



Biological Baseline Studies 2022 Work Plan

Ore Transportation Project

20 December 2021

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Biological Baseline Studies 2022 Work Plan

Ore Transportation Project



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Acronyms and Abbreviations

AGOL	ArcGIS Online
ARMPA	Approved Resource Management Plan Amendment
BCC	Bird of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
ERM	ERM-West, Inc.
ESD	Ecological Site Description
GIS	Geographic Information System
GPS	Global Positioning System
IM	Instruction Memorandum
MBTA	Migratory Bird Treaty Act
NAAMP	North American Amphibian Monitoring Program
NDNH	Nevada Division of Natural Heritage
NDOW	Nevada Department of Wildlife
NGM	Nevada Gold Mines, LLC
NHD	National Hydrography Dataset
NRCS	Natural Resource Conservation Service
NV	Nevada
NWI	National Wetlands Inventory
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 baseline surveys and/or trapping/baiting to determine habitat occupancy, and noise monitoring for the Ore Transportation Project (herein referred to as the “Project”). Surveys will be conducted for eagles and other raptors, greater sage-grouse (*Centrocercus urophasianus*; hereafter referred to as “sage-grouse”), amphibians, and springsnail species (Superfamilies *Truncatelloidea* and *Cerithioidea*); trapping for pale (*Microdipodops pallidus*) and dark kangaroo mice (*Microdipodops megacephalus*), and shrews (*Sorex spp*); and noise monitoring will be conducted at eagle nests and sage-grouse leks. These studies were requested by the Bureau of Land Management (BLM) during Project coordination in May 2021.

The 2022 Work Plan is a guideline provided to assist in conducting these surveys and trapping efforts within the relevant survey areas as determined from data collected during the surveys and habitat assessments conducted during the 2021 field season for the Project. The surveys, monitoring, and/or trapping activities will be completed using protocols approved by the BLM, and are anticipated to occur from 1 February through 1 July 2022.

2 PROJECT LOCATION, SETTING AND DESCRIPTION

The Project intersects Elko, Eureka, and Lander counties and includes approximately 3,443 acres (1,393 hectares) of public lands administered by the Elko and Battle Mountain BLM Districts and approximately 5,414 acres (2,190 hectares) of privately owned lands. BLM Resource Management Plans (RMPs) applicable to the Project 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.

The Project setting is 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 Level III ecoregion hydrology is internally drained, and most streams are intermittent and ephemeral (Wiken et al. 2011).

The proposed 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 optimizing processing. NGM's proposed Project includes:

- Conventional Rail Technology—new railway extending from Cortez north to Beowawe where it will connect to the Union Pacific Railroad to travel east and west:
 - New siding and rail line will be constructed at Carlin to travel north to Gold Quarry;
 - New 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.
- Five borrow source areas and 19 temporary construction depots, which will be reclaimed after the completion of construction.

3 SCOPE OF WORK

The biological and noise baseline study area (Project Area) includes a 200-foot buffer (unless specified otherwise for particular resources) of the railway and conveyor centerline, 50-foot buffer of existing roads, five borrow sources, and 19 construction depot locations. Surveys will be conducted for eagles and other raptors, sage-grouse, pale and dark kangaroo mice, shrew species, amphibian species, and springsnail species. Data sources used for these surveys will include:

- BLM Sensitive Species List for Nevada (NV IM-2018-003; BLM 2018, 2019);
- Nevada Division of Natural Heritage (NDNH); and
- NGM previous survey data, including the 2021 baseline studies conducted for the Project guided by these data sources:
 - U.S. Geological Survey (USGS)
 - National Hydrography Dataset (NHD)
 - National Wetlands Inventory (NWI)
 - 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)

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. The 2022 scope of work schedule is shown on Figure 1. Adjustments to the schedule may occur to accommodate drought conditions or inclement weather. Figure 2 shows the Project Area, land jurisdiction, and the three survey areas (Goldstrike, Carlin, and Crescent Valley) where NGM is proposing to construct and operate railway lines.

