



Biological Baseline Studies 2021 Work Plan

Ore Transportation Project

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Signature Page

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Acronyms and Abbreviations

ARMPA	Approved Resource Management Plan Amendment
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
ERM	ERM-West, Inc.
ESA	Endangered Species Act
ESD	Ecological Site Description
GAP	Gap Analysis Project
GIS	Geographic Information System
GPS	global positioning system
IM	Instruction Memorandum
IPaC	Information for Planning and Consultation
MBTA	Migratory Bird Treaty Act
MLRA	Major Land Resource Area
NAC	Nevada Administration Code
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NGM	Nevada Gold Mines, LLC
NHD	National Hydrology Dataset

NISIMS	National Invasive Species Information Management System
NNHP	Nevada Natural Heritage Program
NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventories
Project	Ore Transportation Project
RMP	Resource Management Plan
SSURGO	Soil Survey Geographical Database
SWReGAP	Southwest Regional Gap Analysis Project
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
WAFWA	Western Association of Fish and Wildlife Agencies

1 INTRODUCTION

Nevada Gold Mines, LLC (NGM) contracted ERM-West, Inc. (ERM) to conduct biological and noise baseline studies for the Ore Transportation Project (herein referred to as the “Project”) and prepare a Work Plan for review and approval by the Bureau of Land Management (BLM). This Work Plan is a guideline to assist in conducting inventories that thoroughly document habitat presence, diversity, relative abundance, and distribution of both vegetation and wildlife within the Project footprint. Surveys, inventories, and monitoring will be completed using protocols approved by BLM. The biological and noise baseline studies planned for the Project will provide sufficient data for the future National Environmental Policy Act (NEPA) analysis of potential impacts to vegetation and wildlife. The biological and noise baseline studies are anticipated to be completed from May through September 2021 and will include both a desktop and field assessment. Supplemental work proposed for 2022 is also discussed.

1.1 Project Location and Setting

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

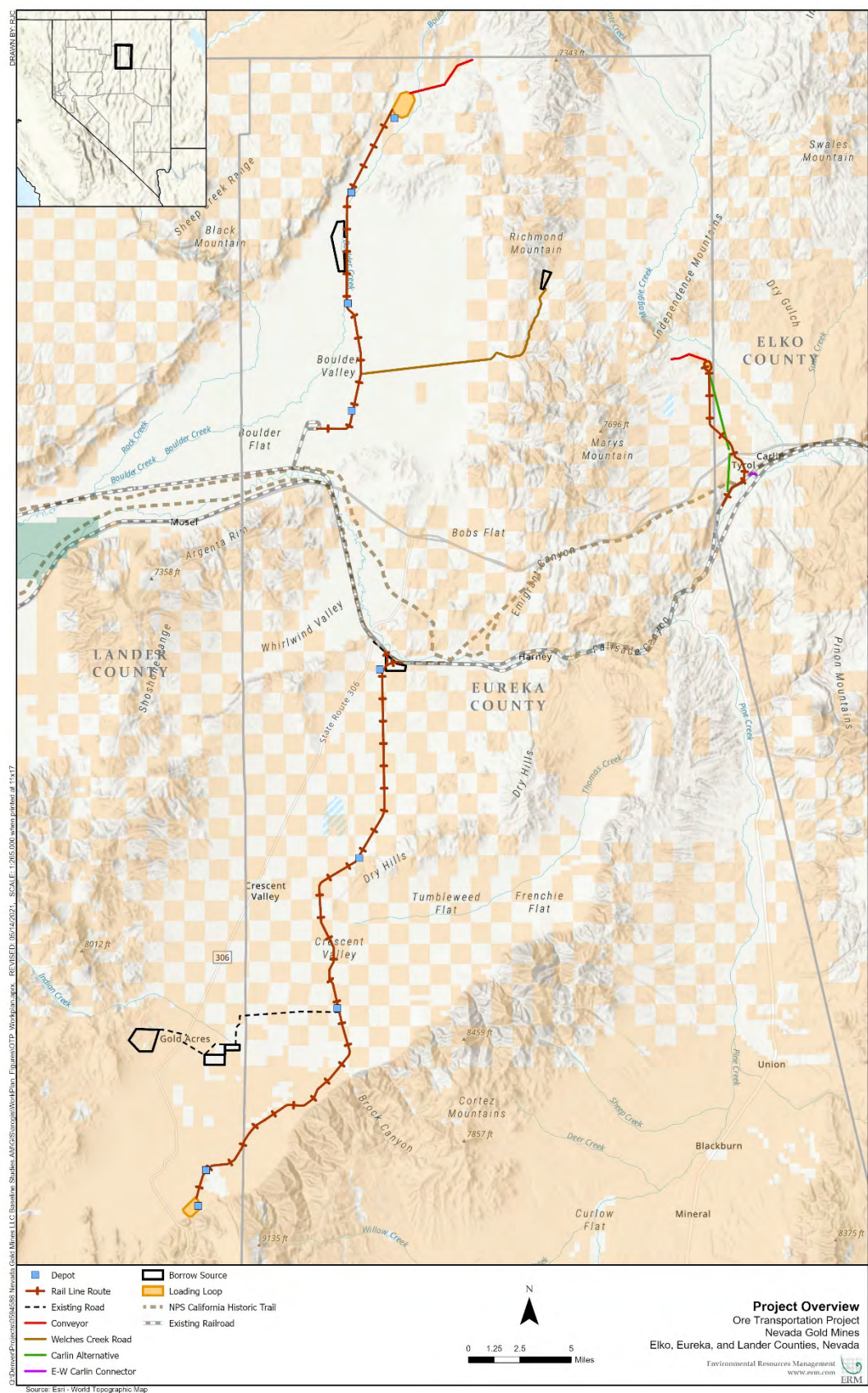


Figure 1: Project Overview

1.2 Regulatory Framework

BLM Resource Management Plans (RMPs) applicable to the Project Area are the 1987 Elko RMP, the 1987 Shoshone-Eureka RMP, and amendments to those plans. The RMPs guide BLM management decisions and actions to manage the public lands on the basis of multiple-use and sustained yield, unless otherwise specified by law.

Section 7 of the Endangered Species Act (ESA; 19 United States Code [USC] § 1536(c)), as amended, states that any action authorized, funded, or carried out by a federal agency does not jeopardize the continued existence of a federally listed threatened and endangered species, or result in the destruction or adverse modification of federally listed designated critical habitat.

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

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

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

BLM Nevada Sensitive Species List are species that occur on BLM administered lands in Nevada consistent with Manual Section 6840 and current WO-230 guidance (NV IM [Instruction Memorandum]-2018-003) (BLM 2018, 2019). This IM officially updates the list, which includes federally designated threatened, endangered, and proposed species as well as Nevada BLM sensitive species.

2 PROJECT DESCRIPTION

The Project consists of a newly constructed railway and conveyor system to haul ore from the Cortez District north to the Gold Quarry and Goldstrike Mines for processing. The purpose of the Project is to improve safety by reducing over-the-road haulage on the public highways, reduce NGM operating costs, and allow for optimized processing. Project specifics include the following:

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

This rail system includes temporary borrow source areas and temporary depots (construction laydown yards). The depots and borrow sources will be reclaimed after construction is complete.

3 SCOPE OF WORK

The biological and noise baseline study area (Project Area) includes the railway and conveyors, existing roads, four borrow sources, and 15 depot locations (Figure 1). The following list includes the biological resources included in the scope of work, each described in more detail regarding the desktop assessment and biological and noise field survey methodologies:

- Ecological Site Description (ESD)
- Water Resource Surveys
 - Wetlands and waterbodies
 - Seeps and Springs
- Vegetation Surveys
 - General Vegetation Communities
 - Special Status Plant Species
 - Butterfly hostplants (Occurrence Survey)
 - Noxious Weeds and Invasive Plants
- Wildlife Surveys
 - General Wildlife Species
 - Migratory and Breeding Birds
 - Eagles and other Raptors
 - Burrowing Owl
 - Greater Sage-grouse
 - Threatened and Endangered Species
 - Pygmy Rabbit
 - Dark and Pale Kangaroo Mouse
 - Bats
 - Amphibians
 - Butterflies
- Noise

The survey methodologies described in Section 3.1 through 3.4 describe the desktop assessment, field studies, and the field survey areas. The desktop assessment and field studies will include the following Project Area¹ buffers for each resource, as shown on Figure 2a through Figure 2d.

1. 200-foot-buffer field survey for:
 - a. ESDs
 - b. General vegetation
 - c. Special status plant species
 - d. Noxious weed and invasive plants
 - e. General wildlife

¹ Project Area buffers are the distance from the railway and conveyor centerline, or 50 feet from existing roads.

- f. Migratory and breeding birds
 - g. Burrowing owl
 - h. Threatened and endangered species
 - i. Pygmy rabbit
 - j. Dark and pale kangaroo mice
- 2. 400-foot-buffer field survey for:
 - a. Wetland and waterbodies
 - b. Seeps and springs
 - 3. 0.25-mile buffer survey for bats
 - 4. 0.5-mile buffer for noise study
 - 5. 10-mile buffer desktop assessment for eagles and other raptors
 - 6. 4-mile buffer desktop assessment of greater sage-grouse leks

Field surveys for butterflies and their hostplants will be conducted concurrently during special status plant surveys.

The 2021 scope of work for biological and noise baseline studies are anticipated to be completed from May through August, and will include both a desktop and field assessment. The schedule is shown on Figure 3. Additional biological baseline studies to be conducted in 2022 include surveys for shrews and snails, small mammal trapping, call-baiting surveys for amphibians, aerial raptor surveys, and sage-grouse lek monitoring. Adjustments to the schedule may occur to accommodate drought or other weather conditions.

