.62918	22.65592	21.78812
9/4/2021	42.60764	2.029151	70.36633	30.959	22.32598	21.71772
9/5/2021	20.59556	5.268156	48.491	24.16107	22.29793	21.80856

WM11: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	51.92787	24.00852	74.56591	53.28609	38.33164	30.99732
8/25/2021	57.07651	25.72496	76.47074	60.29929	45.64147	33.80563
8/26/2021	55.05882	24.4815	75.8731	57.32966	42.01821	31.98348
8/27/2021	53.17441	26.65576	74.81154	55.51597	41.07413	33.56958
8/28/2021	52.51705	25.52437	72.74413	55.42809	41.42293	32.68819
8/29/2021	52.64458	24.81225	73.2963	55.77304	41.32802	32.01657
8/30/2021	51.35466	25.43343	73.93061	52.89666	39.84962	32.74499
8/31/2021	52.68354	25.84534	72.41189	55.80869	44.30525	34.30377
9/1/2021	54.50567	27.81425	74.34126	57.44148	43.29715	34.74283
9/2/2021	64.81552	30.36245	85.99586	67.393	57.8608	45.87431
9/3/2021	60.30775	26.76207	85.91207	56.53552	42.05386	33.54795
9/4/2021	58.75137	24.288	84.87181	55.45885	40.98726	31.59109
9/5/2021	48.4147	27.15556	68.89595	51.38014	40.80005	34.30774

WM11: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	62.62785	28.94497	83.54742	65.17708	50.44147	38.69869
8/25/2021	67.77229	30.87565	85.21445	71.72145	58.60188	43.86548
8/26/2021	65.96884	30.15137	85.18793	69.15367	54.76358	41.44355
8/27/2021	63.83864	31.46503	83.80814	66.96418	52.63479	41.27961
8/28/2021	63.32684	30.26822	82.46675	66.74127	53.27051	39.92093
8/29/2021	63.22874	29.76996	82.23741	66.89502	53.25668	39.52482
8/30/2021	62.1281	30.8826	83.08916	64.70444	51.39631	41.45053
8/31/2021	63.53951	31.57003	82.38775	66.99904	56.23905	44.74149
9/1/2021	64.98749	32.39584	83.7115	68.4402	54.77567	42.64933
9/2/2021	72.96223	38.60179	89.27475	76.89344	68.7267	57.84921
9/3/2021	65.07117	31.00646	87.92281	67.0343	53.17963	40.09248
9/4/2021	64.42251	29.39174	86.96607	66.37632	53.10107	39.89825
9/5/2021	59.81304	32.10573	79.27835	63.20348	52.14157	42.65318

WM12: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	34.77444	20.06833	56.5275	38.08	33.10417	28.2815292
8/25/2021	29.64468	11.2324	49.46497	33.7401	24.78673	23.15457
8/26/2021	27.60288	15.92189	44.31933	31.64248	25.40057	23.8594777
8/27/2021	35.23247	20.06713	56.1827	39.07021	33.82812	26.7084511
8/28/2021	33.39057	18.1598	44.97001	36.80854	32.42147	25.8651149
8/29/2021	33.2302	17.8896	46.62225	37.85007	30.48187	25.4266524
8/30/2021	31.53932	15.70116	44.14478	36.32351	27.44931	23.8999569

WM12: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	43.27406	27.91998	65.98564	44.77436	38.13753	33.88238
8/25/2021	46.92982	25.50406	70.66528	48.37679	36.7663	31.52079
8/26/2021	46.05774	24.8048	67.45958	47.69549	35.62156	30.61748
8/27/2021	44.64442	28.95961	66.72865	46.74386	39.69674	34.77891
8/28/2021	42.15116	28.99459	60.32983	45.36574	39.13206	34.6916
8/29/2021	43.00692	29.78956	66.21533	45.02185	39.8992	35.71323
8/30/2021	43.92109	24.39738	65.42644	46.45905	35.59294	30.56689

WM12: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	53.95008	31.60534	76.81061	55.79903	44.06868	38.86658
8/25/2021	59.0905	29.79463	80.67131	61.58719	47.37859	37.79315
8/26/2021	58.79624	29.03949	79.41733	61.26144	46.6554	37.00242
8/27/2021	55.35826	32.82564	77.07094	57.63618	46.00658	40.15923
8/28/2021	50.42196	33.04784	72.97113	52.94537	44.85421	40.19621
8/29/2021	51.60347	34.20504	75.80388	52.55947	45.94448	41.58014
8/30/2021	56.46687	30.02652	76.60645	59.42232	46.57616	38.33541

WM13: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	36.67743	14.91274	64.36413	28.19723	22.26553806	18.77004
4/7/2022	40.65703	11.536	63.92758	31.09166	20.60806507	16.38039
4/8/2022	40.96535	19.86684	63.90168	42.28648	34.62055757	27.34385
4/9/2022	40.11109	17.29491	63.18671	41.78965	33.50953489	24.67025
4/10/2022	30.98423	11.58764	57.268	32.48247	22.25786383	16.60328
4/11/2022	46.2826	23.28817	60.88951	50.17256	43.02675201	35.06019
4/12/2022	38.10146	19.71198	55.13178	41.75495	34.32972119	27.12907
4/13/2022	34.7761	17.20327	56.23055	37.87768	29.70789055	23.21856
4/14/2022	40.47714	22.13964	60.70974	43.97251	35.93644165	28.64145
4/15/2022	33.78447	16.7324	54.47894	36.50148	28.80834855	22.85038
4/16/2022	43.65448	23.72022	62.91919	47.16355	40.15469756	32.64087
4/17/2022	35.14872	12.47647	59.6175	31.17766	23.08919007	17.74087
4/18/2022	38.89445	17.77111	62.04756	40.35629	31.90923721	24.66981

WM13: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	47.82182	35.24133	69.72981	49.63213	44.21486	40.54961
4/7/2022	46.50845	31.0576	67.74333	47.86749	40.70372	36.51326
4/8/2022	66.16106	39.18606	78.6174	69.99019	63.56369	55.45753
4/9/2022	66.32559	36.19538	79.3816	70.43876	62.91046	52.52027
4/10/2022	54.00117	31.76906	73.92571	57.0357	45.46503	37.66225
4/11/2022	71.96147	44.9077	82.8706	75.65368	69.94564	62.86228
4/12/2022	67.61393	43.18101	80.3025	71.59063	64.57122	56.21732
4/13/2022	63.87981	36.36888	78.51933	68.01909	59.13323	48.93624
4/14/2022	69.06292	39.92476	81.80113	73.24287	65.51647	55.34182
4/15/2022	61.98072	32.84101	77.3223	66.05414	56.81851	46.21404
4/16/2022	70.25184	44.65136	81.45724	73.91145	68.26689	60.71197
4/17/2022	55.86846	30.85177	74.11534	59.61124	47.66027	37.84802
4/18/2022	64.95287	37.76863	78.20891	68.99618	61.39739	52.49578

WM13: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	57.38336	38.64486	78.40964	60.30582	50.84504	45.33317
4/7/2022	54.46529	34.83638	75.48828	57.34594	47.51317	41.64417
4/8/2022	76.73678	51.40338	88.31608	80.45632	74.57304	67.46178
4/9/2022	77.21649	47.01006	89.41389	81.23735	74.38146	65.1711
4/10/2022	66.39238	35.45933	84.53093	70.08304	58.39735	45.15719
4/11/2022	81.5454	56.84292	91.98348	85.14375	79.8031	73.12014
4/12/2022	78.65303	54.89219	90.60749	82.51731	76.12684	68.44231
4/13/2022	75.77439	46.16023	89.36139	79.87648	71.97757	62.4253
4/14/2022	80.33488	52.41786	92.09042	84.33333	77.67395	68.79912
4/15/2022	74.20591	43.25517	88.47175	78.3162	70.11711	60.15941
4/16/2022	80.23846	57.22998	90.70881	83.74652	78.63236	71.99266
4/17/2022	68.40567	35.39334	84.92661	72.57688	61.33367	48.21422
4/18/2022	76.39113	50.63938	88.57729	80.38316	73.5223	65.43909

WM15: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	28.4819	23.07141	47.11856	29.50976	27.10557	25.3015
2/10/2022	28.27677	22.94932	46.92922	29.12411	26.733	25.01877
2/11/2022	30.88428	23.60641	54.05734	30.10439	27.4027	25.82909
2/12/2022	28.65226	23.43033	47.84785	29.76801	27.10968	25.56389
2/13/2022	28.64287	23.0576	49.43712	29.24549	26.6128	25.08512
2/14/2022	30.07832	22.76063	57.11114	30.06162	26.68416	24.92087
2/15/2022	27.49423	20.68019	45.89532	29.4289	25.31042	23.07745
2/16/2022	29.74839	21.32615	52.58971	29.18727	25.52747	23.62857
2/17/2022	29.34894	22.29384	54.52608	29.36541	26.84925	25.04304
2/18/2022	29.35224	23.19581	48.02004	30.76345	28.09596	25.96738
2/19/2022	29.21612	24.01381	48.59678	30.04339	28.05143	26.60589
2/20/2022	36.54263	24.66078	57.10769	38.82128	30.43926	27.39474
2/21/2022	29.86708	21.32659	52.71489	30.29103	25.36775	23.61315

WM15: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	47.64017	31.0816	67.54927	50.94036	40.1554	34.99545
2/10/2022	43.58024	30.53687	66.08987	45.19087	37.47739	34.29582
2/11/2022	46.76821	30.68904	69.80713	48.12219	37.49191	34.04967
2/12/2022	45.66389	30.04391	66.98579	48.14321	37.7764	33.2646
2/13/2022	48.99472	29.60709	72.04041	50.15392	36.31269	32.5175
2/14/2022	52.714	29.72016	74.95092	52.93527	38.12153	33.17599
2/15/2022	50.06956	28.85639	71.08076	52.35905	39.17217	33.28161
2/16/2022	49.49756	30.3395	70.22913	52.48453	40.33066	34.93823
2/17/2022	46.02414	30.66841	67.43599	48.21006	38.60353	34.84939
2/18/2022	48.60353	30.95973	69.63525	51.06374	39.83954	35.2469
2/19/2022	48.2082	31.0688	70.69944	49.45952	37.52469	34.45828
2/20/2022	61.84894	33.08459	79.42736	65.71675	50.60241	38.84614
2/21/2022	53.34608	29.05495	75.74256	53.92045	38.17849	32.68263

WM15: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L9
2/9/2022	59.97777	33.56736	79.54254	63.57335	51.29182	40.33679
2/10/2022	57.08289	32.74731	79.11657	59.25303	45.97487	38.77901
2/11/2022	60.04539	32.23555	81.34535	62.57462	47.78922	38.03587
2/12/2022	59.46512	30.92964	79.98164	62.59273	49.83575	37.92121
2/13/2022	61.75947	30.40544	82.81313	64.08166	46.54666	35.40789
2/14/2022	64.61129	31.10016	85.3119	66.32717	48.50957	37.45349
2/15/2022	62.15133	31.47377	82.04673	65.24536	50.91533	39.39251
2/16/2022	61.34157	33.45073	80.61857	64.90037	51.46227	41.59084
2/17/2022	59.81071	33.17181	79.99269	62.62524	49.14319	39.74894
2/18/2022	62.61447	33.22157	82.25425	65.78835	51.74208	40.91925
2/19/2022	61.35243	32.27942	83.12056	63.26105	46.39268	37.58448
2/20/2022	72.52496	36.25843	88.82445	76.81692	63.54391	46.99208
2/21/2022	65.1742	30.51828	85.49099	67.44868	49.84758	36.72118

WM16: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	47.08428	15.90628	71.4042	40.69707	24.50954	20.5135
4/7/2022	47.92678	18.32341	73.75789	44.51093	25.67115	22.27832
4/8/2022	49.28824	18.14867	76.44955	42.66056	28.33103	22.87381
4/9/2022	57.16682	20.49294	80.83516	48.32773	30.97212	25.4536
4/10/2022	52.69703	13.61106	79.98082	45.52638	22.66789	18.61277
4/11/2022	43.53549	21.52512	62.43341	47.15989	38.94562	30.51428
4/12/2022	40.85117	19.83585	58.26877	44.13042	36.9093	29.1691
4/13/2022	40.66541	10.96963	65.78094	36.56316	26.57553	18.29428
4/14/2022	45.02986	17.86685	70.95329	40.77737	32.40885	25.15227
4/15/2022	50.86813	13.37893	76.26408	41.17372	25.10102	18.89159
4/16/2022	49.36427	19.14495	76.90295	46.77735	35.22653	27.15107
4/17/2022	50.64837	12.4359	72.36305	48.73842	22.40061	17.43577
4/18/2022	51.49898	19.66461	77.15402	48.84229	31.06957	25.10356

WM16: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	50.69046	36.6104	72.74081	51.95017	46.20787	42.0575
4/7/2022	51.32394	38.3524	74.06663	52.306	47.44035	43.77514
4/8/2022	60.24005	37.48455	78.23124	64.19716	54.50687	45.28194
4/9/2022	62.90766	37.66202	81.49293	66.28082	56.23115	45.69925
4/10/2022	55.24201	32.33395	79.32845	56.75931	45.8487	38.4753
4/11/2022	69.06698	40.40034	81.6958	73.1654	65.87195	56.56304
4/12/2022	67.76393	42.7846	80.34027	71.61245	65.15755	57.15834
4/13/2022	61.74856	35.19971	78.05959	65.74354	56.44395	47.09295
4/14/2022	64.17737	37.44513	79.37387	68.25143	59.63764	50.49869
4/15/2022	57.30544	30.08287	78.15681	60.16258	49.42485	39.38013
4/16/2022	65.9139	36.6848	80.63602	69.98402	62.23647	52.41086
4/17/2022	56.31446	30.78593	75.2888	59.35536	47.63734	38.20688
4/18/2022	62.3358	38.00802	79.0098	66.20334	57.98564	49.27813