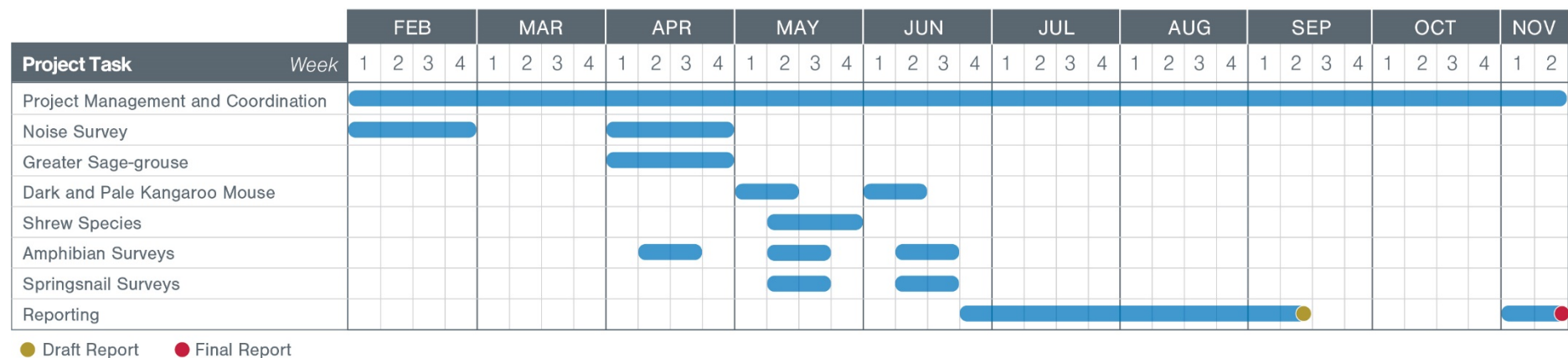


Figure 1: 2022 Anticipated Project Schedule

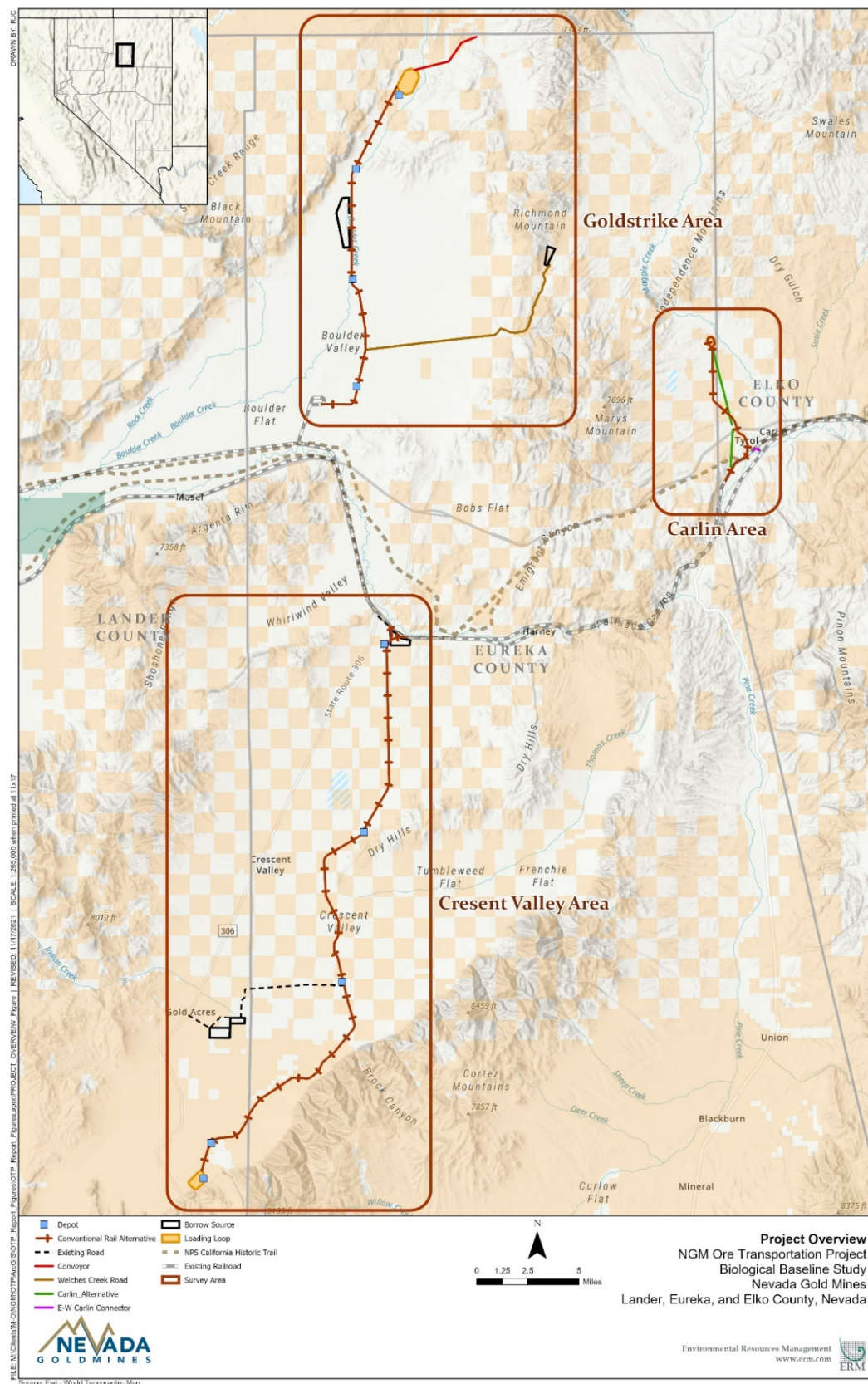


Figure 2: Project Overview

3.1 Eagles and other Raptors

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 United States Code [USC] § 668) and the Migratory Bird Treaty Act of 1918 (MBTA; 16 USC §§ 703–712). The BGEPA 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 authorized under federal permit. As defined in the BGEPA, 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 MBTA implements various treaties and conventions for the protection of migratory birds, including raptors. Under this act, taking, killing, or possessing migratory birds (including any part, nest, or egg) is unlawful.

The Project contains multiple diverse habitats (e.g., rocky outcrop and cliff/canyon habitats, open valleys, grasslands/forblands, agricultural lands, riparian areas, trees, and transmission line corridors) that may provide suitable nesting and foraging habitat for raptors. Eleven species of raptors have the potential to occur within and near the Project, as shown in Table 1.

Table 1: Special Status Raptor Species Potentially Occurring within the Project Area

Species	Agency Status	Habitat
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	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 ^a ; 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
Great Horned Owl (<i>Bubo virginianus</i>)	N/A	Nests in trees near open areas; Can utilize desert canyons, mountain forests, and agricultural areas
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
Prairie Falcon (<i>Falco mexicanus</i>)	USFWS BCC ^a	Treeless terrain, including prairies, deserts, canyons, and foothills in arid environments, preferring nest sites on cliff ledges
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	N/A	Grasslands, sagebrush, pinyon-juniper, and riparian/shrub habitats
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
Turkey Vulture (<i>Cathartes aura</i>)	N/A	Nests in caves, rock ledges, and abandoned raptor nests adjacent to rangeland, forests, and open areas
Western burrowing owl ^b (<i>Athene cunicularia hypugaea</i>)	BLM Sensitive	Breed throughout NV in salt desert scrub, Mojave shrub, sagebrush habitat, and agricultural landscapes

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

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

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

^b Western Burrowing Owl nests will not be captured during the eagle and raptor surveys.

3.1.1 Purpose and Objectives

The presence of eagles and other raptor species protected under the BGEPA and/or MBTA that occur within the Project area will be determined using background data (including previous NGM surveys and publicly available data) and conducting aerial and ground-based surveys.

3.1.2 Project Survey Area

Eagle and raptor data will be assessed for all nests and documented occurrences within a 10-mile buffer of the Project (Project Area). Figure 3 shows previously documented nests from historic and recent NGM and NDOW survey data.

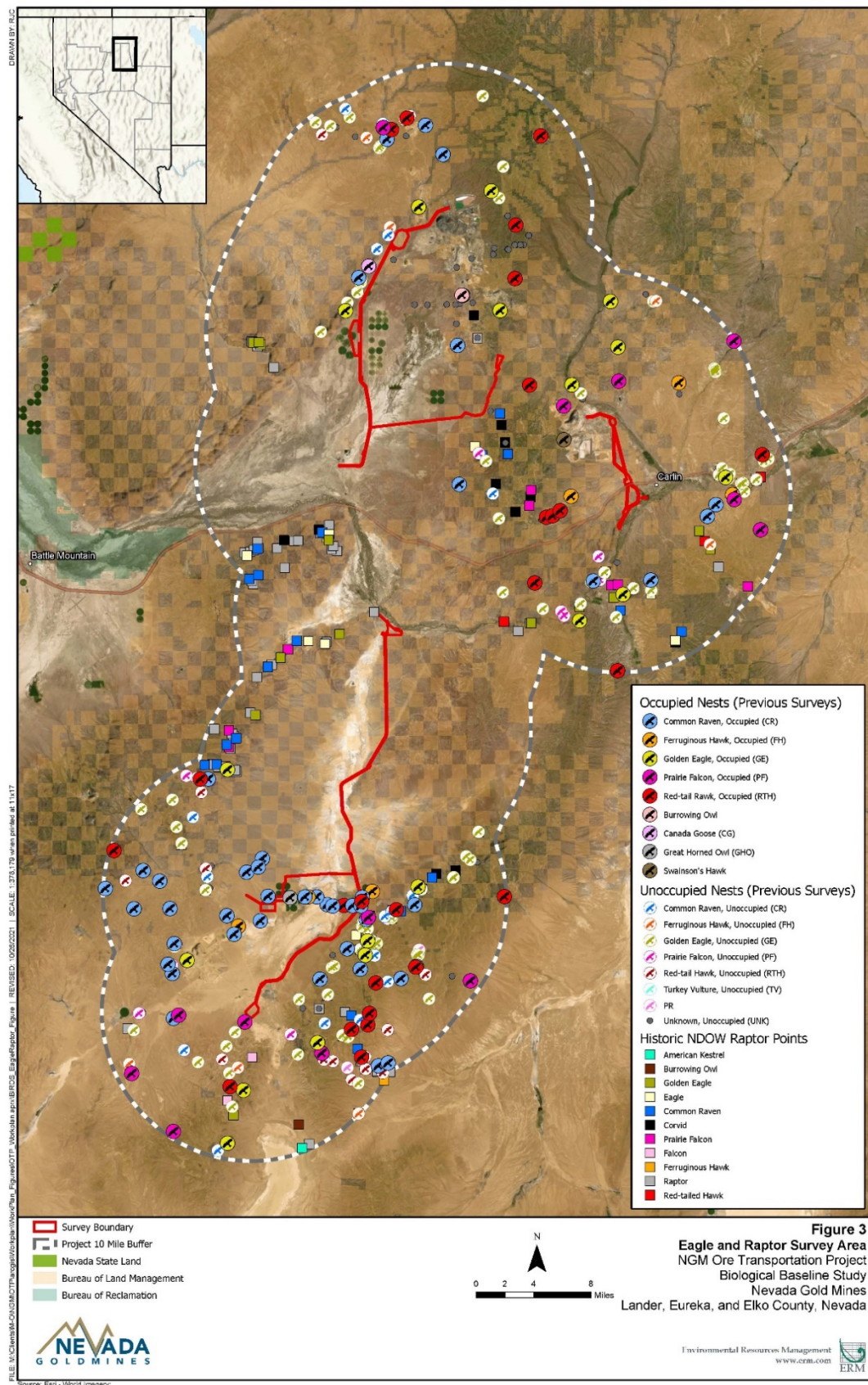


Figure 3: Eagle and Raptor Survey Area

3.1.3 Methodology

Existing literature, Geographic Information System (GIS) data, observations, and survey information from BLM, U.S. Fish and Wildlife Service (USFWS), NDOW, NDNH, and NGM will be compiled and analyzed against aerial imagery during the desktop assessment to identify known nest occurrences and suitable habitat within the Project and 10-mile 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)

Eagle and other raptor surveys will be conducted via aerial and ground-based surveys to determine nest occupancy. Three aerial survey events will be conducted no less than 30 days apart beginning in February and ending in April. Nests determined to be occupied during the aerial surveys will be confirmed during ground-based surveys in May and/or June to document nesting success. The eagle and raptor nest aerial surveys will include searching for cliff- and tree-dwelling raptors.

