U.S. Department of the Interior
Bureau of Land Management

North Diamond Valley #1-27 Exploration Project

Environmental Assessment

DOI-BLM-NV-E020-2021-0013-EA

NORTH DIAMOND VALLEY #1-27 EXPLORATION PROJECT

Environmental Assessment

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December 2021

Bureau of Land Management
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1.0 INTRODUCTION

1.1 Introduction

Great Basin Operating, LLC (the Applicant) submitted an Application for Permit to Drill (APD) to the United States Department of the Interior (DOI) Bureau of Land Management (BLM) on January 4, 2021. The Applicant proposes to drill an exploratory oil well, North Diamond Valley #1-27, located in Section 27, Township 27 North (T27N), Range 54 East (R54E), Mount Diablo Baseline and Meridian (MDB&M). The proposed well is located approximately 45 miles south of Elko, Nevada. Map 1-1 shows the general location of North Diamond Valley #1-27 exploration project (the Project).

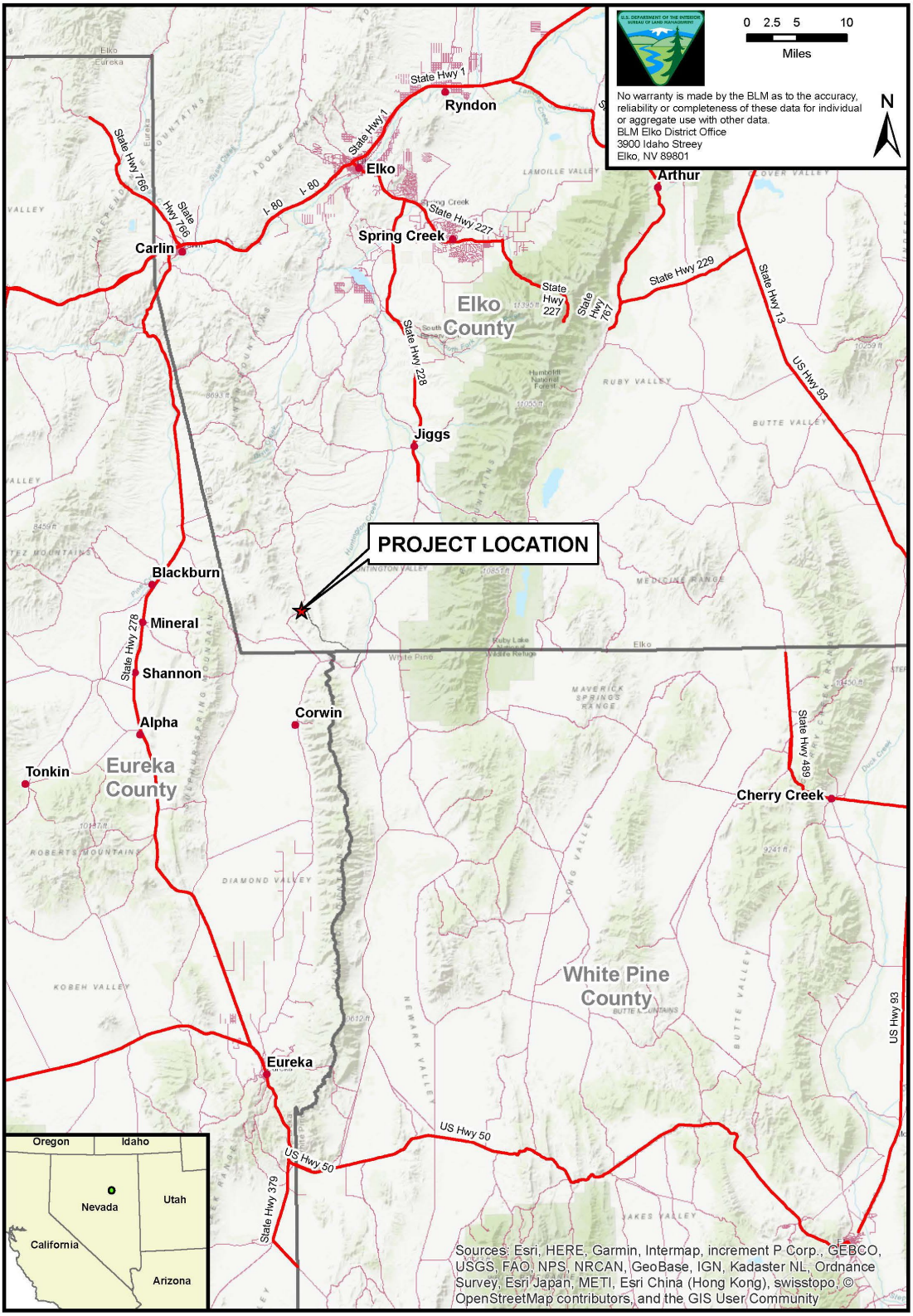
The approval of the APD is a federal action subject to analysis under the National Environmental Policy Act of 1969 (NEPA; Public Law [PL] 1-91-190, as amended [42 United States Code (USC) 4321 et seq.]). The BLM Tuscarora Field Office determined that an environmental assessment (EA) is required to analyze the North Diamond Valley #1-27 APD request. This EA analyzes the direct impacts, indirect impacts, and reasonably foreseeable environmental trends of the Proposed Action to provide the information needed to determine if it would have significant impacts, in which case an Environmental Impact Statement (EIS) would be required.

Under any alternative, all appropriate statutes, regulations, and policies (see Section 1.4) and Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (DOI and USDA 2007; commonly referred to as The Gold Book) would be applied.