WM16: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	59.49459	39.71554	80.63375	62.41729	53.25518	46.82298
4/7/2022	56.02484	40.76287	76.86744	58.45222	51.40383	46.92789
4/8/2022	71.92372	40.69276	86.49494	76.20193	67.11729	55.99605
4/9/2022	74.63543	41.24592	89.33023	78.85658	69.83186	57.71374
4/10/2022	66.15748	35.2575	85.04375	69.81772	58.23723	45.59594
4/11/2022	79.4589	52.05372	90.99113	83.41236	76.85742	68.72485
4/12/2022	78.37782	55.11931	90.13866	82.10754	76.11496	68.93841
4/13/2022	73.59189	43.79425	88.32699	77.70664	69.00144	59.32318
4/14/2022	75.97102	48.26342	89.5553	80.04136	72.26867	63.37775
4/15/2022	69.13766	37.03757	86.4898	72.99539	62.81749	51.90944
4/16/2022	76.96414	47.45184	89.20982	80.93547	74.1743	65.28033
4/17/2022	68.12185	35.40099	85.02112	72.08318	60.82815	48.94284
4/18/2022	73.83954	46.24484	87.26389	77.91165	70.31729	61.62083

WM18: 00:00-24:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	42.25409	25.12628	61.28089	45.76795	37.26627	30.84466
4/6/2022	40.26033	9.189777	64.18927	33.13687	15.63335	12.17594
4/7/2022	40.30574	11.55664	65.29416	35.05166	17.65087	14.29028
4/8/2022	47.50337	14.04386	68.9366	49.57041	35.33238	23.30696
4/9/2022	51.37264	25.34267	69.76484	54.69378	43.47986	33.12722
4/10/2022	38.55085	20.54592	62.2722	40.39383	31.48341	24.74248
4/11/2022	38.55394	13.73312	64.171	37.6556	26.36154	19.67028
4/12/2022	34.707	10.01397	57.8238	34.90447	23.77402	16.81713
4/13/2022	39.29309	10.82561	59.84403	41.90318	26.20255	17.8384
4/14/2022	37.96866	3.662279	60.43692	38.70865	21.37958	11.30044
4/15/2022	41.81334	12.17324	61.54765	45.12663	29.51122	20.40213
4/16/2022	41.50567	9.002649	63.51624	40.65298	25.50355	17.24023
4/17/2022	25.24947	2.423717	42.80521	28.35223	22.36461	15.94105

WM18: 00:00-24:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	69.34759	41.31329	82.36667	73.37034	66.13805	56.98779
4/6/2022	50.61787	26.94973	74.52576	50.39447	39.78155	33.36041
4/7/2022	50.60174	22.57005	73.99795	50.06139	37.41183	29.14476
4/8/2022	62.66762	26.73188	79.28267	66.70765	56.20696	43.5586
4/9/2022	67.94155	41.86965	81.72048	71.85382	64.63337	56.03046
4/10/2022	57.16272	31.44218	75.12771	60.86935	51.89958	42.81506
4/11/2022	62.85932	31.95308	79.23221	67.06643	56.46012	43.63128
4/12/2022	61.79297	30.46399	79.12506	65.70231	54.41282	41.94146
4/13/2022	61.80329	29.40295	79.29039	65.63742	54.59197	42.12052
4/14/2022	56.76632	24.42734	78.05984	59.23516	45.48606	33.25631
4/15/2022	65.19588	29.68722	79.85859	69.51493	59.74541	46.52283
4/16/2022	55.60039	23.52225	75.27811	58.72857	46.43553	33.08663
4/17/2022	30.67202	11.9368	48.74073	33.53739	27.42609	21.64002

WM16: 00:00-24:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	80.08415	53.14703	91.68906	83.9324	77.62977	69.59177
4/6/2022	60.18417	32.38533	81.35672	63.37374	52.78111	42.14352
4/7/2022	59.40858	28.05885	80.35154	62.29919	51.40851	39.84011
4/8/2022	74.0369	37.69438	88.29796	78.29261	69.27887	57.91201
4/9/2022	78.73594	53.42995	90.79792	82.55601	76.18741	68.43754
4/10/2022	69.24564	39.53995	85.12168	73.11719	64.70903	55.66716
4/11/2022	74.68462	37.44584	88.56028	78.36674	69.47523	57.3274
4/12/2022	73.67917	37.43214	89.02272	77.89361	67.98207	55.76915
4/13/2022	73.34744	36.66986	88.69279	77.47949	68.06368	56.27169
4/14/2022	67.06354	29.26152	85.36411	70.82731	58.75343	44.2617
4/15/2022	76.62131	38.74856	89.72976	80.87868	72.59354	60.92936
4/16/2022	67.73698	28.69234	84.42156	71.69584	60.69426	46.00535
4/17/2022	34.17801	14.68511	53.08962	36.83841	30.32698	24.48267

APPENDIX F SUMMARY DATA BETWEEN THE HOURS 0400 AND 0900 FOR WILDLIFE NOISE MONITORING LOCATIONS

WM1: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	34.02486	24.21817	50.20483	36.75928	32.10538	28.0947
2/9/2022	33.13315	22.70407	53.11096	35.60293	30.47533	26.5266
2/10/2022	34.80642	22.3819	53.14629	37.54177	30.81767	25.99509
2/11/2022	39.04597	26.54176	62.92529	40.85077	35.6568	31.30524
2/12/2022	34.00427	22.19342	51.2009	36.96678	31.43864	26.8662
2/13/2022	37.37804	24.56115	54.36455	40.29772	34.48267	29.5924
2/14/2022	36.68467	21.59876	65.88022	35.54998	29.80015	25.76501
2/15/2022	32.42855	20.51378	47.80328	35.77659	29.70843	25.2549
2/16/2022	37.56091	24.42274	59.42563	40.31503	34.94916	29.89021
2/17/2022	34.01539	18.88915	64.77519	31.97175	26.34981	22.33555
2/18/2022	33.85874	22.83678	48.00751	36.8252	31.89691	27.82517
2/19/2022	33.25804	22.74415	50.23205	35.93171	30.82684	26.62297
2/20/2022	50.57329	24.23736	70.4805	53.91039	37.72936	29.53742

WM1: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	50.10867	38.60127	67.29354	52.91988	48.14378	43.88483
2/9/2022	54.75772	36.77816	75.19529	57.16965	47.8354	42.66186
2/10/2022	57.74752	36.48998	76.73216	60.76847	47.79455	42.11332
2/11/2022	59.54277	41.49014	77.52735	62.99399	54.3791	47.66608
2/12/2022	56.16541	36.30712	75.75422	59.30559	48.92307	42.56335
2/13/2022	60.31425	39.73165	76.73916	64.41959	53.75553	46.18985
2/14/2022	55.13898	35.29879	76.57379	57.52532	47.36258	41.42446
2/15/2022	53.32164	33.87273	74.90558	55.19155	45.2467	39.80512
2/16/2022	52.10947	39.37179	68.1814	55.12193	49.99263	45.23531
2/17/2022	46.51991	34.02714	67.91706	49.45561	43.62355	39.25971
2/18/2022	49.54652	38.20146	61.91988	52.53494	47.90571	43.84389
2/19/2022	48.10153	36.01768	62.77092	51.08252	45.98488	41.46793
2/20/2022	72.22539	37.55884	86.33622	77.05626	64.50577	48.11153

WM1: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	52.7331	40.50642	74.02544	55.1775	50.55915	46.40449
2/9/2022	62.97422	39.36244	83.07986	66.02316	54.22958	46.47289
2/10/2022	65.74698	39.27061	85.05059	69.14202	54.44353	46.5144
2/11/2022	67.32197	43.38594	84.7903	71.0191	61.8851	52.04736
2/12/2022	64.31264	38.22505	83.90734	67.79334	56.45617	47.00216
2/13/2022	68.21975	41.35728	84.82534	72.4339	61.56725	49.26372
2/14/2022	62.96036	36.8031	83.30738	65.92217	53.90422	43.97671
2/15/2022	66.34988	36.62546	86.9493	68.99731	54.52454	44.99228
2/16/2022	54.13784	41.23267	71.70627	56.92253	51.98947	47.52375
2/17/2022	54.63928	37.34009	74.18124	58.05066	49.71502	43.91764
2/18/2022	52.06127	40.33328	64.74401	55.0219	50.49883	46.50141
2/19/2022	50.7193	37.82355	65.84268	53.73967	48.49669	44.03429
2/20/2022	78.91491	39.37634	92.53992	83.6849	72.38599	56.19582

WM2: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	33.81798	18.89153	55.25833	35.09857	28.30626	23.79957
4/3/2022	29.80771	15.49878	56.09509	31.41017	25.06168	20.20733
4/4/2022	33.79786	21.89177	57.32439	35.44364	30.73789	26.87062
4/5/2022	34.75633	22.95218	56.23357	36.58538	31.40794	27.5714
4/6/2022	30.94914	14.72285	52.85498	31.03649	25.78399	20.30207
4/7/2022	32.16681	15.5712	55.17602	32.53367	26.30167	21.06939
4/8/2022	35.65405	19.73724	65.12772	35.85046	30.44794	25.45511
4/9/2022	34.57001	17.54006	65.84625	31.80712	25.74121	21.64302
4/10/2022	25.20569	7.402235	53.30108	24.39348	18.28088	13.08756
4/11/2022	38.54648	22.46419	57.35446	41.74236	34.64835	27.91078
4/12/2022	31.81722	20.2969	51.01227	33.9644	28.73444	24.7294
4/13/2022	30.70068	18.08218	51.53061	32.83005	27.67477	23.65414
4/14/2022	32.58644	21.2732	53.34912	33.78261	29.47351	25.97664
4/15/2022	34.11491	21.15506	54.43609	35.94681	30.89908	25.98658

WM2: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	48.78599	36.14461	64.28746	51.85317	46.18675	41.82567
4/3/2022	45.63555	33.00112	61.44509	48.71738	43.41045	38.66588
4/4/2022	49.79953	37.58449	67.79542	52.3453	47.00016	43.03506
4/5/2022	57.39624	37.95784	76.78095	60.28932	49.79602	43.8296
4/6/2022	45.11445	32.41511	62.5099	47.80053	42.82191	37.8421
4/7/2022	47.03359	34.41906	64.5052	49.48472	44.53756	40.02632
4/8/2022	50.04872	37.01432	69.79221	52.56635	47.69649	43.36254
4/9/2022	54.72362	34.09545	74.09967	58.15341	47.19937	40.20587
4/10/2022	41.3119	28.62834	61.19139	44.34594	39.18654	34.63366
4/11/2022	64.97097	37.55179	79.87464	69.42822	58.26695	45.49623
4/12/2022	50.50458	35.83231	69.48841	53.19333	46.20163	41.61235
4/13/2022	47.68139	34.36879	68.27223	49.9018	44.38628	40.21462
4/14/2022	50.9607	36.99699	69.53593	53.80192	46.33607	42.21642
4/15/2022	49.37221	36.60075	64.78991	52.39214	47.43389	42.52958

WM2: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	54.08909	38.22775	71.11509	57.50772	49.68379	44.66763
4/3/2022	48.79937	35.25839	63.86144	51.80419	46.79657	41.96956
4/4/2022	58.69798	39.28381	78.78769	61.36049	51.54912	45.83509
4/5/2022	70.77382	40.35771	88.82885	74.48857	62.06177	49.85032
4/6/2022	48.68434	36.01445	65.39289	51.37595	46.69242	42.29522
4/7/2022	49.69734	36.99224	66.10454	52.26874	47.64159	43.32861
4/8/2022	53.33162	39.22913	72.09751	56.17145	50.53706	45.98029
4/9/2022	68.84032	37.62889	86.25882	72.83245	60.84738	48.82697
4/10/2022	47.36835	32.67283	68.73812	50.34142	44.4859	39.74843
4/11/2022	77.37054	40.84919	91.22917	81.82561	72.52727	57.55913
4/12/2022	62.82953	38.59603	82.98952	65.69067	53.45398	46.07535
4/13/2022	55.42112	36.96383	78.76353	56.50215	47.92293	43.50164
4/14/2022	63.64056	39.23271	83.06362	67.01043	54.75954	46.0336
4/15/2022	53.02372	38.59917	69.46155	56.03449	50.23769	45.22283

WM3: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	21.038	9.918777	43.71792	21.85171	16.95028	13.64938
2/10/2022	22.90542	10.39245	47.15146	22.83952	17.75446	14.1957
2/11/2022	35.4287	13.34781	60.9934	26.26305	20.81659	17.72499
2/12/2022	24.65914	11.06577	42.30766	27.10907	19.99928	15.7463
2/13/2022	35.78428	11.90035	61.09658	31.07801	22.77074	16.65855
2/14/2022	22.2126	9.429404	49.69065	23.31379	18.40013	13.80829
2/15/2022	25.51988	13.42673	42.12118	29.05709	22.6358	18.07937
2/16/2022	24.03269	12.12148	40.74783	26.90229	21.58846	17.43206
2/17/2022	27.14288	14.69702	42.80883	30.27228	24.57417	20.45263
2/18/2022	25.68585	12.24706	43.46121	28.6552	22.62493	17.49647
2/19/2022	32.57006	21.74417	47.46433	35.32327	30.91083	26.83609
2/20/2022	27.73455	10.63727	48.0195	30.37025	22.61585	15.34217