Surveys will not be completed in inclement weather. All observation posts—the locations from which biologists will conduct nest observation during ground-based surveys—will be established after the aerial surveys are completed and confirmed with BLM and NDOW biologists. The observation posts of potentially active nests will be established in locations that are far enough from the potential nest site to effectively observe the behavior of the adults (if present) without disturbing nesting behavior. Ground observers will survey from the established observation posts to document presence or behavior indicative of eggs or young. The ground survey will end if observations confirm presence, behavior indicative of the presence of eggs or young, or if there is evidence that the observer is disturbing the birds.

All previously recorded nests will be added to ArcGIS Online (AGOL) web app and a route analysis created to plan flight paths in preparation for the surveys. The anticipated schedule of the aerial surveys will be coordinated with the agencies to reduce disturbance to nesting species. Cloud-based electronic survey forms (Survey123) will be created following data collection guidance from the *Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance* (Pagel et al. 2010).

To maintain consistency in collected data, ERM will use the raptor nest IDs established in previous surveys and follow the recommended naming convention for new nest discoveries (Pagel et al. 2010). The survey date, time, name of observers, coordinates of nest, nest substrate, nest type, nest condition, nest size, nest status, and the species utilizing the nest (if applicable) will be recorded in Survey123. Each nest will be photographed using a high-resolution camera with telephoto lens. All data and photo(s) will be collected quickly in order to reduce disturbance to occupied nests. Nests will be recorded as occupied if observation of eggs, young, fresh decorations, or presence of adults. Biologists will attempt to identify the species of raptor associated with each active nest. The flight path travelled during the aerial surveys will be recorded using GPS units.

3.2 Greater Sage-grouse

Sage-grouse is a BLM Sensitive Species and a game bird under Nevada Administration Code (NAC) 503. The sage-grouse was a candidate species for listing under the Endangered Species Act until 2 October 2015, when the USFWS determined that listing was unwarranted (80 Federal Register 191 pgs. 59858-59942). BLM finalized the 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 sage-grouse habitat resulting from development projects.

The 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). Productive nesting habitat for sage-grouse includes sagebrush with a diverse canopy and healthy understory of native forbs and grasses (Wakkinen 1990; Gregg 1991; Schroeder et al. 1999; Connelly et al. 2000). During the spring breeding season—approximately March 1 through May 15 in Lander and Eureka counties, Nevada (BLM 2014)—males gather on “leks” to perform courtship displays. 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).

3.2.1 Purpose and Objectives

Lek monitoring will be conducted to determine the status of known sage-grouse leks occurring within the Project Area.

3.2.2 Project Survey Area

Sage-grouse lek monitoring will occur at leks within a 4-mile buffer of the Project (Project Area), as shown on Figure 4. The 4-mile buffer is based on recommended lek buffer distances established in the ARMPA (BLM 2015). Per ERM’s data sharing agreement with NDOW, the lek locations shown on Figure 4 are approximate.

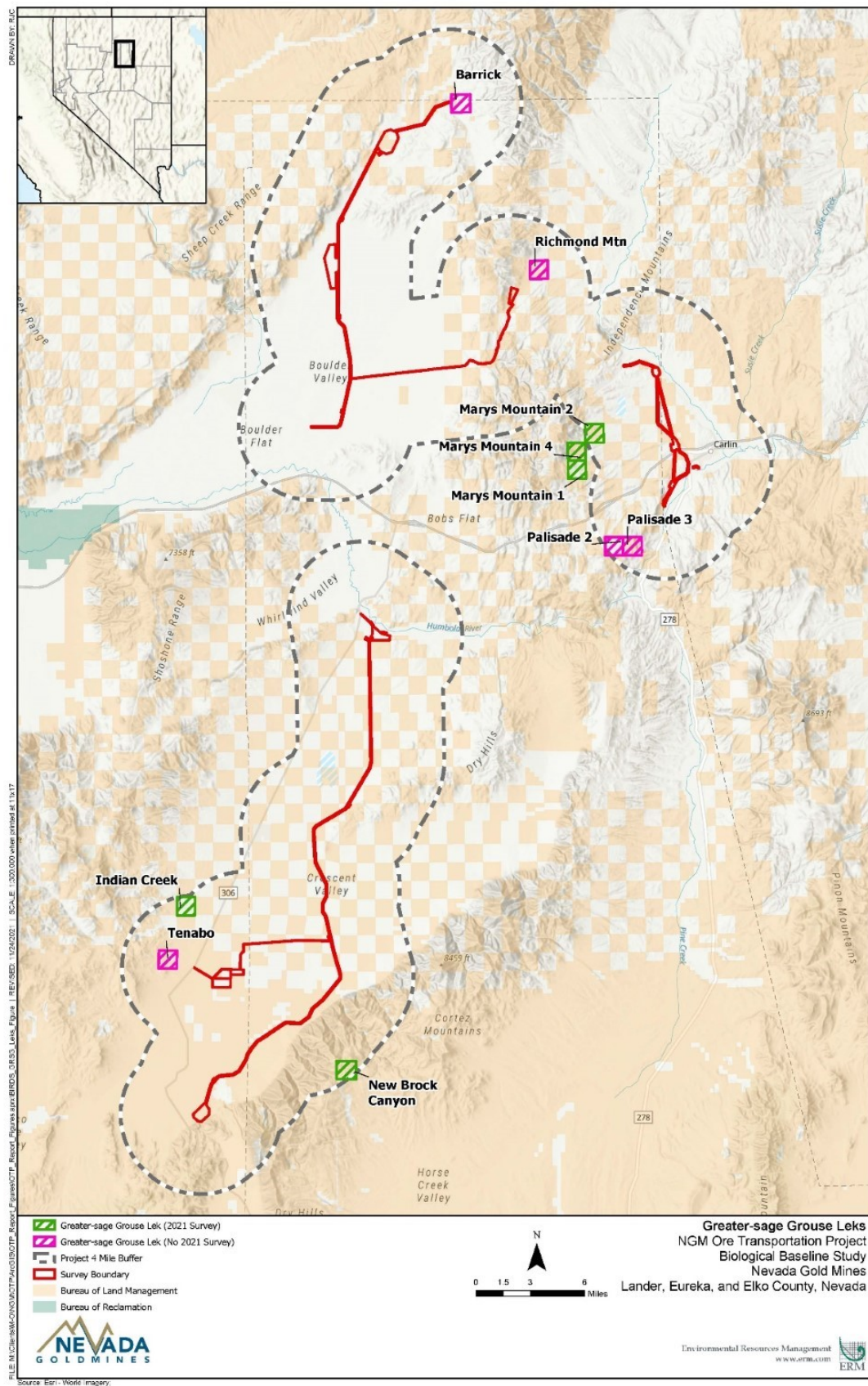


Figure 4: Greater-sage Leks Survey Area

3.2.3 Methodology

The sage-grouse leks within the Project Area were mapped using data supplied by NDOW through a sensitive data request (Figure 4). In spring 2021, ground-based lek counts were conducted by NDOW and also ERM in conjunction with surveys occurring in the Cortez District (ERM 2021).

The following protocols will be used for this analysis:

- *Statewide Wildlife Survey Protocols* (BLM 2014)
- *NDOW Lek Survey Protocol* (NDOW 2013)

Surveys for sage-grouse are anticipated to be conducted during the peak of lekking activity (April). Based on coordination with NDOW and BLM, seven of the 10 known leks will be monitored in 2022. Table 2 lists the monitoring plan for the sage-grouse leks within the Project Area.

Table 2: GRSG Lek Status and Monitoring Plan

Lek ID	Name	NDOW Status ^a	Last Survey Year	2022 Monitoring Plan ^b
COR-007	Mary's Mountain 1 ^c	Inactive	2019	No Monitoring
COR-006	Mary's Mountain 2	Active	2021	Monitor for activity
COR-031	Mary's Mountain 4	Inactive	2021	Monitoring for activity
COR-018	Palisade 2	Inactive	2019	Monitor for inactivity
COR-015	Palisade 3	Active	2019	Monitor for activity
COR-032	New Brock Canyon ^d	Active	2021	Monitor for activity
SHO-018	Indian Creek ^d	Inactive	2021	Monitor for inactivity
SHO-006	Tenabo ^c	Unknown	2016	No monitoring
TUS-078	Barrick ^c	Unknown	Unknown	No monitoring
NOFO-139	Richmond Mountain ^d	Unknown	2014	Monitor for activity

Table Source: NDOW 2021

^a NDOW Status—Official lek status based on information received from NDOW in January 2021.