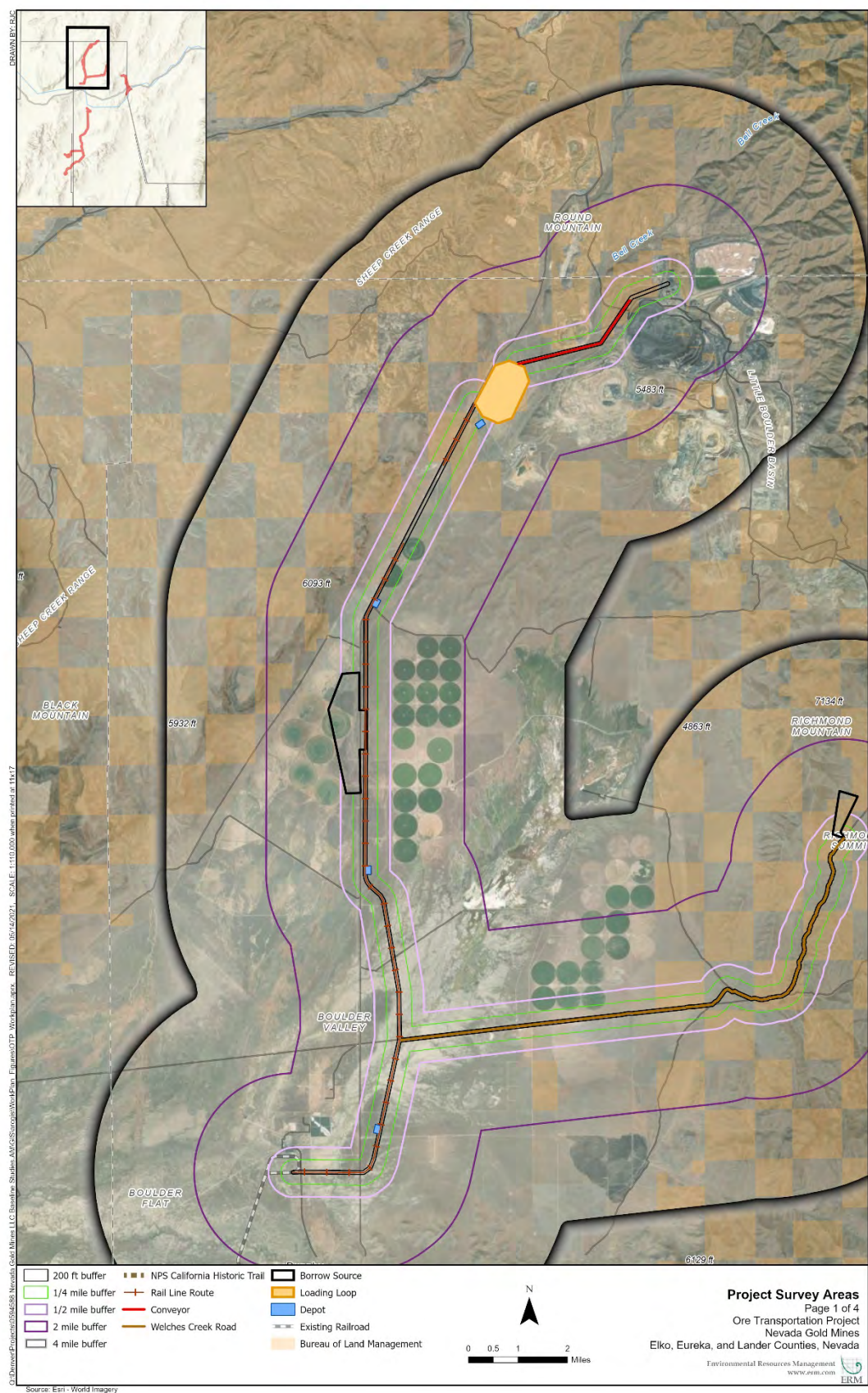


Figure 2a: Survey Area

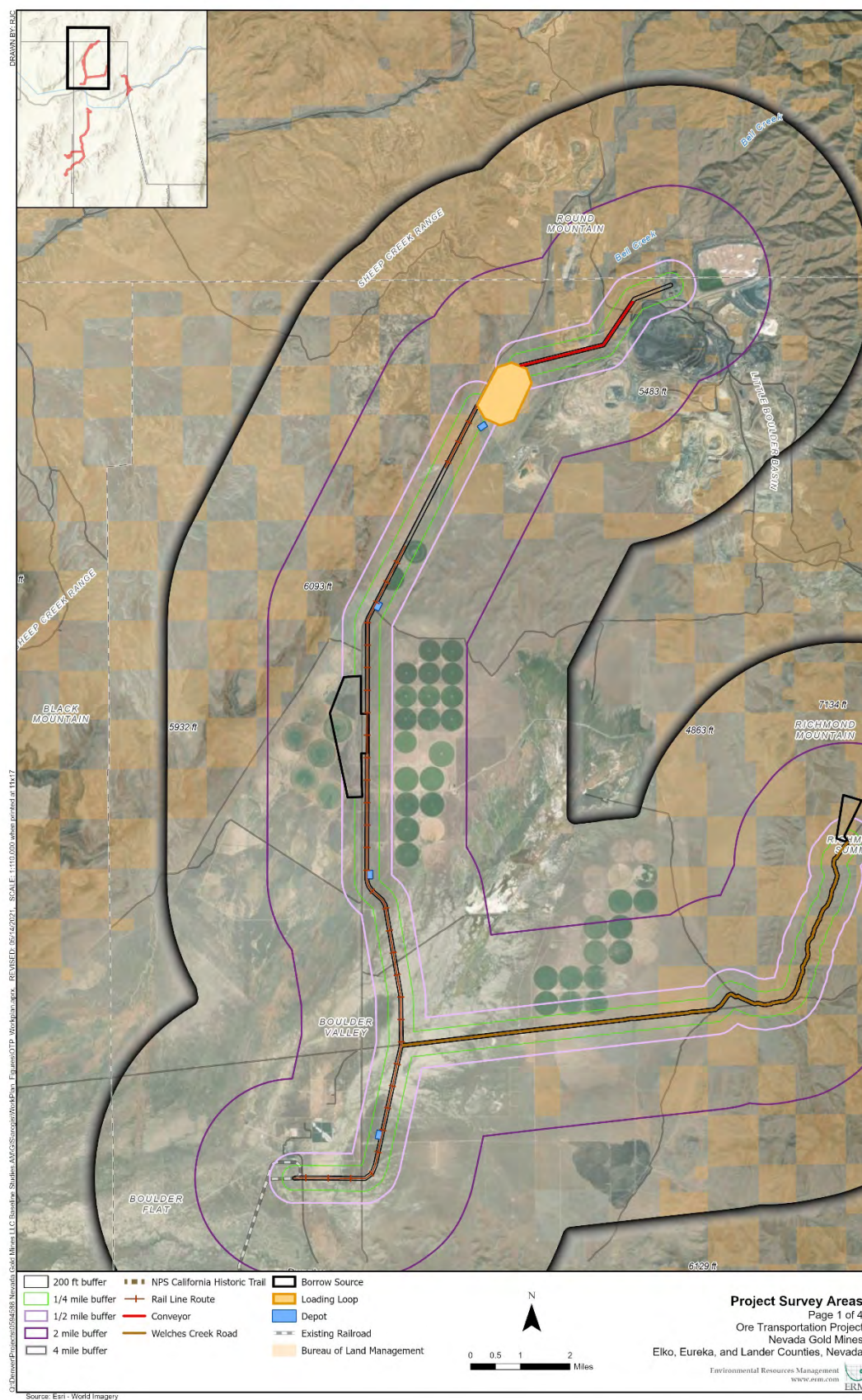


Figure 2b: Survey Area

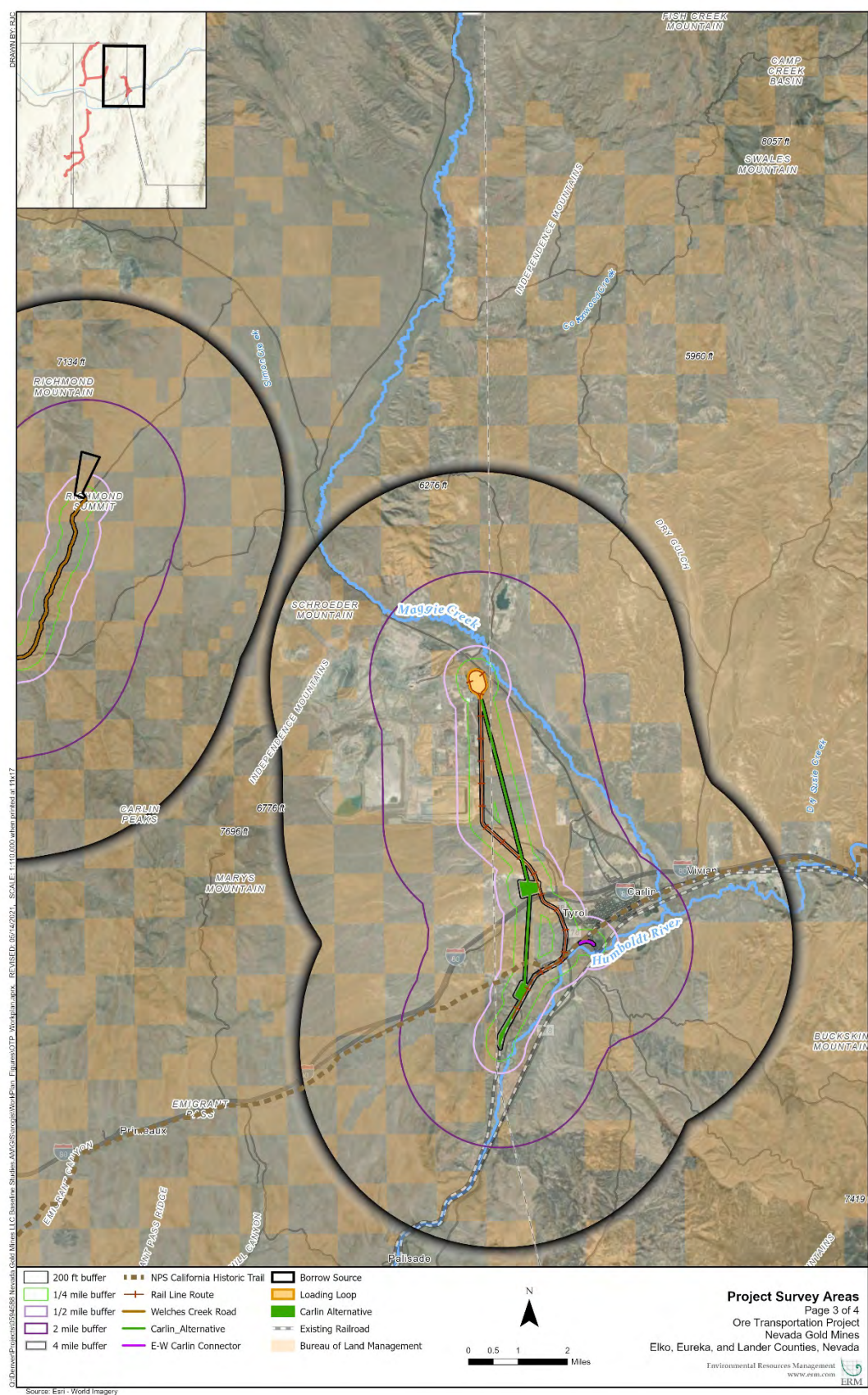


Figure 2c: Survey Area

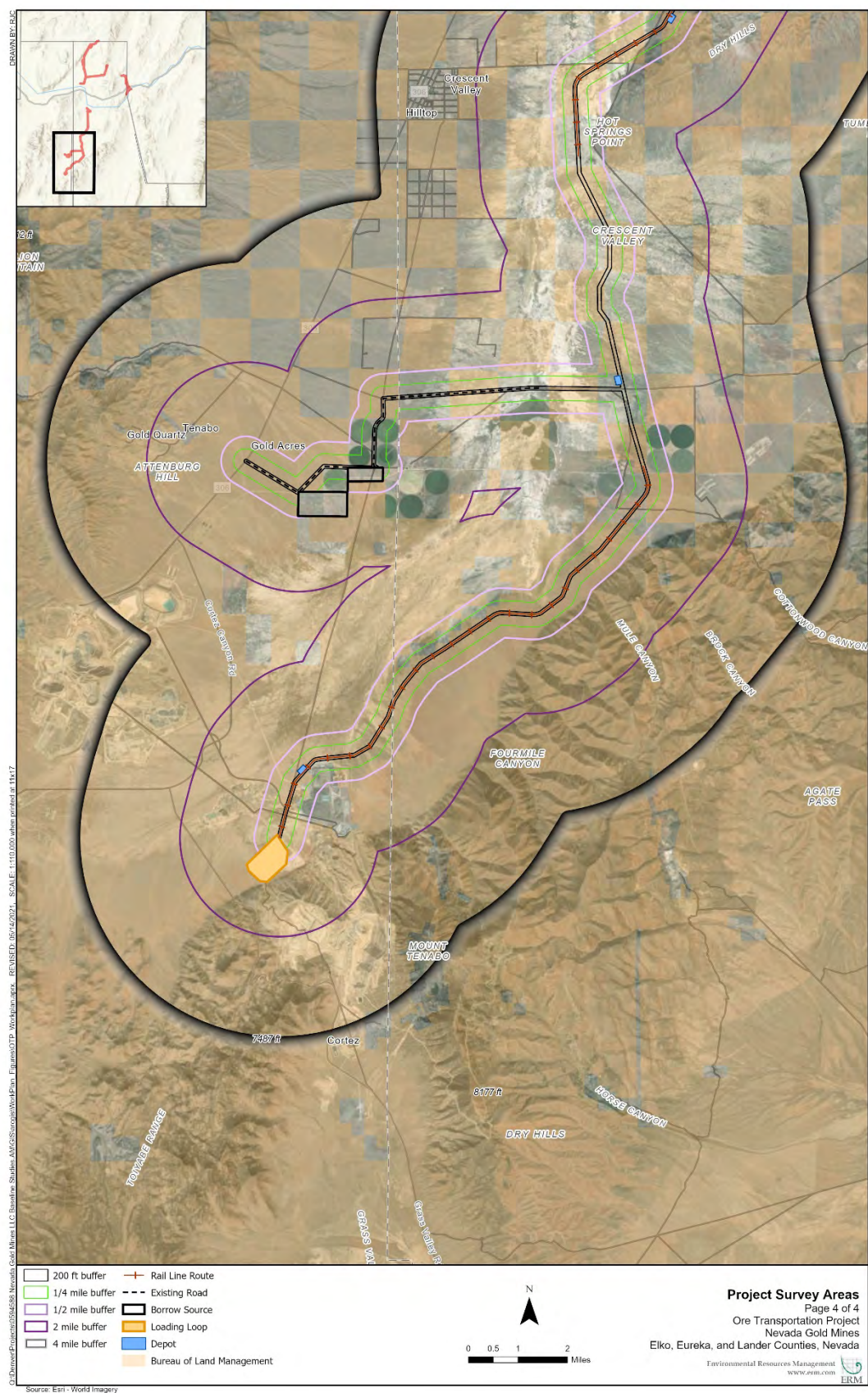
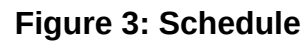


Figure 2d: Survey Area



Following BLM guidance (BLM 2014a), a list of special status species was compiled for Elko, Eureka, and Lander counties, and a preliminary determination was made of the potential for those special status species to be present in the Project Area. Data sources for species that may be present in the Project Area include:

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) planning tool
- BLM Sensitive Species List for Nevada (IM-NV-2018-003; BLM 2018, 2019)
- Nevada Natural Heritage Program (NNHP)

Data from the following sources will also be used to plan and conduct the baseline surveys:

- U.S. Geological Survey (USGS)
- Natural Resource Conservation Service (NRCS)
- Nevada Department of Wildlife (NDOW)
- Nevada Department of Forestry
- Nevada Department of Water Resources
- Southwest Regional Gap Analysis Project (SWReGAP)
- Western Association of Fish and Wildlife Agencies (WAFWA)

Relevant information from other NGM baseline studies may also be incorporated where available. A brief description of the desktop and/or field assessment methodology, data sources, protocols, survey timing, and survey area for each resource included in the Project are described below.

3.1 Ecological Site Descriptions

3.1.1 Purpose and Objectives

Ecological Sites classify landscapes into areas based on similar environmental factors and are used as a guide to support decisions (NRCS 2021; Brischke et al. 2018). The four categories of information NRCS uses to describe Ecological Sites provide information on resource conditions and trends. The BLM Assessment, Inventory, and Monitoring (AIM) Strategy standard measurements (i.e., indicators) quantify land cover and vegetation data used to describe resource conditions and aggregate this information with other data (MacKinnon et al. 2011; Herrick et al. 2017).

3.1.2 Project Study Area

The vegetation and soil stability will be mapped and verified within the Project Area and up to a 200-foot-wide buffer. The environmental site description investigation points mark soil unit boundaries are shown on Figure 4a through Figure 4b.

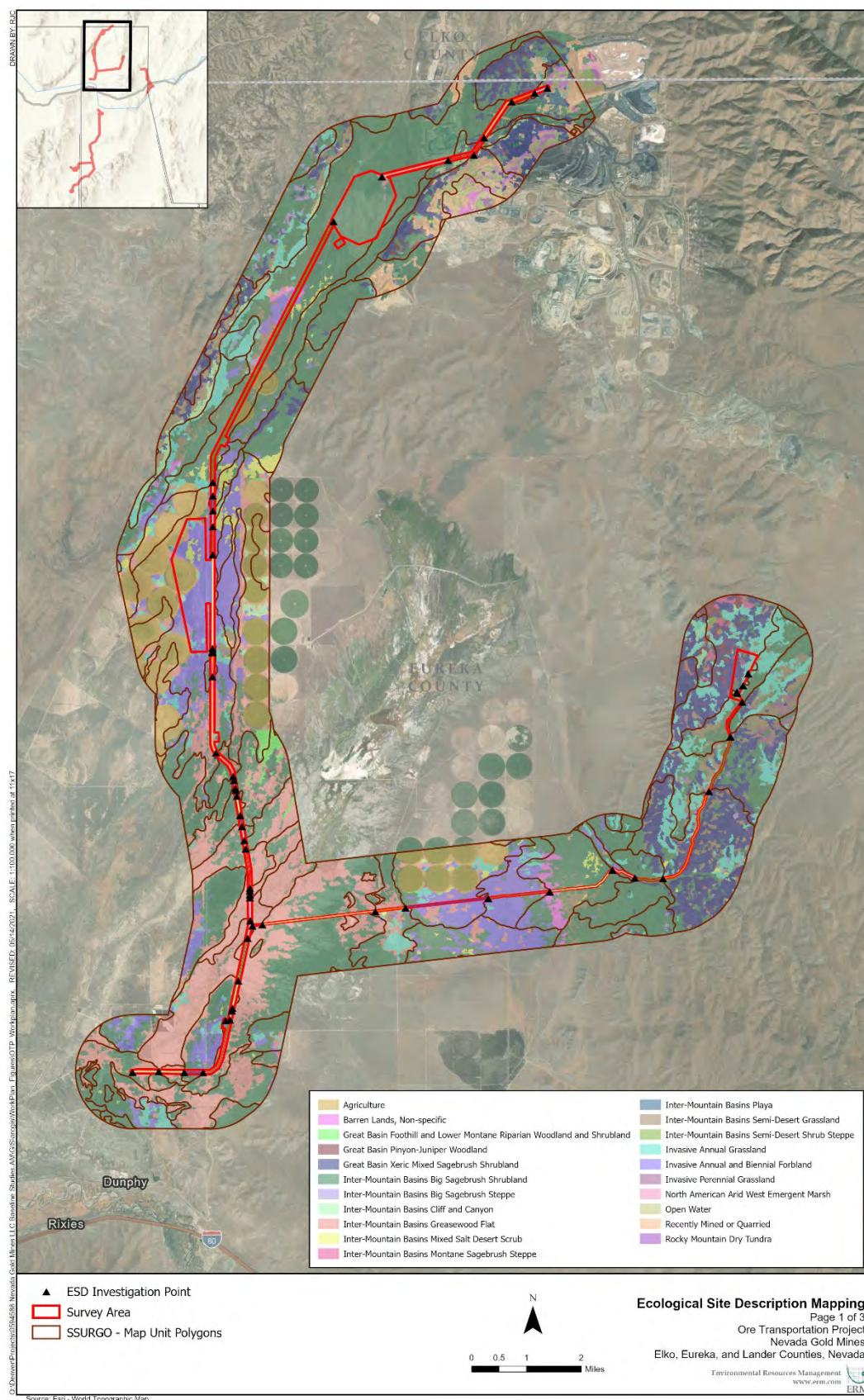


Figure 4a: Ecological Site Description Mapping

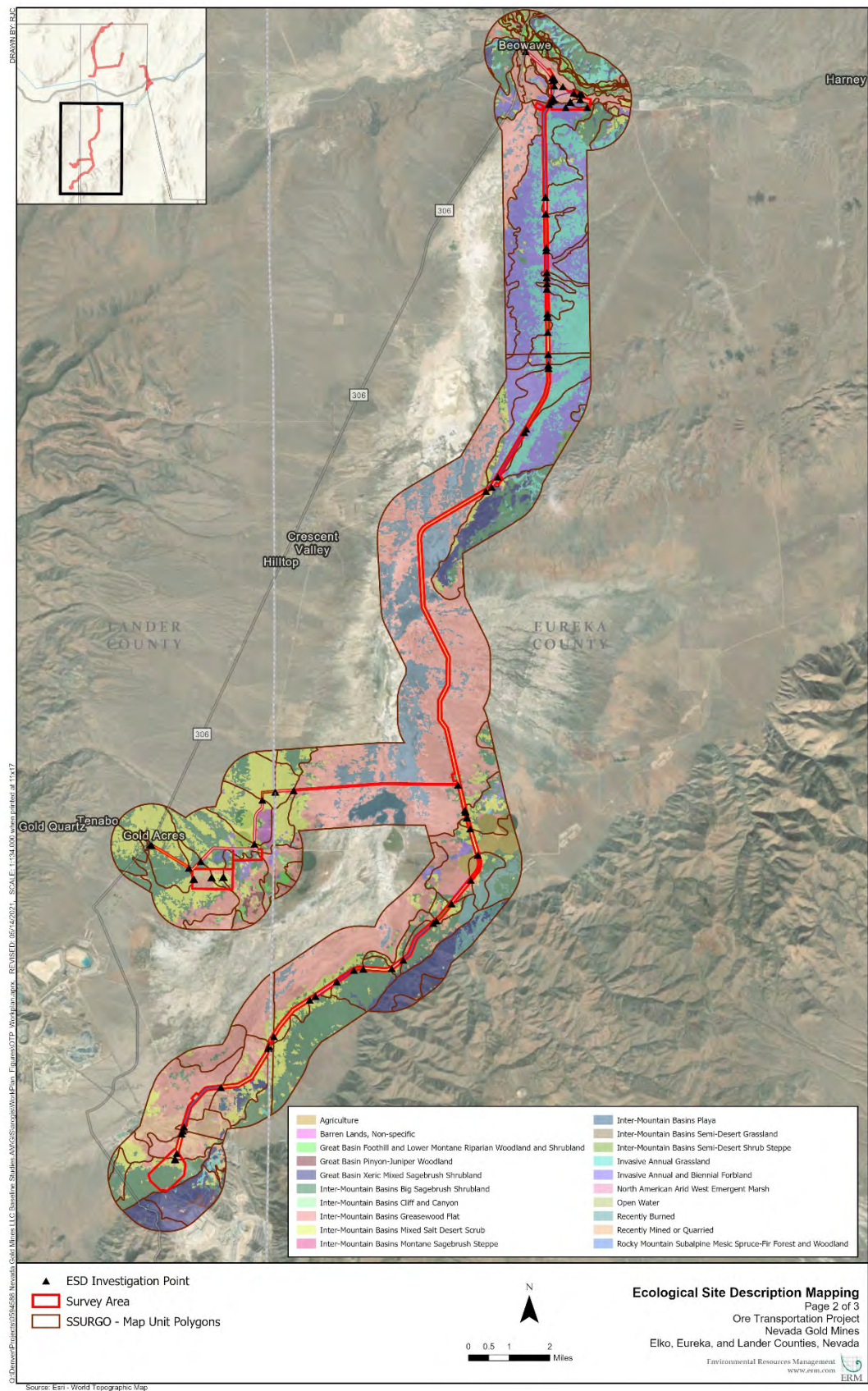


Figure 4b: Ecological Site Description Mapping

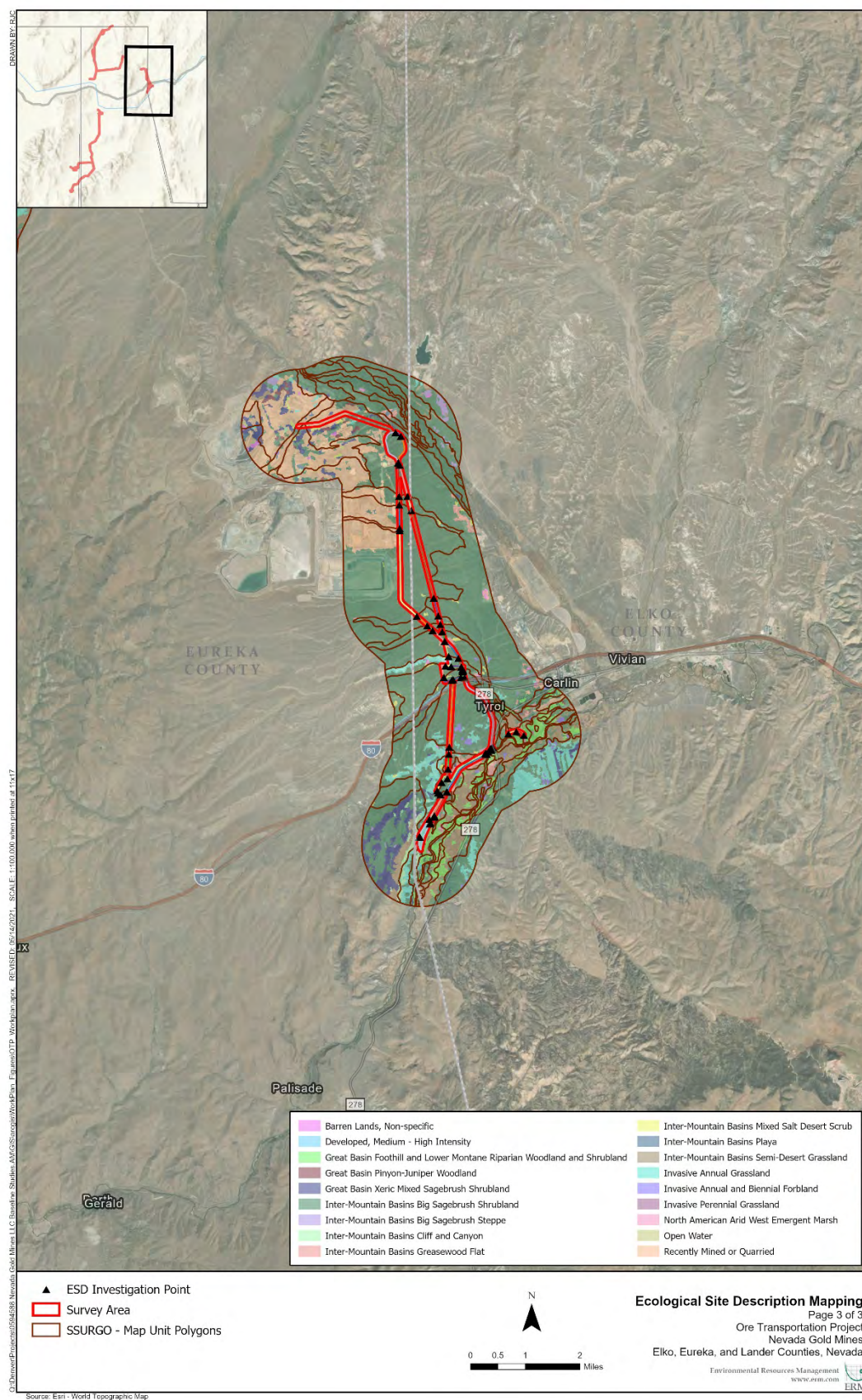


Figure 4c: Ecological Site Description Mapping

3.1.3 Study Methodology

The Project Area is located within the Humboldt, Owyhee High Plateau, and Central Nevada Basin and Range Major Land Resource Areas (MLRA). These MLRAs are located in northeast and north-central Nevada (Stringham et al. 2015a, 2015b).

Prior to field surveys, existing background information and data will be collected. Ecological Site verification and vegetation mapping will be completed within the entire Project Area. Initially, existing literature and background data for soils, vegetation, and Ecological Sites will be referenced. Because Ecological Sites are directly associated with soil types, potential soil map units and Ecological Sites will be analyzed and mapped in the Project Area using the NRCS Web Soil Survey tool.

The following protocols and handbooks will be used in this analysis:

- *Vegetation and Soils – Baseline Data Collection* (BLM 2014b)
- *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Second Edition, Volume I Core Methods* (Herrick et al. 2017)
- *Interpreting Indicators of Rangeland Health, Version 5.* (Pellant et al. 2020)
- *Guide to Using AIM and LMF Data in Land Health Evaluations and Authorizations of Permitted Uses. Tech Note 453* (Kachergis et al. 2020)
- *Final Report for USDA Ecological Site Description State-and-Transition Models by Disturbance Response Groups, Major Land Resource Area 25 Nevada* (Stringham et al. 2015a)
- *Final Report for USDA Ecological Site Description State-and-Transition Models by Disturbance Response Groups, Major Land Resource Areas 28A and 28B Nevada* (Stringham et al. 2015b)

Each of the Ecological Sites identified from the desktop assessment will be field verified by a team of qualified ecologists. The field survey schedule is anticipated to occur from May to August 2021 (approximately 6 to 14 weeks). Table 1 lists the ecological classification ID and the ecological classification type names within the survey area. This information is overlain with the SWReGAP land cover data to identify potential locations for collecting quantitative vegetation and soil data as described in the *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Second Edition, Volume I Core Methods*.

Table 1: Ecological Sites within Project Area

Ecological Classification ID	Ecological Classification Type Name
024XY002NV_1	LOAMY 5-8 P.Z.
024XY011NV_1	SODIC FLAT 6-8 P.Z.
024XY014NV_1	COARSE SILTY 4-8 P.Z.
024XY020NV_1	DROUGHTY LOAM 8-10 P.Z.
024XY022NV_2	SODIC TERRACE 8-10 P.Z.
R024XY002NV	LOAMY 5-8 P.Z.
R024XY003NV	SODIC TERRACE 6-8 P.Z.
R024XY005NV	LOAMY 8-10 P.Z.
R024XY006NV	DRY FLOODPLAIN
R024XY007NV	SALINE BOTTOM
R024XY011NV	SODIC FLAT 6-8 P.Z.
R024XY012NV	SALINE TERRACE 6-8 P.Z.
R024XY014NV	COARSE SILTY 4-8 P.Z.
R024XY015NV	DEEP SODIC FAN
R024XY017NV	SANDY 8-10 P.Z.