1.2 Purpose and Need for Action and Decision to be Made

The purpose of the action is to provide the Applicant with authorized use of the public land managed by BLM to drill the North Diamond Valley #1-27 well and develop associated infrastructure, in compliance with the Federal Land Policy and Management Act of 1976 (FLPMA) and other applicable federal and state laws. The need for the action is established by BLM's legal responsibility to respond to the Applicant's application to drill the North Diamond Valley #1-27 well on Oil and Gas lease NVN-94067, on which the Applicant has valid existing lease rights. The Authorized Officer (AO) must decide whether or not to approve the APD and authorize drilling at the proposed location.

As authorized by Section 501 of the FLPMA, BLM issues right-of-way (ROW) grants for roads, trails, powerlines, communication towers, and other facilities that are in the public interest. The purpose of BLM's ROW portion of the action is to determine whether to issue ROWs for the utilization and maintenance of the roads and well sites and if so under what conditions. The need for the action is established by BLM's responsibility under the FLPMA to respond to a request by a proponent for ROW grants. The AO must decide whether to approve or deny the ROW application.



Map 1-1. General Location Map

1.3 Land Use Plan Conformance

1.3.1 Elko Resource Management Plan

The Proposed Action is in conformance with the Elko Resource Management Plan (RMP) and Record of Decision (ROD), approved on March 11, 1987 (BLM 1987). The Minerals Objective in the Elko RMP is to "Maintain public lands open for exploration, development, and production of mineral resources while mitigating conflicts with wildlife, wild horses, recreation, and wilderness resources."

A Standard Operating Procedure in the Elko RMP states that BLM shall, "Apply restrictions on leasable and/or saleable mineral developments to protect crucial deer winter range, Greater sage-grouse strutting and nesting habitats, and antelope kidding areas."

1.3.2 Nevada and Northeastern California Approved Resource Management Plan Amendment

The Project conforms with BLM's Nevada and Northeastern California Greater Sage-grouse (GRSG) Approved Resource Management Plan Amendment (ARMPA) and Record of Decision – September 2015 (GRSG ARMPA; BLM 2015). In March 2019, BLM issued a revised GRSG ARMPA (BLM 2019) that included map changes; however, in October 2019, an injunction was issued and compliance reverted to the 2015 GRSG ARMPA. The Nevada and Northeastern California Greater Sage-Grouse Final Supplemental Environmental Impact Statement (FSEIS) and Record of Decision reaffirmed the findings of the 2019 ARMPA (BLM 2020 and 2021a, respectively). The applicable Project Design Features (PDFs), required for all habitat management areas (HMAs), are included in Appendix A.

1.4 Relationship to Statutes, Regulations, and Policy

The Proposed Action is in conformance with the NEPA; the Mineral Leasing Act of 1920 (MLA) as amended and supplemented (30 USC 181 et seq.); the Federal Oil and Gas Leasing Reform Act of 1987, with regulatory authority under 43 Code of Federal Regulations (CFR) Part 3100, Onshore Oil and Gas Leasing and 43 CFR Part 3160, Onshore Oil and Gas Operations; and Title V of the FLPMA of 1976. The oil and gas lease holder is required to abide by all applicable federal, state, and local laws and regulations. This includes obtaining all required permits if they develop the lease.

Lease notices were attached to NVN-94067 at the time of the sale. The lease notices informed GBO of Federal laws and Best Management Practices (BMP) for threatened and endangered species, sensitive and special status species, cultural resources and tribal consultation, raptor nesting sites, pronghorn antelope crucial winter range, GRSG brood rearing areas, and historic road or trails. Lease stipulations for GRSG habitat were attached to portions of this lease parcel. The lease notice stated that PDFs are required

for certain activities to help mitigate adverse impacts. PDFs for the project are provided in Appendix A.

BLM Onshore Order #1 was established pursuant to the authority prescribed in 43 CFR 3160. It requires that approval of all proposed exploratory, development, and service wells and all required approvals of subsequent well operations and other lease operations be obtained in accordance with 43 CFR § 3162.3-1, 3162.3-2, 3162.3-3, 3162.3-4 and 3162.5-1.

Pursuant to 43 CFR § 3101.1-2, a lessee shall have the right to use so much of the leased lands as is necessary to explore for, drill for, mine, extract, remove and dispose of all the leased resource in a leasehold, subject to: stipulations attached to the lease; restrictions derived from specific, non- discretionary statutes; and such reasonable measures as may be required by the AO to minimize adverse impacts to other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed.

The exploration must be in conformance with all Nevada State and Federal requirements including, but not limited to, those of the BLM, State of Nevada Division of Minerals, State of Nevada Division of Environmental Protection, Nevada State Engineer, and the United States (U.S.) Environmental Protection Agency (EPA).

National policy under 43 CFR § 2801.2 states, "[i]t is BLM's objective to grant rights-of-way under the regulations in this part to any qualified individual, business, or governmental entity and to direct and control the use of rights-of-way on public lands in a manner that:

a) Protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity;
b) Prevents unnecessary or undue degradation to public lands;
c) Promotes the use of rights-of-way in common considering engineering and technological compatibility, national security, and land use plans; and
d) Coordinates, to the fullest extent possible, all BLM actions under the regulations in this part with state and local governments, interested individuals, and appropriate quasi-public entities."

The Project is in conformance with Elko County Public Land Use & Natural Resource Management Plan, which states, "The Federal agencies should continue to manage the presently open, federally-owned mineral estate in Elko County as open to mineral location, sales and leases" (Elko County 2010).

1.5 Environmental Justice

Executive Order (EO) 12898 - Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income focuses federal attention on the environmental

and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.