WM3: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	42.89376	31.01365	67.20946	44.37177	39.53357	36.13326
2/10/2022	44.34755	31.71123	67.23594	45.63031	40.35653	36.79336
2/11/2022	48.12383	34.04762	72.40639	46.96426	42.53162	39.10825
2/12/2022	43.58183	30.32627	59.35922	46.53308	40.34405	36.05285
2/13/2022	49.73404	32.03192	73.16705	50.0154	42.77726	37.56071
2/14/2022	43.67318	29.28946	64.78253	46.45712	40.19738	35.37669
2/15/2022	48.34063	26.41093	70.56204	50.44087	38.74559	32.26495
2/16/2022	50.69231	31.36964	69.50928	53.91874	43.67683	37.41856
2/17/2022	54.43138	27.80086	73.19191	57.92685	45.80893	35.57461
2/18/2022	52.09575	29.13406	72.36994	55.00577	43.70044	35.97221
2/19/2022	56.49793	37.32655	75.17158	59.60479	49.61202	43.36667
2/20/2022	52.33794	27.85908	72.33844	55.33982	42.25308	34.40467

WM3: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	50.40508	34.91106	76.91095	50.38412	45.11493	41.34261
2/10/2022	53.47229	35.61669	77.84434	53.14305	45.59991	41.71554
2/11/2022	51.82065	36.97947	76.9459	50.77123	46.56679	42.9607
2/12/2022	46.6746	33.23059	62.24405	49.59297	44.04621	39.69807
2/13/2022	52.88417	34.76346	75.86901	53.75357	46.22834	41.02394
2/14/2022	53.59736	32.40437	77.72192	55.61768	45.88827	39.8102
2/15/2022	61.55043	30.68027	82.11059	64.43118	50.29362	39.19529
2/16/2022	64.5109	35.84038	82.66865	68.10367	56.55498	45.89742
2/17/2022	68.24601	33.0861	85.57247	72.12256	60.32132	47.38529
2/18/2022	65.42809	33.20287	84.09951	68.8158	56.76236	44.45351
2/19/2022	69.46911	41.47119	86.88081	73.10061	61.84026	51.41895
2/20/2022	65.55884	32.09956	84.20868	69.20636	54.84618	42.38822

WM4: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	33.35531	23.52886	50.82757	36.72556	30.05993	27.46023
7/14/2021	36.09394	20.00295	61.59888	38.19384	33.01711	28.06213
7/15/2021	33.25769	21.48609	54.09303	35.62234	29.50136	26.29761
7/16/2021	33.23808	18.12791	57.04089	34.72652	29.62421	26.5717
7/17/2021	28.6913	6.144815	48.31376	31.06111	26.51186	16.65571
7/18/2021	28.66681	9.757429	53.4398	29.38558	23.60718	17.30876
7/19/2021	31.91782	11.73738	51.59643	35.10565	26.68952	20.1835
7/20/2021	30.98237	12.8393	53.4653	32.69793	27.22763	23.69513
7/21/2021	36.5627	30.68272	52.18794	38.2877	35.57336	33.6506
7/22/2021	38.10812	31.69898	54.05345	40.3405	36.80568	34.487

WM4: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	61.67962	32.60694	76.04952	65.94768	57.1874	44.73895
7/14/2021	50.8979	28.04031	72.02699	53.42983	39.81558	33.65009
7/15/2021	49.4066	26.40691	71.66919	51.21074	39.01459	32.18912
7/16/2021	48.43564	24.88484	73.71475	48.0029	36.01494	30.9048
7/17/2021	46.74404	30.90862	66.35785	49.66537	42.203	36.80328
7/18/2021	60.38355	31.35707	76.46226	64.67228	54.18283	41.84873
7/19/2021	60.79044	32.58514	77.03931	65.05964	53.82653	41.48057
7/20/2021	54.34542	34.23333	74.44652	57.75622	41.432	37.58559
7/21/2021	50.24296	38.21556	73.8918	50.44032	43.57843	41.2263
7/22/2021	53.22001	37.73991	75.59246	54.61312	44.54894	41.30595

WM4: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	53.28266	32.28001	74.07732	55.75337	47.21658	39.34707
7/14/2021	47.03887	31.88711	71.92433	48.04843	42.96527	38.55401
7/15/2021	43.19277	30.00963	61.31608	46.01734	40.30345	36.33928
7/16/2021	51.87351	29.6277	83.22766	46.56843	40.58626	36.74532
7/17/2021	44.27515	26.26582	67.10995	46.11333	38.34966	33.27925
7/18/2021	47.68048	26.89656	78.06727	47.99193	38.99969	33.9291
7/19/2021	59.26442	26.95338	80.86858	56.22659	40.33132	33.86214
7/20/2021	50.27148	26.85221	70.63442	53.26128	41.48442	34.87364
7/21/2021	47.43346	38.13987	68.57815	49.45811	43.92061	41.51177
7/22/2021	51.59843	40.19723	68.27466	54.70253	48.07434	44.29676

WM5: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	20.19194	2.578876	39.63396	25.39811	22.20237	21.92953
8/26/2021	18.89498	1.35284	46.48149	23.11906	22.01264	21.89326
8/27/2021	24.39722	0	56.38919	22.59298	21.97033	21.87329
8/28/2021	23.79386	1.311873	55.97274	23.25491	22.16173	21.90807
8/29/2021	19.90223	2.381944	47.52203	23.75827	22.15064	21.94139
8/30/2021	21.68079	1.109224	44.32592	25.52223	22.09431	21.90375
8/31/2021	22.42704	1.875545	49.59191	23.847	22.11037	21.90206
9/1/2021	28.35065	3.799712	52.64964	23.53756	22.25754	21.98824
9/2/2021	28.30489	2.985147	58.86424	23.61542	22.1211	21.94967
9/3/2021	22.98612	0	48.82725	22.87089	21.91527	21.84433
9/4/2021	20.80624	0	50.42522	22.58771	21.99052	21.87972
9/5/2021	24.32297	0	56.21868	22.27242	21.95816	21.8767

WM5: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	40.65629	25.47127	64.70616	43.30364	36.27681	31.94927
8/26/2021	37.49179	24.85474	54.54258	40.24661	34.62441	31.21623
8/27/2021	37.57911	24.58919	59.36296	40.11145	35.00029	31.11498
8/28/2021	37.70014	23.18172	56.37425	41.13392	35.237	30.1684
8/29/2021	39.26556	26.49055	54.9912	42.44259	36.84678	32.72208
8/30/2021	40.05147	25.8625	55.57027	43.33359	36.60239	32.4256
8/31/2021	38.44009	24.57489	59.11486	40.28963	34.81925	31.00701
9/1/2021	41.66407	26.22954	64.32367	42.37634	37.08899	32.82719
9/2/2021	40.304	27.37018	60.97497	42.92041	37.53209	33.62897
9/3/2021	39.00925	18.99754	63.69796	37.29876	30.53858	26.7933
9/4/2021	36.50127	24.16584	52.39106	40.19771	33.95854	30.25369
9/5/2021	36.68759	23.88491	55.84929	39.81803	34.79722	30.66633

WM5: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	46.60942	29.47623	75.57034	48.35577	41.35161	36.77235
8/26/2021	42.62083	29.28326	59.95962	45.28837	40.33387	36.44012
8/27/2021	43.54278	28.88432	69.06674	44.92548	40.15088	36.0131
8/28/2021	41.15969	26.25282	58.05506	44.54327	38.87152	33.78654
8/29/2021	43.39329	29.74519	59.59056	46.3611	40.94144	36.5765
8/30/2021	43.90781	29.87057	58.69731	47.11818	41.28673	36.97839
8/31/2021	41.77027	28.28697	60.23724	44.20504	39.44095	35.42656
9/1/2021	44.41481	29.55153	65.33141	46.2733	41.17649	36.77879
9/2/2021	44.38194	31.19407	62.25792	47.34601	42.20303	37.99089
9/3/2021	41.25136	23.32286	64.72802	41.35127	35.56477	31.46145
9/4/2021	40.87132	27.5433	57.33153	44.23954	38.28493	34.18134
9/5/2021	41.26619	27.18916	57.98265	44.56722	39.21618	34.5573

WM6: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	31.85798	17.03407	53.80459	30.18409	24.4216	20.45094
7/10/2021	27.69129	15.17797	48.597	29.5564	22.48485	18.42781
7/11/2021	29.42681	17.0879	51.82262	31.18713	24.97757	20.75143
7/12/2021	52.06293	22.3799	68.00953	48.30454	32.44578	27.52374
7/13/2021	31.45688	18.25895	60.91054	32.87959	26.29339	21.73772
7/14/2021	34.08078	20.37344	56.92802	34.56754	29.19372	24.81336
7/15/2021	31.83977	18.28949	54.12	33.69289	27.11539	22.30407
7/16/2021	33.46146	18.38562	55.36517	34.3399	27.75289	22.75744
7/17/2021	29.61124	16.62224	50.91672	31.1291	24.04072	20.04104
7/18/2021	29.30433	16.56319	50.62435	31.00247	24.21995	19.83527

WM6: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	47.13789	34.16263	63.20865	49.85353	44.11663	39.94988
7/10/2021	46.95281	33.20968	62.48161	50.05647	44.19995	39.60544
7/11/2021	49.93255	35.39004	65.32919	53.1749	47.21943	42.03172
7/12/2021	59.60753	38.8495	76.89431	62.97171	53.38901	45.21416
7/13/2021	51.67664	34.1372	71.25331	55.33842	46.23829	40.28221
7/14/2021	50.25864	38.58497	66.7445	52.82307	48.14395	44.15274
7/15/2021	48.9988	35.91865	66.53726	52.02254	45.92315	41.52916
7/16/2021	49.2703	35.67332	65.73509	52.25811	46.29658	41.7493
7/17/2021	47.92887	33.9526	64.23939	50.99039	44.67782	40.23634
7/18/2021	47.76442	33.92581	65.41679	50.37089	44.42092	39.84197

WM6: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	55.25538	38.45394	73.37381	57.92447	50.0449	45.70203
7/10/2021	55.71548	37.93787	74.67034	59.00261	50.59253	45.4371
7/11/2021	59.50774	39.65966	76.02134	63.13769	55.91309	48.73987
7/12/2021	72.06495	42.1618	90.22591	76.02877	66.06852	52.07695
7/13/2021	63.88678	38.69669	83.63408	67.83024	55.56479	46.26253
7/14/2021	56.68103	41.83626	76.2049	59.69523	52.74662	48.43759
7/15/2021	56.47951	39.86459	73.12684	60.0913	52.51668	46.91902
7/16/2021	54.92269	39.38951	71.4551	58.12022	51.35979	46.61843
7/17/2021	55.77698	37.9746	74.13338	59.02731	50.68097	45.76012
7/18/2021	54.9051	38.5032	73.06189	58.18694	50.49762	45.54817

WM8: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	39.67577	16.81166	57.6884	41.94175	32.6564	24.74772
8/25/2021	39.36853	18.14345	60.85168	41.83637	32.54152	25.45843
8/26/2021	37.88904	14.81117	59.09589	40.71105	30.99347	22.97138
8/27/2021	38.75933	12.42004	60.92107	41.57482	31.75475	22.76977
8/28/2021	32.03419	8.688134	50.70972	34.64719	24.24736	15.16916
8/29/2021	38.06299	11.0919	57.52888	41.67688	28.87798	19.26374
8/30/2021	40.82016	15.6641	62.41004	44.24075	34.56182	26.50638

WM8: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	54.99887	35.15559	73.28947	56.85279	47.73478	42.16604
8/25/2021	56.35135	37.08895	73.89673	58.1216	48.67839	43.38544
8/26/2021	54.0866	34.58677	72.84554	56.19157	46.82559	41.09037
8/27/2021	55.65834	32.40535	74.00028	57.32702	46.5367	39.64981
8/28/2021	47.73948	30.89584	65.28113	49.81868	42.01022	36.93332
8/29/2021	56.52137	33.07915	74.42643	59.77231	46.13765	39.67378
8/30/2021	58.17803	34.51392	76.52468	60.64017	48.39987	42.183

WM8: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	58.58266	38.43908	76.46139	60.55144	51.49247	46.10216
8/25/2021	60.5203	40.55337	78.75456	62.77823	53.34157	47.78856
8/26/2021	57.3602	38.03059	75.57595	59.3621	50.85547	45.37002
8/27/2021	58.82611	36.18831	77.7482	61.00231	50.37703	44.03848
8/28/2021	52.91426	34.83504	71.60774	55.05629	47.17406	41.94066
8/29/2021	60.70848	36.71776	78.25445	64.16737	50.67305	44.33638
8/30/2021	62.26854	37.81483	79.85457	64.70768	52.0534	45.94933