^b2022 Monitoring Plan—Protocol to be followed as explained in the technical scope of work. Monitoring for activity will include three ground-based survey events; Monitoring for inactivity will include one ground-based survey event. Noise monitoring will follow the Interim Sage-Grouse Noise Protocol Clarifications protocol as described in Section 3.7.

^cNDOW confirmed no monitoring is required.

^dMonitoring activity at these leks may be coordinated with other project's monitoring efforts and schedules

Ground-based lek monitoring will be conducted following established protocols (BLM 2014, NDOW 2013). These protocols require repeated, on-the-ground surveys of lek activity during the breeding season between 1 March 1 to 15 May, with the goal of assessing peak attendance by males and females.

ERM will perform site reconnaissance to determine observation points and access for each lek location prior to surveys. For each survey, a team of two biologists will arrive at the lek observation point at a minimum of 45 minutes before sunrise to reduce disturbance to GRSG. If birds can be heard but not seen, the biologists will hike in opposite directions around the estimated location of the auditory detection, taking care to maintain a minimum distance of 200 yards in an attempt to gain a more suitable vantage point.

For each lek monitoring event, four counts will be obtained at 15-minute intervals between 30 minutes before and 90 minutes after sunrise. All survey data will be collected electronically in ArcGIS

Survey123 using the NDOW Lek Count Data Collection Form (NDOW 2013). The following data will be documented during each survey:

1. Monitors will record the following upon arrival:
 - a. Lek name, activity, and sign of recent activity
 - b. Coordinates of the surveys vantage point
 - c. Date and time of survey
 - d. Wind Speed (miles per hour)
 - e. Temperature (Fahrenheit)
 - f. Cloud Cover
 - g. Precipitation
2. Males and females will be distinguished during counts. Per NDOW protocol, if the sex of the bird cannot be identified, the sex will be recorded as “unknown”. Only confirmed sage-grouse males and females are included in the high count totals.
3. Any presence of predators will also be documented by species, time, and activity
4. The survey end time will be noted.

If no sage-grouse are observed during the first count, biologists will conduct the remaining counts by searching the area around the lek to look and listen for signs (i.e. feathers, scat, cecal tar) of sage-grouse. If activity is documented, NDOW will be consulted to determine the need for additional lek surveys.

3.3 Dark and Pale Kangaroo Mouse

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

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

3.3.1 Purpose and Objectives

Field trapping will be conducted to confirm the presence or absence of kangaroo mice within the Project Area in order to assess future impacts to individuals and habitats. The status of sensitive small mammal populations, including dark and pale kangaroo mice, is currently unknown in vicinity of the Project.

3.3.2 Project Survey Areas

Dark and pale kangaroo mouse trapping will occur in the three areas identified during the 2021 surveys, as shown in Table 3 and Figure 5. During the 2021 surveys, the Project plus a 200-foot buffer including the depot and borrow sites, was surveyed for habitat characteristics preferred by dark

and pale kangaroo mice. Both species of kangaroo mouse are associated with intermountain scrub habitat (Nevada Wildlife Management Plan Team 2012) and are found in shadscale, sagebrush, and alkali-sink plant communities. Surveys focused on habitat consisting of soils with a high sand or sand gravel component, over 12 inches of depth to a restrictive layer, suitable vegetation consisting of sufficient cover, and suitable forage.

Based on the 2021 survey results and mapped field conditions, ERM has delineated habitat areas that represent the greatest potential habitat in relation to the entire Project. The habitat areas delineated within Figure 5 show the areas where there is the highest potential for occupancy by dark and/or pale kangaroo mouse species due to their generally sandy soils and robust vegetation communities that are characteristic of this species.

Table 3: 2022 Pale and Dark Kangaroo Mouse Trapping Areas

Project Area	Trapping Area	SWReGAP (Land Cover Type)	Area (acres)	Total Acres	Number of Transects
Crescent Valley	Crescent Playa Margin 1 (Trap Site 1)	Inter-Mountain Basins Big Sagebrush Shrubland	0.5	38.0	2 50 meter transects across habitat gradient
		Inter-Mountain Basins Greasewood Flat	22.3		
		Inter-Mountain Basins Mixed Salt Desert Scrub	0.2		
		Inter-Mountain Basins Playa	14.9		
	Crescent Playa Margin 2 (Trap Site 2)	Inter-Mountain Basins Greasewood Flat	118.2	141.3	3 50 meter transects across habitat gradient
		Inter-Mountain Basins Playa	23.1		
	Cortez Foothills North (Trap Site 3)	Agriculture	7.1	354.3	5 50 meter transects across habitat gradient
		Barren Lands, non-specific	4.6		
		Inter-Mountain Basins Big Sagebrush Shrubland	183		
		Inter-Mountain Basins Greasewood Flat	38		
		Inter-Mountain Basins Mixed Salt Desert Scrub	113.5		
		Invasive Annual and Biennial Forbland	2.4		
		Recently Mined or Quarried	5.7		

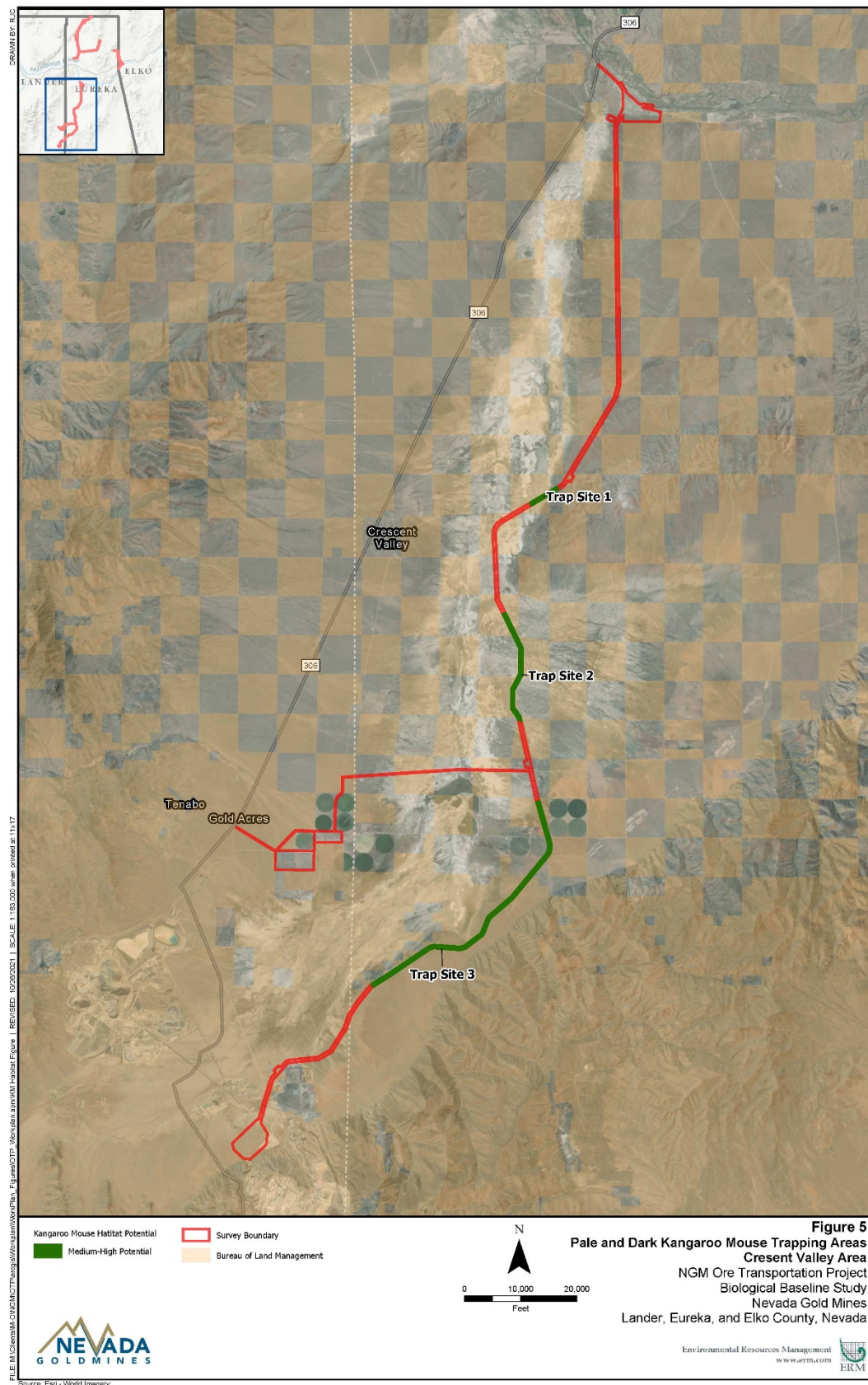


Figure 5: Dark and Pale Kangaroo Mouse Trapping Areas

3.3.3 Methodology

Trapping for dark and pale kangaroo mice will occur within three main areas identified during the 2021 surveys using the following protocols for the analysis:

- *Statewide Wildlife Survey Protocols* (BLM 2014)
- *Guidelines of the American Society of Mammalogists for the use of wild mammals in research and education* (Sikes 2016)
- *Modified Hycroft Microdipodos Survey Protocol* (Stantec Consulting Inc. 2019)

Dark and pale kangaroo mouse trapping will be conducted in May 2022, when temperatures are consistently above 32 degrees Fahrenheit. If no individuals are trapped in an area during the first session, then a second trapping session will be required and occur in June 2022.

The Universal Transverse Mercator (UTM) coordinates of all trap locations along a transect or at a trapping station will be recorded, and georeferenced photos will be taken for any signs of kangaroo mice, including scat, tracks, or potential burrows. Precise locations of the traps will be determined in the field by experienced biologists to determine the most effective trapping locations based on current field conditions and utilizing existing data sources including NRCS Ecological Site Description (ESD), NRCS Soil Survey Geographical Database (SSURGO).

Field crews will conduct a single trapping season with two 4-day trapping sessions in each of the three trapping areas, resulting in eight trap checks during a survey season. Transects will be placed across the three trapping areas to cover proportional variation of landcover types within each trapping area. A pair of traps will be set approximately every 25 meters along a 50 meter transect. The distance between each trap in the pair will be approximately 10 meters. Specific transects will be sited in locations developed in the field based on habitat characteristics that season, which represent the greatest potential for trapping success. At least one trap station will be located within each SWReGAP land cover type within each of the three trapping areas identified in Table 3.

Captured individuals will be handled as described in the 2016 *Guidelines of the American Society of Mammalogists for the use of wild mammals in research and education* (Sikes 2016) and guidelines provided by the BLM or NDOW. Sherman live traps will be baited with rolled oat and peanut butter mixture and birdseed. In addition, traps will include poly-fill material for bedding and insulation and, if necessary, placed in a shaded area or covered with shade cloth. An ear clip from all of the kangaroo mice captured will be sent to NDOW for genetic evaluations.

Kangaroo mouse activity has been observed as highest immediately after sunset and continues through the night (Manley et al. 2006). Trapping will not be conducted when the predicted ambient temperature is below 45 degrees Fahrenheit (7 degrees Celsius). Traps will be opened approximately 1 hour prior to sunset and will be checked within approximately 1 hour after sunrise. Field teams will collect all data electronically (ArcGIS Survey123), including data on weather, survey, start/stop time, Site ID, number of successful traps, number of false trips, and all non-target species.

3.4 Shrews

Four shrew species—i.e., American water shrew (*Sorex palustris*), Inyo shrew (*Sorex tenellus*), Merriams' shrew (*Sorex merriami*) and Preble's shrew (*Sorex preblei*)—are BLM Sensitive Species in Nevada (Table 4). These four *Sorex* species potentially occur on BLM administered lands in Nevada and are associated with intermountain scrub habitat and are found in areas with shadscale, sagebrush, and alkali-sink plant communities with riparian features (BLM 2018, 2019; Nevada Wildlife Management Plan Team 2012).

Table 4: BLM and NDOW Special Status Shrew Species

Species	Agency and Population Status	Wildlife Action Plan Habitat Links
American water shrew (<i>Sorex palustris</i>)	BLM NV Sensitive Moderately Vulnerable	Most abundant along small streams with thick riparian growth around lakes, ponds, marshes, bogs, and other lentic habitats
Inyo shrew (<i>Sorex tenellus</i>)	BLM NV Sensitive Presumed Stable	Habitats include riparian zones and canyon bottoms, rocky mountain habitat in areas with logs, boulders, or sagebrush scrub and red-fir communities; In Great Basin National Park, this shrew was found at 9,800 feet (3,000 meters) in habitat dominated by Engelmann spruce
Merriam's shrew (<i>Sorex merriami</i>)	BLM Sensitive Presumed Stable	Primarily found in various grassland habitats, including grasses in sagebrush scrub/pinyon-juniper habitat, and also in mountain-mahogany and mixed woodlands
Preble's shrew (<i>Sorex preblei</i>)	BLM NV Sensitive Presumed Stable	Habitats include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush, willow-fringed creeks, marshes, bunchgrass, sagebrush-aspen and sagebrush-grass associations, and alkaline shrublands

Table Source: BLM 2018, 2019

3.4.1 Purpose and Objectives

There is a lack of species-specific information on the abundance and distribution of the four special status shrew species with the potential to occur in the Project. The amount and distribution of habitat potentially occupied by these shrew species is comparatively well known based on the 2021 field surveys. The purpose of trapping is to determine presence or absence of the four special status shrew species within the Project.

3.4.2 Project Survey Areas

Based on the 2021 field data collected, ERM identified 20 trapping areas in the Project, as shown in Table 5 and on Figure 6.

Table 5: 2022 Special Status Shrew Species Trapping Areas

Project Area	Site_ID	Southwest Regional Gap Landcover Type
Carlin Area	CA01_SH	Inter-Mountain Basins Big Sagebrush Shrubland
	CA02_SH	Inter-Mountain Basins Big Sagebrush Shrubland
	CA03_SH	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	CA04_SH	North American Arid West Emergent Marsh
	CA05_SH	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	CA06_SH	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	CA07_SH	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
Cortez Valley Area	CV01_SH	Inter-Mountain Basins Greasewood Flat
	CV02_SH	Inter-Mountain Basins Greasewood Flat
	CV03_SH	Inter-Mountain Basins Greasewood Flat
	CV04_SH	Inter-Mountain Basins Mixed Salt Desert Scrub
	CV05_SH	Inter-Mountain Basins Mixed Salt Desert Scrub
	CV06_SH	Recently Mined or Quarried
	CV07_SH	Recently Mined or Quarried
	CV08_SH	Inter-Mountain Basins Mixed Salt Desert Scrub
	CV09_SH	Inter-Mountain Basins Greasewood Flat
Goldstrike Area	GS01_SH	Inter-Mountain Basins Big Sagebrush Shrubland
	GS02_SH	Inter-Mountain Basins Big Sagebrush Shrubland
	GS03_SH	Inter-Mountain Basins Big Sagebrush Shrubland
	GS04_SH	Inter-Mountain Basins Big Sagebrush Shrubland