Evaluating the potential EJ effects of projects requires specific identification of minority populations when either: 1) a minority population exceeds 50 percent of the population of the affected area; or 2) a minority population represents a meaningfully greater increment of the affected population than of the population of some other appropriate geographic unit, as a whole. For the purposes of the analysis, 10 or more percentage points above the reference population is considered to be meaningfully greater increment (59 Federal Register [FR] 32). In addition, it is necessary to evaluate whether or not any concentrated populations of American Indians are present.

The evaluation of the EJ populations for the Project shows that a low income EJ population is present, a minority EJ population is present, and an American Indian EJ population is present. The Project is relatively close to the South Fork Band Reservation of the Te-Moak Tribe of Western Shoshone. The Project has the potential to employ local residents, though it's likely to only bring in contractors for the duration of drilling. Even though there are low income, minority, and American Indian populations in the study area, it is not anticipated that there would be any disproportionate impacts on the existing EJ population resulting from the project.

1.6 Scoping and Public Involvement

A virtual kickoff meeting was conducted on April 13, 2021. The meeting was attended by the Applicant and representatives from BLM.

1.6.1 Internal Scoping

A BLM interdisciplinary team conducted internal scoping to identify potentially affected resources to be analyzed in the EA. Through subsequent communications, a list of preliminary issues identified for detailed analysis was developed (**Table 1-1**). The BLM also developed a list of resources and issues that were eliminated from detailed analysis (Appendix B).

Table 1-1. Issue Identified During Detailed Analysis

Resource	Issue	Issue Number
Air Quality/Climate Change	How would approval of the APD affect air resources and contribute to climate change?	1
Listed Species (Federal and Special Status), Greater Sage-grouse, Migratory Birds, Crucial Winter Range for Mule Deer and Antelope, and Burrowing Owls	How would approval of the APD affect the following resources within and in the vicinity of the proposed disturbance area: listed species (federal and special status), Greater sage-grouse, migratory birds, crucial winter range for mule deer and antelope, and burrowing owls?	2

Resource	Issue	Issue Number
Invasive Species/Noxious Weeds	What effect would approval of the APD have on invasive species/noxious weeds within and in the vicinity of the project?	3
Soils	How would approval of the APD affect soils within and in the vicinity of the proposed disturbance area?	4
Groundwater	What effect would approval of the APD have on the quantity of groundwater and existing water rights?	5
Pygmy Rabbits	How would approval of the APD affect pygmy rabbits and their habitat?	6

1.6.2 External Scoping

External scoping efforts began on June 29, 2021, when BLM mailed scoping letters to Eureka, White Pine, and Elko County Commissioners. In addition, scoping letters were also mailed to the Nevada State Clearinghouse, which were then shared with 106 state agencies and non-governmental organizations. On July 14, 2021, BLM issued a news release that was sent to 221 news organizations. Scoping information was also posted on BLM's ePlanning project website, indicating BLM's intent to consider the Project. The scoping letters and news releases asked the interested public and agencies to submit any comments to be considered by July 30, 2021.

BLM received seven responses to the scoping letter. From the scoping input, comments regarding potential effects to GRSG and other wildlife were identified. The potential effects to these resources are analyzed in detail in Chapter 3 and were considered during development of the measures to minimize effects listed in Chapter 2.

1.6.3 Native American/Tribal Coordination

Tuscarora Field Office began coordination with the tribes on April 12, 2021. Information sharing letters about the project, including the project location, were mailed to the Te-Moak Tribe of Western Shoshone and the four constituent Bands (Battle Mountain, Elko, South Fork, and Wells) inviting them to request additional information or engage in formal government to government consultation. An information sharing meeting with representatives of the Te-Moak Tribe was held on April 27, 2021. During the meeting the Tribe requested additional information from BLM as well as site visits and reviews.

1.7 Federal, State, and Local Permits or Required Consultation

Table 1-2 includes the permits and approvals required for the project.

Table 1-2. Permits and Approvals

Permit/Approval	Agency
BLM Right-of-Way Grant for new access road	Bureau of Land Management
BLM Right-of-Way Grant for improved access roads	Bureau of Land Management
BLM Permit to Drill	Bureau of Land Management
Temporary Use of Groundwater for Oil, Gas, or Geothermal Exploration	Department of Conservation and Natural Resources, Division of Water Resources
White Pine County Road Maintenance Agreement	White Pine County Road Department
Elko County Road Maintenance Agreement	Elko County Road Department
Eureka County Gravel Agreement	Eureka County Public Works

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

The Applicant has leased a parcel of Federal land for potential oil development under the MLA and 43 CFR Part 3100. BLM conducted a virtual site visit on November 19, 2020, and a completed APD was submitted to the BLM on January 4, 2021. Main components of the project relevant to environmental effects are described in this chapter.