WM10: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	49.93347	16.99371	71.78201	41.35054	29.62463	24.53348
8/25/2021	46.11277	19.27129	67.58502	41.45934	31.3081	26.62146
8/26/2021	43.31068	15.2022	65.12201	45.18016	31.26915	25.04671
8/27/2021	47.28769	12.27052	67.68861	45.16797	28.98541	23.02267
8/28/2021	32.58137	6.662582	52.83421	29.83804	22.88902	21.48512
8/29/2021	49.0524	8.467045	67.61667	47.03644	25.20915	21.88589
8/30/2021	47.9236	15.26304	66.29079	51.03149	31.95099	24.90901
8/31/2021	43.08048	16.17462	63.45498	39.67301	30.63194	25.28511
9/1/2021	38.94505	15.24754	59.96425	38.42796	29.4531	24.56647
9/2/2021	47.60911	15.64535	73.15611	40.99073	29.84697	24.63141

WM10: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	62.65614	32.48241	82.81945	58.87196	45.4869	38.97111
8/25/2021	63.28556	35.19389	83.62796	59.42373	46.60479	41.52535
8/26/2021	59.69986	32.76231	78.73527	62.48304	46.78468	39.68795
8/27/2021	62.77782	30.13053	82.29624	60.68877	43.07124	36.49778
8/28/2021	53.63445	27.14734	73.28839	48.11484	37.58097	33.26239
8/29/2021	64.44317	30.27234	83.31184	64.57305	42.83987	36.59594
8/30/2021	64.99711	32.89056	83.02002	68.72113	49.98944	41.07235
8/31/2021	59.82662	33.28225	78.85526	58.66339	45.66447	40.01868
9/1/2021	59.51248	32.95476	79.59592	56.26091	44.75912	39.59242
9/2/2021	63.28283	33.11786	83.29624	60.47224	46.26256	40.35024

WM10: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	65.07287	35.3119	85.20051	62.24243	48.79968	42.61689
8/25/2021	65.62546	37.89746	85.77798	62.45101	50.06809	45.03775
8/26/2021	61.66968	35.88126	81.70704	63.86653	49.52825	43.23391
8/27/2021	65.12371	33.67189	85.54489	63.69333	47.01483	40.9188
8/28/2021	56.27464	30.98859	75.60949	52.78907	42.48699	38.037
8/29/2021	66.99201	33.84862	85.84604	67.79263	47.32148	41.02942
8/30/2021	67.53477	35.88609	85.64477	70.84525	52.05282	44.10061
8/31/2021	61.94259	36.24432	81.04011	60.7663	48.59838	43.48348
9/1/2021	62.55101	36.39771	82.39998	59.9173	48.4879	43.50053
9/2/2021	66.09506	36.23493	85.51783	64.05079	49.83971	44.11604

WM11: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	21.30549	1.179694	51.48608	23.34578	21.94979	21.69441
8/25/2021	22.04128	0	41.67787	26.35063	22.07157	21.63788
8/26/2021	21.34785	0	43.51476	25.08778	22.10913	21.66831
8/27/2021	28.28793	6.888019	53.05608	26.73022	22.84117	22.01126
8/28/2021	22.4406	3.189463	50.08648	24.7278	22.32338	21.7805
8/29/2021	27.49252	4.192971	51.48268	25.11827	22.45526	21.8545
8/30/2021	25.17107	3.68112	48.36784	25.90413	22.29588	21.7962
8/31/2021	24.52199	3.2608	49.5723	27.38852	22.39506	21.77409
9/1/2021	28.33341	7.139985	50.47093	27.42877	22.88546	21.99869
9/2/2021	50.55263	7.77	77.72099	36.21564	24.88713	22.3212
9/3/2021	51.06824	6.615173	77.18143	38.69345	23.62182	22.03467
9/4/2021	48.94165	4.47108	76.60861	36.40359	23.00972	21.92954
9/5/2021	21.70002	5.923306	48.40235	25.47099	22.87912	21.96496

WM11: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	43.82227	25.92822	63.85666	46.67966	37.74546	32.79368
8/25/2021	44.34542	24.83262	63.0533	47.46647	39.00978	32.03153
8/26/2021	45.11437	25.25801	65.32223	48.07793	38.65282	32.57892
8/27/2021	48.24346	30.50455	68.84504	49.57986	41.77301	36.95008
8/28/2021	48.30928	27.9276	69.17969	51.75341	41.76025	35.20054
8/29/2021	47.05532	28.17469	67.85232	48.52401	40.1417	35.15382
8/30/2021	48.04726	27.86275	66.92829	51.52383	41.86115	35.21838
8/31/2021	49.5904	28.07199	68.96062	52.66346	42.16019	35.44512
9/1/2021	46.18539	30.71548	65.52154	47.96804	41.14272	36.67127
9/2/2021	65.61443	30.36575	91.01709	53.75456	43.01204	37.1796
9/3/2021	65.058	29.02011	90.50017	55.56495	42.35065	35.95271
9/4/2021	63.67081	27.64793	90.27685	52.45231	39.2845	34.27428
9/5/2021	48.39639	29.22841	67.07677	51.75767	42.62565	36.33092

WM11: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	55.48747	31.20677	74.702	58.84641	48.51899	40.62236
8/25/2021	55.16066	30.85278	74.81334	58.65122	48.27989	39.5605
8/26/2021	56.32511	31.27496	74.47158	59.86243	49.608	40.97867
8/27/2021	56.67547	35.29113	76.00055	59.82673	50.45441	43.66299
8/28/2021	59.77668	33.28468	79.88687	63.5692	52.74909	42.45903
8/29/2021	56.6963	33.03849	76.23288	59.98453	49.16318	41.67178
8/30/2021	59.46159	34.14239	77.39575	63.25778	53.59133	44.66196
8/31/2021	60.90911	33.76474	80.03234	64.387	53.72108	44.33303
9/1/2021	53.87237	35.19514	71.98407	57.03882	48.88494	42.98849
9/2/2021	66.1319	34.89648	91.35485	58.54936	49.06965	42.92536
9/3/2021	66.13789	33.35019	91.01698	62.91951	51.74943	42.69228
9/4/2021	64.3521	32.11851	90.72098	57.94069	47.15061	40.42938
9/5/2021	59.7153	33.89348	78.04218	63.36112	53.19934	44.12122

WM12: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	21.56354	8.132005	40.2616	25.99203	23.54441	22.64367
8/25/2021	26.31505	3.462996	51.62801	26.50329	23.22788	22.37908
8/26/2021	17.78551	0	35.65702	24.20567	22.63125	22.30449
8/27/2021	20.65847	6.509795	38.85912	25.2802	22.95825	22.44432
8/28/2021	22.78832	9.958155	35.8221	27.44079	24.01616	22.79129
8/29/2021	24.69767	12.61047	43.30649	28.16509	25.16639	23.30858
8/30/2021	19.66901	2.550995	38.75076	24.81035	22.71936	22.34537

WM12: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	38.69592	27.60692	53.46585	41.466	37.1999	33.19763
8/25/2021	38.36529	24.06713	54.53706	41.68245	35.55487	30.73406
8/26/2021	35.72672	23.386	50.3208	38.84837	33.6223	29.81327
8/27/2021	40.11502	27.07702	61.25238	41.43599	36.27327	32.65978
8/28/2021	40.01188	28.42817	52.51881	43.23259	38.29916	34.45685
8/29/2021	43.43345	31.85884	55.40834	46.29155	42.35802	37.9471
8/30/2021	37.64147	24.75522	53.15702	40.54241	35.52997	31.31795

WM12: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	43.82314	31.50928	58.77861	46.63391	42.51342	38.30043
8/25/2021	43.36646	29.25114	61.65997	46.15613	41.28095	36.87952
8/26/2021	41.6702	28.67354	56.99305	44.46094	40.14655	36.0954
8/27/2021	45.63501	31.67055	68.55998	47.11426	42.80979	38.86301
8/28/2021	45.50405	32.83606	60.37459	48.36434	43.89811	39.92525
8/29/2021	49.07678	36.32869	61.20847	51.83813	48.15878	43.7337
8/30/2021	44.50904	30.75957	60.52115	47.11913	43.17357	38.71385

WM13: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	41.90939	18.28669	69.2233	31.84992	26.45279	22.60266
4/7/2022	46.76953	16.44373	68.32444	35.98858	24.78779	20.84881
4/8/2022	43.06857	17.66871	67.97082	39.636	28.29289	22.38723
4/9/2022	41.88279	18.17601	67.60004	39.63988	30.32954	22.71108
4/10/2022	33.67468	12.19615	61.0163	35.99625	25.11721	17.11656
4/11/2022	39.54284	21.96381	57.32407	43.3216	35.3797	28.25023
4/12/2022	41.60921	23.63089	56.15226	45.51011	38.24116	30.98678
4/13/2022	33.86287	18.31882	60.39501	34.71777	27.76653	23.15901
4/14/2022	36.41194	22.57686	55.14705	39.71301	32.95473	27.81322
4/15/2022	31.79363	15.72761	54.47534	32.59185	24.78718	20.33379
4/16/2022	37.51482	15.34169	64.23386	35.41819	25.44037	20.41349
4/17/2022	41.05111	14.37352	65.86999	32.60627	25.66814	20.16141
4/18/2022	43.07604	16.00191	68.29019	41.17211	30.06259	21.06794
4/19/2022	39.269	22.59305	63.64002	41.05327	33.87017	28.24986

WM13: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	49.24678	38.22377	69.31922	51.3401	47.05209	43.47239
4/7/2022	48.94709	35.18387	67.87284	49.74346	43.81273	40.35792
4/8/2022	51.01657	33.81746	72.72215	52.96852	44.54861	39.56717
4/9/2022	53.1039	35.09648	71.94776	56.35833	47.61798	41.2594
4/10/2022	44.70787	33.68948	62.49041	47.55276	42.59415	38.90757
4/11/2022	68.7367	41.29276	81.79555	72.89603	65.1736	55.9065
4/12/2022	70.96031	48.32814	82.38555	74.85931	68.5021	60.64164
4/13/2022	60.62158	38.04504	76.41975	64.50946	56.41103	48.23314
4/14/2022	66.5816	40.64594	80.02332	70.60795	62.88625	54.15941
4/15/2022	51.16851	30.74823	71.18183	54.14096	44.74161	38.01828
4/16/2022	50.42848	32.54822	70.32201	53.17772	44.12618	38.8077
4/17/2022	47.40137	32.81219	66.48273	49.87822	43.73603	38.64329
4/18/2022	51.52152	32.92433	70.18009	55.24194	44.77979	38.71283
4/19/2022	67.54359	39.54831	81.94521	71.61967	63.72278	54.53014

WM13: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	56.64374	41.23228	74.66629	59.99433	53.03081	47.81479
4/7/2022	53.85992	38.57031	71.03651	56.56012	49.52052	44.88112
4/8/2022	53.18274	36.20871	73.71709	55.80635	47.64815	42.69191
4/9/2022	66.51495	39.33846	83.23545	70.32629	60.95091	50.74701
4/10/2022	51.54111	37.08643	68.36833	54.9103	48.0469	43.30885
4/11/2022	80.08365	53.93044	91.79977	84.0831	77.35914	68.92544
4/12/2022	81.41315	59.76907	92.31156	85.12877	79.48114	72.37273
4/13/2022	72.88527	46.39247	87.03795	76.79282	69.0764	60.77692
4/14/2022	78.59924	53.78644	91.28554	82.55109	75.67517	67.75942
4/15/2022	64.62088	37.11767	83.60559	68.04485	58.03003	49.12762
4/16/2022	58.00843	35.99177	75.95514	61.50471	52.77188	44.7453
4/17/2022	54.42474	36.34612	71.93485	57.87792	50.24247	43.68097
4/18/2022	54.81268	35.96849	72.86534	58.53308	49.31841	43.13286
4/19/2022	79.22454	51.43501	91.28363	83.23527	76.31575	68.01481

WM15: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	27.41983	22.9336	45.76711	28.55595	26.41458	25.01785
2/10/2022	29.14876	23.10344	49.71903	29.54725	26.92233	25.13131
2/11/2022	34.21624	23.80128	59.62326	29.9205	27.67281	26.11598
2/12/2022	28.67231	23.38663	49.30562	29.72047	27.01089	25.54759
2/13/2022	29.6486	23.23875	49.42193	29.69161	26.75352	25.17697
2/14/2022	27.584	23.00471	46.38612	28.91664	26.42618	24.93925
2/15/2022	28.61908	19.46483	46.35152	31.56118	25.28305	22.22313
2/16/2022	30.17765	20.61031	52.5052	27.4837	24.70019	22.9286
2/17/2022	31.15377	21.62146	60.57302	27.21437	25.59997	24.13162
2/18/2022	28.37296	22.77346	49.97267	29.24392	27.51534	25.47369
2/19/2022	29.17494	23.91407	48.10212	29.74291	28.10937	26.56297
2/20/2022	31.86802	24.59934	56.64308	30.90696	28.086	26.88889
2/21/2022	26.04719	18.15545	51.1912	25.98554	21.52556	20.21926
2/22/2022	31.74681	21.12007	60.42795	29.72095	25.15596	23.37383

WM15: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	40.66137	30.82764	61.43276	42.1122	36.71219	34.28625
2/10/2022	39.44087	30.74737	58.58351	41.35557	36.93285	34.27192
2/11/2022	45.22538	31.37261	72.44815	41.73393	37.50346	34.92261
2/12/2022	37.77135	29.79825	58.74465	39.17783	34.48792	32.55029
2/13/2022	38.75772	29.81713	56.34613	41.19384	35.38878	32.72902
2/14/2022	44.69174	29.6864	67.96979	44.68433	35.09406	32.50566
2/15/2022	53.29956	27.18277	73.53604	55.52766	39.08306	31.79097
2/16/2022	43.41785	30.99896	67.39112	42.72559	38.27888	35.4874
2/17/2022	40.7485	30.71577	65.86018	41.69834	37.4083	34.80781
2/18/2022	39.44544	30.92434	58.61164	41.2698	37.5832	34.92345
2/19/2022	39.2883	31.1917	58.75533	40.75716	36.7882	34.63121
2/20/2022	44.34474	31.56461	66.1577	45.61962	36.833	34.5627
2/21/2022	38.94909	26.47214	59.29163	40.84791	32.77754	30.08076
2/22/2022	51.0945	29.02328	74.79615	50.86682	36.94353	32.59594