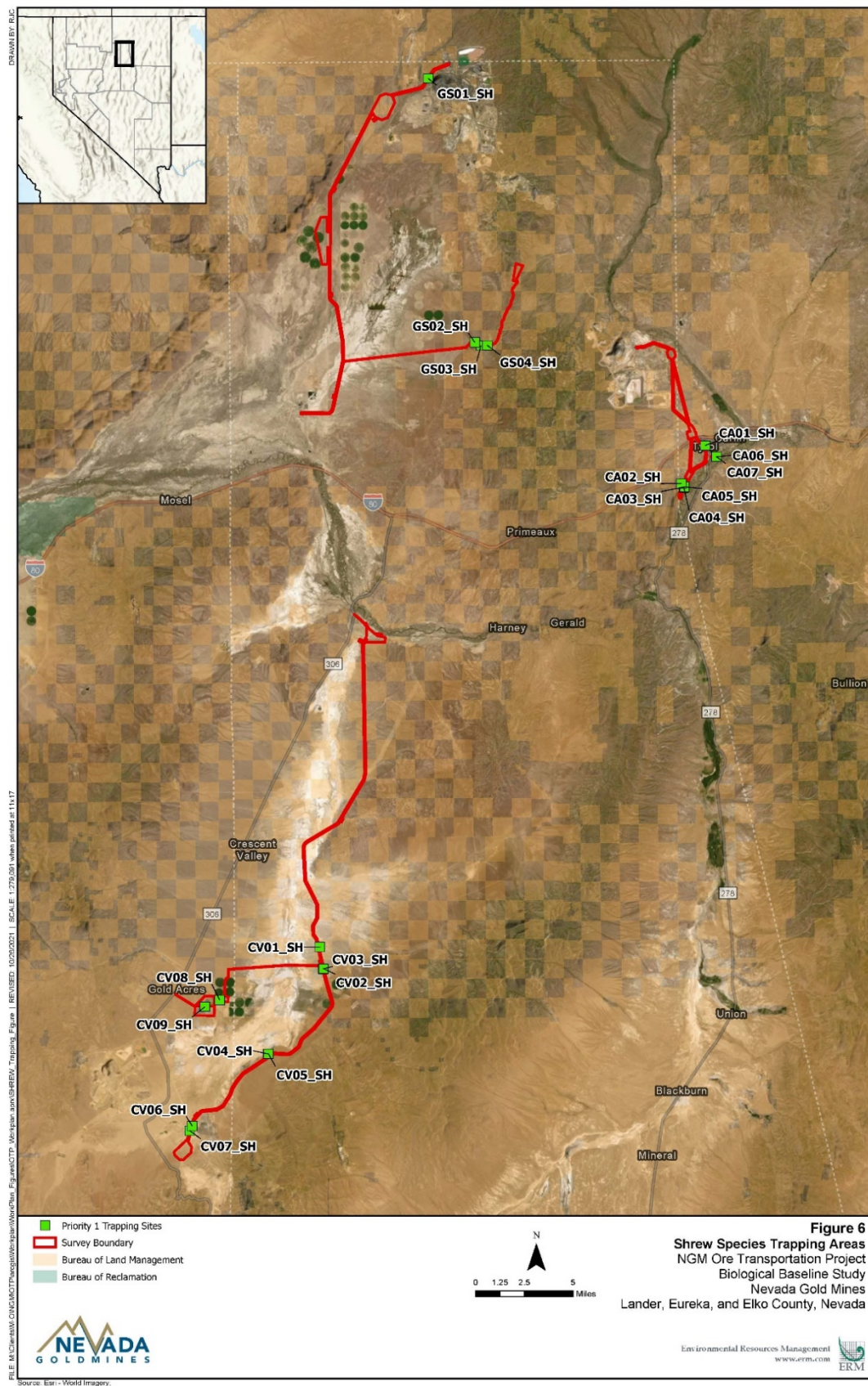


Figure 6: Shrew Species Trapping Areas

3.4.3 Methodology

Nocturnal trapping in areas shown on Figure 6 will be used to determine the presence of the four species of shrews listed in Table 4.

The following protocols will be used in this analysis:

- *Sorex Capture and Handling Protocol for Northern Nevada Elko Biodiversity Program Version 5* (NDOW 2020a)

Special status shrew species trapping sessions will be conducted in April to May 2022.

Trapping arrays for *Sorex* species can be in transects or grids, depending upon the trapping area's habitat, and will therefore be determined based on site conditions at the time of survey. As described in the BLM and NDOW protocol, field crews will conduct a single 4-day trapping season in each of the 20 trapping areas, resulting in a total of 8 trap checks during the single survey season. Captured individuals will be handled as described in the *2016 Guidelines of the American Society of Mammalogists for the use of wild mammals in research and education* (Sikes 2016) or other guidelines provided by the BLM or NDOW. The preferred trapping method will be using Sherman live traps.

In each trapping area, 20 traps would be set and baited with catfood. In addition, the traps will be insulated with a poly-fill material for bedding and insulation and, if necessary, will be placed in a shaded area or covered with shade cloth. Trapping will not be conducted when the predicted ambient temperatures is below 45 degrees (7 degrees Celsius). Traps will be opened approximately 1 hour prior to sunset and will be checked within approximately 1 hour after sunrise. Field teams will collect all data electronically (ArcGIS Survey123), including data on weather, survey, start/stop time, number of successful traps, number of false trips, and all non-target species.

Specimen processing, including tail clipping and or dead or euthanized individuals will be provided to the University of Idaho for genetic testing to confirm species identification. All mortality and euthanized individuals will be collected and the entire specimen submitted to NDOW. Information on the specimen tag will include the trap site, trap number, field measurements, and weight prior to freezing the specimen.

3.5 Amphibians

The three amphibian species listed as BLM Sensitive—i.e., Columbia spotted frog (Great Basin population) (*Rana luteiventris*), Northern leopard frog (*Lithobates pipiens*), and Western toad (*Anaxyrus boreas*)—with the potential to occur within the Project are shown in Table 6. Columbia spotted frog and northern leopard frog are also protected by NAC 503. These species are found in slow moving streams, or in adjacent uplands in the case of Western toads (BLM 2018, 2019). The status of these amphibian species presence is currently unknown in the vicinity of the Project.

Surveys for amphibian species during the 2021 field season followed protocols for Region 1 National Wildlife Refuges, Northern Leopard Frog, and Columbia Spotted Frog Visual Encounter Survey (VES) (Rombough 2012, Kendell 2002, and Hatch and Simandle 2004). In the 24 areas surveyed, two species were detected: numerous bullfrogs (*Lithobates catesbeianus*), a non-native invasive species, and a single Woodhouse toad. Bullfrogs were very prevalent in the area near the Humboldt River, and native frog species are often absent in areas where bullfrog populations have become established.

Table 6: BLM and NDOW Special Status Amphibian Species

Species	Agency Status	Habitat
Columbia spotted frog (Great Basin population) (<i>Rana luteiventris</i>)	BLM Sensitive NDOW State Protected	Closely associated with clear, slow-moving or ponded surface waters with little shade and relatively constant water temperatures; Overwintering occurs in spring heads and deep undercuts with overhanging vegetation and ice-covered deep ponds
Northern leopard frog (<i>Lithobates pipiens</i>)	BLM Sensitive NDOW State Protected	Permanent ponds, swamps, marshes, and slow-moving streams throughout forest, open and urban areas, normally inhabit water bodies with abundant aquatic vegetation
Western toad (<i>Anaxyrus boreas</i>)	BLM Sensitive	Found in a wide variety of habitats ranging from desert springs to mountain wetland and various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers or streams

3.5.1 Purpose and Objectives

Field surveys will be conducted to document the occurrence of amphibian species within the Project and to assess potential future impacts of Project activities to individuals, communities, and/or habitat.

3.5.2 Project Survey Areas

Amphibian egg mass and call baiting surveys will be conducted in the seven areas listed in Table 7 and shown on Figure 7¹. Target habitats for these surveys were identified during 2021 field work that indicates these areas provide aquatic habitats that could be occupied by these species.

Table 7: 2022 Amphibian Nocturnal Call Survey Areas

Project Area	Amphibian Survey Area Number	2021 Species Result	Survey Area Length (feet)	Number of Listening Stations
Carlin	Amp#1	<i>Lithobates catesbeianus</i>	736	2
Carlin	Amp#2	<i>Lithobates catesbeianus</i> <i>Anaxyrus woodhousii</i>	646	2
Carlin	Amp#3	<i>Lithobates catesbeianus</i>	938	3
Carlin	Amp#12	None Observed ^a	967	3
Total			3,287	10

^a While no amphibian species were observed in Amp#12 during the 2021 field season, ERM recommends including this area due to the potential for amphibian species to be present.

¹ No surveys are proposed for Amp#5, Amp#6, and Amp#10 in 2022 as these survey areas are down gradient from the existing Union Pacific Railroad tracks.