2.2 Proposed Action

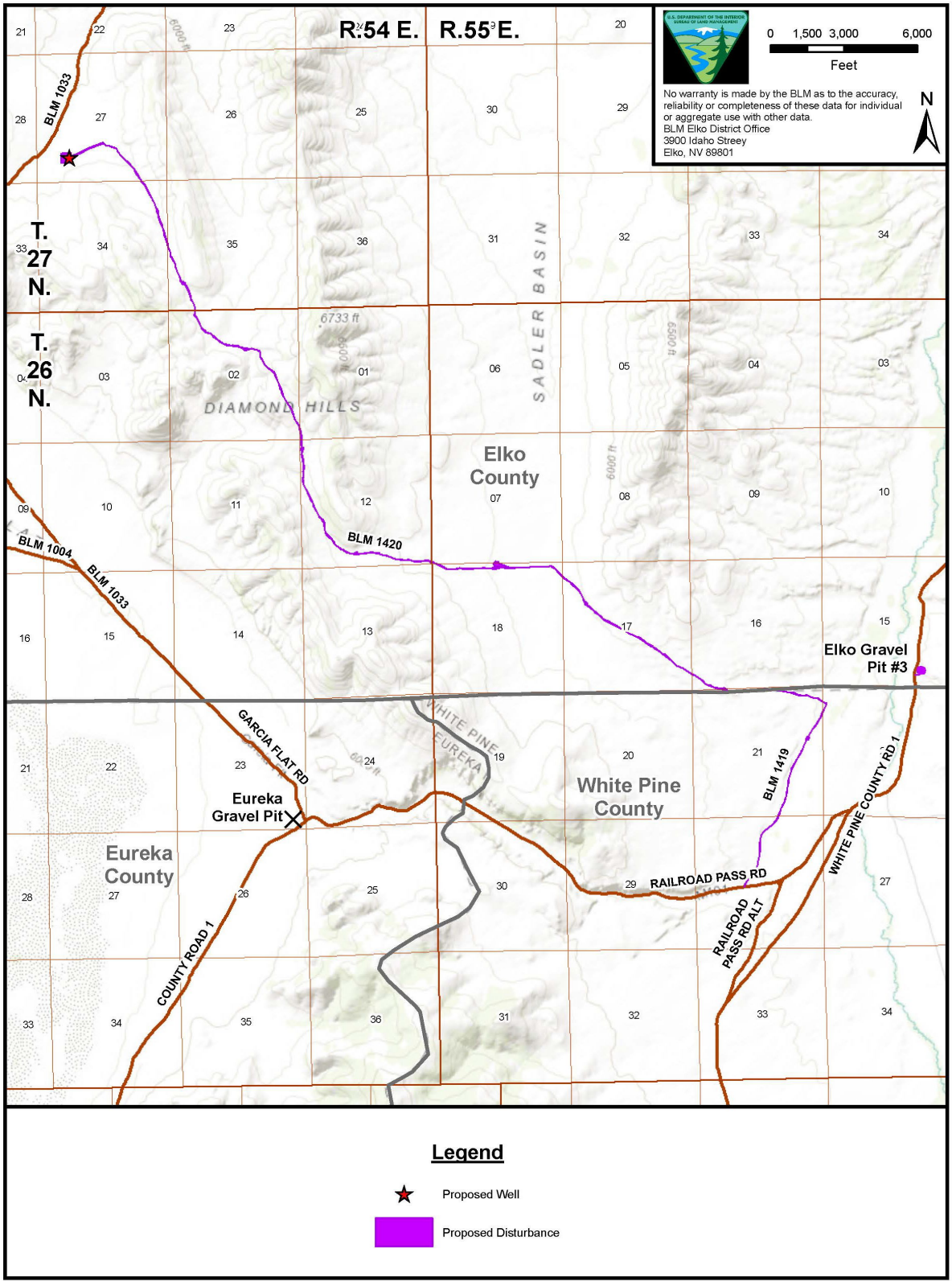
Under the Proposed Action, the Applicant would execute an oil exploratory drilling plan for the North Diamond Valley #1-27 well. The proposed well would be situated in Section 27, T27N, R54E, MDB&M, approximately 45 miles south of Elko, Nevada (Map 2-1). Diamond Valley is a valley between the Sulphur Spring Range and the Diamond Mountains. The valley's elevation range is approximately 5,700 to over 9,000 feet.

The Applicant would drill the vertical exploration well to a target depth of 8,000 feet to determine if commercially viable oil resources exist. If the well is a producer, the Applicant would submit a Sundry Notice to BLM informing the Agency of the intent to move forward with production. Production facilities would be installed on the well pad, but no additional surface disturbance would occur as result of the production phase. If no viable resource is discovered, then reclamation and abandonment activities would be completed.

In addition to the well, the Applicant proposes to improve a 9.7-mile existing two track road, construct a new access road, establish a gravel pit, and drill and complete two temporary water supply wells. Table 2-1 provides a summary of the proposed disturbance associated with the Proposed Action. No disturbance would be associated with the water supply wells since they would be constructed in areas that would already be disturbed.

Table 2-1. Proposed Action Disturbance

Project Component	Disturbance (acres)
Existing Road Improvements	20.7
Access Road	0.5
Well Pad	3.7
Gravel Pit (Elko Gravel Pit 3)	2.0
Temporary Water Supply Wells	0
TOTAL	**26.9**



Map 2-1. North Diamond Valley #1-27 Project Overview

2.2.1 Existing Road Improvements and Access Road

To access the well pad, the Applicant would use existing BLM roads 1419 and 1420 and a proposed new access road. The Applicant proposes to improve the 9.7-mile existing BLM roads by adding gravel and constructing 15 turnouts approximately every 0.5 mile and eight turnarounds roughly every 2 miles (Map 2-1). Each turnout would be 150 feet long and 15 feet wide and each turnaround would be approximately 100 feet long by 100 feet wide.

The Applicant proposes to surface the existing BLM roads with approximately 6 inches of gravel. Based on this, the 9.7-mile section of roads would require approximately 15,000 cubic yards of gravel; however, some stretches of road would likely require less gravel. The Applicant proposes to source the gravel from the following existing permitted gravel pits:

- Elko County Gravel Pit 1 in Section 13, T27N, R55E MDB&M
- Elko County Gravel Pit 2 in Section 23, T27N, R55E MDB&M
- Eureka County (Railroad Pass) Gravel Pit in Section 23, T26N, R54E MDB&M

As part of the Proposed Action, the Applicant would establish a gravel pit in Section 15, T26N, R55E MDB&M (Map 2-1). The Applicant proposes to remove approximately 15,000 cubic yards from the gravel pit for a total disturbance of 2 acres. The Applicant would acquire the necessary permits and approvals prior to using the gravel.