WM15: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	51.93314	32.79104	74.97023	52.24872	41.58336	38.10921
2/10/2022	48.03853	32.63616	70.32591	49.38577	41.28965	37.84786
2/11/2022	49.574	33.28093	76.48418	46.15764	41.54789	38.28624
2/12/2022	42.93998	30.62204	64.54114	44.75094	37.3075	34.41986
2/13/2022	42.66083	30.67537	61.83288	45.21444	38.36655	34.81053
2/14/2022	58.53417	30.41248	80.56816	58.94265	38.45283	34.44794
2/15/2022	65.26913	29.5426	84.42482	68.46908	52.12163	38.00885
2/16/2022	50.09636	34.25573	72.63358	51.1279	44.24899	40.28702
2/17/2022	50.28733	33.47691	72.56707	51.66619	43.30554	39.4206
2/18/2022	47.09403	33.31285	71.12798	47.85786	42.18932	38.75713
2/19/2022	48.63115	32.48553	72.94644	50.26345	40.91815	37.25032
2/20/2022	56.21697	32.48627	77.53842	58.03412	42.79726	37.0051
2/21/2022	45.06384	28.37962	67.14835	46.39788	37.94692	33.80416
2/22/2022	63.34955	30.51294	85.60257	64.47796	45.89781	36.80656

WM16: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	51.28709	19.77816	71.65921	47.20841	28.14206	23.92922
4/7/2022	52.66933	23.72459	78.25115	51.03636	30.60579	27.62073
4/8/2022	49.58105	21.71304	73.8331	44.7165	29.16162	25.71906
4/9/2022	63.50316	24.35081	86.1871	54.39767	33.01586	29.03255
4/10/2022	53.97975	9.6134	80.31625	52.23222	20.84704	14.645
4/11/2022	40.62186	18.35764	65.47823	41.37781	32.38243	24.27254
4/12/2022	44.97564	25.74355	58.64296	48.71937	42.13532	34.93543
4/13/2022	37.54818	10.63402	59.73302	37.04167	27.76499	19.63433
4/14/2022	37.95627	19.39571	56.22979	41.59742	34.3927	27.21729
4/15/2022	57.06682	13.38584	82.23435	46.22002	24.87501	18.40977
4/16/2022	55.2438	14.58301	83.4377	51.07289	23.32541	19.42904
4/17/2022	55.0664	9.355035	75.63998	55.11187	20.0551	14.26057
4/18/2022	57.39414	23.85597	82.86306	55.23168	31.41645	27.78338

WM16: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	52.80449	39.66709	70.51418	53.58627	48.69075	44.82353
4/7/2022	55.30538	43.87313	76.79587	56.71887	52.30803	49.08078
4/8/2022	52.72386	41.3923	72.73419	53.9417	49.81452	46.40325
4/9/2022	64.08399	41.19737	85.11584	64.41641	55.20222	47.94382
4/10/2022	52.93348	31.94105	78.69124	52.16311	41.60008	37.49296
4/11/2022	65.16124	36.57686	79.54131	69.40044	60.50571	49.86838
4/12/2022	72.00016	48.73708	83.2644	75.69292	70.03106	62.70317
4/13/2022	62.43868	37.17305	77.72388	66.38123	57.99831	49.76394
4/14/2022	66.38364	42.1209	79.5933	70.37824	63.24781	55.19053
4/15/2022	57.5051	28.65836	81.55144	56.49337	43.38753	34.1403
4/16/2022	54.03958	33.41897	81.80744	51.34753	42.18544	38.74794
4/17/2022	53.91532	30.48272	74.25742	54.4305	41.07883	36.3028
4/18/2022	57.23657	41.31976	81.35401	57.25584	50.45606	46.33446

WM16: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	54.94026	42.19142	71.59998	56.45993	51.88419	48.01418
4/7/2022	57.31621	46.05627	77.59892	59.13484	55.02159	51.69295
4/8/2022	54.8558	43.47226	73.70475	56.6419	52.4774	48.93527
4/9/2022	74.01941	45.0512	90.12341	77.95396	68.9418	58.0933
4/10/2022	56.13723	35.3236	80.218	57.20124	47.25132	42.06996
4/11/2022	76.82499	47.34996	90.16438	81.05109	73.11699	62.80384
4/12/2022	82.28925	61.14851	92.38514	85.7851	80.70864	74.25925
4/13/2022	74.04926	45.5554	88.13767	78.06356	70.14584	61.71067
4/14/2022	77.86756	53.63325	90.02847	81.71743	75.26245	67.72953
4/15/2022	66.63804	32.04596	87.19552	69.724	56.9591	41.79888
4/16/2022	55.26333	35.93763	82.5718	53.99741	46.1141	42.08592
4/17/2022	58.12275	34.79489	77.73947	60.36334	50.81953	43.86015
4/18/2022	58.57653	43.39634	82.20434	59.2887	53.21004	48.92904

WM18: 04:00-09:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	43.86446	25.28685	59.40516	47.51575	39.869	33.34794
4/6/2022	31.9616	3.613496	60.26063	20.06793	12.41063	8.370334
4/7/2022	36.41472	6.389938	65.86879	21.77986	11.55392	8.446464
4/8/2022	27.79251	0	57.11762	21.5536	11.91717	6.747956
4/9/2022	49.85117	24.57154	70.3683	51.95195	39.8335	31.6168
4/10/2022	38.45409	21.65501	58.96515	40.94116	31.73451	24.86221
4/11/2022	40.95044	19.33216	65.27052	43.21237	31.67985	24.61824
4/12/2022	33.19742	4.077728	55.83664	35.06134	24.09194	14.25995
4/13/2022	42.55934	13.56315	62.87618	45.59709	29.94369	19.82218
4/14/2022	41.30154	7.906897	64.35656	43.17324	26.61694	14.39385
4/15/2022	47.84735	8.768128	67.25696	51.14183	31.48551	21.05301
4/16/2022	27.97569	11.25101	48.49326	30.87009	22.54472	16.72694
4/17/2022	26.05435	0	44.03862	29.17589	22.24389	16.64331

WM18: 04:00-09:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	72.35942	45.31238	83.80601	76.27936	69.70539	61.09635
4/6/2022	42.51007	28.16666	69.35756	42.59176	37.87226	34.09894
4/7/2022	45.25753	24.44996	72.45186	44.87342	36.34282	30.48958
4/8/2022	46.2559	22.45611	70.10713	46.68501	35.6175	29.16454
4/9/2022	64.58717	40.53627	80.65142	68.31031	60.2617	52.00391
4/10/2022	47.98533	30.91482	67.16307	50.59179	43.23855	37.692
4/11/2022	67.85642	36.51263	82.41505	72.36668	62.02208	49.05803
4/12/2022	62.7863	30.25944	80.38687	66.65363	56.26877	43.81844
4/13/2022	64.54497	31.4828	82.55697	68.23826	56.71684	44.15831
4/14/2022	59.96529	26.69316	81.49946	62.64341	49.67007	36.88818
4/15/2022	66.71257	28.67146	81.82141	71.01262	60.34647	46.16876
4/16/2022	59.41303	26.99852	75.97183	63.45431	51.74354	37.56474
4/17/2022	31.19829	1.054115	50.29621	34.18286	26.89845	20.88695

WM18: 04:00-09:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	82.66786	57.74209	92.99289	86.34289	80.71684	73.32145
4/6/2022	49.67615	33.10725	74.27161	51.85875	45.46872	40.64036
4/7/2022	55.2629	30.10281	76.76283	58.68782	48.61863	39.50284
4/8/2022	57.29985	26.96807	76.96337	60.81167	48.26639	37.16856
4/9/2022	75.79125	49.83481	89.51648	79.67222	72.56375	64.68327
4/10/2022	56.15488	34.5083	74.24751	59.53664	50.20555	43.15801
4/11/2022	79.7819	42.00729	91.66388	83.30962	74.91069	63.02915
4/12/2022	74.31184	38.83792	89.62939	78.4342	69.36372	57.72243
4/13/2022	75.58756	38.50971	91.12177	79.70695	69.92653	57.93826
4/14/2022	69.85835	32.12973	88.10767	73.60597	62.30088	48.752
4/15/2022	78.13594	38.96904	91.37292	82.45448	73.54075	60.82866
4/16/2022	72.28216	31.53112	87.72983	76.44813	66.02251	51.4074
4/17/2022	34.65663	9.237257	55.03404	37.4386	29.65913	23.4135

APPENDIX G SUMMARY DATA BETWEEN THE HOURS 1800 AND 1000 FOR WILDLIFE NOISE MONITORING LOCATIONS

WM1: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	32.39705	22.59362	55.58054	34.82364	30.15538	26.23624
2/9/2022	36.8459	21.82789	57.78312	39.7571	29.66859	25.3529
2/10/2022	35.16789	20.92537	55.03587	37.66881	28.83733	24.26777
2/11/2022	36.72831	24.40796	59.83975	38.62485	32.95379	28.76967
2/12/2022	35.44335	20.8206	55.34258	38.22408	30.01546	25.28571
2/13/2022	36.32418	22.22765	55.74068	39.11725	32.15552	27.21001
2/14/2022	36.77715	21.21591	62.85277	36.62839	29.15077	25.12591
2/15/2022	33.14209	21.71872	48.14086	36.51155	30.44576	25.95745
2/16/2022	35.22275	22.90356	55.86893	38.11222	32.68596	27.89903
2/17/2022	33.09516	21.03448	60.67539	34.36057	29.05873	25.01861
2/18/2022	33.57827	22.25793	48.66585	36.55449	31.34767	27.18429
2/19/2022	31.22284	21.08341	48.22018	33.91154	28.77606	24.84605
2/20/2022	48.22516	23.88063	68.52928	51.11426	36.15851	28.91925

WM1: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	48.47246	35.86268	66.70173	51.25635	45.7364	41.19822
2/9/2022	61.59557	34.83785	78.8466	65.74891	53.35214	41.53051
2/10/2022	61.28641	34.56645	79.27313	64.99799	51.73565	41.17574
2/11/2022	59.66328	38.80103	78.54915	63.00856	52.7831	45.18266
2/12/2022	61.07784	34.5514	79.22315	64.8316	53.49272	42.14399
2/13/2022	61.20822	37.25406	78.82948	65.02908	54.10888	44.70076
2/14/2022	60.37689	34.91162	79.84945	63.00569	49.21209	41.17558
2/15/2022	53.70933	35.08059	74.57204	55.87613	46.49985	41.0835
2/16/2022	50.5552	37.34655	68.078	53.46597	47.91694	43.18931
2/17/2022	48.16489	34.51887	68.57973	50.8769	44.58268	40.08534
2/18/2022	49.35866	37.07632	65.09219	52.26496	47.22362	42.90704
2/19/2022	47.30282	33.76325	66.4326	50.0859	44.02394	39.38212
2/20/2022	70.58967	37.95571	86.02894	75.05286	62.47607	47.95071

WM1: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/8/2022	55.85616	37.89432	76.75594	58.70343	49.1607	44.0467
2/9/2022	69.26368	37.63768	86.14723	73.47274	61.94923	48.31584
2/10/2022	69.3138	38.07193	87.23187	73.17684	60.98486	48.77104
2/11/2022	67.68235	41.00464	85.86816	71.31617	61.1255	50.7947
2/12/2022	69.11761	36.90232	86.63192	73.00837	62.4877	49.8644
2/13/2022	69.34181	39.17488	86.60461	73.25847	62.9604	51.01922
2/14/2022	68.00999	36.44057	87.00215	71.08412	57.7911	45.28605
2/15/2022	66.06847	37.19153	86.3181	68.74978	54.29283	44.99861
2/16/2022	57.33403	39.55135	78.40066	59.49529	50.96176	46.03894
2/17/2022	57.83465	37.35052	79.08941	60.46587	49.78541	44.04126
2/18/2022	54.35779	39.27009	75.49894	56.39059	49.99697	45.65401
2/19/2022	55.78539	35.68269	77.30074	58.19645	47.97151	42.22361
2/20/2022	77.46284	40.13966	92.40813	81.93188	70.48074	55.95861

WM2: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	30.46905	15.23494	51.13122	32.42296	25.79983	20.67383
4/3/2022	26.70486	11.54303	52.16651	27.94243	21.61513	16.98542
4/4/2022	31.72917	19.7096	52.92993	34.11354	29.07842	24.92038
4/5/2022	38.01002	24.27641	60.29797	39.93521	33.36098	29.30653
4/6/2022	28.83973	12.54691	50.05397	29.74775	23.8643	18.36383
4/7/2022	29.95692	14.29676	51.76106	30.89723	24.8784	19.89474
4/8/2022	31.7372	16.67246	60.14754	32.79928	27.1509	22.1329
4/9/2022	32.18427	18.97342	60.92146	32.85638	27.63525	23.53566
4/10/2022	28.2749	13.87745	49.71563	30.95946	25.0022	20.22734
4/11/2022	35.44143	21.41472	55.06237	38.33559	31.86598	26.42408
4/12/2022	35.58843	21.62965	57.6399	35.89902	30.47841	26.44654
4/13/2022	34.28803	18.39243	58.34532	33.02469	27.76806	23.59634
4/14/2022	34.9977	21.80464	58.33588	34.89904	29.90947	26.33766
4/15/2022	35.2469	19.351	54.74998	38.59668	28.98974	24.16522