Ecological Classification ID	Ecological Classification Type Name
R024XY020NV	DROUGHTY LOAM 8-10 P.Z.
R024XY022NV	SODIC TERRACE 8-10 P.Z.
R024XY030NV	SHALLOW CALCAREOUS LOAM 8-10 P.Z.
R024XY035NV	SHALLOW LOAM 10-14 P.Z.
R025XY001NV	MOIST FLOODPLAIN
R025XY003NV	LOAMY BOTTOM 8-14 P.Z.
R025XY005NV	WET MEADOW
R025XY014NV	LOAMY 10-12 P.Z.
R025XY015NV	SOUTH SLOPE 8-12 P.Z.
R025XY019NV	LOAMY 8-10 P.Z.
R025XY021NV	SHALLOW LOAM 8-12 P.Z.
R025XY022NV	COBBLY CLAYPAN 8-12 P.Z.
R025XY025NV	CHALKY KNOLL
R028BY003NV	LOAMY BOTTOM 10-14 P.Z.

Table Source: Soil Survey Geographic Database, NRCS

The Ecological Sites will be field verified by digging at least one soil pit in each of the ecological classes to a minimum depth of 20 inches or the depth of a restrictive layer. Soil texture, landform, and topographic features will be recorded for each soil pit. The current condition of the Ecological Site, including a plant species list, will also be recorded at each soil pit. Each consecutive occurrence of an Ecological Site will not require an additional soil pit unless during field review the ecologist determines the area exhibits a different AIM Terrestrial Core and Contingent Indicator. Table 2 lists the terrestrial indicators for the Nevada Northeastern Great Basin Area used during the ecological site description survey. Soil data will be collected using the Interpreting Indicators of Rangeland Health Version 5 Evaluation Form (page 2).

Table 2: Ecological Site Description Land Health Standards and AIM Indicators

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

Source: Kachergis et al 2020; page 53. Ecological site information for the indicators listed in Table 2 and soils will be collected from each of the vegetation and soil units shown on Figure 4a through Figure 4b.

3.2 Water Resources Surveys

This section describes the assessment of wetlands, waterbodies, seeps, and springs within the study area, including delineation per U.S. Army Corps of Engineer protocol, potential jurisdictional status, and assessment of BLM Proper Functioning Condition (PFC).

3.2.1 Purpose and Objectives

The objectives of the wetlands and waters study are to:

- Delineate all wetland and water features within the Project Area (defined below), per U.S. Army Corps of Engineers (USACE) protocol;
- Provide information on the potential jurisdictional status of each wetland or water feature that meets the USACE protocol as a wetland or water;
- Identify all seeps and springs habitat; and
- Conduct a PFC assessment of all non-ephemeral wetland or water features that have a predominance of wetland vegetation (described Section 3.2.3.5), regardless of whether the feature meets the USACE protocol as a wetland or water.

Results of the delineation and jurisdictional assessment will be used to support any Clean Water Act Section 404 permitting that may be required for Project construction. The wetland and waters, PFC assessment, and seeps and springs results will provide baseline information to inform the BLM assessment of potential Project effects. The seeps and spring information will also be used to inform the associated wildlife surveys, such as for amphibians.

3.2.2 Project Study Area

Wetland and water features will be identified and mapped within the Project Area and up to a 400-foot-wide buffer, including the depot and borrow sites (Figure 2a through Figure 2d).

3.2.3 Study Methodology

3.2.3.1 Desktop Assessment

Prior to commencing surveys, ERM staff will conduct a desktop analysis of the following spatial data within the study area to identify potential wetlands and waters, including seeps and springs: aerial imagery, USGS 7.5-minute Topographic Quadrangles, NRCS Soil Survey Geographic database, USFWS National Wetlands Inventory (Figure 5a through Figure 5d), USGS National Hydrography Dataset (stream lines and seeps-springs points) (Figure 6a through 6d), Federal Emergency management Agency National Flood Hazard Layer, and wetland and waters location data provided by NGM. Potential wetland and waters features will be identified on maps for use in the field.