The proposed new access road will be approximately 1,700 feet long and 15 feet wide. The road will be crowned and surfaced with gravel. Culverts and drainage ditches will be installed only if determined necessary by the AO.

Road construction on public lands would meet the standards listed in BLM Roads Manual 9113. BMPs would be implemented to limit fugitive dust caused by operations, including speed restrictions, regular road maintenance according to BLM standards, and a flexible work schedule to accommodate undesirable weather conditions (i.e., high winds). Other management techniques include wetting the roads as necessary and cleaning equipment in controlled areas to limit the spread of noxious weeds.

2.2.2 Well Pad Construction

The Applicant proposes to construct a 400 feet by 400 feet (3.7 acres) well pad to support well drilling equipment, emergency pit, equipment, trailers, and Project vehicles. The well would be placed central to the pad and an emergency pit would be located on the south side of the proposed wellbore. Figure 2-1 shows the proposed well pad layout design.

The undeveloped site proposed for well pad installation would require conditioning (i.e., grading, cut-and-fill activities) to provide a level and stable surface for the drilling operation. The Applicant estimates that approximately 12 inches of gravel would be

used to level the well pad. Topsoil would be stockpiled adjacent to the well pad and would be separated from other material. An area on the well pad would also be designated as a drying and cleaning area for drill cuttings.

The Applicant would install a 100 feet by 50 feet emergency pit on the well pad to store clean drill cuttings and utilized drilling fluids. The emergency pit would be installed and managed in accordance with the standards provided in the BLM Gold Book. The emergency pit would be fenced on three sides during drilling and all four sides while allowing the pit to dry, if necessary.

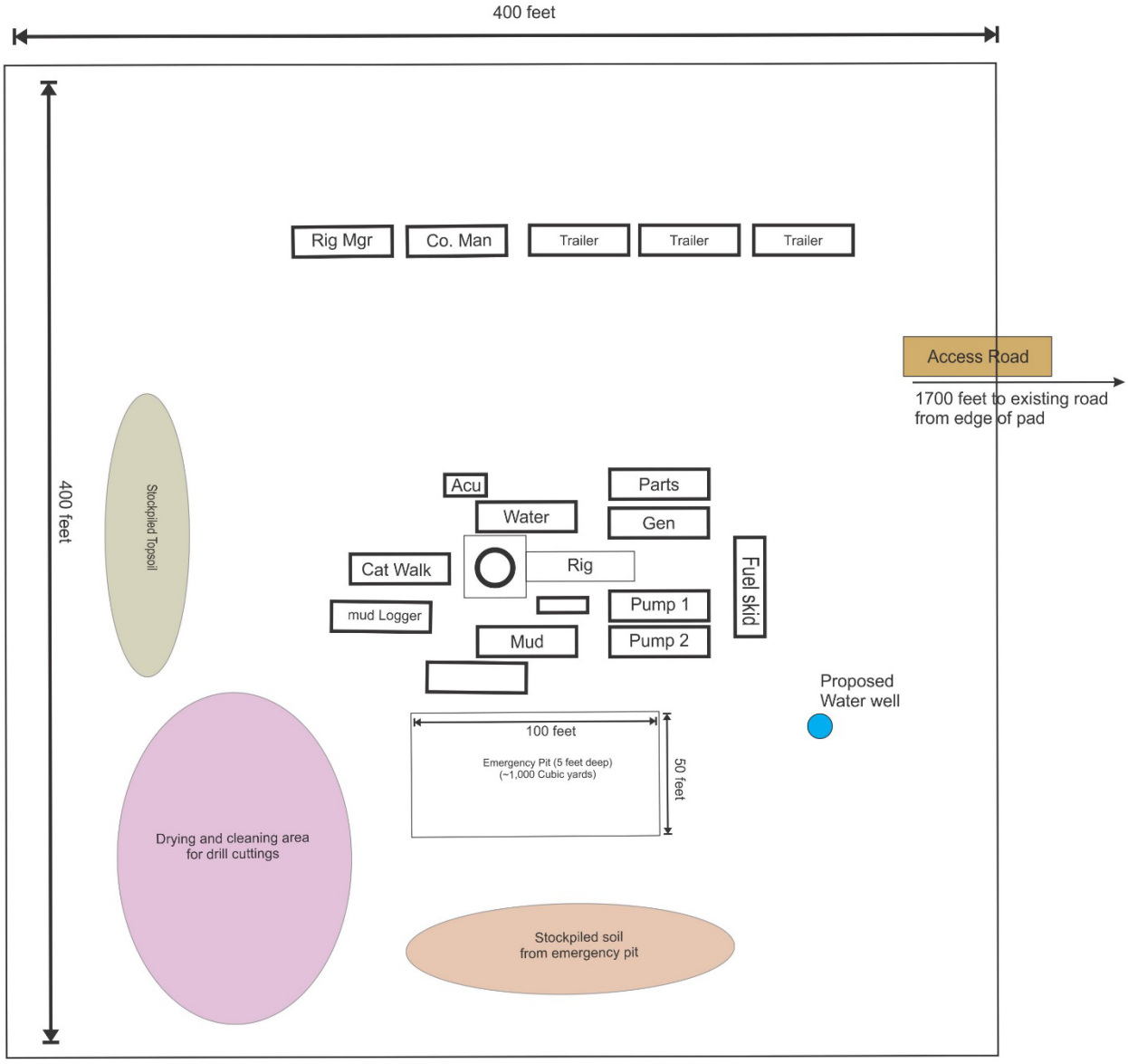


Figure 2-1. Typical Well Pad Layout Design

2.2.3 Well Construction

The well construction phase includes well drilling, casing, and testing (i.e., evaluation of drill cuttings, geophysical logging, and/or drill-stem testing). If commercially viable resources are identified, the well would be completed by additional testing to ensure casing strength and casing perforation.