WM2: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	46.34243	32.91971	62.37427	49.50778	43.58824	38.7614
4/3/2022	45.05715	29.65999	64.96754	47.55493	40.53791	35.63094
4/4/2022	51.74612	35.46583	68.19938	55.51407	46.43854	41.09888
4/5/2022	61.63464	39.59834	79.6739	65.45246	55.09688	46.25331
4/6/2022	48.56441	30.72827	67.77709	50.82967	42.30876	36.70889
4/7/2022	45.1956	32.3527	62.23224	47.81692	42.63255	38.05133
4/8/2022	46.94638	33.69136	65.84282	49.67575	44.45916	39.96231
4/9/2022	53.25416	35.224	72.46654	56.42596	46.85023	41.06611
4/10/2022	50.10779	32.33258	68.34442	53.43618	44.72959	39.11569
4/11/2022	60.62653	36.94819	76.38024	64.93586	53.97341	43.59245
4/12/2022	54.40161	37.11521	76.36166	55.9331	47.87593	43.13823
4/13/2022	52.49314	34.43472	76.46749	51.94404	44.68945	40.25813
4/14/2022	55.56137	37.13033	77.428	57.66968	47.35828	42.44959
4/15/2022	51.57295	35.1369	69.09939	55.19737	46.08665	40.86535

WM2: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/2/2022	52.43452	35.2109	71.33989	55.80165	47.53446	41.93401
4/3/2022	55.97795	32.50027	76.34662	58.69402	46.70802	39.75015
4/4/2022	64.01801	37.3399	79.18848	68.42263	57.40762	45.10243
4/5/2022	74.23041	42.63614	89.82036	78.40786	68.96007	56.77983
4/6/2022	59.78564	34.61936	78.45176	63.39163	51.54203	42.43319
4/7/2022	48.3086	35.02949	65.62715	50.92419	45.89879	41.48069
4/8/2022	51.73222	35.96889	71.12724	54.71237	47.73572	42.87157
4/9/2022	66.99877	37.66387	84.97576	70.77642	58.47432	47.06371
4/10/2022	62.28939	35.35833	80.33659	66.20036	54.4652	44.36342
4/11/2022	73.0776	39.52987	87.75295	77.47394	67.82832	53.28232
4/12/2022	65.04779	39.49799	84.80354	68.28237	55.64539	47.12338
4/13/2022	61.16527	36.98478	82.36017	63.22	50.87479	43.92983
4/14/2022	67.61163	39.24093	86.0434	71.41096	57.83633	46.67211
4/15/2022	60.44151	37.23108	79.28177	63.93084	52.21864	44.06877

WM3: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	21.54934	8.431026	41.54822	24.29066	17.38373	12.35397
2/10/2022	21.40631	9.351521	43.45358	23.16546	17.5714	13.21684
2/11/2022	31.83385	13.46474	56.81754	27.66275	22.30633	18.34016
2/12/2022	24.65033	11.9807	41.3685	27.50672	21.38069	17.29093
2/13/2022	31.97094	12.31859	56.92614	28.78423	21.84009	16.94939
2/14/2022	22.11767	9.100365	46.10735	24.37552	18.97697	14.00038
2/15/2022	26.68844	13.77049	43.43654	29.80056	23.70959	19.13951
2/16/2022	27.80492	10.37845	61.81496	24.61395	19.32052	15.03146
2/17/2022	24.56114	12.15749	45.91899	26.78471	21.41259	17.63366
2/18/2022	26.38889	11.36978	49.63366	26.48409	20.73165	15.98876
2/19/2022	34.81719	20.42486	53.41993	37.89622	31.8926	26.73192
2/20/2022	27.1237	8.273342	50.68034	28.42291	20.229	13.14828

WM3: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	47.78455	28.53525	68.82048	50.36496	39.04657	34.01641
2/10/2022	46.41379	30.40511	67.11043	49.07503	40.10752	35.76064
2/11/2022	51.58326	32.33016	72.00243	54.56295	44.68826	38.22294
2/12/2022	50.36642	28.39071	69.12243	53.68201	42.62367	34.71432
2/13/2022	49.72594	30.0995	71.08125	52.03635	42.43823	35.92062
2/14/2022	47.11063	27.54007	67.70565	49.91732	40.11777	33.85226
2/15/2022	51.51253	31.18712	71.77575	53.99707	43.82999	37.51362
2/16/2022	48.28572	31.08883	68.79336	51.0921	41.83777	36.6946
2/17/2022	50.70782	30.00639	71.30213	53.98477	43.13841	36.20845
2/18/2022	49.6126	30.02669	69.98041	52.47537	42.18182	35.9664
2/19/2022	60.16078	35.40261	76.92689	64.10994	53.59895	43.94803
2/20/2022	49.49114	27.19758	70.21205	52.15906	40.38191	33.50708

WM3: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	60.98797	32.93603	80.66128	64.14251	49.55614	40.2217
2/10/2022	59.38629	34.65355	79.65385	62.5277	50.01891	41.92754
2/11/2022	64.59057	36.19893	82.5529	68.34835	57.48022	46.56122
2/12/2022	63.93922	31.99906	82.00054	67.61839	56.03689	43.28833
2/13/2022	61.27314	32.90222	79.72208	64.85285	53.49949	41.81209
2/14/2022	60.34435	30.82752	80.66894	63.46431	51.13281	40.10274
2/15/2022	64.3012	34.06947	83.32653	67.42208	55.1714	43.95866
2/16/2022	61.47383	35.60836	80.2948	64.93486	53.64363	44.23726
2/17/2022	64.17604	34.68657	83.31899	67.94854	56.34063	44.90133
2/18/2022	62.69588	33.99586	81.69292	66.03969	54.1998	43.20485
2/19/2022	72.34813	40.53033	87.85977	76.42765	66.71731	55.37956
2/20/2022	62.18667	31.26404	81.54546	65.55321	51.19239	40.11929

WM4: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	39.93838	28.57877	59.46472	42.82404	37.49192	33.31766
7/14/2021	39.99094	26.31068	55.30556	43.36243	35.91582	31.2513
7/15/2021	36.79861	25.92597	58.3351	38.5871	34.75264	31.03969
7/16/2021	39.93953	22.9	56.15359	39.33365	33.12109	28.93454
7/17/2021	38.90359	30.88199	53.50265	41.33021	37.79784	35.12959
7/18/2021	41.2452	32.56173	56.5689	43.88671	39.80983	36.7657
7/19/2021	42.2573	33.13449	55.51224	44.52561	41.13647	37.00664
7/20/2021	41.05866	33.09457	56.57415	43.58065	39.57631	36.23951
7/21/2021	43.25364	36.04111	53.449	45.43981	42.67229	39.85353

WM4: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	60.78756	33.1273	74.33985	64.95716	57.1743	45.13081
7/14/2021	42.78105	26.34273	64.90642	44.32955	36.19871	31.58039
7/15/2021	45.49964	26.35137	73.18614	43.70816	35.59534	31.58372
7/16/2021	41.0977	24.24167	63.38937	41.20922	34.34423	29.98704
7/17/2021	42.39742	29.7626	66.75985	44.10685	37.38219	34.20056
7/18/2021	62.14159	34.08714	77.31297	66.50787	56.41652	44.27734
7/19/2021	57.70451	32.61925	75.06581	61.67729	50.10033	39.44473
7/20/2021	55.05588	38.2294	73.99613	58.88348	43.90196	41.1346
7/21/2021	49.71589	39.89714	68.69644	51.2374	45.98254	43.26626

WM4: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/13/2021	71.80123	39.83383	83.97451	75.62986	69.30904	58.77802
7/14/2021	47.6749	29.43893	70.66379	49.19704	40.39307	35.66924
7/15/2021	51.06899	29.1014	79.27698	50.51482	40.6742	35.74957
7/16/2021	48.42283	26.82979	72.31166	48.33615	38.67106	33.63103
7/17/2021	52.30225	31.06141	75.5344	54.54493	42.6365	36.43263
7/18/2021	73.61225	38.78968	87.07411	77.87043	69.45278	57.90767
7/19/2021	69.539	35.48427	85.01157	73.8771	63.42615	51.01635
7/20/2021	65.86201	38.57254	82.52778	70.74003	49.76908	41.97606
7/21/2021	56.77117	40.31991	77.5629	58.05478	47.12562	43.99866

WM5: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	18.08886	0.046089	39.25138	23.63314	21.97776	21.86924
8/26/2021	22.02263	0	46.18846	23.18319	21.96981	21.86786
8/27/2021	20.7419	0	51.72544	22.34875	21.91563	21.85856
8/28/2021	20.71364	1.987928	51.07842	23.51622	22.16403	21.92276
8/29/2021	17.7158	1.189943	43.43969	23.185	22.07191	21.90379
8/30/2021	18.19429	0	44.88683	23.52351	21.96588	21.87223
8/31/2021	21.62912	0.276454	52.29713	22.88368	21.97051	21.87119
9/1/2021	24.01892	0.460875	48.66106	22.80253	22.0229	21.89357
9/2/2021	23.62687	0.116773	53.95983	22.58287	21.9585	21.88191
9/3/2021	21.38329	0	48.53764	23.27793	21.95938	21.84583
9/4/2021	19.11504	0	46.53994	22.45953	21.9056	21.85494
9/5/2021	20.90775	0	51.4654	22.027	21.87459	21.84717

WM5: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	38.87707	21.87614	61.77822	40.48442	32.97355	29.01523
8/26/2021	41.21008	22.30073	63.59064	40.2294	33.25241	29.33135
8/27/2021	36.15648	22.17723	56.74493	38.91294	32.90771	29.12034
8/28/2021	38.56132	23.99418	55.46389	41.81699	35.79339	31.05068
8/29/2021	38.53427	24.30456	53.83606	41.80657	35.8542	31.2158
8/30/2021	39.32475	23.07137	70.21342	40.19177	33.95693	30.02871
8/31/2021	36.17344	22.23068	56.85355	38.42073	32.71953	29.10924
9/1/2021	38.86997	23.01409	60.62009	40.13313	34.40859	30.14093
9/2/2021	36.95745	23.84492	58.33632	39.2826	34.12408	30.48323
9/3/2021	36.41249	18.12605	60.38411	36.5609	30.12108	26.38977
9/4/2021	34.66632	20.75909	52.53608	37.77094	31.07256	27.76448
9/5/2021	34.45059	19.71713	56.3747	36.0765	30.78543	27.35921

WM5: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/25/2021	44.00121	25.92201	71.21476	45.35451	38.13014	33.66005
8/26/2021	44.25192	26.69297	67.21739	44.7827	38.59321	34.28483
8/27/2021	42.25213	26.44344	65.58652	44.40254	38.21761	33.91669
8/28/2021	42.07107	26.87878	60.1897	45.17564	39.29011	34.41376
8/29/2021	42.45322	27.51633	58.34033	45.67184	39.71222	34.84897
8/30/2021	43.81138	26.96056	74.79693	44.1654	38.52282	34.27452
8/31/2021	40.03936	25.97044	58.90221	42.65404	37.48098	33.44423
9/1/2021	42.38687	26.58414	63.92142	44.3496	38.73507	34.21627
9/2/2021	41.43716	27.79033	60.35089	44.19604	39.09932	34.95654
9/3/2021	40.12312	22.80768	63.75245	41.29428	35.51069	31.27003
9/4/2021	38.80047	24.14759	57.75831	41.77552	35.39398	31.40227
9/5/2021	38.23211	23.20718	57.9427	40.8673	35.2628	31.00769

WM6: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	37.40211	16.83955	58.51506	36.19861	26.47681	20.50002
7/10/2021	28.45408	15.11671	49.23662	30.4193	22.07144	17.85473
7/11/2021	29.94585	15.61399	51.51698	32.10595	23.27316	18.82009
7/12/2021	48.37289	20.28236	65.19419	48.21766	36.52104	27.31845
7/13/2021	35.13686	17.45231	57.96275	38.45214	28.46676	21.19698
7/14/2021	39.6199	21.68803	60.53303	42.34093	35.04102	28.40817
7/15/2021	33.24677	16.71789	56.07455	33.88569	25.56605	20.0839
7/16/2021	36.51816	17.48085	57.57039	39.20885	30.16509	22.6174
7/17/2021	37.41109	17.00428	54.39547	41.39224	32.2847	23.51858
7/18/2021	34.38472	15.76869	53.91921	37.71395	28.76165	20.9203

WM6: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	61.30152	31.91754	79.49348	65.41618	51.45465	38.498
7/10/2021	51.5451	30.45067	71.51888	54.87923	43.84359	37.00718
7/11/2021	56.23163	31.8157	76.42363	59.02923	46.6437	38.94759
7/12/2021	70.10318	36.00768	84.73328	74.6032	64.23125	51.2957
7/13/2021	64.4126	34.04252	81.21914	68.52765	57.61413	44.19483
7/14/2021	65.65981	38.20395	81.21094	69.80778	60.48457	47.79637
7/15/2021	58.50181	32.86316	76.32229	62.18891	51.8115	41.17541
7/16/2021	64.4996	32.93108	79.73309	68.88624	57.54785	42.52341
7/17/2021	66.41842	32.42527	80.01795	70.75708	61.76985	49.40075
7/18/2021	63.15296	32.39573	78.32952	67.29924	58.24597	46.26444