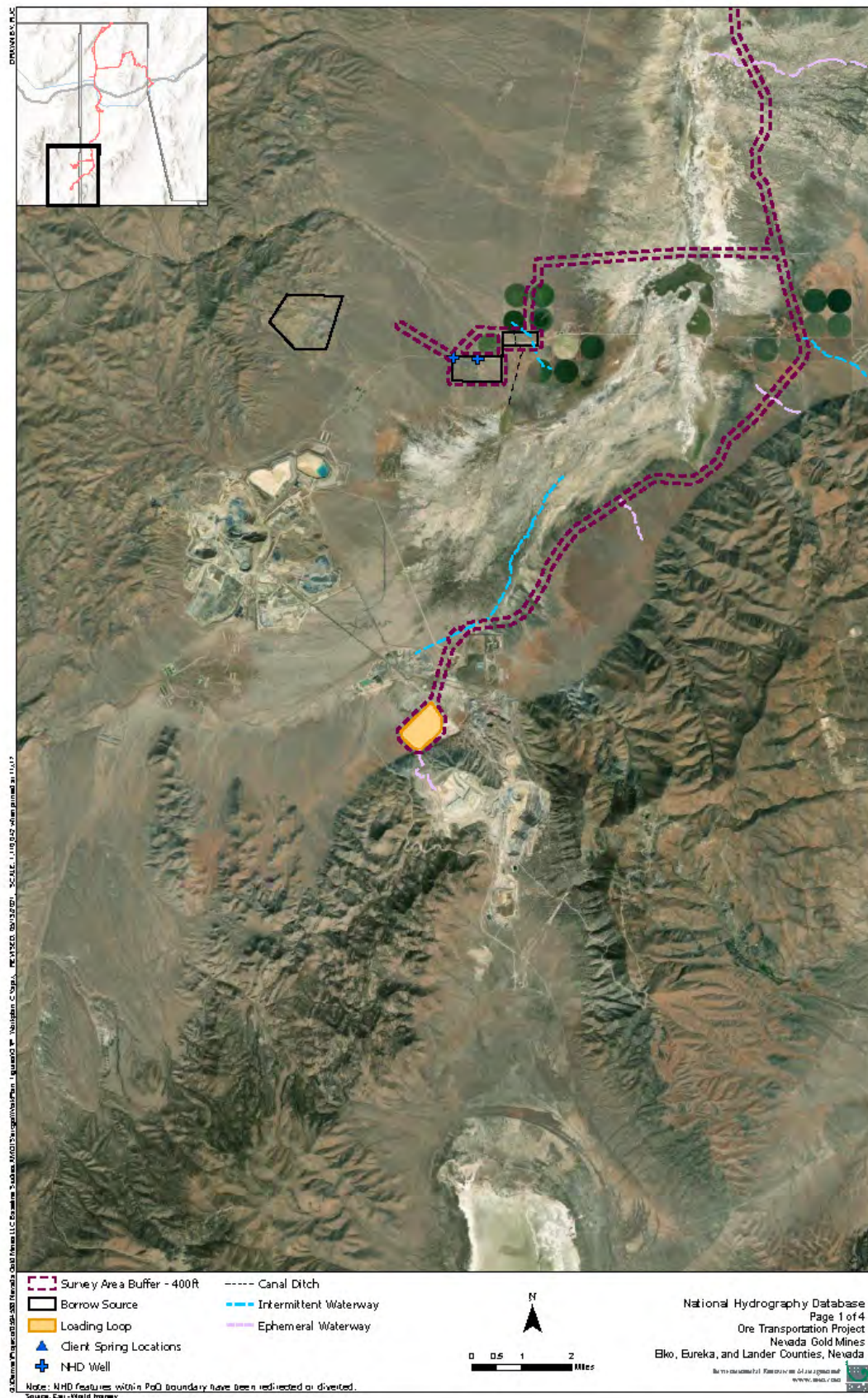


Figure 5a: National Hydrography Database

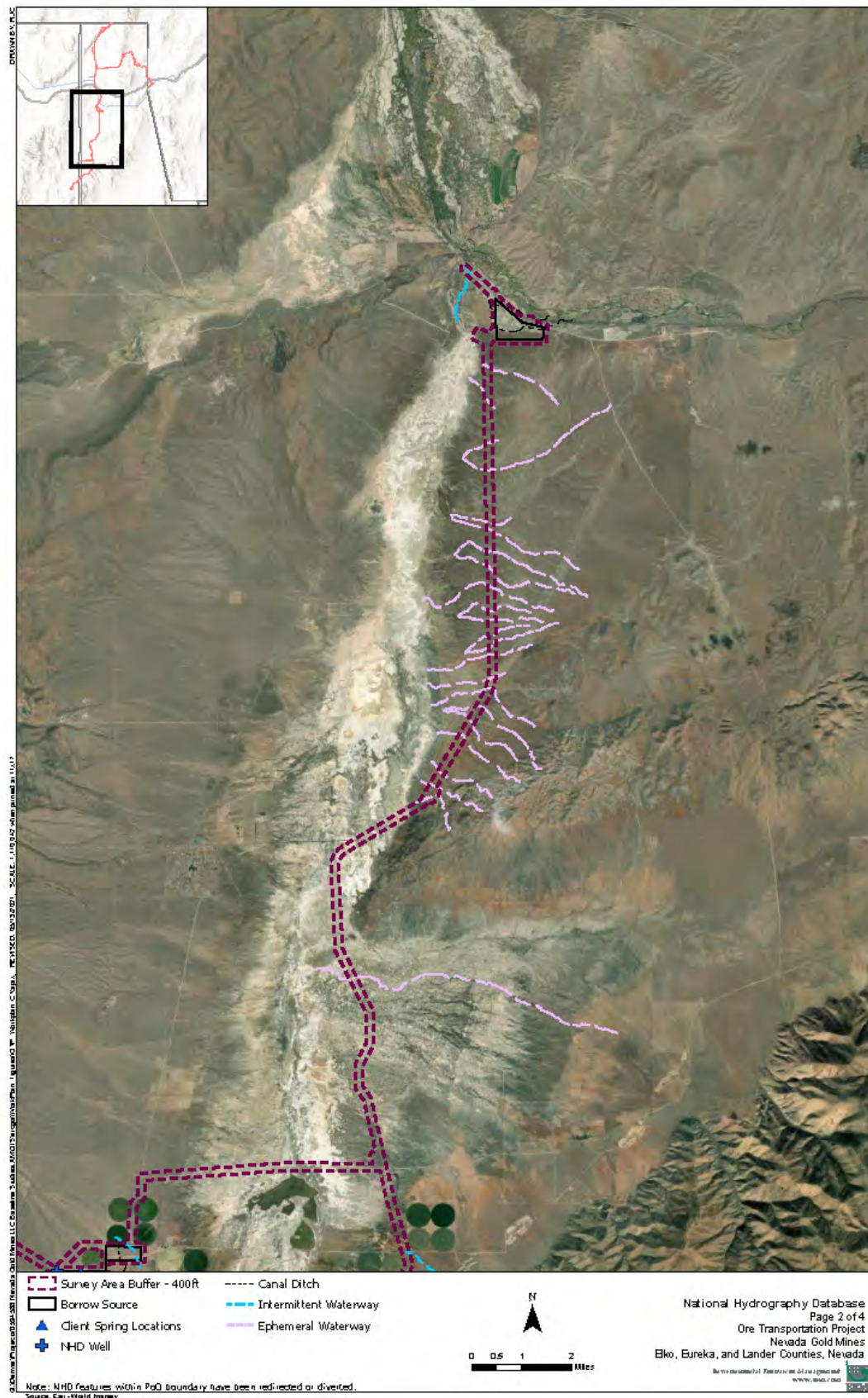


Figure 5b: National Hydrography Database

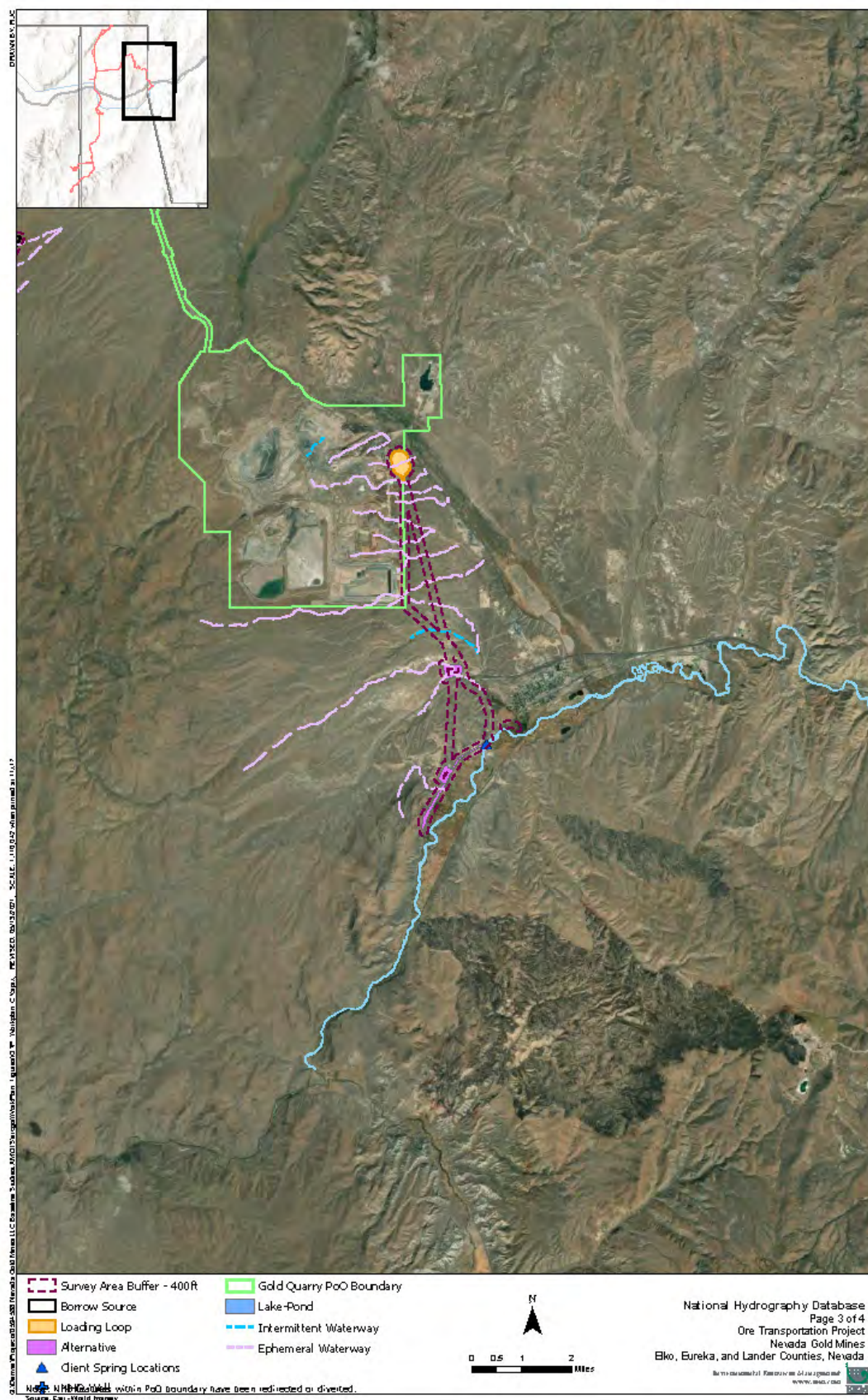


Figure 5c: National Hydrography Database

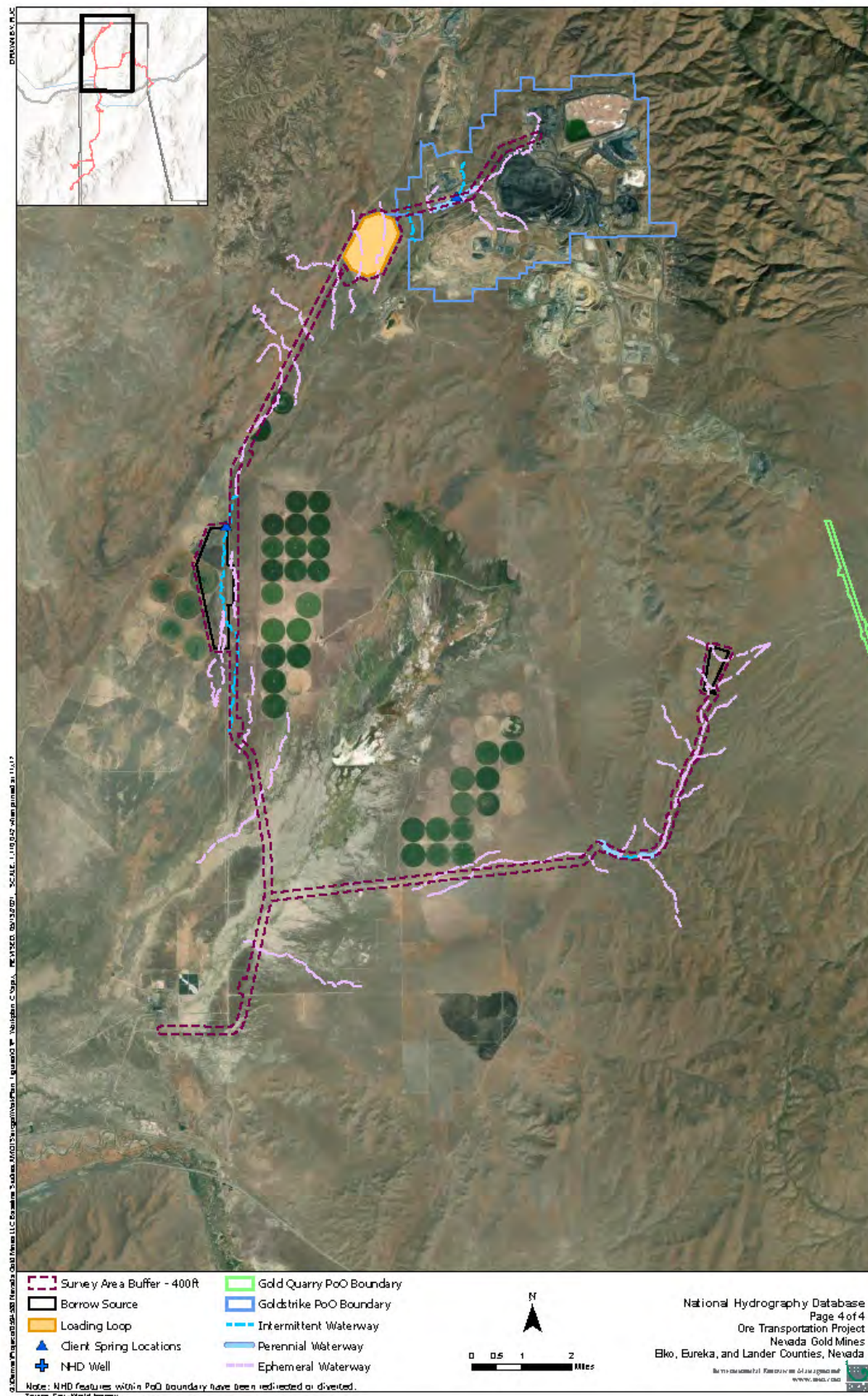


Figure 5d: National Hydrography Database



Figure 6a: National Wetlands Inventory

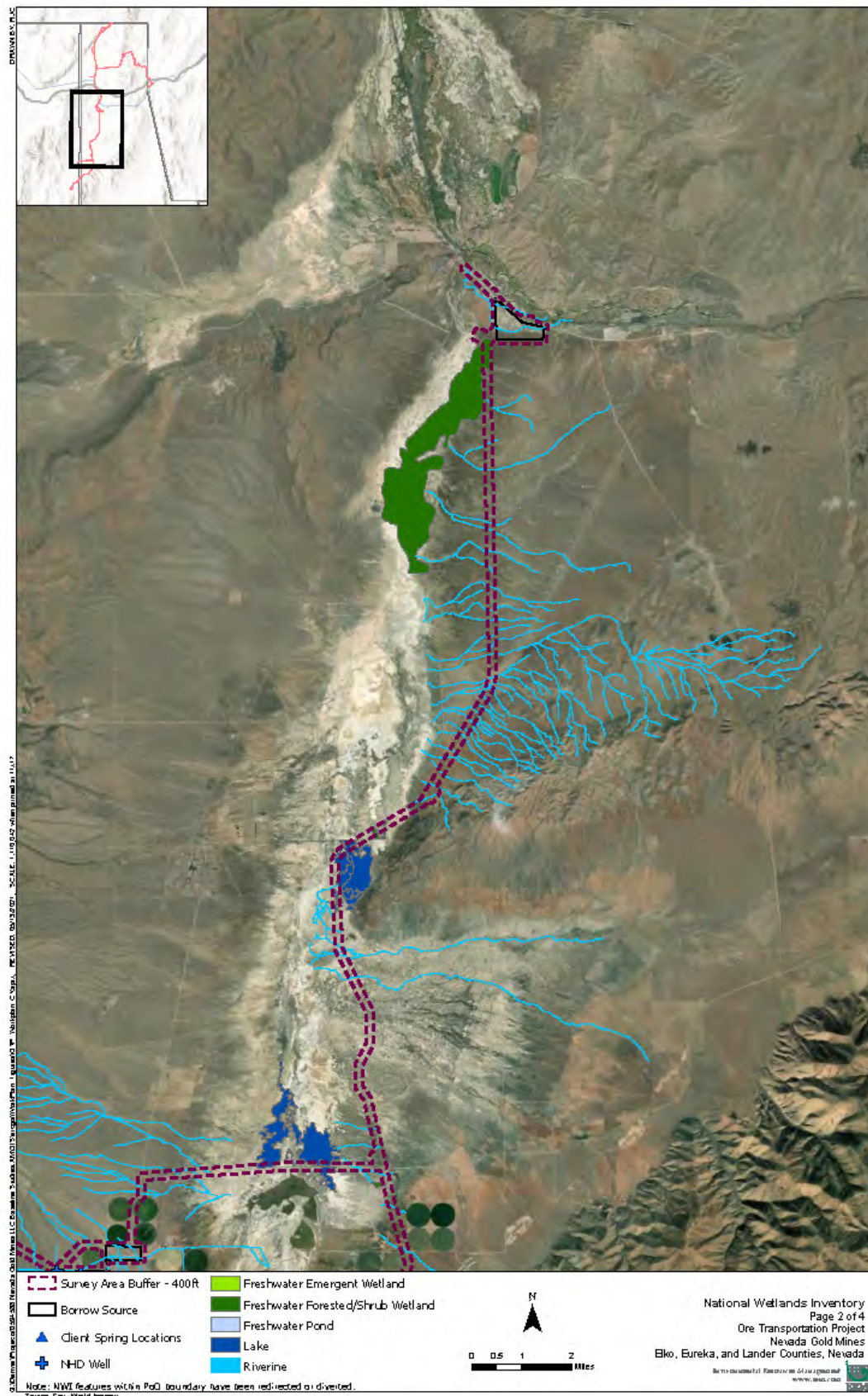


Figure 6b: National Wetlands Inventory

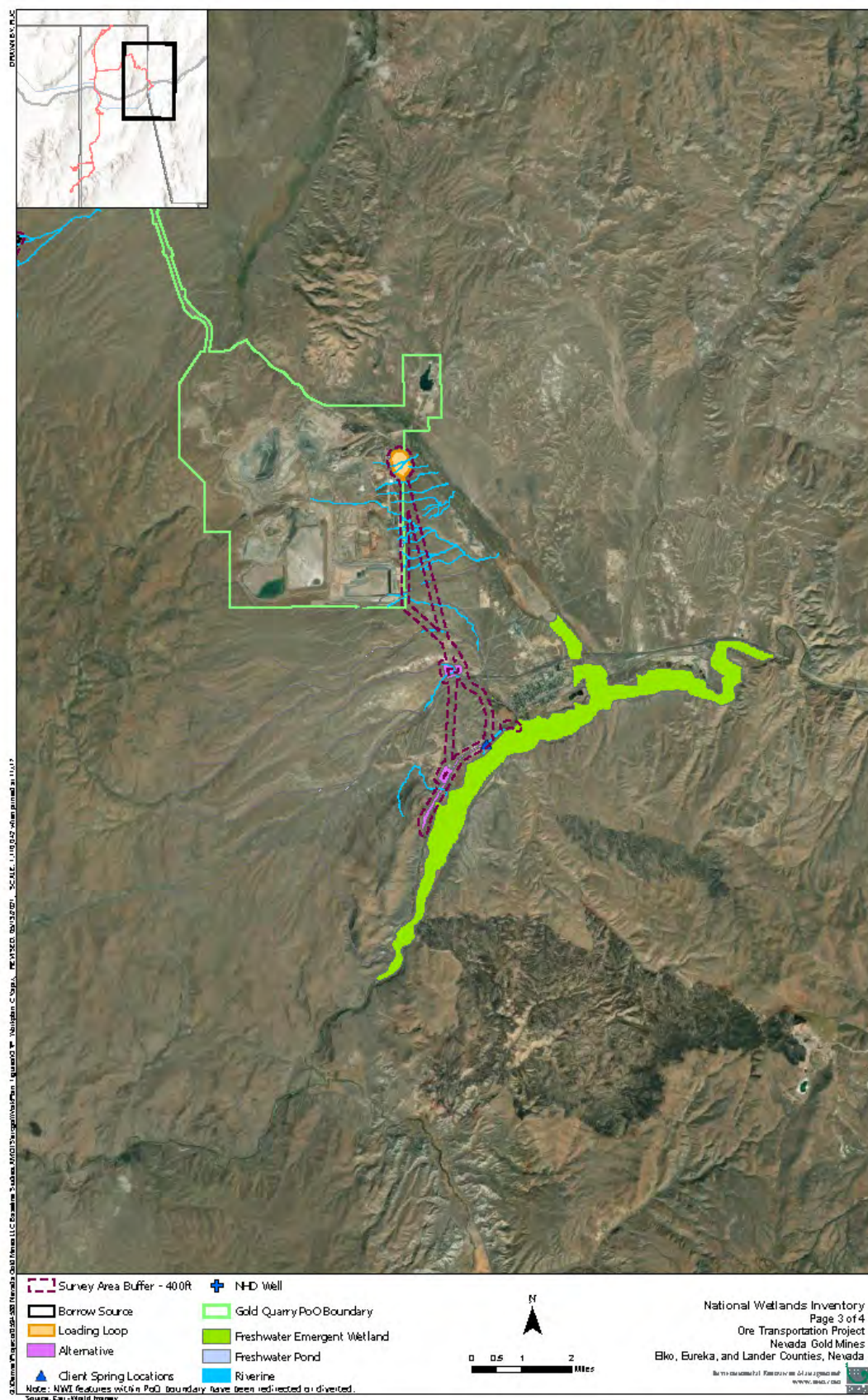


Figure 6c: National Wetlands Inventory

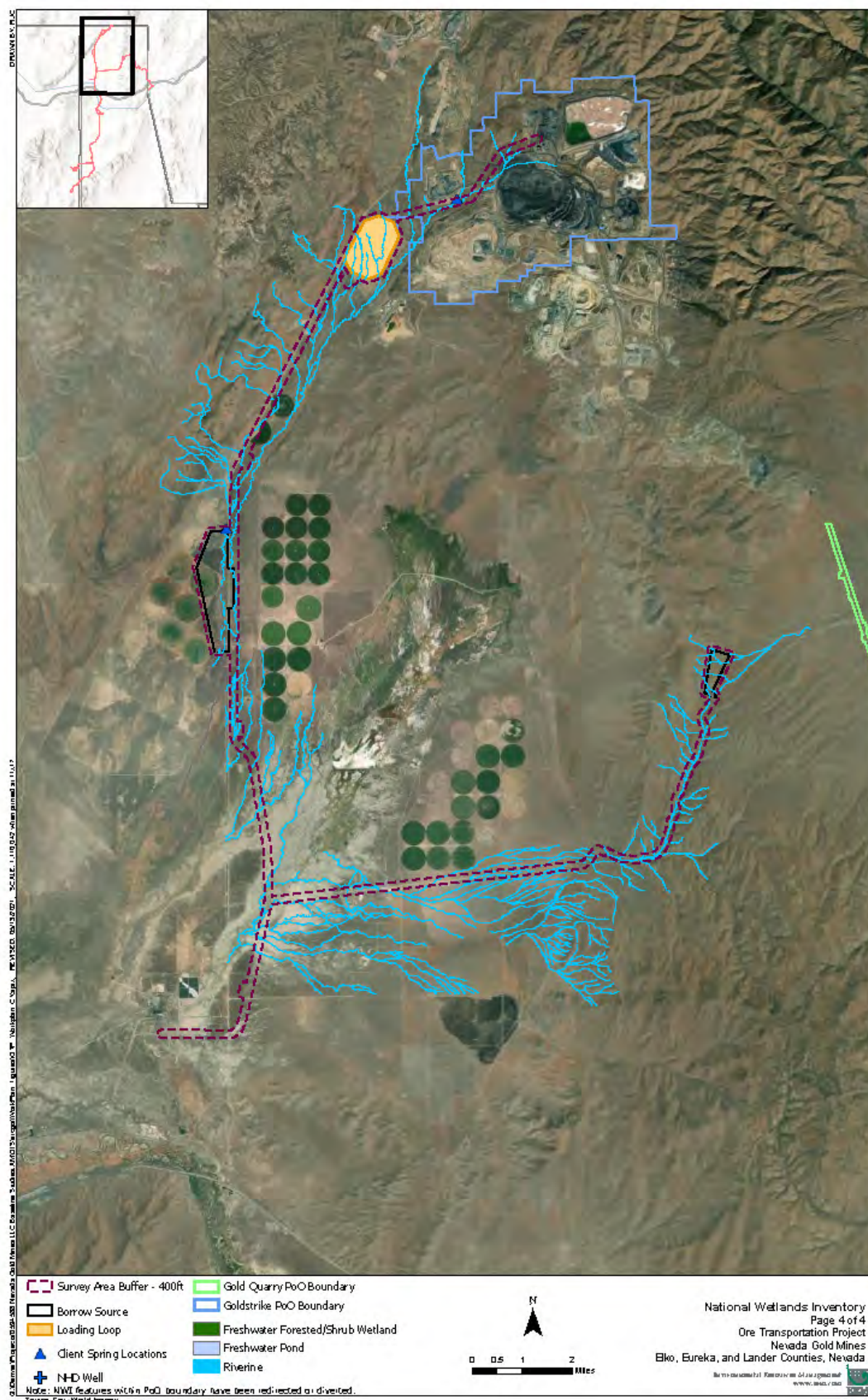


Figure 6d: National Wetlands Inventory

3.2.3.2 Field Assessment

Field surveys will commence June 2021 and will be conducted by at least one ERM lead field team (more teams may be added as surveys progress). The entire study area will be assessed either on foot or by vehicle, where possible. Wetland and waterbody delineations, feature data points, non-water points and seeps and springs data will be collected utilizing sub-meter accurate GPS units as required for USACE jurisdictional determinations. A detailed discussion of the field methods is provided below for the delineation, assessment of potential jurisdictional status, identification of seeps and springs habitat, and PFC assessment.

Delineation of Wetland and Waters

Potential waters of the U.S. are referred to here as “wetlands” and “waters” and are treated separately for the purpose of this Work Plan. Under USACE protocol, for a feature to be considered a wetland it must exhibit the following characteristics: predominance of hydrophytic vegetation; presence of wetland hydrology, and presence of hydric soils under normal circumstances (i.e., where naturally problematic conditions or disturbances are absent). Note that seeps and springs habitat may or may not meet the USACE definition of a “wetland” feature (i.e., it may not exhibit hydric soils); therefore seeps and springs habitat will be further assessed as described in Section 3.2.3.4 below to ensure seeps and springs that do not meet the USACE protocol are adequately captured during the study.

In contrast to wetlands, waters are typically less vegetated or non-vegetated, have a bed, bank, and ordinary high-water mark (OHWM), and include intermittent or perennial streams, rivers, ponds, or lakes (USACE 2008). Under the current waters of the U.S. Rule ephemeral channels are *not* considered waters of the U.S., however given that the USACE has the ultimate authority to determine which channels are ephemeral versus intermittent, all stream channels, including those considered ephemeral, will be included in this effort.

Wetlands

The onsite delineation of wetlands and their boundaries will be conducted using methodology described in the *U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual* (Environmental Laboratory 1987), as well as the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0)*, (USACE 2010). The *National Wetland Plant List: 2016* (NWPL) (Lichvar et al. 2016) will be referenced for the determination of plant indicator status, and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin 1979) will be used to classify wetlands.

USACE wetland determination forms will be completed for each wetland determination point. One corresponding upland community sample point will also be taken for each wetland or wetland complex, as appropriate.

Waterbodies

Waterbodies documented during the field survey will be categorized as linear waterbodies such as streams and rivers or as open waterbodies such as ponds and lakes. Streams are identified as landscape features with a channel that includes a defined bed and a bank in a concave profile where water flow has resulted in a feature that possesses an OHWM. Based on evidence of flow at the time of survey, linear waterbodies are attributed a flow regime according to the definitions provided by the USACE (33 Code of Federal Regulations [CFR] Part 330) and further guidance will be provided by USACE Delineation Manual: *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008). Open waterbody features will be assigned a Cowardin water regime based on observations recorded at the time of survey.

Water Regime Classification

For flowing water features, water regime classification will be assigned as defined by the flow duration of the water feature. Regime classifications pursuant to the CFR 33 Part 330 ruling include the following:

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

For non-flowing water features, or wetlands, water regime will be assigned based on inundation/saturation was observed at the time of surveys, and further classified as one of five categories in accordance with Cowardin (1979), as follows:

- **Permanently flooded:** Water covers the land surface throughout the year in all years.
- **Semi-permanently flooded:** Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.
- **Seasonally flooded:** Surface water is present for extended periods especially early in the growing season but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.
- **Saturated:** The substrate is saturated to the surface for extended periods during the growing season, but surface water is seldom present.
- **Temporarily flooded:** Surface water is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season.

Feature Naming Protocol

Specific naming conventions for field-collected data will be utilized in order to catalog each feature type collected. Table 3 provides the unique naming conventions for the features identified.

Table 3: Wetland and Waterbody Naming Protocols

Initial identifier	Field Crew Letter	Feature Number and Class or Regime
<i>Wetland Polygons</i>		
w (wetland)	crew letter (e.g., a, b, c)	001e, 001s, 001f (emergent, scrub-shrub, and forested) 001e1, 001e2, 001e3...(multiple components of a similar type [for example, two Palustrine emergent components of a complex])
<i>Waterbody Points, Lines and Polygons</i>		
s (stream) o (open water) x (seeps, springs)	crew letter (e.g., a, b, c)	001e, 002i, 003p (ephemeral, intermittent, and perennial)

3.2.3.3 Jurisdictional Status of Wetlands and Waters

Features that meet the USACE criteria as a wetland or water will be further assessed for their potential to be considered jurisdictional features, or waters of the U.S., by the USACE. The USACE will make the ultimate determination as to whether or not a feature is a water of the U.S.; therefore this assessment involves documenting information to assist the USACE in their determination. This assessment includes documentation of the following information: 1) a desktop review of the water source and connections to upstream and downstream waterbodies using current and historic topographic maps and aerial imagery; and 2) field documentation of connections to upstream and downstream waterbodies (where possible); and the feature's water regime (described above).

3.2.3.4 Seeps and Springs

Seeps and springs are considered a Nevada Important Habitat because they provide moist oasis areas unique in these types of arid environments to species, including threatened and endangered species. Seeps and springs are treated as wetlands in Nevada, but they may or may not be considered wetlands per USACE protocol, as seeps and springs habitat does not have to have all of the three USACE-required parameters present to be considered wetland habitat. As such, some of the seeps and springs habitat will be captured in the wetland and waters delineation described above. Seeps and springs that do not meet the USACE wetland criteria will also be documented, based on the presence or indication of a water source such as through mineral staining, or the predominance of wetland vegetation as identified per the *National Wetland Plant List for the Arid West Region* (Lichvar et al. 2016)

Existing data from NGM and the USGS will be gathered and evaluated during the desktop assessment described above. Field verification of seeps and springs identified during the desktop assessment will be conducted in early June 2021. Observations about the presence of standing and/or flowing water, substrate, and presence of hydrophytic vegetation will be collected and recorded along with representative geo-referenced photographs. The location of the seeps and springs documented will be recorded and each plant species will be identified and assigned wetland ratings, according to Lichvar et al. (2016). For the purposes of this survey, wetland plant species are defined as those with a rating of either facultative wetland, or obligate wetland.

3.2.3.5 Proper Functioning Condition Assessment

All wetlands and waters features, and seeps and springs, identified during the study that were determined to have an intermittent or perennial water regime will be assessed in the field using the BLM PFC method for either lentic or lotic systems (BLM 2020 and USDI 2015, respectively). Lentic systems are characterized by still or slow-moving water, e.g., seeps, springs, and other non-riverine wetlands; lotic systems are characterized by flowing water, e.g., riparian areas along perennial or intermittent streams. The PFC assessment will not be conducted for features classified as ephemeral, as the PFC method is not intended for use on ephemeral features (USDI 2015).

PFC assessments will be led by field staff who are formally trained in BLM PFC assessment methods, and who have conducted PFCs in the arid west.

3.3 Vegetation Surveys

3.3.1 General Vegetation Communities

3.3.1.1 Purpose and Objectives

The objectives of the vegetation baseline surveys will be to collect background information to understand the vegetation communities within the Project Area. General vegetation community surveys will be conducted to describe the existing vegetation within the Project Area in order to assess future impacts to vegetation and habitats for wildlife species.

3.3.1.2 Project Study Area

Vegetation communities will be identified and mapped within the Project Area and up to a 200-foot-wide buffer of the centerline (Figure 2a through Figure 2d).

3.3.1.3 Study Methodology

As described in the ESD survey, the vegetation communities are those found in the Owyhee High Plateau and Central Nevada Basin and Range. A desktop assessment using SWReGAP, Soil Survey Geographical Database (SSURGO), and ESD data will be conducted, and field verification and vegetation community condition assessments will be correlated with the ESD survey state-and-transition model descriptions (Stringham et al. 2015a, 2015b). A vegetation inventory will be conducted to meet ESD requirements, as well as collecting data on the presence of noxious weeds, invasive plants, and special status plants.

The following protocols will be used in this analysis:

- *International Vegetation Classification Alliances and Associations Occurring in Nevada with Proposed Additions* (Peterson 2008)
- *Vegetation and Soils – Baseline Data Collection* (BLM 2014b)

General vegetation community transects and point data will be collected between May and August 2021, concurrent with the ESD survey. Approximately 50-meter vegetation transects using a point intercept method will be used to collect general vegetation community data. Field crews will delineate vegetation communities in the Project Area.

3.3.2 Special Status Plant Species

3.3.2.1 Purpose and Objectives

The purpose of these surveys is to inform future impact analyses about the occurrence and status of special status plant species, per the BLM policy, *Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species* (BLM 2009).

3.3.2.2 Project Study Area

Special status plant species will be identified and mapped within the Project Area and up to a 200-foot-wide buffer (Figure 2).

3.3.2.3 Study Methodology

Special status plant surveys will include a desktop review of BLM special status species lists (BLM 2018, 2019) and existing NNHP occurrence data. There are 49 special status plant species designated by Battle Mountain and/or Elko BLM; of these, 14 have the potential to occur in the Project Area, as shown in Table 4. Where possible, potentially suitable habitats will be identified in the Project Area to guide field surveys. Plant phenology (e.g., growth cycles, blooming periods) was referenced for each of these species to determine the appropriate survey window; however, based on current conditions in Nevada, it is expected that bloom periods may occur earlier.