2.2.3.1 Well Construction

The proposed oil well would be drilled to an approximate depth of 8,000 feet, in the Chainman Shale and Guilmette Limestone formations. Production casing would be installed in the borehole once it is fully completed and tested. Surface casing would be set and cemented in place to a depth to isolate upper aquifers. The surface casing would be set in a competent bed and cemented with sufficient cement to fill the outer casing (annular) space and set to a depth of 1,000 feet to protect freshwater aquifers. Blowout Preventer Equipment (BOPE) would be installed on the top of the surface casing to contain unexpected fluid blowouts. The BOPE and related equipment would meet the minimum requirements of Federal Onshore Oil and Gas Order No. 2, and the BLM would be notified in advance to witness all pressure tests.

During continued drilling, intermediate casing could be set for the protection of oil, gas, usable quality water zones (if encountered), and prospectively valuable minerals deposits; for protection against abnormal pressure zones and lost circulation zones; or when otherwise required by unexpected well conditions. The casing string would be cemented with a sufficient volume of cement to cover and/or isolate all hydrocarbon zones or other mineral deposits; to isolate abnormal pressure intervals from normal pressure intervals; and, to contain any fluids with a potential to migrate and/or isolate formation fluids.

After drilling the hole to its final depth, logging tools would be run into the well to evaluate the potential hydrocarbon resource. If the evaluation indicates that adequate hydrocarbon resources are present and recoverable, steel production casing would be run and cemented into place in accordance with the well design as approved by BLM. The entire casing and cementing program would be designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. BLM approval would be required prior to the use of any isolating medium other than cement.

Lighting during construction would follow “dark sky” lighting practices, which would include, but not be limited to the following:

- Using low glare lighting equipment;
- Shielding security lighting so that the majority of light hits the target and does not cause glare;

- Targeting lower lighting levels and better uniformity for safety and security lighting; and,
- To the extent practical, aiming lighting on facilities from the top down, and away from adjacent areas.

2.2.3.2 Drilling Fluids and Cuttings Management

Drilling would be performed with circulation of an inert bentonite water-based mud, with various viscosity and density-adjusters, such as polymers and barite. Density would be adjusted to lift cuttings and suppress formation fluid pressure. Other additives may be used to stabilize borehole wall expansive clays. Drilling mud lubricates and cools the bit and flushes cuttings to settling tanks at the surface. Drilling mud would be displaced from the well bore in each separate casing setting and cementing event (i.e., surface, intermediate, and production casings). Cuttings would be dried on location, analyzed for toxic substances and, if clean, buried on-site in an emergency pit. The emergency pit would be fenced, if necessary. It is not anticipated that soil would be imported to cover the cuttings; rather stored material from site preparation would be used to backfill the emergency pit once dry.

Fluids would be evaporated and then buried along with the drill cuttings after exploration activities are complete. Evaporators could be utilized to decrease the liquid volume in the emergency pit fluids, as necessary. Thicker non-toxic fluid and solids would be disposed of at the Elko County Landfill. Although not anticipated, any fluids not acceptable to the Elko County Landfill would be removed by a licensed contractor and transported to a licensed facility for disposal.

Any usable water zones encountered during drilling would be adequately protected in accordance with the Federal Onshore Oil and Gas Orders and the Oil & Gas Leasing regulation (43 CFR Part 3100) by installing surface or intermediate casing as approved by BLM. All usable water zones, potentially productive hydrocarbon zones, and valuable mineral zones would be isolated.

2.2.4 Well Completion

If, upon completion of drilling, the well is capable of production, a completion report would be submitted to the AO. Well-pumping equipment and layout would be constructed on the gravel fill of the well pad. An impermeable berm or dike of sufficient capacity to adequately contain the contents of the largest vessel within the dike plus one day production, would be constructed to encompass all the production equipment. All above-ground facilities will be painted an earth tone color, approved by BLM. Any additional facilities or disturbance beyond the disturbance area addressed in this EA would be subject to additional NEPA analysis.

2.2.5 Water Supply

Water for drilling, makeup water, and fugitive dust control would be obtained from two proposed temporary water supply wells. One well would be drilled along the access road at the first proposed turnaround, located in Section 21, T26N, R55E MDB&M. The other well would be drilled on the proposed well pad (figure 2-1). Both wells would be equipped with an electric pump to be operated by a generator. The Applicant has submitted application for temporary water well permits with the Nevada Division of Water Resources (NDWR) for both wells. Temporary water well permits are issued for a period of one year by NDWR.

The total estimated water volumes required under the Proposed Action are summarized in Table 2-2.

Table 2-2. Estimated Water Requirements

Activity	Barrels	Gallons	Acre-Feet
Water Well Drilling (2 temporary wells)	2,700	113,400	0.35
Oil Well Drilling	8,000	336,000	1.03
Oil Well Completion	5,000	210,000	0.64
Dust Control	2,500	105,000	0.32
Total	**18,200**	**764,400**	**2.34**

The temporary water supply wells would be drilled using standard mud-rotary methods, to depths of approximately 500 feet. The wells would be cased per NDWR regulations. The temporary water supply wells would be plugged and abandoned according to the guidelines provided in the Nevada Administrative Code (NAC) 534.420.

If an alternative water source is required, a back-up water source will be used. The back-up water sources are discussed in section 3.6. The Applicant would apply for a temporary water well permit with NDWR prior to use.