WM6: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
7/9/2021	73.25594	37.08539	88.89463	77.72251	66.08364	47.83692
7/10/2021	63.71219	35.668	83.87332	67.32339	54.55376	43.80969
7/11/2021	68.65412	36.44829	87.69587	72.00319	58.41872	46.37545
7/12/2021	81.40929	40.8964	94.86382	85.89593	76.70191	65.03634
7/13/2021	76.60215	43.20525	92.4382	80.82016	70.88011	56.66674
7/14/2021	78.46085	43.97099	92.86405	82.62331	74.44261	61.63687
7/15/2021	70.34639	38.53143	86.79762	74.43274	64.89713	52.99956
7/16/2021	76.2485	38.67779	89.89177	80.7111	71.20889	55.16354
7/17/2021	77.69752	39.88516	90.48059	82.00793	74.06036	63.84138
7/18/2021	74.70332	40.43393	88.70278	78.85366	70.6841	59.64629

WM8: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	38.83714	12.75379	60.75095	41.06556	29.73763	21.30015
8/25/2021	38.03311	13.48899	60.08633	39.94434	31.00765	21.48718
8/26/2021	35.66805	10.62474	57.20574	38.24626	27.55193	19.1221
8/27/2021	36.62598	8.867953	59.02211	38.8768	27.49879	18.6923
8/28/2021	33.53301	6.134842	55.95297	35.43212	22.4349	13.37958
8/29/2021	34.92609	6.988456	54.5184	37.98621	24.60673	14.83118
8/30/2021	37.95359	10.94662	59.53171	40.58007	30.01154	21.76471

WM8: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	56.94228	31.97101	74.71276	60.10272	49.1321	40.56531
8/25/2021	56.00086	33.27769	73.83466	58.28333	48.31923	40.88287
8/26/2021	54.59036	31.48823	73.10195	57.26737	47.48809	39.47732
8/27/2021	53.73238	30.3245	72.20883	55.5776	44.31983	37.5394
8/28/2021	51.02387	28.6399	69.33001	53.34816	42.50709	35.81217
8/29/2021	53.0637	29.64739	71.3932	55.72107	42.59055	36.30405
8/30/2021	54.65006	30.41021	73.23676	56.77773	45.16144	38.39454

WM8: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	64.84123	35.9773	80.70377	68.72115	59.5544	48.99846
8/25/2021	64.2698	37.34726	80.3836	67.94114	58.86818	49.3728
8/26/2021	63.57402	35.76489	80.18711	67.31748	58.06237	48.3224
8/27/2021	59.1648	34.31263	78.10881	61.8187	50.66013	42.91924
8/28/2021	58.61806	33.28476	76.23751	61.7632	51.40026	42.88858
8/29/2021	57.54743	33.57796	75.91713	60.46348	47.81484	41.41041
8/30/2021	60.1396	34.24294	78.22138	62.84696	51.51863	43.78387

WM10: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	48.11934	12.49813	69.14411	45.96338	28.31904	22.97705
8/25/2021	46.25567	14.2893	67.39986	39.12061	27.61193	23.80671
8/26/2021	45.72879	10.85334	65.91755	45.02357	27.72533	22.94154
8/27/2021	47.17471	8.166663	66.56518	42.48714	25.93153	21.95663
8/28/2021	47.59601	4.897183	67.99421	35.08129	23.00094	21.42903
8/29/2021	45.59976	5.02814	65.58382	42.33097	23.27191	21.50584
8/30/2021	47.35043	10.69665	66.90004	46.37082	28.25319	22.84353
8/31/2021	46.28608	11.49774	66.12313	42.86278	27.60203	23.09777
9/1/2021	46.45148	10.67341	66.83013	42.42049	26.28917	22.65773
9/2/2021	46.57112	11.32789	69.38167	41.81001	26.81317	22.78207

WM10: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	63.71923	29.39024	82.80243	64.91564	45.32543	36.73881
8/25/2021	62.27112	30.913	82.5017	57.27459	43.43233	37.6197
8/26/2021	60.94137	29.06309	80.80326	61.30801	43.77269	36.31202
8/27/2021	61.63107	27.38176	81.08661	59.70242	40.74083	34.09419
8/28/2021	60.65529	25.31374	81.51967	52.20517	37.50477	32.21915
8/29/2021	61.11377	27.09552	80.69479	59.77729	39.18337	33.48959
8/30/2021	62.37006	28.82382	81.17522	64.34211	46.09254	37.09557
8/31/2021	60.77314	29.84291	80.45628	57.86743	42.70652	36.6979
9/1/2021	61.27422	29.01177	81.24635	58.43858	41.48776	35.87016
9/2/2021	61.94694	29.61729	81.74968	58.92061	42.77906	36.89986

WM10: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	66.76375	32.89682	85.70711	68.38764	52.25656	42.37209
8/25/2021	65.45514	34.02948	85.40633	63.58725	50.63186	42.35938
8/26/2021	64.25528	32.94829	84.09188	65.22368	51.48832	42.19377
8/27/2021	64.03521	31.19291	83.81631	62.60194	45.319	38.84891
8/28/2021	62.98876	29.294	83.68508	57.73022	43.336	37.11517
8/29/2021	63.63756	30.87509	83.09968	63.09116	43.89355	38.10002
8/30/2021	64.70828	31.99757	83.58906	66.42749	48.3011	40.33828
8/31/2021	63.38996	33.1416	83.14631	61.47192	46.78337	40.71235
9/1/2021	63.96463	32.69188	83.76657	61.9685	45.8079	40.16746
9/2/2021	64.54694	33.06879	83.96058	62.63752	46.81564	41.05666

WM11: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	25.25052	4.72342	49.37145	27.446	22.89269	21.98855
8/25/2021	21.46948	0	46.31685	24.95834	21.93261	21.63802
8/26/2021	25.70931	9.483571	46.735	28.17736	23.76763	22.36272
8/27/2021	29.67022	7.601266	61.19557	27.5488	23.15828	22.05599
8/28/2021	22.65493	3.236012	48.72171	25.33696	22.13786	21.74798
8/29/2021	23.99702	0.947164	49.40531	23.62033	22.01385	21.71372
8/30/2021	23.48122	0.379733	48.37648	24.94647	21.99335	21.69471
8/31/2021	21.26089	1.07177	46.98564	25.11845	22.06025	21.69912
9/1/2021	25.71455	4.879588	48.59844	27.29784	22.74772	21.85775
9/2/2021	46.8026	4.633825	73.38678	32.53062	23.31417	21.9365
9/3/2021	47.2684	15.7158	73.44382	41.4497	30.31359	24.46286
9/4/2021	44.31163	1.211931	72.09344	31.83532	22.26105	21.74983
9/5/2021	20.03955	2.009781	47.14903	23.77357	22.16303	21.74785

WM11: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	53.76615	25.50478	73.06811	56.97687	41.83579	32.56726
8/25/2021	47.60709	23.86206	68.13399	50.20094	38.77514	31.30128
8/26/2021	53.04334	25.93977	72.50018	55.89799	41.72548	33.05841
8/27/2021	53.65925	27.86075	73.85161	56.40509	42.6408	34.64334
8/28/2021	51.66705	26.88172	71.69472	54.70844	40.84925	33.93378
8/29/2021	46.47275	25.47727	68.0798	47.80112	37.48114	32.44533
8/30/2021	46.8283	25.08763	66.99071	49.94391	39.52186	32.63708
8/31/2021	47.46629	25.97997	68.37796	50.09809	39.80403	33.36347
9/1/2021	53.05099	28.71611	71.91729	56.50189	45.66746	36.26773
9/2/2021	62.30454	27.36999	87.10745	57.82737	43.95673	34.64045
9/3/2021	66.27394	32.11927	87.37263	69.18459	59.62675	47.61946
9/4/2021	59.35425	25.27012	86.26151	50.42628	38.20064	32.18573
9/5/2021	47.18682	26.28215	66.5463	50.40077	40.29202	33.62933

WM11: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	64.6567	30.25886	82.2432	68.47965	54.65415	40.69443
8/25/2021	59.15737	29.67851	78.8865	62.32599	50.5597	40.09379
8/26/2021	63.9974	31.21377	82.12609	67.57552	54.29935	42.09275
8/27/2021	64.54571	32.6618	83.08823	68.0834	54.66358	42.7215
8/28/2021	62.53488	31.60168	81.93164	66.07633	51.9967	40.74268
8/29/2021	57.15495	30.22109	77.8499	59.77902	47.11132	38.85433
8/30/2021	58.28247	31.18619	77.32032	61.87285	51.54858	42.03465
8/31/2021	58.92093	31.48613	79.41875	62.03736	51.34997	42.00327
9/1/2021	63.58763	33.51219	81.17914	67.38184	57.19099	45.8668
9/2/2021	66.32586	31.98097	88.39754	68.2647	55.39715	43.07345
9/3/2021	74.57173	40.28892	90.39922	78.63328	70.49723	59.59725
9/4/2021	61.41131	30.24504	87.0213	60.40382	48.95626	39.42172
9/5/2021	58.7337	31.44438	77.2565	62.35215	51.87812	42.3923

WM12: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	31.8339	22.43448	44.49395	34.47887	29.62357	26.84917
8/25/2021	36.13734	21.48929	48.91168	39.72636	34.68077	29.58498
8/26/2021	29.96625	11.04638	43.59403	34.84448	25.16499	23.34599
8/27/2021	28.23075	17.74206	42.51711	32.32505	26.2339	24.4277
8/28/2021	36.78812	21.9818	45.78393	40.87875	35.57363	28.09074
8/29/2021	34.99559	19.31421	45.2341	38.34489	33.99353	26.83927
8/30/2021	34.9868	18.74075	46.56694	39.73866	31.85842	26.17688

WM12: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	39.89972	27.87952	55.52762	42.78876	37.63783	33.42681
8/25/2021	40.07858	26.70088	54.82805	43.28809	38.01146	33.32673
8/26/2021	39.40227	23.17137	60.77297	42.0192	34.26175	29.87277
8/27/2021	38.81352	25.13227	58.49337	41.19362	34.94151	30.92911
8/28/2021	44.64409	31.58485	59.28792	48.12344	42.22949	37.45263
8/29/2021	42.71565	30.77652	55.94835	45.65558	41.33859	36.81695
8/30/2021	39.08912	24.68207	59.93928	42.06231	35.94087	31.33279

WM12: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
8/24/2021	46.35636	31.67218	65.18591	48.67583	42.98163	38.66317
8/25/2021	45.2591	30.6219	62.91884	48.04351	42.68848	38.21594
8/26/2021	47.77966	28.48468	71.56211	49.29459	41.02924	36.34358
8/27/2021	46.66543	29.76026	68.36288	48.46931	41.70235	37.20787
8/28/2021	51.35048	35.36207	70.09332	54.38653	47.18602	42.39407
8/29/2021	47.95482	35.02207	61.34588	50.78419	46.78354	42.40049
8/30/2021	46.05993	30.35186	69.39989	47.33056	42.76205	38.43702

WM13: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	37.03703	15.84324	64.20138	29.07497	23.68521	20.01969
4/7/2022	42.01218	12.44276	64.53725	32.05108	21.66083	17.40701
4/8/2022	38.67355	13.58143	64.35722	35.37773	24.31361	18.69949
4/9/2022	37.48573	16.69084	63.33616	35.91524	27.20627	21.11173
4/10/2022	36.43134	15.90019	58.37877	39.66837	32.12168	24.02162
4/11/2022	35.33205	17.83627	54.34954	38.98335	30.69855	23.81862
4/12/2022	38.53236	20.48982	53.36895	42.37692	34.85253	27.64785
4/13/2022	31.01675	15.38654	56.12151	32.53884	25.29521	20.34601
4/14/2022	36.45892	20.9077	58.92393	39.66372	32.50084	26.75518
4/15/2022	35.91183	19.38831	54.93628	39.13954	31.17114	25.25148
4/16/2022	33.90521	12.98292	60.00779	33.26427	23.74595	18.64877
4/17/2022	38.63975	15.91785	61.5145	39.0434	31.05614	23.38656
4/18/2022	38.41409	12.30487	63.45814	37.08984	25.85042	17.8876
4/19/2022	38.26768	21.10371	59.73449	41.25327	34.01884	27.61048
*Data for 4/19/2022 summarizes hours 18:00-09:00 (missing the last hour) due to measurement period ending						

WM13: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	49.20741	36.19663	68.01543	52.12548	45.59001	41.53548
4/7/2022	46.69282	32.58864	66.31314	48.01555	41.83786	37.98427
4/8/2022	47.74074	30.24089	68.89711	50.14655	41.11887	36.05488
4/9/2022	56.54602	33.43403	74.21088	60.3276	49.66824	40.94433
4/10/2022	63.84486	36.78841	75.84878	67.67562	61.42203	52.61317
4/11/2022	64.0059	36.86782	77.39595	68.16088	60.28126	50.98268
4/12/2022	68.09215	44.27376	80.7936	72.05251	65.06753	56.78662
4/13/2022	58.31502	34.95625	74.61111	62.2632	53.0733	44.43985
4/14/2022	65.96948	38.53853	79.59938	70.02438	62.27319	53.06833
4/15/2022	63.82279	35.42417	78.35649	68.07549	58.94274	48.56062
4/16/2022	51.93203	30.54383	70.54235	55.29883	45.53653	37.84875
4/17/2022	63.53197	33.07856	77.43525	67.51343	60.13922	50.17067
4/18/2022	47.67065	30.14786	66.17762	51.29444	41.60733	35.99263
4/19/2022	67.36035	40.44417	80.63569	71.3561	64.10999	55.43048
*Data for 4/19/2022 summarizes hours 18:00-09:00 (missing the last hour) due to measurement period ending						