The following protocols will be used in this analysis:

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

Table 4: Potential Special Status Plant Species within the Project Area

Species	Habitat
Alkali ivesia (<i>Ivesia kingii</i> var. <i>kingii</i>)	Sagebrush scrub, alkali sink, wetland-riparian; meadows, playas
Beatley buckwheat (<i>Eriogonum beatleyae</i>)	Dry, volcanic outcrops
Broad fleabane (<i>Erigeron latus</i>)	Shallow, relatively barren, vernal saturated, otherwise dry, gravelly to sandy soils or bedrock on flats and slopes of volcanic scablands or benches, mostly rhyolitic or basaltic in composition, in the sagebrush steppe and juniper zones
Davis peppergrass (<i>Lepidium davisii</i>)	Hard-bottomed clay playas on volcanic plains in the sagebrush zone with sparse associated <i>Atriplex confertifolia</i> and <i>A. cana</i> , surrounded by <i>A. tridentata</i> vegetation; during spring, the playas are usually inundated up to a foot deep; aquatic or wetland-dependent in Nevada
Deeth buckwheat (<i>Eriogonum nutans</i> var. <i>glabratum</i>)	Sandy, gravelly soil
Eastwood milkweed (<i>Asclepias eastwoodiana</i>)	open areas on a wide variety of basic soils, including calcareous clay knolls, sand, carbonate or basaltic gravels, or shale outcrops, generally barren and lacking competition, frequently in small washes or other moisture-accumulating microsites, in the shadscale, mixed-shrub, sagebrush, and lower pinyon-juniper zones
Elko rockcress (<i>Boechera falcifructa</i>)	Dry, densely vegetated, relatively undisturbed, light-colored silty soils with a high cover of moss and other soil crust components on moderate to steep north-facing slopes in the sagebrush zone
Grimy mousetails (<i>Ivesia rhypara</i> var. <i>rhypara</i>)	Dry, relatively barren, yellowish or light-colored outcrops or badlands of welded, sometimes hydrothermally altered and re-cemented, ash-fall tuff, and on shallow gravel grus
Grimes vetchling (<i>Lathyrus grimesii</i>)	Dry, open, shallow, silty clay soils usually overlain by a thin scree of reddish to yellowish brown gravel floated from an underlying cherty or partly quartzitized mudstone component of the Schoonover Formation
Least phacelia (<i>Phacelia minutissima</i>)	Vernal saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, in sagebrush swales, along creek bed high-water lines, or around springs, in flat to gently sloping areas; aquatic or wetland-dependent
Lewis buckwheat (<i>Eriogonum lewisii</i>)	Dry, exposed, shallow, relatively barren and undisturbed, rocky residual soils on convex ridgeline knolls and crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes of all aspects, but with the densest stands on southerly aspects; occasionally found at lower elevations on clay hills derived from silty carbonate or calcium-rich siliceous rock
Meadow pussytoes (<i>Antennaria arcuata</i>)	Bare, periodically disturbed soil in marginal, seasonally dry parts of moist, often hummocky, alkaline meadows, seeps, and springs, surrounded by sagebrush and grassland associations; aquatic or wetland-dependent
Nachlinger catchfly (<i>Silene nachlingeriae</i>)	Dry, exposed or somewhat sheltered carbonate (rarely quartzite) crevices in ridgeline outcrops, talus, or very rocky soils on or at the bases of steep slopes or cliffs, on all aspects but predominantly on northwesterly to northeasterly exposures, mainly in the subalpine conifer zone
Obscure buttercup (<i>Ranunculus triternatus</i>)	Meadow steppe habitat dominated by bunchgrasses and forbs; mostly found on north-facing upper slopes and crests of basalt ridges overlaid by loess deposits of varying depth

Targeted field surveys of suitable habitat will be performed based on information collected during the desktop review and follow the BLM protocol identified above. A field crew will conduct the survey between May and August 2021. Universal Transverse Mercator (UTM) coordinates and geo-referenced photographs of all identified special status plant species will be recorded. Population size will be estimated where possible, and associated plant species will be documented on the survey forms.

3.3.3 Noxious Weeds and Invasive Plants

3.3.3.1 Purpose and Objectives

A “noxious weed” is defined in Nevada as any species of plant that is, or is likely to be, detrimental or destructive and difficult to control or eradicate (Nevada Revised Statute 555.005). BLM considers plants “invasive” if they have been introduced into an environment where they did not evolve. Federal agencies are directed to prevent the introduction of noxious and invasive species and to follow an Invasive Species Management Plan (Federal Noxious Weed Act 1974 and 1990, Executive Order 13112, and Executive Order 13751).

3.3.3.2 Project Study Area

Noxious weeds and invasive species will be identified and mapped within the Project Area and up to a 200-foot-wide buffer (Figure 2).

3.3.3.3 Study Methodology

Federal, state, and county agencies maintain lists of noxious weed species.

Note that the BLM is transitioning to the Vegetation Management Action Portal, formerly the National Species Information Management System (NISIMS). The National Invasive Species Information Management System (NISIMS) is a standardized, spatially enabled BLM database containing location, treatment, and monitoring data relevant to invasive species. The Nevada Department of Agriculture noxious weed list, NRCS lists, and information from regulatory agency personnel will also be referenced to identify potential noxious weeds and invasive species in the Project Area. A list of potential federal, state, and county noxious weed and invasive species will then be compiled for the field survey.

The following protocols will be used in this analysis:

- *Inventory and Survey Methods for Nonindigenous Plant Species*, Chapter 5 (Rew and Pokorny 2006)
- *Vegetation and Soils – Baseline Data Collection* (BLM 2014b)

Field surveys will be scheduled concurrent with the special status plant and butterfly host plant surveys between May and August 2021. Surveys will be conducted during the appropriate time of year to positively identify each species, per the protocols. Field surveys for noxious weeds and invasive plant surveys will also follow the Tier 1 methods in the established Rew and Pokorny protocol, which includes an emphasis on surveying disturbed sites (such as roadsides) and wet areas. UTM coordinates and geo-referenced photographs of all identified noxious or invasive plant species will be recorded. Incidental observations of noxious weeds and invasive plant species will also be recorded during other vegetation and wildlife species surveys.

All data collected will be done using the GPS function (receiving satellite signals); digitizing data will be avoided where possible to increase location accuracy. Infestations will be mapped by walking the area before collecting data, as some plants may be visible while smaller plants may be more difficult to observe if they are scattered throughout the area.

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

- Points will be used for small infestations measuring up to 1/10th acre in size;
- Lines will be used for linear features, such as roads, streams, and fence lines; and
- Polygons will be used for irregular shaped areas greater than 1/10th of an acre in size.

Weed species will be mapped separately, with each point, line, or polygon feature consisting of only one species. Direct overlap of features will be used if more than one species occupies the same location as long as the same size and shape are appropriate for the newly copied feature.

3.4 Wildlife Surveys

3.4.1 General Wildlife Species

3.4.1.1 Purpose and Objectives

The objectives of the wildlife baseline surveys will be to collect sufficient information to characterize the affected environment for terrestrial wildlife and terrestrial wildlife habitat in qualitative and quantitative discussions within the Project Area. Data collected for the study area as a result of other NGM environmental baseline programs will be used as reference documents to show past use and current conditions as relevant.

3.4.1.2 Project Study Area

Wildlife species will be identified and mapped within the Project Area and up to a 200-foot-wide buffer (Figure 2).

3.4.1.3 Study Methodology

The general wildlife desktop assessment will use existing literature, Geographic Information System (GIS) data, and survey information from BLM, USFWS, NDOW, NNHP, and WAFWA. Spatial data available from BLM such as the Western Wildlife Crucial Habitat Assessment Tool or similar databases will be used to identify wildlife migration corridors. The desktop assessment and habitat assessment provide information on general wildlife species that may be present in the Project Area.

The following protocol will be used in this analysis:

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

Based on a review of NDOW's species accounts for mammals and reptiles, Table 5 lists the wildlife species that may be present within the Project Area based on the Project setting and the Wildlife Action Plan habitat links. Additionally, the BLM Elko Special Status Species list) will be referenced to identify potential species that may be present within the Project Area (BLM 2018, 2019).

Table 5: Potential Wildlife Action Plan Species within the Project Area

Species	Agency Status	Wildlife Action Plan Habitat Links
Bighorn sheep	NNHP G4S4 BLM NV Sensitive	Mojave Warm Desert and Mixed Desert Scrub, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forest, Grasslands and Meadows, Cliffs and Canyons
Desert horned lizard	NNHP G5S4	Intermountain Cold Desert Scrub, Sagebrush, Lower Montane Woodlands and Chaparral, Grasslands and Meadows, Cliffs and Canyons, Exotic Grasslands and Forblands, Developed Landscapes, Agricultural Lands
Great Basin collared lizard	NNHP G5S4	Intermountain Cold Desert Scrub, Sagebrush, Lower Montane Woodlands and Chaparral, Cliffs and Canyons, Exotic Grasslands and Forblands
Long-nosed leopard lizard	NNHP G5S4	Intermountain Cold Desert Scrub, Sagebrush, Grasslands and Meadows, Exotic Grasslands and Forblands, Developed Landscapes, Agricultural Lands
Merriam's shrew	NNHP G5S3	Sagebrush, Lower Montane Woodlands and Chaparral
Montane shrew	NNHP G5S3	Aspen, Intermountain Coniferous Forests and Woodlands, Grasslands and Meadows, Intermountain Riparian

Species	Agency Status	Wildlife Action Plan Habitat Links
Mule deer	NNHP G5S5	Sagebrush, Intermountain Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands, Grasslands and Meadows, Agricultural Lands, Cliffs and Canyons
Northern river otter	NNHP G5S2	Intermountain Riparian
Northern rubber boa	NNHP G5S3S4	Sagebrush, Intermountain Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands, Grasslands and Meadows, Cliffs and Canyons
Sagebrush vole	NNHP G5S3	Sagebrush
Western jumping mouse	NNHP G5S2	Intermountain Riparian, Aspen, Grasslands and Meadows

Source: Wildlife Action Plan Team 2012

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

3.4.2 Migratory and Breeding Birds

3.4.2.1 Purpose and Objectives

Avian species that migrate annually from summer breeding grounds to a different winter range are protected under the MBTA. Birds that are protected under the MBTA include, but are not limited to, raptors, passerines (songbirds), and water birds. The purpose of the migratory and breeding bird surveys will be to identify the species that occur within the Project Area to inform the future impact analysis.

3.4.2.2 Project Study Area

Transects and point counts for migratory bird species will be located within the Project Area and up to a 200-foot-wide buffer (Figure 2).

3.4.2.3 Study Methodology

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

The following protocols will be used in this analysis:

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

In the Project Area, 11 USFWS Birds of Conservation Concern (BCC) and 10 BLM special status species potentially occur. Table 6 lists the special status bird species that may be present within the Project Area.

Table 6: Potential BLM Special Status Migratory Birds within the Project Area

Species	Agency Status	Habitat
Black-chinned sparrow (<i>Spizella atrogularis</i>)	USFWS BCC	Dry brushlands, including sagebrush, rabbitbrush, and chaparral habitats
Brewer's sparrow (<i>Spizella breweri</i>)	BLM Sensitive; NDOW Sensitive	Arid sagebrush steppe
Burrowing owl (<i>Athene cunicularia</i>)	BLM Sensitive	Breed throughout NV in salt desert scrub, Mojave shrub, sagebrush habitat, and agricultural landscapes
Columbian sharp-tailed grouse (<i>Tympanuchus phasianellus columbianus</i>)	BLM Sensitive	Sagebrush-grassland and mountain shrub habitats in areas dominated by perennial bunchgrasses
Great Basin willow flycatcher (<i>Empidonax traillii adastus</i>)	BLM Sensitive	Montane riparian habitat with lowland riparian areas, including wet meadows
Green-tailed towhee (<i>Pipilo chlorurus</i>)	USFWS BCC	Sage flats, sagebrush shrubsteppe, high desert, open slopes in the Great Basin, and disturbed habitats
Lesser yellowlegs (<i>Tringa flavipes</i>)	USFWS BCC	Open or semi-open woodlands and wet meadows interspersed with marshes, bogs, and ponds
Loggerhead shrike (<i>Lanius ludovicianus</i>)	USFWS BCC; BLM Sensitive; NDOW Sensitive	Open country with short vegetation and well-spaced shrubs or low trees, agricultural fields, pastures, riparian areas, and desert scrublands
Long-billed curlew (<i>Numenius americanus</i>)	USFWS BCC; BLM Sensitive	Breed in native dry grasslands and sagebrush prairies, favoring nearby damp low spots
Pinyon jay (<i>Gymnorhinus cyanocephalus</i>)	USFWS BCC; BLM Sensitive	Pinyon-juniper woodlands, sagebrush, scrub oak, and chaparral communities
Sage sparrow (<i>Artemisiospiza nevadensis</i>)	USFWS BCC	Open areas of rolling, sage-dominated shrubsteppe habitat
Sage thrasher (<i>Oreoscoptes montanus</i>)	USFWS BCC; BLM Sensitive	Breeds exclusively in shrubsteppe habitats, requiring dense ground cover for concealment and some bare ground
Sandhill crane (<i>Antigone canadensis</i>)	BLM Sensitive	Open wetland habitats surrounded by shrubs or trees, marshes, bogs, wet meadows, prairies, and other moist habitats
Western snowy plover (<i>Charadrius nivosus nivosus</i>)	USFWS BCC; BLM Sensitive	Sparsely vegetated sand beaches, dry salt flats, dune habitat, river bars, and along alkaline or saline lakes, reservoirs, and ponds
Willet (<i>Tringa semipalmata</i>)	USFWS BCC	Nest in grasslands and prairies near freshwater
Willow flycatcher (<i>Empidonax traillii</i>)	USFWS BCC	Shrubby areas with standing water or along streams

Two qualified biologists will conduct migratory bird surveys following the protocols listed above. Field surveys will be conducted within each SWReGAP community (approximately 49 point count locations), with the exception of Developed or Recently Mined/Quarried communities. Full transects including 10 point count stations will be completed where possible in communities with continuous acreages greater than 300 meters. The location of transects and point counts will be recorded and photos will be taken in addition to weather, habitat, identification of species, and distance of observation. Surveys will be conducted during the middle of June.

3.4.3 Eagles and Other Raptors

3.4.3.1 Purpose and Objectives

Background data collection will be designed to identify the presence of golden eagles (*Aquila chrysaetos*) and other raptor species protected under the BGEPA and/or MBTA.

3.4.3.2 Project Study Area

Eagle and raptor data will be assessed for all nests and documented occurrences within a 10-mile buffer of the Project Area (Figure 2).

3.4.3.3 Study Methodology

Existing literature, GIS data, observations, and survey information from BLM, USFWS, NDOW, NNHP, and NGM will be compiled and analyzed against aerial imagery during the desktop assessment to identify suitable habitat within the Project Area and buffer.

The following protocols will be used in this analysis:

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

Table 7 lists the eagle and raptor species with the potential to occur in the Project Area. No field surveys are proposed for 2021. However, incidental observations of golden eagles and raptor activity or their nests will be recorded concurrently with migratory and breeding bird surveys. Field surveys will be conducted in 2022 for the Project Area.

Table 7: Potential Special Status Raptor Species within the Project Area

Species	Agency Status	Habitat
Bald eagle (<i>Haliaeetus leucocephalus</i>)	USFWS BCC; BLM Sensitive; NDOW Endangered	Lakes, reservoirs, rivers, marshes, and coasts with scattered breeding occurrences in Northern NV
Ferruginous hawk (<i>Buteo regalis</i>)	USFWS BCC; BLM Sensitive	Arid and semi-arid grasslands; open or rolling prairies; foothills or middle elevation plateaus
Golden eagle (<i>Aquila chrysaetos</i>)	USFWS BCC; BLM Sensitive	Open country, shrublands, grasslands, and nest in mountainous cliff habitat
Peregrine falcon (<i>Falco peregrinus</i>)	USFWS BCC; BLM Sensitive; NDOW Endangered	Breed and nest in open landscapes with cliffs at elevations up to 12,000 feet
Short-eared owl (<i>Asio flammeus</i>)	BLM Sensitive	Large, open areas with low vegetation, including prairies, meadows, shrubsteppe, savanna, dunes, and agricultural areas
Swainson's hawk (<i>Buteo swainsonii</i>)	BLM Sensitive	Nest in trees near open habitats, including agricultural fields, grasslands, and shrubsteppe habitat
Western burrowing owl (<i>Athene cunicularia hypugaea</i>)	BLM Sensitive	Breed throughout NV in salt desert scrub, Mojave shrub, sagebrush habitat, and agricultural landscapes

3.4.4 Burrowing Owl

3.4.4.1 Purpose and Objectives

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

3.4.4.2 Project Study Area

Burrowing owl habitat and presence will be identified and mapped within the Project Area and up to a 200-foot-wide buffer (Figure 7a through Figure 7c).

3.4.4.3 Study Methodology

Burrowing owls live in open habitats with sparse vegetation such as prairie, open grasslands, or shrub steppe generally with canopy coverage of less than 30 percent (CBOC 1993). The desktop assessment will use the USGS Gap Analysis Project (GAP) modeled habitat layer for burrowing owls to identify areas characterized by low-growing vegetation, grasslands, and areas where trees and shrub canopy is less than 30 percent (BLM 2014b).

The following protocols will be used in this analysis:

- *Statewide Wildlife Survey Protocols* (BLM 2014a)
- *Burrowing Owls in Wildlife Survey Protocols* (BLM 2011)

Field surveys will be conducted on three separate survey events between mid-May and mid-July 2021, during the nesting season using call surveys stations 800 meters (0.5 miles) apart through the entire Project Area as shown on Figure 7a through Figure 7c. Surveys and calls will be conducted early morning (1/2 hour before sunrise until 2 hours after sunrise) and early evening (2 hours before sunset until 1/2 hour after sunset) (BLM 2011). Because poor weather conditions may impact the ability to detect burrowing owls, call location surveys will be conducted when wind speed is below 15 miles per hour, the ambient temperature greater than 68 degrees Fahrenheit, and there is no precipitation.

At the call site locations, the call survey will broadcast the primary male (coo-coo) and alarm (quick-quick-quick) calls at 80 to 90 decibels (measured 1 meter from the speaker) and rotated in each cardinal direction. The observer will scan the area for burrowing owls during the entire call location survey period. The call survey period and sequence of activities is described below.

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

Surveys will be conducted for 10 minutes at each survey location as some burrowing owls may not be detected immediately because they are inside of burrows, or are not present on the site when the call site survey starts (BLM 2011). During surveys observers will ensure they are searching 360 degrees around the broadcast call site. Some burrowing owls may be detected by their call, and observers will listen for burrowing owls while conducting the survey and record those observations as well as sightings of burrowing owls.

All call station locations will be recorded. Geo-referenced photos will be taken at any observation of burrowing owls, their burrows, feathers, whitewash, or pellets found at the burrow entrance. These UTM coordinates and/or delineation of these features will also be recorded.