2.2.6 Workforce

Approximately 15 personnel would be required for construction and drilling operations, with additional workers utilized as needed for tasks such as cementing casing strings, installing wellhead equipment, running open hole drill stem tests, providing wireline services for downhole evaluations, etc. The drilling contractor personnel, mud loggers, and Applicant supervisors would be housed on-site in trailers. The Applicant geologist and drilling engineer would be housed off-site in Elko, NV.

A comprehensive worker safety program would be implemented from initiation of Project through reclamation/abandonment. The closest first aid and emergency services are in Elko at Northeastern Nevada Regional Hospital.

2.2.7 Waste Management

The following details the proposed waste management under the Proposed Action:

- Garbage would be stored on location and disposed of at an approved facility in compliance with all Federal and State regulations.
- Drill cuttings would be dried on location, analyzed for toxic substances and, if clean, buried in the emergency pit during reclamation.
- Produced fluids would be captured in portable vessels on location during and following drilling and testing. Produced water would be collected in the reserve pit during drilling and testing per Onshore Order #7.
- Portable chemical toilets would be rented and used onsite. The rental company would haul away and dispose of sewage regularly according to State and BLM requirements in EPMs.
- All oil, diesel, or hydraulic fluid spills would be cleaned up immediately, excavated, and removed as required to eliminate contaminated soil. All spill-related materials would be hauled to an approved disposal site.
- All hazardous substances would be stored in appropriate containment to prevent site contamination. Current Safety Data Sheets (SDS) for all chemical substances that are used during the course of drilling, completion, reclamation, and testing operations for this project will be present at the site.

2.2.8 Reclamation

At the conclusion of Project activities, the well would be plugged, abandoned, and the pad, access road to the pad, and turnarounds would be reclaimed within 180 days of well abandonment, weather permitting if the activity does not result in establishing satisfactory hydrocarbon production. Upon well abandonment, a Sundry Notice would be submitted to BLM, and the borehole would be plugged, capped, and its related surface equipment removed. The Sundry Notice would describe the engineering, technical, and/or environmental aspects of final plugging and abandonment, as well as final reclamation procedures. Reclamation activities proposed for the Project would be consistent with BLM requirements, including recommendations provided in BLM's Gold Book.

2.2.8.1 Vegetation Management

The following vegetative restoration practices apply to both interim and final restoration activities.

- Salvaging and spreading of topsoil would not be performed when the ground or topsoil is frozen or too wet to support construction equipment.
- A certified weed-free seed mix would be used to meet reclamation standards. The BLM-approved seed mix would be used on all disturbed surfaces.

- For revegetation, some areas would be drill seeded. Other areas would be broadcast-seeded at twice the application rate shown and covered 0.25 to 0.5 inches deep with a harrow or drag bar or would be broadcast-seeded into imprints, such as fresh dozer cleat marks.
- No seeding would occur from May 15-September 15. Fall seeding would be conducted after September 15 and prior to ground freezing. Spring seeding would be conducted after the frost leaves the ground and no later than May 15.
- Invasive and noxious weeds would be controlled on all disturbed areas as directed by BLM. An intensive weed monitoring and control program would be implemented beginning the first growing season after each phase of site restoration (i.e., interim and final phases). Invasive and noxious weeds that have been identified during monitoring would be promptly treated and controlled. A Pesticide Use Plan (PUP) would be submitted to the BLM for approval prior to the use of herbicides. All equipment would be cleaned prior to use to reduce the potential for introduction of invasive and noxious weeds. The Applicant would coordinate all weed and insect control measures with BLM.

2.2.8.2 Interim Reclamation

Interim reclamation would be performed to rehabilitate areas that have been disturbed during construction, drilling, and completion operations and that are not needed for production. Rehabilitation of these unneeded, disturbed areas would consist of backfilling and contouring the emergency pit area and back-sloping and contouring all cut-and-fill slopes. These areas would then be reseeded within one year. The well pad size would be reduced to the minimum size necessary to conduct safe operations. Cuts and fills would be reduced to 3:1 or shallower.

The portions of the cleared well site not needed for operational and safety purposes would be recontoured to the original contour if feasible, or if not feasible, to an interim contour that blends with the surrounding topography as much as possible. Sufficient level area would remain for setup of a workover rig and to park equipment.

The emergency pit would be closed and backfilled as soon as the pit contents are dry enough to do so, or no later than the end of the next full summer following drilling rig release (whichever comes first) to allow sufficient time for the pit contents to dry. Once dry, the pit would be backfilled with a minimum of five feet of soil material and all fencing would be removed, if necessary. The pit area would be slightly mounded to allow for settling and to promote surface drainage away from the backfilled pit.

Topsoil would be evenly respread and aggressively revegetated over the entire disturbed area not needed for all-weather operations, including road cuts/fills and to within a reasonable distance from the production facilities, unless an all-weather, surfaced, access route or "teardrop" turnaround is needed on the well pad.

The initial seedbed preparation would consist of backfilling, leveling, and ripping all compacted areas. The final seedbed preparation would consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding. Seeding would be conducted no more than 24 hours following completion of final seedbed preparation. To help mitigate the contrast of recontoured slopes, reclamation would include measures to feather cleared lines of vegetation and to save and redistribute cleared trees, debris, and rock over recontoured cut-and-fill slopes.

The well pad would be fenced to BLM standards to ensure timely revegetation, if necessary. The fence would serve to exclude livestock grazing for the first two growing seasons or until seeded species become firmly established, whichever comes later. Fencing would meet standards found in the BLM Gold Book.

Reclamation would be considered successful if the following criteria were met:

- 70 percent of predisturbance cover;
- 90 percent dominate species (vegetation consists of species included in the seed mix and/or occurring in the surrounding natural vegetation); and
- Erosion features are equal to or less than surrounding area.