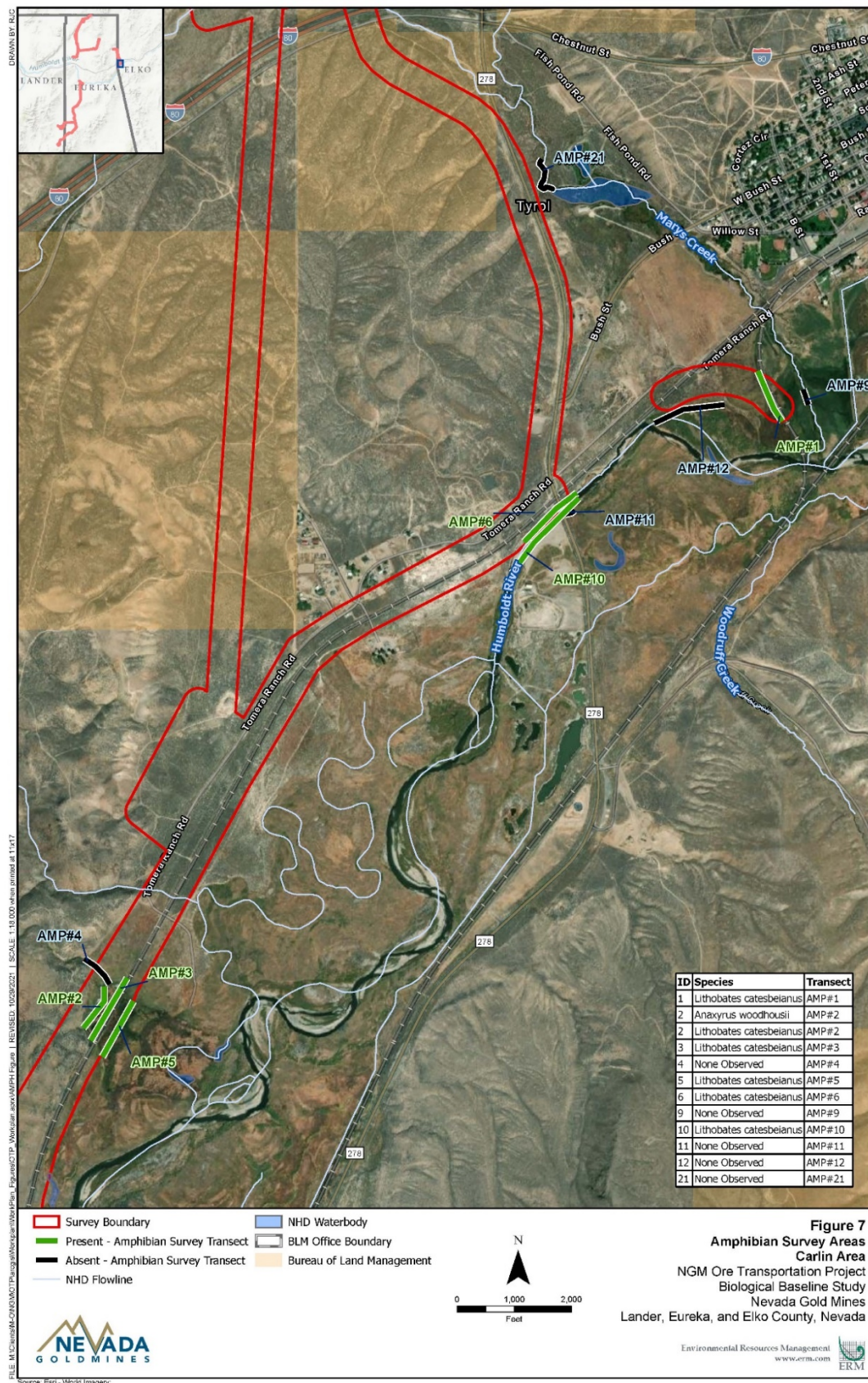


Figure 7: Amphibian Survey Areas

3.5.3 Methodology

ERM Biologists will conduct one egg mass survey and two nocturnal call baiting surveys in each areas listed in Table 7. These surveys will be conducted in accordance with the North American Amphibian Monitoring Program, and species-specific protocols provided by the BLM and NDOW.

The following protocols will be used for these surveys:

- Columbia Spotted Frog (*Rana luteiventris*) Visual Encounter Surveys (Hatch and Simandle 2004)
- Survey Protocol for the Northern Leopard Frog (Kendall 2002)
- North American Amphibian Monitoring Program (USGS 2015)

Surveys for amphibians will be conducted between April and June 2022. The April survey period will be to look for egg masses in the four survey areas. The UTM coordinates of areas where egg masses are observed will be recorded and geo-referenced photographs taken of the area depicting habitat conditions. Nocturnal call baiting surveys where egg masses are observed will be conducted twice, one in May and again in June.

The North American Amphibian Monitoring Program (NAAMP) developed by the USGS is a road-based survey and ERM proposes to modify for a pedestrian based survey. The USGS protocol was modified by reducing the distance between listening stations from 0.5 mile to a maximum of 100 meters.

Two-person crews will conduct the two nocturnal surveys in the four areas for a total of 8 listening stations. The first call baiting survey would be mid-May and the second in mid-June depending upon weather conditions (USGS 2015; Estes-Zumpf et al. 2017). Environmental factors such as rain and habitat between overwintering sites can affect the start of the breeding season. Nocturnal surveys will begin no earlier than 30 minutes after sunset and completed no later than 01:00 a.m. Listening stations will be located 330 feet (100 meters) apart or in each major habitat type present in the survey area. Listening stations within each survey area will be sited away from roads or other areas where ambient noise could mask amphibian calls. At each listening station, call baiting (playing recordings of the three species listed in Table 6) will be conducted by playing call recording for 1 minute at each listening point prior a 5-minute listening interval. Listening stations will be accessed by foot and placed as close to the habitat as feasible without disturbing amphibians. At each listening station, the call index for each species (if present) and other data specified in the protocol will be documented.

3.6 Springsnails

There are 14 springsnail species listed as BLM Sensitive with the potential to occur within the Project. Springsnails are small aquatic gastropods that live in fresh to brackish water and the species can be closely linked to individual sites (Springsnail Conservation Team 2020). Springsnail genera *Eremopyrgus*, *Fluminicola*, *Juga*, *Pyrgulopsis*, and *Tryonia* are included in NDOW's 2012 Wildlife Action Plan due to their localized populations. The status of these species is at a moderate risk of extinction due to a restricted range, small population numbers, or other factors (Nevada Wildlife Management Plan Team 2012).

3.6.1 Purpose and Objectives

The purpose of the surveys is to document the presence of springsnail species in perennial water sources within the Project, and to inform future impact analyses about the occurrence and status of these species in areas where there could be potential direct or indirect effects on springsnail species habitat.

3.6.2 Project Survey Areas

During the 2021 field season, ephemeral flow areas, springs, and streams were identified and evaluated within the Project and up to a 400-foot-wide buffer, including the depot and borrow sites.

This evaluation included conducting Proper Functioning Condition assessment of all non-ephemeral wetland or water features that have a predominance of wetland vegetation regardless of whether the feature meets the U.S. Army Corps of Engineers protocol as a wetland or waterbody. Using information compiled from the 2021 field surveys, 11 areas were identified as having the potential for springsnail species presence, as shown in Table 8 and Figure 8.

Table 8: 2022 Springsnail Survey Areas

Project Area	Site_ID	Name	Length (feet)
Goldstrike Area	GS01_SS	Rodeo Creek	8,868
	GS02_SS	Boulder Creek	7,452
	GS03_SS	Welches Creek Reach 2	2,102
	GS04_SS	Welches Creek Reach 1	3,308
Carlin Area	CA01_SS	Warm Springs Reach 1 and 2	760
	CA02_SS	Wetland	688
	CA03_SS	Wetland	455
	CA04_SS	Wetland	544
Crescent Valley Area	CV01_SS	Cottonwood Creek Diversion	1,364
	CV02_SS	Brock Creek Diversion	2,549
	CV03_SS	Indian Creek	2,678
Total			30,768