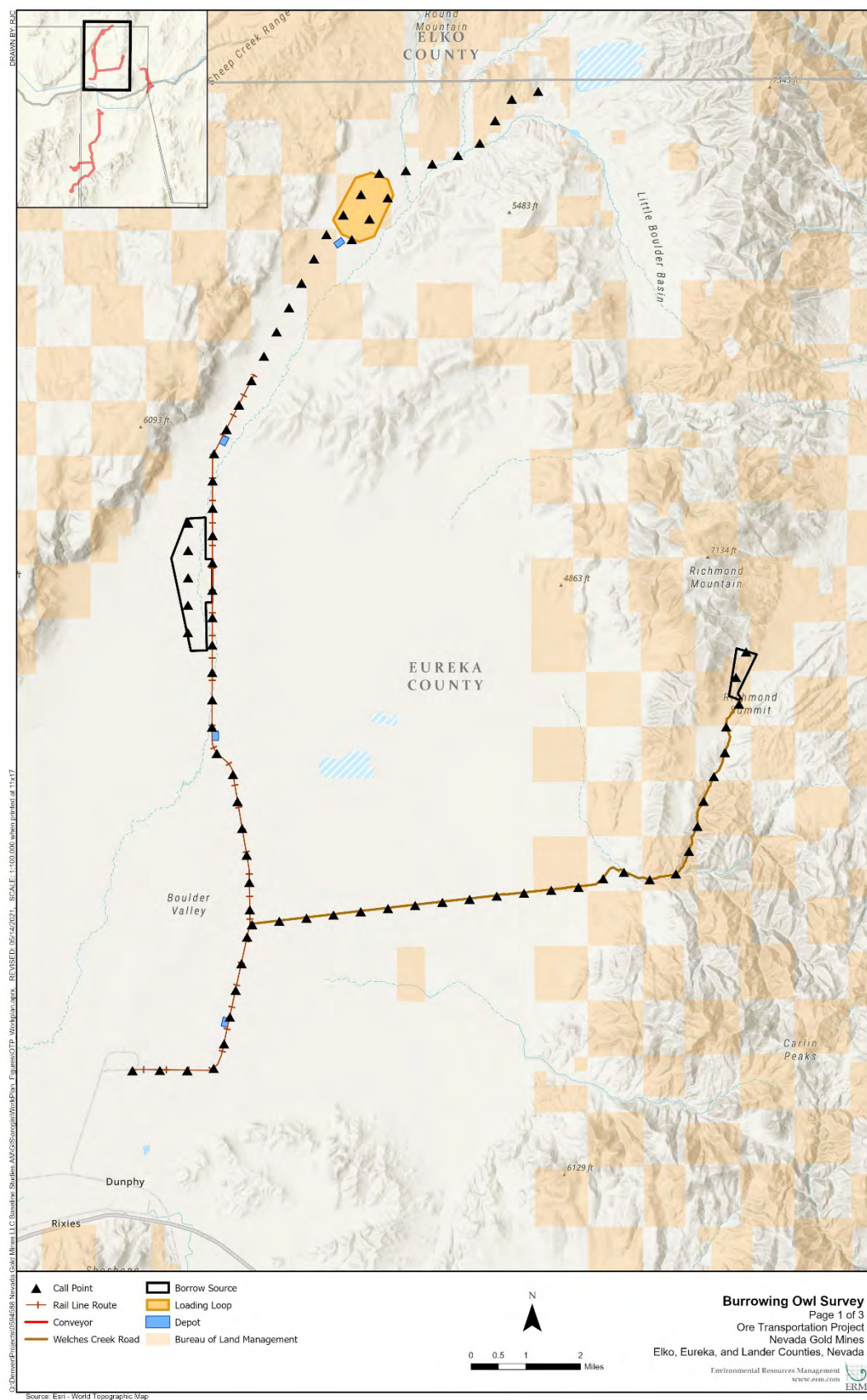


Figure 7a: Burrowing Owl Habitat and Preliminary Call Sites

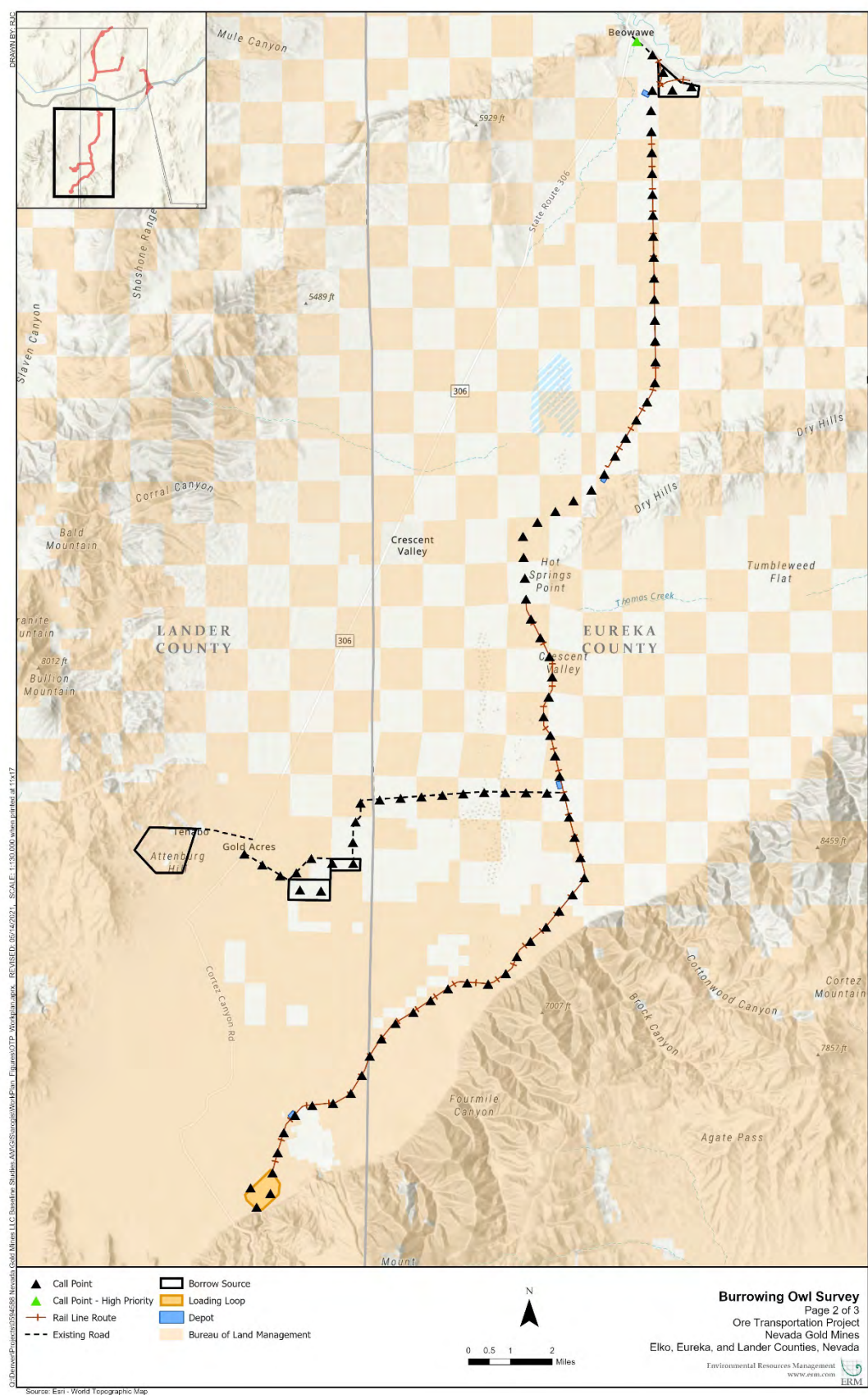


Figure 7b: Burrowing Owl Habitat and Preliminary Call Sites

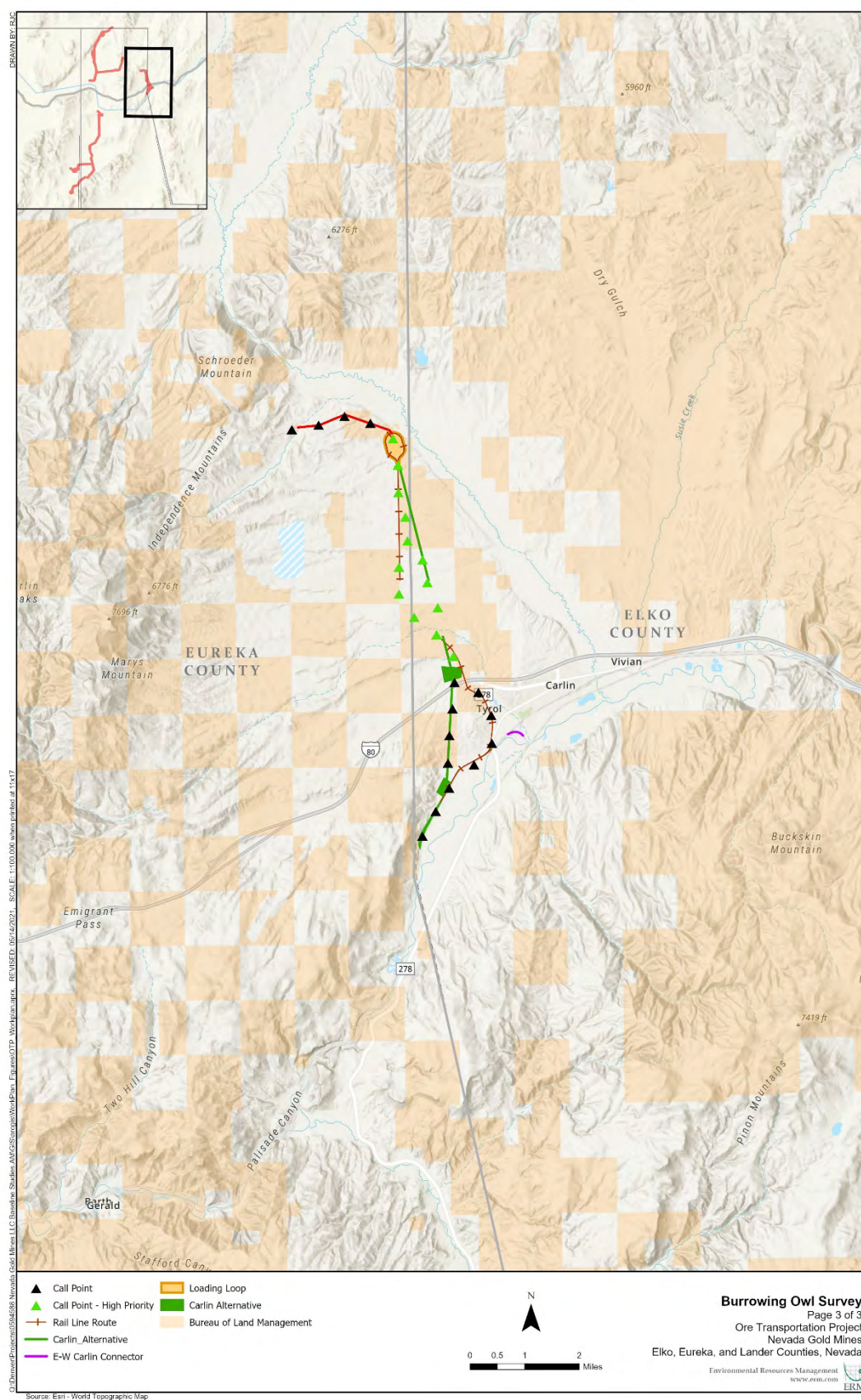


Figure 7c: Burrowing Owl Habitat and Preliminary Call Sites

3.4.5 Greater Sage-grouse

3.4.5.1 Purpose and Objectives

Greater sage-grouse (*Centrocercus urophasianus*) is designated as a Sensitive Species by the BLM and as a Game Bird under Nevada Administration Code (NAC) 503. Greater sage-grouse was also listed as a candidate under the ESA until 2 October 2015, when the USFWS determined that listing was unwarranted (80 Federal Register 191 pgs. 59858-59942).

3.4.5.2 Project Study Area

A 4-mile buffer around the Project Area is applied based on the lek buffer distances in the ARMPA (BLM 2015).

3.4.5.3 Study Methodology

Greater sage-grouse is a sagebrush-obligate species, depending on multiple shrub-steppe habitats for food, shelter, and rearing; sagebrush is a primary food source throughout the year (Patterson 1952; Braun et al. 1976; Connelly et al. 2000, 2004). Greater sage-grouse individuals have variable seasonal migratory behavior, but have demonstrated high fidelity to seasonal ranges, returning to the same areas for foraging, courtship, and nesting (Connelly et al. 2000). Typical lek habitat consists of open areas including bare soil, short-grass steppe, windswept ridges, and exposed knolls in close proximity to denser shrub-steppe habitat with substantial cover (Patterson 1952; Connelly et al. 2004).

Desktop mapping of greater sage-grouse leks and habitat will be completed using data from NDOW, NGM, and BLM. During 2021, in lieu of a field survey, lek count data from NGM and NDOW will be gathered, analyzed, and correlated with the results of the noise survey.

3.4.6 Threatened and Endangered Species

3.4.6.1 Purpose and Objectives

Threatened and endangered wildlife species are protected under the ESA of 1973 (16 USC § 1531, *et seq.*). Under Section 7(a)(2) of the ESA, federal agencies are required to determine whether projects may affect or jeopardize the continued existence of threatened and endangered species and/or critical habitat. The purpose of this assessment is to determine if any threatened and endangered species occur in the Project Area in order to inform future impact analysis.

3.4.6.2 Project Study Area

Threatened and endangered species surveys will be identified and mapped within the Project Area and up to a 200-foot-wide buffer (Figure 2).

3.4.6.3 Study Methodology

A desktop assessment of potential threatened and endangered species habitat will be conducted using the data from NNHP, USFWS IPaC, SWReGAP land cover, NRCS soil and ESD, U.S. Environmental Protection Agency Level IV ecoregions, National Hydrology Dataset (NHD), and National Wetland Inventories (NWI). The IPaC query identified three federally listed species with potential to occur in the Project Area: Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*), gray wolf (*Canis lupus*), and monarch butterfly (*Danaus plexippus*). The information reviewed during the desktop assessment will be used to assess whether potentially suitable habitat is present within the Project Area.

The following protocols will be used in this analysis:

- *Statewide Wildlife Survey Protocols* (BLM 2014a)
- USFWS Species-Specific Protocols

A field reconnaissance and analysis of stream systems and habitat will be conducted to assess suitable habitat for the Lahontan cutthroat trout in the Project Area (Figure 8). Field surveys are not anticipated for the gray wolf, although incidental observations of scat and tracks will be recorded along with geo-referenced photographs if documented. Surveys for monarch butterfly suitable habitat will be conducted by documenting milkweed occurrence throughout the Project Area.

3.4.7 Pygmy Rabbit

3.4.7.1 Purpose and Objectives

The pygmy rabbit (*Brachylagus idahoensis*) is a BLM special status species in Nevada. The desktop assessment and field surveys will be conducted to assess the potential habitat and document the presence of pygmy rabbits within the Project Area.

3.4.7.2 Project Study Area

Pygmy rabbit surveys will occur within the Project Area and up to a 200-foot-wide buffer (Figure 2) with a focus on potential pygmy rabbit habitat (Figure 9a through Figure 9c).

3.4.7.3 Study Methodology

Pygmy rabbits are sagebrush obligates that occur throughout most of the Great Basin but exhibit specialized habitat requirements. They are found on big sagebrush plains and alluvial fans, particularly in clumps of mature sagebrush that are tall and dense relative to the surrounding sagebrush (Ulmschneider et al. 2008). Suitable habitat can be recognized by distinctly taller patches of sagebrush, which indicate deeper soils as preferred by this species, however, pygmy rabbits have been found in other vegetation communities. The following are the criteria used to identify potential pygmy rabbit habitat during the desktop evaluation and field surveys:

- Elevations ranging from 5,600 to 7,800 feet above mean sea level;
- Deep Loamy soils;
- Friable soils;
- Flat to moderate slopes;
- Vegetation communities where sagebrush and/or rabbitbrush species dominate;
- Tall/dense stands of sagebrush;
- Dense shrub canopy cover.

The USGS GAP modeled habitat layer, SWReGAP, NRCS SSURGO, and NNHP vegetation and species data will be used during the desktop assessment to identify potential pygmy rabbit habitat within the Project Area. Based on the NNHP vegetation and species data Figure 9a through Figure 9c show where sagebrush species (*Artemisia spp.*) are an element of the vegetation community within the 200-foot-wide survey area. Surveys will be conducted between June and August 2021.

The following protocols will be used in this analysis:

- *Statewide Wildlife Survey Protocols* (BLM 2014a)
- *Surveying for Pygmy Rabbits (Brachylagus idahoensis)* (Ulmschneider et al. 2008)

Identifying pygmy rabbit presence relies on locating active burrows and pellets (i.e., scat) rather than seeing actual rabbits. No trapping or cameras will be used for remote wildlife data survey collection. Field surveys will be conducted in accordance with the accepted state BLM protocols from mid-May through mid-July 2021. The surveys will be performed by GPS tracked pedestrian transects at 100-foot center-to-center spacing in areas identified by NNHP data as containing potential suitable pygmy rabbit habitat. In potential pygmy rabbit habitat areas with taller, denser, sagebrush stands, meandering transects that are 8 meters wide (approximately 27 feet) or less will be walked to cover the entire stand and recorded.