WM13: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	60.65376	39.73929	78.46361	64.35913	54.8089	47.05363
4/7/2022	52.70215	36.28958	70.71587	55.69985	48.08675	42.99773
4/8/2022	50.4243	32.87528	71.04945	53.11355	44.61565	39.55988
4/9/2022	69.38402	39.56975	85.53678	73.41273	63.48719	52.94782
4/10/2022	74.47055	48.17624	86.18016	78.1674	72.39286	64.73838
4/11/2022	75.40775	48.98978	87.48209	79.43358	72.53003	63.97721
4/12/2022	78.89436	55.70589	91.02774	82.74947	76.36727	68.73382
4/13/2022	70.78916	42.5217	86.13011	74.79882	66.05836	56.72648
4/14/2022	77.90241	50.97631	90.52987	81.85152	74.97236	66.65331
4/15/2022	75.63401	46.83324	89.31632	79.77188	71.88289	62.42346
4/16/2022	63.15199	35.23586	79.58689	67.05716	57.84009	48.08298
4/17/2022	74.35049	41.87923	87.41837	78.27	71.57685	62.7622
4/18/2022	53.45301	33.42847	71.54331	57.12749	47.82483	41.02241
4/19/2022	78.76525	53.50079	90.60071	82.66587	76.1997	68.44657
*Data for 4/19/2022 summarizes hours 18:00-09:00 (missing the last hour) due to measurement period ending						

WM15: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	27.22819	22.93019	43.17163	28.54336	26.50377	25.04707
2/10/2022	27.96195	23.01437	45.72123	28.88166	26.68284	25.00844
2/11/2022	31.17193	23.58994	54.79548	29.90272	27.51915	25.83154
2/12/2022	28.71228	23.55889	46.3832	30.02626	27.27659	25.71023
2/13/2022	28.70796	23.43393	46.33719	29.77689	27.18227	25.45547
2/14/2022	27.64068	23.0651	44.8311	28.94486	26.61455	25.06776
2/15/2022	28.88653	21.73904	46.867	30.72197	26.3602	24.15797
2/16/2022	27.68753	20.79017	48.31152	27.07238	24.86911	23.09179
2/17/2022	28.54992	21.6569	55.71264	27.16436	25.53155	24.0288
2/18/2022	28.58279	22.89122	46.34625	30.02448	27.79846	25.75179
2/19/2022	29.66884	24.06463	45.98907	31.23223	28.63221	26.75043
2/20/2022	30.20837	24.47623	52.28372	30.4124	28.17612	26.85472
2/21/2022	31.75698	22.57012	53.16332	33.36994	27.8138	25.223
2/22/2022	30.47167	22.09659	56.4336	30.10757	26.19629	24.35808
*Data for 2/22/2022 summarizes hours 18:00-09:00 (missing the last hour) due to measurement period ending						

WM15: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	40.71291	30.35293	63.23575	42.04663	36.08491	33.59555
2/10/2022	39.85266	30.62657	61.86573	41.38267	36.91025	34.22675
2/11/2022	46.05483	31.09808	70.4333	46.62257	38.03634	34.78289
2/12/2022	47.08864	30.34419	68.88297	49.00647	37.56342	33.51765
2/13/2022	45.83478	30.10426	66.70941	48.34186	37.7298	33.30101
2/14/2022	45.32438	29.7083	67.74523	46.53832	35.72008	32.5602
2/15/2022	53.65923	28.96946	74.61855	54.98811	39.40291	33.0145
2/16/2022	44.34953	30.18468	67.82184	45.2698	37.77142	34.5122
2/17/2022	40.336	30.09391	63.70416	41.08088	36.64469	34.02056
2/18/2022	47.50801	31.26349	68.64995	49.73358	39.68915	35.60112
2/19/2022	50.39704	31.48339	71.44519	52.78891	40.30372	35.33392
2/20/2022	46.6104	31.43376	69.82858	46.60829	37.10586	34.60779
2/21/2022	56.60885	31.28958	75.3076	59.98252	46.44456	36.83544
2/22/2022	52.4462	29.74195	75.4089	52.91617	38.79036	33.25428
*Data for 2/22/2022 summarizes hours 18:00-09:00 (missing the last hour) due to measurement period ending						

WM15: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
2/9/2022	52.89883	32.02631	76.22841	54.13468	41.70207	37.18169
2/10/2022	50.54138	32.77388	74.83507	51.29396	41.96656	38.13954
2/11/2022	59.2187	33.12395	81.60406	61.12897	47.04783	39.08358
2/12/2022	61.35199	31.50639	82.20295	64.00008	49.38586	37.73143
2/13/2022	59.7534	30.97277	79.71616	62.9783	49.93713	37.93043
2/14/2022	59.55189	30.40884	81.11187	61.4347	45.00869	35.14893
2/15/2022	65.65206	30.64936	85.52183	68.19336	51.56999	38.06748
2/16/2022	55.5539	33.22793	77.57454	57.6109	45.79967	39.44733
2/17/2022	49.92383	32.70437	73.46125	51.0987	42.54439	38.57199
2/18/2022	61.60659	33.77683	81.94419	64.3727	50.66379	40.55994
2/19/2022	64.57617	33.05506	84.17473	67.70844	53.03565	40.51061
2/20/2022	59.59346	32.47272	82.31272	60.19367	43.62746	37.34925
2/21/2022	67.90659	34.12977	84.60052	71.98778	59.25907	45.17945
2/22/2022	65.03402	30.97374	86.18849	67.17665	50.788	37.47177
*Data for 2/22/2022 summarizes hours 18:00-09:00 (missing the last hour) due to measurement period ending						

WM16: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	47.20516	18.94453	68.41815	42.58213	27.30002	23.26765
4/7/2022	48.96164	19.8442	75.26535	46.08261	27.38679	23.92998
4/8/2022	47.50267	19.05955	73.01009	41.33992	26.67143	23.24839
4/9/2022	58.57391	20.60047	81.25634	49.76756	29.76912	25.39008
4/10/2022	49.33384	18.23811	76.10052	47.39757	27.43365	22.84739
4/11/2022	46.92655	14.41698	76.38879	37.41454	28.32676	20.46391
4/12/2022	42.99008	21.6697	57.86969	46.84279	39.30067	31.20139
4/13/2022	36.69223	8.810924	59.4833	35.26132	25.4803	17.28913
4/14/2022	43.06395	15.93496	68.92344	38.69766	30.89374	23.75384
4/15/2022	52.14337	15.70922	77.29267	42.66606	29.61707	22.81929
4/16/2022	50.31131	12.7807	78.42991	46.08067	22.63559	18.085
4/17/2022	50.43492	14.31201	71.2888	50.27233	27.60035	20.55601
4/18/2022	52.57458	20.19618	78.0453	50.20968	27.86228	24.24234
4/19/2022	44.04013	16.55433	65.71354	44.17637	31.69741	24.30143

WM16: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	51.90879	38.62245	70.7405	53.98032	47.99813	43.90044
4/7/2022	52.39667	40.06747	73.99951	54.08743	49.32947	45.5637
4/8/2022	50.85792	38.80554	71.86382	52.1717	47.82294	44.15209
4/9/2022	61.41339	37.5893	81.32099	63.60697	53.63466	45.25384
4/10/2022	58.14324	35.95367	77.18574	61.88913	51.92693	42.93727
4/11/2022	61.08571	33.03799	78.09529	65.26591	56.01545	45.16247
4/12/2022	70.33076	44.71733	82.45566	74.27089	67.6625	59.34217
4/13/2022	60.90165	34.71514	77.01444	64.82977	56.00318	47.22659
4/14/2022	62.96128	38.02416	77.79425	66.90427	59.27638	50.92403
4/15/2022	61.07779	31.78739	79.624	64.62827	54.44193	43.86178
4/16/2022	51.5425	31.39403	77.09779	52.70701	43.89579	37.57595
4/17/2022	61.6533	31.9659	78.07709	65.71555	55.11197	43.65725
4/18/2022	53.08991	37.6244	76.70349	53.58098	46.94819	42.79235
4/19/2022	64.54445	37.01093	79.47663	68.53689	60.29789	51.39676

WM16: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/6/2022	60.78645	41.27649	80.22484	64.2377	54.50055	47.75761
4/7/2022	57.6661	42.55874	76.8345	60.68038	54.22844	49.1684
4/8/2022	54.29388	41.09246	73.57275	56.68162	51.34442	47.10536
4/9/2022	72.73422	41.81713	88.76104	76.80605	67.24043	56.27739
4/10/2022	69.86496	38.5425	85.73698	74.00622	64.7581	52.68012
4/11/2022	72.62934	42.60516	86.39224	76.90152	68.6268	57.87172
4/12/2022	80.77853	57.07897	91.76944	84.54754	78.6388	71.19831
4/13/2022	72.64592	44.46373	87.39745	76.67261	68.37089	59.51096
4/14/2022	74.74558	49.26086	88.18064	78.63552	71.56729	63.57747
4/15/2022	72.92868	40.80716	88.58997	76.95731	67.85748	57.56532
4/16/2022	60.77269	34.3859	80.57493	64.43752	55.02374	44.29356
4/17/2022	73.57574	39.24543	88.12156	77.84089	68.51309	57.13623
4/18/2022	57.33166	39.81355	79.09681	59.63812	51.49634	46.02075
4/19/2022	76.29194	48.46801	89.73983	80.33502	72.76701	64.34754

WM18: 18:00-10:00 Intervals – A-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	54.41411	26.87493	75.24481	57.22052	41.57607	33.17166
4/6/2022	33.11712	11.32406	60.37236	31.66151	24.19864	17.58826
4/7/2022	36.45148	11.2603	64.42702	26.02781	14.93605	12.95155
4/8/2022	33.09659	8.754221	64.30424	23.95453	17.22923	12.24705
4/9/2022	52.88869	21.40115	71.89784	55.99215	42.71116	30.64408
4/10/2022	44.8639	25.9215	62.44863	47.9263	39.62662	32.95526
4/11/2022	40.36969	15.76859	66.39107	39.03471	27.94369	21.40147
4/12/2022	30.01938	2.754905	52.22306	32.15397	21.39523	12.30562
4/13/2022	38.01644	13.26359	58.33357	41.02282	26.84796	19.0411
4/14/2022	38.86295	7.323113	61.23151	40.05314	23.23227	14.09055
4/15/2022	42.88302	6.041103	62.34455	46.1608	26.94842	17.12111
4/16/2022	26.1073	8.125024	48.69166	28.13344	20.01748	13.74244
4/17/2022	43.18045	8.673227	64.77541	42.43886	28.09119	20.06804

WM18: 18:00-10:00 Intervals – C-Weighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	70.50018	41.86122	84.50949	74.57904	66.68198	57.02106
4/6/2022	59.74316	32.06783	74.70708	63.89481	55.77365	45.74736
4/7/2022	45.71765	23.29396	71.41823	45.15993	36.13558	29.73308
4/8/2022	51.22851	21.67498	71.37363	54.86234	45.92185	35.73879
4/9/2022	64.33849	37.56251	80.90152	68.02491	59.20607	50.40158
4/10/2022	66.54181	40.80201	79.45183	70.43651	63.72858	55.38398
4/11/2022	64.13954	33.42341	79.89992	68.45994	57.97223	45.16977
4/12/2022	60.13455	28.72988	77.32355	64.12945	53.4397	41.06842
4/13/2022	62.59858	31.29908	80.19267	66.39226	54.49656	42.05521
4/14/2022	56.8398	26.59428	78.41378	59.28207	46.25574	35.28381
4/15/2022	62.4752	25.98301	77.83501	66.77041	55.72454	41.5233
4/16/2022	56.12482	25.64926	73.64821	59.95464	48.08235	34.82826
4/17/2022	50.30833	16.69027	74.06032	48.2202	34.98548	26.77986

WM18: 18:00-10:00 Intervals – Unweighted						
Date	Leq	Lmin	Lmax	L10	L50	L90
4/5/2022	80.95707	53.35002	92.73369	84.92669	78.19565	69.45308
4/6/2022	71.20724	43.80293	84.13214	75.23861	68.12498	59.05592
4/7/2022	55.30768	29.35513	76.4119	58.44272	49.59563	40.33317
4/8/2022	63.44793	30.3075	78.94855	67.39098	59.43484	50.02238
4/9/2022	74.91426	47.57043	89.30612	78.80649	71.24901	63.06089
4/10/2022	77.48595	53.01066	88.94692	81.22693	75.22928	67.78665
4/11/2022	76.04616	38.77157	89.48373	79.71344	70.97396	58.90884
4/12/2022	71.83248	37.04959	87.29887	76.0016	66.64724	54.93456
4/13/2022	74.35652	37.01919	89.99298	78.53623	68.22967	55.59601
4/14/2022	66.82693	30.92572	85.86475	70.44367	58.92182	45.57445
4/15/2022	73.89268	34.87902	87.34963	78.27023	68.9831	56.03874
4/16/2022	68.97027	29.92802	85.16144	73.01743	62.30712	47.68825
4/17/2022	55.04776	20.0341	78.42794	54.0743	42.83159	33.61081