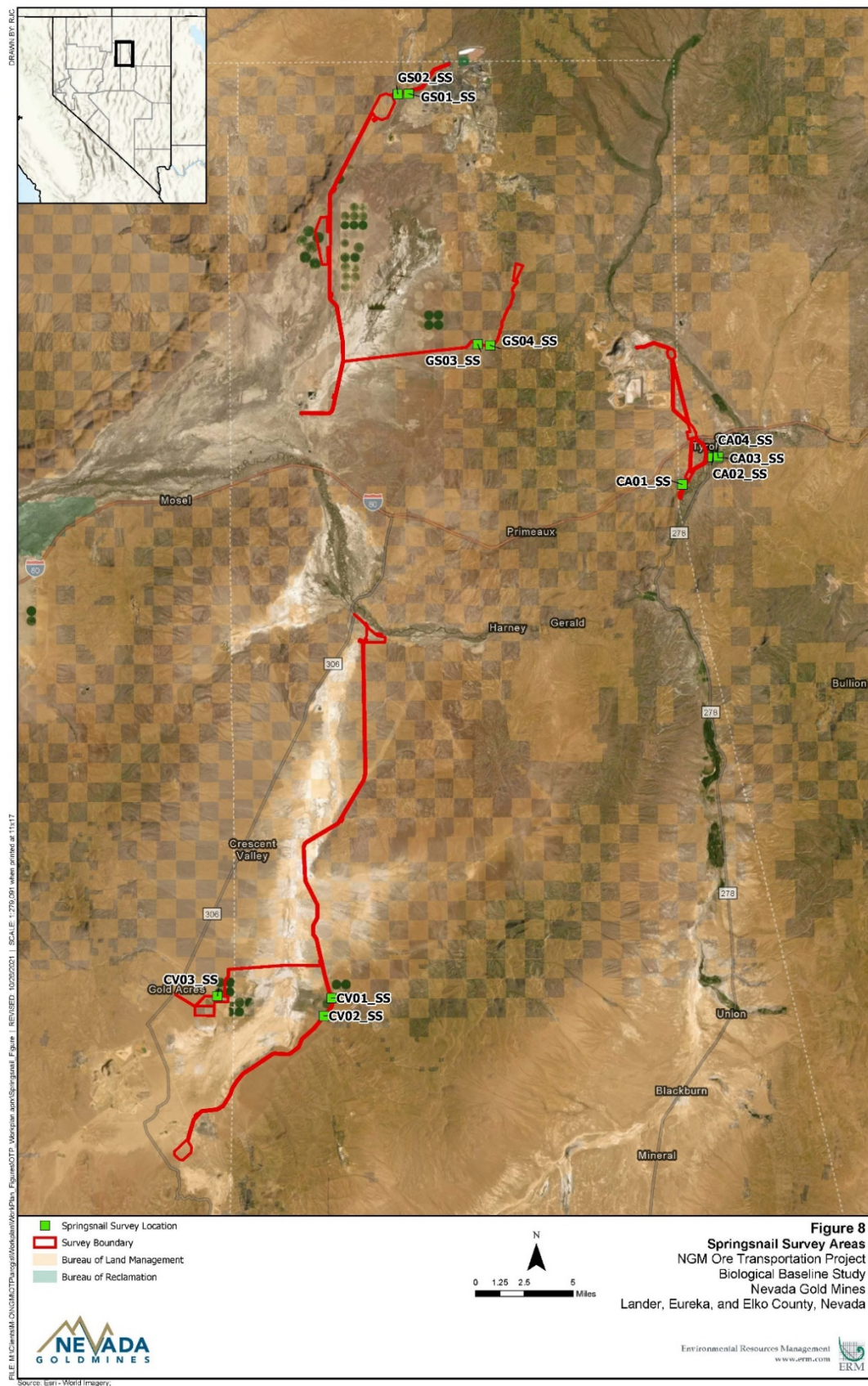


Figure 8: Springsnail Survey Areas

3.6.3 Methodology

Springsnail surveys will be conducted at the 11 areas shown on Figure 8 during the 2022 field season.

The following protocol will be used in this analysis:

- *Nevada Springsnail Survey Protocol [EKDO Springsnail Survey Protocol], BLM and Great Basin Institute 2018 (Helmig et al. 2018).*

The springsnail surveys will be conducted between April and May 2022. The springsnail detection survey at each of the sites will be conducted with two independent observers to record if the species are present during timed observations. Water quality information (temperature, pH, and conductivity) and flow information will be collected. Additional information as described in the *EKDO Springsnail Survey Protocol* will also be recorded and include habitat disturbance, aspect of the spring or water flow, sketch of general features, and site photographs.

If springsnails are observed, a timed search by each observer will be conducted using equipment to help count the number of snails downstream from the first encounter. The length of the wetted area from spring, water depth, and substrate characteristic will be recorded as described in the *EKDO Springsnail Survey Protocol*. The presence or absence of other aquatic species such as fish, amphipods and caddisfly, mayfly or stonefly larvae, or adults will also be recorded.

3.7 Noise Monitoring

Noise monitoring will be conducted at seven locations as part of the 2022 Baseline Noise Assessment, as shown in Table 9. These seven locations are comprised of two golden eagle nests, three sage-grouse leks, Mill Canyon, and Cooks Creek, and were approved by BLM and NDOW in December 2021. Ambient noise measurements were recorded during the 2021 field season at locations focused on bats, amphibians, and human receptors. Mill Canyon and Cooks Creek were monitored during the 2021 surveys, but will be monitored again in 2022 due to equipment issues.

Table 9: 2022 Noise Monitoring Locations

Location ID	Description	Latitude	Longitude
WM-1	Mill Creek - bats and amphibians	40.20398	-116.58408
WM-2	Cooks Creek	40.22916	-116.61301
WM-3	Bats/Eagle Nest near grove of Cottonwoods	40.28161	-116.49862
WM-13	Palisade 3 Lek	40.6407	-116.188047
WM-15	Representative of multiple eagle nests	40.277602	-116.498408
WM-16	Mary's Mountain 2 Lek	40.741552	-116.230994
WM-18	New Brock Canyon Lek	40.217012	-116.483639

^a Actual location to be modified in the field to ¼ mile from the lek in direct line of site

3.7.1 Methodology

Noise monitoring will be conducted between February and April 2022 at the seven locations listed in Table 9.

The following protocols will be used per coordination with NDOW:

- *Acoustic Impacts and Greater Sage-Grouse: A Review of Current Science, Sound Measurement Protocols, and Management Recommendations, February 2018 Update (NDOW 2018)*
- *NDOW Interim Sage-Grouse Noise Protocol Clarifications (NDOW 2020b)*

3.7.1.1 Golden Eagle Nests

ERM will deploy two noise detectors for 10-14 consecutive days during the February breeding season at two known golden eagle nests. The placement of these noise detectors was established during a meeting with BLM and NDOW on 25 October 2021. If changes to noise monitoring stations become necessary due to site conditions, ERM will notify BLM and NDOW before implementing any changes to the location of the detectors.

3.7.1.2 Sage-grouse Leks

Continuous digital sound recordings will be collected at the three active leks listed in Table 9 (Mary's Mountain 2, Palisade 3, and New Brock Canyon). Sound data will be collected 1 foot (approximately 0.3 meters) above ground level to match the approximate ear height of an adult sage-grouse. The placement of the microphone is in an area where vegetation is less than 1 foot tall. The UTM coordinates of the location of each microphone will be recorded and geo-referenced photographs taken with a tape measure or other object for scale.

Sound meters will be placed 0.25 miles from the lek in direct line of site to the nearest lek boundary point. Sound meters will be calibrated in the field at the beginning and end of the measurement period. Calibration results will be included in the 2022 Noise Baseline Report. Field crews will set up sound meters and visits to maintain them outside of lekking periods, preferably from 9:00 a.m. to 2:00 p.m.

Sound measurements will be collected for 10-14 consecutive days during the active lek season (March 1 through May 15). At least 7 of the days recorded must have no interruptions in data, unique disturbance events, or unusual weather. Recording quality will be MP3, 16-bit, 128 kbps; uncompressed .wav, 16-bit, 44,100 kilohertz (kHz).

4 REPORTING

A Comprehensive Biological Baseline Report will be drafted for review by BLM. The report will include the sections as described above and the 2021 Baseline Report data. A schedule for reporting is provided below:

- Draft Report: Due to BLM October 3, 2022
- BLM Review: October 2022 – 30 days
- Final Report: Due mid-November 2022

A Noise Impact Assessment Report, separate 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 Year-1 and Year-2 noise baseline assessment and modeled construction and operational noise impact assessments. The report will also include a summary of recommended noise mitigation measures.

5 DATA COLLECTION AND MANAGEMENT

An AGOL project will be created to manage all desktop and field collected data. All field data will be collected electronically using Survey123 and Field Maps with tablets connected to sub-meter accuracy GPS receivers (Trimble R1). 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 Universal Transverse Mercator (UTM) NAD83, Zone 11 and include all associated metadata, complying with the Federal Geographic Data Committee metadata standards.

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