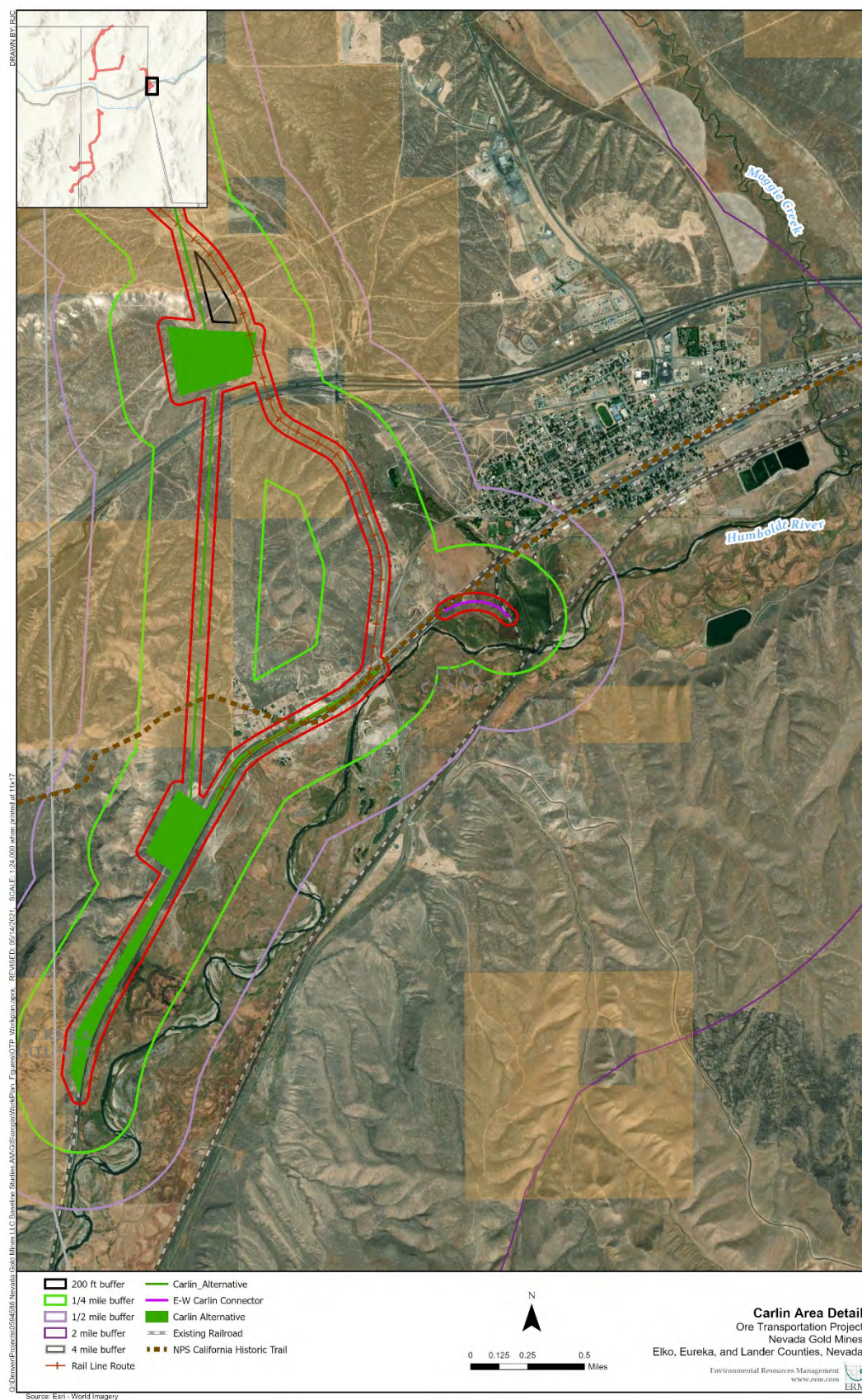


Figure 8: Carlin Area Detail

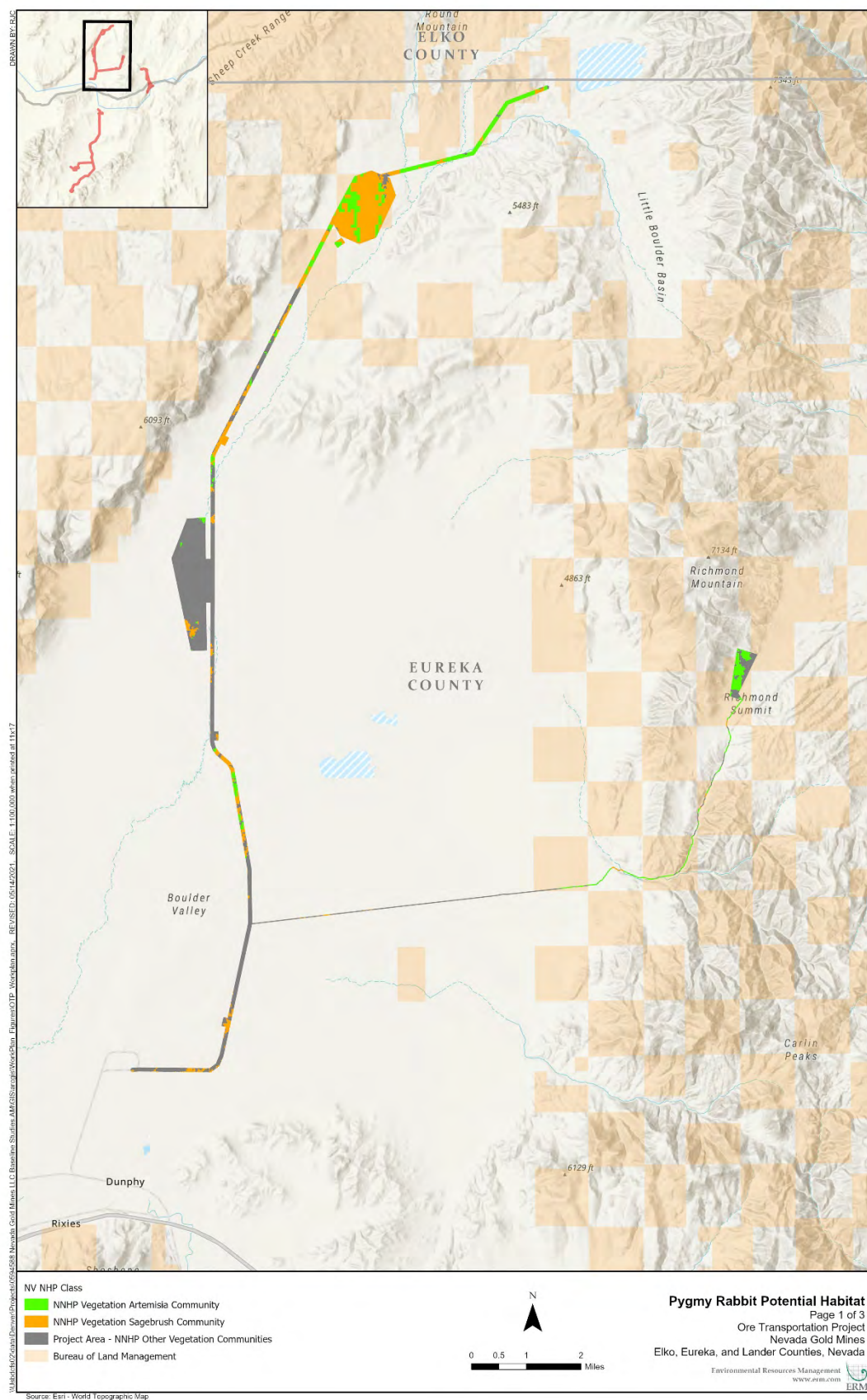


Figure 9a: Pygmy Rabbit Potential Habitat

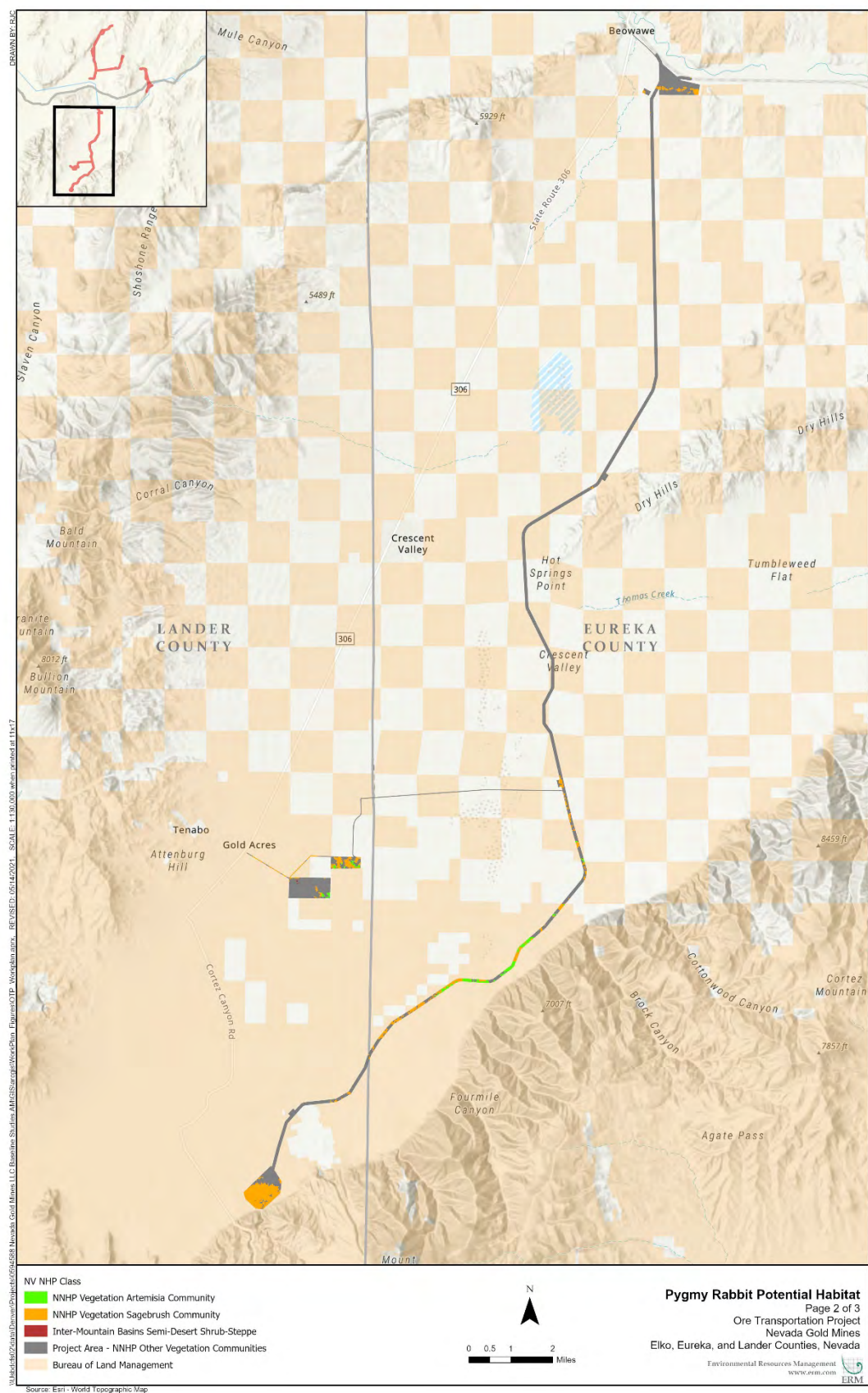


Figure 9b: Pygmy Rabbit Potential Habitat

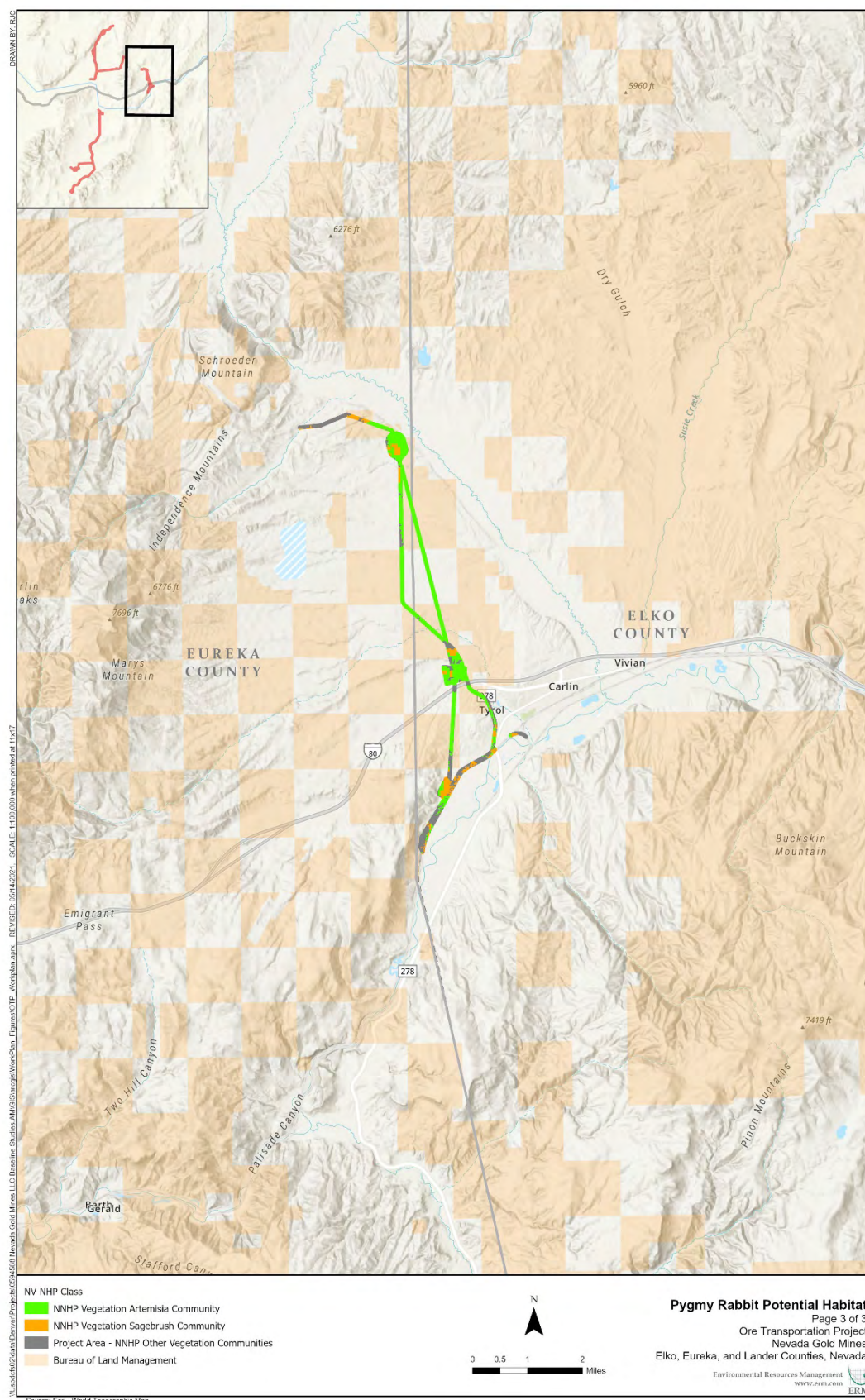


Figure 9c: Pygmy Rabbit Potential Habitat

All burrows and tracks will be recorded using GPS units for mapping purposes and future reference. Burrows located during the pedestrian surveys of potential habitat will be classified as active, inactive, or collapsed. Pellets occurring in piles under sagebrush, piles along runways, and/or as single pellets will be considered as pygmy rabbit sign and will be classified as fresh (moist, do not crumble, dark in color) or old (dry, crumble easily, brown or gray in color). Geo-referenced photos and point locations or polygons will be taken at any observation of pygmy rabbit individuals, their mounded burrows, or scat/tracks. Observations of individuals, burrows, pellets, soil types, and general vegetation communities will be collected and recorded in electronic survey forms.

3.4.8 Dark and Pale Kangaroo Mouse

3.4.8.1 Purpose and Objectives

The dark kangaroo mouse (*Microdipodops megacephalus*) and pale kangaroo mouse (*Microdipodops pallidus*) are BLM special status species in Nevada. The desktop assessment and field surveys will be conducted to assess the potential occurrence of kangaroo mice within the Project Area in order to assess future impacts to individuals and habitats.

3.4.8.2 Project Study Area

Dark and pale kangaroo mouse surveys will occur within the Project Area and up to a 200-foot-wide buffer (Figure 2).

3.4.8.3 Study Methodology

Both species of kangaroo mouse prefer habitat containing loose, friable (meaning, exhibiting a crumbly texture) soils, and inhabit shadscale and sagebrush scrub communities (NatureServe 2017) that have an abundance of Indian ricegrass, as noted by Great Basin Ecology (GBE 2016). The pale kangaroo mouse prefers habitats with loose, sandy soils with little or no gravel overlay, and the dark kangaroo mouse prefers habitats with loose sandy and gravelly soil (NatureServe 2017). Both species primarily forage on seeds and some insects (NatureServe 2016; Roach 2016). The Great Basin Ecology, Inc. protocol also suggests that absence of disturbance (e.g., human activities) increases the habitat suitability. A desktop assessment of potential dark kangaroo mouse and pale kangaroo mouse suitable habitat will be conducted using NRCS ESD and SSURGO data to target survey locations within the Project Area.

The following protocols will be used in this analysis:

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

The field survey will be conducted concurrently with burrowing owl and pygmy rabbit surveys from mid-May through mid-July 2021 by pedestrian transects at a 100-foot spacing throughout potentially suitable habitat. The survey team will scan each side of the pedestrian transect for potential burrows or kangaroo mouse tracks. All survey tracks will be recorded and geo-referenced photos will be taken for any signs of kangaroo mice, including scat, tracks, or potential burrows. Observations regarding the habitat (e.g., soil types, adjacent vegetation) will also be recorded for each burrow site. No trapping will occur in 2021; however, subsequent trapping efforts in identified suitable habitat may be conducted in 2022 following BLM protocols.

3.4.9 Bats

3.4.9.1 Purpose and Objectives

A total of 20 bat species found in the BLM Battle Mountain and Elko districts are designated as BLM special status species. Of these, one species is listed as state threatened under NAC 503: the spotted bat (*Euderma maculatum*). Additional species are listed as species of conservation priority by the Wildlife Action Plan Team (Wildlife Action Plan Team 2012) and/or as Nevada protected or sensitive species under NAC 503.

3.4.9.2 Project Study Area

Acoustic surveys for bat species will occur within the Project Area and up to a 0.25-mile-wide buffer (Figure 2). Detector locations are shown in Figure 10 based on collective input from NGM, ERM, and BLM.

3.4.9.3 Study Methodology

A desktop review will identify known and potential bat habitats within 0.25 mile of the Project Area. This review will include USGS, BLM, NDOW, NHD, NWI, and NNHP data. The desktop assessment will focus on potential hibernacula (abandoned mine lands, shafts, or caves), identification of forested areas with suitability for roosting or foraging, and identification of water features.

The following protocol will be used in this analysis:

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

Based on a review of NDOW's species accounts for mammals and review of the Revised Nevada Bat Conservation Plan (Bradley et al. 2006), Table 8 lists the bat species that may be present within the Project Area based on the Project setting and the Wildlife Action Plan habitat links.

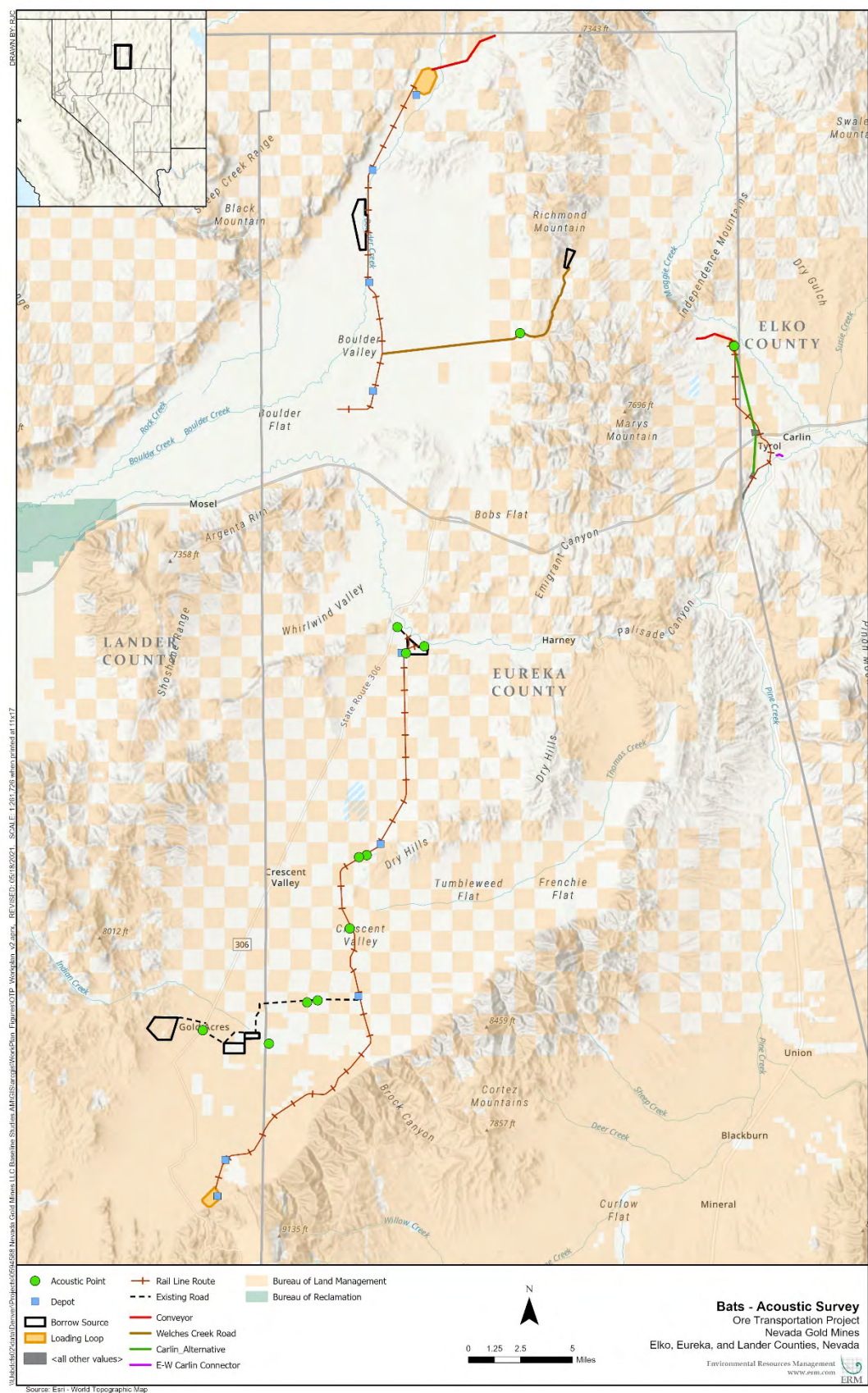


Figure 10: Bats—Acoustic Survey

Table 8: Potential Bat Species within the Project Area

Species	Agency Status	Wildlife Action Plan Habitat Links
Big brown bat (<i>Eptesicus fuscus</i>)	NNHP G5S3 BLM NV Sensitive	Caves and Mines, Cliffs and Canyons, Developed Landscapes, Agricultural Lands, Woodlands and Riparian Areas
Fringed myotis (<i>Myotis thysanodes</i>)	NNHP G4S2 BLM NV Sensitive	Sagebrush, Aspen, Lower Montane Woodlands and Chaparral, Cliffs and Canyons, Caves and Mines, Developed Landscapes
Hoary bat (<i>Lasiurus cinereus</i>)	NNHP G5S3N BLM NV Sensitive	Intermountain Riparian, Warm Desert Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands
California myotis (<i>Myotis californicus</i>)	NNHP G5S3 BLM NV Sensitive	Salt Desert Scrub, Woodlands and Riparian Areas, Caves and Mines, Cliff and Canyons
Little brown myotis (<i>Myotis lucifugus</i>)	NNHP G5S3 BLM NV Sensitive	Intermountain Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands, Caves and Mines, Cliffs and Canyons, Developed Landscapes
Long-eared myotis (<i>Myotis evotis</i>)	NNHP G5S4 BLM NV Sensitive	Aspen, Intermountain Coniferous Forests and Woodlands, Lower Montane Woodlands and Chaparral, Caves and Mines
Long-legged myotis (<i>Myotis volans</i>)	NNHP G5S3 BLM NV Sensitive	Montane Coniferous Forest, Salt Desert Scrub, Sagebrush
Yuma myotis (<i>Myotis yumanensis</i>)	NNHP G5S3 BLM NV Sensitive	Caves and Mines, Cliffs and Canyons, Developed Landscapes, Agricultural Lands, Woodlands and Riparian Areas
Canyon bat (<i>Parastrellus hesperus</i>)	NNHP G5S3 BLM NV Sensitive	Salt Desert Scrub, Sagebrush, Caves and Mines, Cliffs and Canyons
Brazilian (Mexican) free-tailed bat (<i>Tadarida brasiliensis</i>)	NNHP G5S3S4B BLM NV Sensitive	Warm Desert Riparian, Intermountain Riparian, Lower Montane Woodlands, Aspen, Intermountain Coniferous Forest, Cliffs and Canyons, Caves and Mines, Developed Landscapes
Silver-haired bat (<i>Lasionycteris noctivagans</i>)	NNHP G5S3B BLM NV Sensitive	Intermountain Riparian, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forests and Woodlands
Spotted bat (<i>Euderma maculatum</i>)	NNHP G4S2 BLM NV Sensitive	Intermountain Riparian, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forest and Woodlands, Cliffs and Canyons, Caves and Mines, Developed Landscapes
Western red bat (<i>Lasiurus borealis</i>)	NNHP G4S2 BLM NV Sensitive	Wooded Riparian, particularly cottonwood/willow or mesquite bosque
Pallid bat (<i>Antrozous pallidus</i>)	NNHP G5S3 BLM NV Sensitive	Salt Desert Shrub, Sagebrush, Caves and Mines, Cliffs and Canyons Woodlands and Riparian Areas,
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	NNHP G3G4S2 BLM NV Sensitive	Lower Montane Woodlands and Chaparral, Caves and Mines
Western small-footed myotis (<i>Myotis ciliolabrum</i>)	NNHP G5S3 BLM NV Sensitive	Salt Desert Shrub, Sagebrush, Aspen, Lower Montane Woodlands and Chaparral, Intermountain Coniferous Forest, Cliffs and Canyons, Caves and Mines, Developed Landscapes, Agricultural Lands

Source: Wildlife Action Plan Team 2012

Field surveys using acoustic bat detectors will be conducted during three separate events. The first survey will be conducted in May, the second in July, and the third in late September. The detectors will be programmed to record from 15 minutes before sunset to 15 minutes after sunrise for six consecutive nights during each survey event. If weather conditions are not favorable to bat activity (i.e., rain, wind, or low temperatures), detectors will remain deployed until six nights of optimal weather conditions are observed. Data for each detector locations will be recorded following established protocols and survey forms.

Acoustic survey data will be processed, with metadata appended to files using the Kaleidoscope Pro program. Kaleidoscope Pro's automated results will be the starting point for analysis; however an experienced manual vetter will review and interpret the results. This vetter will be a biologist experienced in manual vetting analysis, familiar with western bat species. The vetting process will include review of a subset of files identified to each species, to confirm presence of each potential species identified by the Kaleidoscope Pro program. The vetter will also perform a spot check of NoID and Noise files, with a focus on identifying low intensity files with characteristic call features. Although there are inherent limitations to acoustic analysis, the goal of the manual vetter will be to identify the strongest call types and assess likely presence of species along the Project Area. Some species within the Project Area produce acoustic calls that share overlap with other species. Where needed, ERM will identify the highest quality files and will share these files with BLM, BCI, or other resources in order to establish likely presence or absence of species. All acoustic file data will be retained by the Project, and can be provided to BLM upon request.

3.4.10 Amphibians

3.4.10.1 Purpose and Objectives

A desktop assessment and field surveys will be conducted to assess the potential occurrence of amphibian species within the Project Area in order to assess potential future impacts to any individuals, communities, and/or habitats.

3.4.10.2 Project Study Area

Species-specific amphibian surveys will occur in suitable habitat identified within the Project Area and up to a 400-foot-wide buffer. Target habitats for these surveys will be focused on springs, seeps, and riparian areas (Figure 5a through Figure 6d).

3.4.10.3 Study Methodology

A review of existing literature and data from BLM, USFWS, NDOW, and NNHP will be evaluated for potential occurrence of these species of concern within the Project Area. The desktop assessment will also utilize NHD, NWI, USGS, and SWReGAP data to identify target areas for conducting field surveys. Priority areas for surveys will include seeps, springs, and wetlands with adequate vegetation.

Based on a review of the BLM special status species list for the Elko District, Table 9 lists the amphibian species that may be present within the Project Area (BLM 2018, 2019).

Table 9: Potential Wildlife Action Plan Amphibian Species within the Project Area

Species	Agency Status	Wildlife Action Plan Habitat Links
Columbia spotted frog (Great Basin population) (<i>Rana luteiventris</i>)	NNHP G4T2T3QS2S3 BLM NV Sensitive	Intermountain Riparian, Wet Meadow, Springs and Springbrooks, Marshes, Lakes and Reservoirs
Northern leopard frog (<i>Lithobates pipiens</i>)	NNHP G5S2S3 BLM NV Sensitive	Marshes, Lakes and Reservoirs, Wet Meadow, Intermountain Riparian, Springs and Springbrooks
Western toad (<i>Anaxyrus boreas</i>)	NNHP G4S4	Lower Montane Woodlands, Intermountain Coniferous Forests and Woodlands, Intermountain Riparian, Aspen, Grasslands and Meadows, Springs and Springbrooks, Lakes and Reservoirs

Source: Wildlife Action Plan Team 2012

The following protocols will be utilized and adapted to this study area as appropriate in this analysis:

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

Amphibian field surveys will be conducted in suitable habitat in July 2021 when tadpoles are expected. Biologists will conduct a time-restrained visual encounter survey in accordance with the protocols listed above. The total time spent surveying will be recorded but will not be less than 20 minutes. The total area searched and the number of individuals observed will be recorded.

3.4.11 Butterflies

3.4.11.1 Purpose and Objectives

Monarch butterfly (*Danaus plexippus*; as discussed in Section 3.4.6, Threatened and Endangered Species), Nevada viceroy butterfly (*Limenitis archippus lahontani*), and Mattoni's blue butterfly (*Euphilotes pallescens mattonii*) have the potential to occur within the Project. Milkweed species (*Asclepias* spp.) are a known host plant for the monarch butterfly. The Nevada viceroy adult butterfly, a riparian specialist, resembles adult monarch butterflies and utilizes species in the *Salicaceae* family (*Salix* spp. and *Populus* spp.) for host plants but also favors composite flowers for feeding (Opler et al. 1999). The slender buckwheat (*Eriogonum microthecum*) is the host plant for the Mattoni's blue butterfly. Surveys for these species of butterflies and their hostplant species will be conducted within the Project.

3.4.11.2 Project Study Area

Surveys for butterfly hostplants (*Asclepias* spp., *Eriogonum microthecum*, and *Salix* spp.) will be conducted within the Project Area as part of special status plant surveys in the 200-foot-wide buffer of the Project (Figure 2).

3.4.11.3 Study Methodology

There are 13 milkweed species native to Nevada, although six species (i.e., Eastwood milkweed, spider milkweed, pallid milkweed, desert milkweed, narrow-leaved milkweed, and showy milkweed) are more likely to be present in the Project Area (Border 2018). Milkweed species can be found within a wide range of habitats including xeric or riparian grasslands, shrublands, and woodlands or disturbed areas. Riparian habitat corridors with a willow and/or cottonwood component will be surveyed for Nevada viceroy butterflies as well as areas that are generally more mesic that may support preferred flowering forbs. Slender buckwheat, which generally grows on loamy rocky slopes, will be surveyed for Mattoni's blue butterfly.

A desktop assessment will be conducted using data from NNHP, BLM, WAFWA, and other publicly available sources to identify areas with potentially suitable habitat and documented occurrences to target during the field surveys for hostplants and butterflies. The Nevada viceroy butterfly was identified near the proposed Project Area along the Humboldt River near Beowawe according to NNHP data.

The following tools and protocols will be used in this analysis:

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

The field surveys will identify locations with known occurrences of milkweeds, which could be used by monarch. Milkweeds with the potential to occur in the Project Area typically bloom from May through September. Slender buckwheat often blooms from early to mid-July through August. Occurrences of milkweeds, willows, and slender buckwheat will be documented concurrently with the special status plant surveys from mid-May to late August, utilizing the BLM vegetation protocol listed above. Milkweed species will be identified to genus and, where possible, to species based on floristic characteristics. UTM coordinates and geo-referenced photographs of all identified hostplants will be recorded. Riparian corridors and mesic areas will be surveyed for active Nevada viceroy's May through August. Mattoni's blue butterflies will be surveyed before or after the heat of the day and the survey will avoid windy conditions. Little blue butterflies will be captured in a butterfly net for identification, and only positively-identified male specimens will be collected. Incidental observations of monarch, Nevada viceroy, or Mattoni's blue butterflies or caterpillars will also be recorded.

3.4.12 Noise

A separate noise monitoring plan will be prepared and submitted after additional coordination with BLM on the protocols and sites selected. The selection of noise sites and protocols is influenced by other resources such as greater sage-grouse, bats, eagles, and amphibians.

3.4.12.1 Purpose and Objectives

The purpose of this study is to document existing ambient noise levels at representative locations in the Project study area. The noise impact assessment will determine potential noise levels associated with Project construction and operation on human and wildlife receptors.

3.4.12.2 Project Study Area

Noise-sensitive receptors and areas within 0.5 mile of the Project Area will be identified during the desktop assessment (Figure 2).

3.4.12.3 Study Methodology

A baseline noise assessment will be completed to assess potential noise impacts associated with Project construction and operation on human and wildlife receptors. A desktop assessment using aerial imagery and review of NDOW, NNHP, BLM, and USFWS data will be conducted to identify noise-sensitive areas for wildlife.

- Human receptors - A noise-sensitive property means real property normally used for sleeping or as schools, churches, hospitals, or public libraries. Property used for industrial or agricultural activities is not considered noise-sensitive property. During the preliminary review of human noise receptors, four residences or groups of residences were identified within 0.5 mile of the Project Area that data will be recorded.
- Wildlife receptors include any location where sensitive species may be present. Wildlife receptor will be identified through a combination of desktop analysis, review of data from and/or consultation with the NDOW, NNHP, BLM, and USFWS, as well as field verification.

A noise monitoring protocol will be submitted under separate cover and will include the areas selected for collecting ambient noise data to assess impacts to both human and wildlife receptors, as well as the methodology to be used during the study.

4 REPORTING

A Comprehensive Biological Baseline Report will be drafted for review by BLM. The report will include the sections as described above. A schedule for reporting is provided below:

- Draft Report: Due to BLM January 2022

- BLM Review: Due March 2022
- Final Report: Due March/April 2022

A Noise Impact Assessment Report under separate cover from the Biological Baseline Report will be drafted for review by BLM and follow the timeline listed above. The report will summarize the results of the noise baseline assessment and the construction and operational noise impacts assessments.

5 DATA COLLECTION AND MANAGEMENT

An ArcGIS Online project will be created to manage all desktop and field-collected data. All field data will be collected electronically using survey forms built in Survey123. All geospatial data will be recorded using ArcGIS Collector with tablets connected to sub-meter accuracy GPS receivers. Quality control of the field data will occur daily.

Upon finalization of the Project, ERM will prepare electronic copies of all field data collected and geospatial information, including survey tracks and documented species occurrences, for submittal to BLM. The geospatial data will be in UTM NAD83, Zone 11 and include all associated metadata, complying with the Federal Geographic Data Committee metadata standards.

6 REFERENCES

- BLM (Bureau of Land Management. 2009. *Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species*.
- _____. 2011. *Wildlife Survey Protocols*. January 2011. BLM/WY/PL-11/013+6501
- _____. 2014a. *Statewide Wildlife Survey Protocols*.
- _____. 2014b. *Vegetation and Soils – Baseline Data Collection*.
- _____. 2015. *Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment*. Attachment 2, From the Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, including the Greater Sage-Grouse Sub-Regions of: Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. Prepared by U.S. Department of the Interior Bureau of Land Management Nevada State Office. September.
- _____. 2018. *Updated Bureau of Land Management (BLM) Sensitive Species List for Nevada*. Instruction Memorandum NV-2018-003.
- _____. 2019. BLM Sensitive Species List, Elko District Office, Elko, Nevada.
- _____. 2020. Riparian area management: Proper functioning condition assessment for lentic areas. 3rd ed. Technical Reference 1737-16. Bureau of Land Management, National Operations Center, Denver, Colorado
- Border, B. 2018. *A Guide to Common Milkweeds of Nevada*. The Xerces Society for Invertebrate Conservation. 12-022_04_XercesSoc_NativeMilkweeds_Nevada_web.pdf
- Bradley, P. V., M. J. O'Farrell, J. A. Williams, and J. E. Newmark. Editors. 2006. *The Revised Nevada Bat Conservation Plan*. Nevada Bat Working Group. Reno, Nevada. 216 pp.
- Braun, C. E., M. F. Baker, R. L. Eng, J. W. Gashwiler, and M. H. Schroeder. 1976. Conservation committee report on effects of alteration of sagebrush communities on the associated avifauna. Wilson Bulletin.
- Brischke, A. H. Hall, and K. McReynolds. 2018. *Understanding Ecological Sites*. The University of Arizona College of Agriculture and Life Sciences. Cooperative Extension. Tucson, Arizona May 2018

- CBOC (California Burrowing Owl Consortium). 1993. *Burrowing Owl Survey Protocol and Mitigation Guidelines*. April. Available online at: <https://www.wildlife.ca.gov/Conservation/Survey-Protocols>
- Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. *Wildlife Society Bulletin* 28:970-972.
- Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Cheyenne, WY.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of Interior, Fish and Wildlife Service, Washington, DC. 131 pp.
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Wetlands Research Program Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.
- GBBO (Great Basin Bird Observatory). 2010. *Nevada Comprehensive Bird Conservation Plan*, ver. 1.0. Great Basin Bird Observatory, Reno, NV. Available online at www.gbbo.org/bird_conservation_plan.html
- GBE (Great Basin Ecology, Inc.). 2016. *Draft Survey Protocol, Kangaroo Mouse*. Elko, Nevada.
- Hatch, K. and E. Simandle. 2004. *Columbia Spotted Frog (Rana luteiventris) Visual Encounter Surveys*.
- Helmig, Ali. 2020. Mattoni's Blue Butterfly Monitoring Protocol. Version 1. The Great Basin Institute.
- Helmig, Almeta and Delaney Martin. 2020. Passive Acoustic Monitoring Protocol for Bat Species in Northern Nevada. Elko Biodiversity Program, NDOW, and BLM. May 2020.
- Herrick, J.E.; Van Zee, J.W.; McCord, S.E.; Courtright, E.M.; Karl, J.W.; Burkett, L.M. 2017. Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume 1: Core Methods, 2nd ed.; USDA-ARS Jornada Experimental Range: Las Cruces, NM, USA, 2017. Accessed May 5, 2021. Available online: <http://www.landscapetoolbox.org/manuals/monitoring-manual/>
- Kachergis, E., N. Lepak, M. Karl, S. Miller, and Z. Davidson. 2020. *Guide to Using AIM and LMF Data in Land Health Evaluations and Authorizations of Permitted Uses. Tech Note 453*. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO
- Kendall, K. 2002. Survey protocol for the northern leopard frog. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 43, Edmonton, AB. 30 pp.
- Knutson M.G., L. O'Brien, T.W. Sutherland, K.L. Carlyle, J. Herner-Thogmartin, and L. Carter. 2016. *National Protocol Framework for the Inventory and Monitoring of Breeding Landbirds using Point Counts*. Version 2.0. Natural Resources Program Center, Fort Collins, CO. This protocol is available from ServCat: [<https://ecos.fws.gov/ServCat/Reference/Profile/54162>]
- Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. *Phytoneuron* 2016-30: 1–17. Published 28 April 2016. ISSN 2153 733X
- MacKinnon, W.C., J.W. Karl, G.R. Toevs, J.J. Taylor, M. Karl, C.S. Spurrier, and J.E. Herrick. 2011. BLM core terrestrial indicators and methods. Tech Note 440. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO

- Natural Resources Conservation Service. 2021 *United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Lander County, Nevada, North Part/NV775, Tuscarora Mountain Area, Nevada, Parts of Elko, Eureka and Lander Counties/NV612, Eureka County Area, Nevada/NV776, Nevada*. Soil Survey Staff. Available online. Accessed February, 24, 2021.
- NatureServe (Morefield, J.). 2016. *Microdipodops pallidus* (errata version published in 2017). The IUCN Red List of Threatened Species 2016:e.T42607A115193914. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T42607A22229311.en>.
- NatureServe. 2017. *NatureServe Explorer: An online encyclopedia of life* [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>.
- Nevada Mining Association. 2018. *Golden Eagle Protection Best Practices, Nevada Mineral Exploration and Mining Industry*.
- NRCS (Natural Resources Conservation Service). 2021. Ecological Site Descriptions. <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/>
- Opler, P.A. and A.B. Wright. 1999. *Peterson field guide to western butterflies*. Houghton Mifflin Company, Boston.
- Pagel, J. E., D.M. Whittington, and G.T. Allen. 2010. Interim Golden Eagle inventory and monitoring protocols; other recommendations in support of golden eagle management and permit issuance. Division of Migratory Bird Management, U. S. Fish and Wildlife Service.
- Pellant, M., P.L. Shaver, D.A. Pyke, J.E. Herrick, N. Lepak, G. Riegel, E. Kachergis, B.A. Newingham, D. Toledo, and F.E. Busby. 2020. *Interpreting Indicators of Rangeland Health, Version 5*. Tech Ref 1734-6. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO
- Patterson, R.L. 1952. *The sage-grouse in Wyoming*. Sage Books, Denver, CO.
- Peterson, E.B. 2008. *International Vegetation Classification alliances and associations occurring in Nevada with proposed additions*. Nevada Natural Heritage Program, Carson City, NV. 348 pp.
- Rew, L.J., and M.L. Pokorny. 2006. *Inventory and survey methods for nonindigenous plant species, Chapter 5*.
- Roach, N. 2016. *Microdipodops megacephalus* (errata version published in 2017). The IUCN Red List of Threatened Species 2016: e.T42606A115193770. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T42606A22229414.en>.
- Rombough, Chris. 2012. *Instruction Manual and Frog Survey Protocols for Region 1 National Wildlife Refuges, East-side Zone (Great Basin and Great Northern LCCs)*. U.S. Fish and Wildlife Service
- Stringham, T.K, P. Novak-Echenique, P. Blackburn, D. Synder, and A. Wartgow. 2015a. *Final Report for USDA Ecological Site Description State-and-Transition Models by Disturbance Groups, Major Land Resource Area 25 Nevada*. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-02. p. 569.
- Stringham, T.K, P. Novak-Echenique, P. Blackburn, C. Coombs, D. Synder, and A. Wartgow. 2015b. *Final Report for USDA Ecological Site Description State-and-Transition Models by Disturbance Groups, Major Land Resource Area 28A and 28B Nevada*. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-01. p. 1524.
- USACE (U.S. Army Corps of Engineers). 2008. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*. Robert Lichvar and Shawn McColley.

- _____. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center. Technical Report TR-08-12.
- USDI (U.S. Department of the Interior). 2015. Riparian area management: Proper functioning condition assessment for lotic areas. Technical Reference 1737-15. Bureau of Land Management, National Operations Center, Denver, CO
- USFWS (U.S. Fish and Wildlife Service). 2016. *Initial Survey Instructions for Western Monarch and Milkweed Habitat Suitability Assessment*.
- Ulmschneider, H., D. Hays, H. Roberts, J. Rachlow, T. Forbes, J. Himes, E. Sequin, M. Haworth, T. Katzner, A. Kozlowski, R. Rauscher, and P. Lauridson. 2008. *Surveying for Pygmy Rabbits (Brachylagus idahoensis)*. Interagency Pygmy Rabbit Working Group.
- WAFWA (Western Association of Fish and Wildlife Agencies). 2021. Crucial Habitat Assessment Tool. <https://www.wafwachat.org/>
- Wiken, Ed, Francisco Jiménez Nava, and Glenn Griffith. 2011. North American Terrestrial Ecoregions—Level III. Commission for Environmental Cooperation, Montreal, Canada. North accessed: American Terrestrial Ecoregions—Level III (epa.gov)
- Wildlife Action Plan Team. 2012. Nevada Wildlife Action Plan. Nevada Department of Wildlife, Reno http://www.ndow.org/Nevada_Wildlife/Conservation/Nevada_Wildlife_Action_Plan

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