2.2.8.3 Final Reclamation

In the event that the well is not successful and production is not feasible, all disturbed areas, including the new access road, drill pad, exploration facilities, turnarounds, and interim reclaimed areas would be recontoured to the contour existing prior to initial construction. Recontouring activities would not exceed the disturbance area of the well pad or access road, or in other words, reclamation activities would not create a new disturbance. The well pad and the new access road would be completely reclaimed, while the 9.7 miles of existing access road that would be improved by the Project as well as the turnouts would not be reclaimed.

Salvaged topsoil would be spread evenly over the entire disturbed site to facilitate successful revegetation. To help mitigate the contrast of recontoured slopes, reclamation would include measures to feather cleared lines of vegetation and to save and redistribute cleared trees, woody debris, and large rocks over recontoured cut/fill slopes.

Revegetation of disturbed areas would be accomplished by dispersing the seed mix approved by BLM. The seed mix would be used on all disturbed surfaces, including pipelines and road cut-and-fill slopes.

If needed, the access road and turnarounds would be ripped or disked prior to seeding. The establishment of perennial vegetation would be the objective, and additional work would be required in case of seeding failures.

The drill pad would be fenced to BLM standards to facilitate successful revegetation, if necessary. The fence would serve to exclude livestock grazing for the first two growing seasons or until seeded species become firmly established, whichever comes later. Fencing would meet standards found in the BLM Gold Book.

2.2.8.4 Monitoring

Reclaimed areas would be monitored annually. Upon site assessment, BLM may require specific actions to be taken to ensure that reclamation standards are met as quickly as reasonably practical. Reclamation monitoring would be documented in a reclamation report and submitted to BLM. The report would document compliance with all aspects of the reclamation objectives and standards, identify whether the reclamation objectives and standards are likely to be achieved in the near future without additional actions, and identify actions that have been or will be taken to meet the objectives and standards. BLM would be informed when reclamation has been completed and the site is ready for final inspection.

2.2.6 Schedule

The Applicant estimates that construction would continue for 60-90 days. This would include approximately 30-60 days to improve existing roads, construct the new access road/well pad, and complete temporary water supply wells; and 30 days to complete the proposed oil well. If the well is viable, the life of the producing well would likely be between 10-50 years, based on other producing wells in Nevada.

2.3 No Action Alternative

Under the No Action alternative, BLM would not approve the APD and the Applicant would not have access to or an authorization to drill the proposed well. BLM's authority to implement the No Action alternative is limited because oil and gas lease holders possess valid existing rights to explore and potentially develop their lease subject to the stipulations of the specific lease agreement. However, BLM can deny the APD if the proposal would violate lease stipulations or applicable laws and regulations or result in undue or unnecessary environmental degradation.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

No other alternatives were considered. Internal and external scoping did not provide any need or reasoning for an alternate proposal.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

Critical elements of the human environment specified by statute, regulation, or EO are described and analyzed in this section. The affected environment for each resource is unique due to the physical or social attributes of that resource. The human and environmental characteristics of the existing environment per resource are described to serve as the basis for assessing potential project effects. Each resource analysis included in this chapter describes and defines the affected environment, analyzes potential project effects, including reasonably foreseeable environmental trends.

3.1.1 Resources Analyzed in this EA

Through the NEPA scoping process, BLM determined which resources should be analyzed. Any element not present within the Project Area or any element that would not be affected by the Proposed Action and No Action Alternative is not analyzed in this EA. Appendix B provides a complete list of resources and issues considered. Those resources found to have notable impacts are addressed below.

Environmental effects analyses were based upon the best-available data and literature from state and federal agencies, peer-review scientific literature, and site-specific resource studies conducted in the Project Area. These analyses are intended to provide an impartial assessment to help inform the decision maker and the public. Actions resulting in adverse effects to one resource may impart a beneficial effect to other resources. Effects are defined as changes to the human environment from the Proposed Action or Alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives. These effects can occur at the same time and place as the proposed action or alternatives but also may include effects that are later in time or farther removed in distance from the proposed action or alternatives.

The context and intensity of effects from implementation of the Proposed Action for each resource were evaluated to determine how significant these effects might be. PDFs were developed, where necessary, to avoid or reduce impacts. The PDFs included in the Applicant's Surface Use Plan of Operations (SUPO; GBO 2021) were evaluated for their ability to reduce expected effects and are accounted for as part of the Proposed Action. If a resource analysis determined that an effect could be avoided or abated, mitigation measures are prescribed. Mitigation is compensation for impacts after avoidance and/or minimization measures are implemented. Mitigation can be required by the BLM as an enforceable condition/requirement of the Project moving forward and would be administered in the Agency decision.

3.1.2 Reasonably Foreseeable Environmental Trends

For the purpose of this EA, the reasonably foreseeable environmental trends are the sum of all past, present, and reasonably foreseeable future actions (RFFAs) resulting primarily from mining, commercial activities, and public uses. The purpose of the reasonably foreseeable environmental trends analysis in the EA is to evaluate the Proposed Action's and No Action Alternative's incremental contributions to the reasonably foreseeable environmental trends environment within the reasonably foreseeable environmental trends Study Area (RFETSA) identified for the specific resource.

The extent of the RFETSAs varies by each resource, based on the geographic or biological limits of that resource. As a result, the list of projects considered under the reasonably foreseeable environmental trends analysis may vary according to the resource being considered. In addition, the length of time for reasonably foreseeable environmental trends analysis varies according to the duration of impacts from the Proposed Action on the particular resource. Table 3-1 defines the RFETSA boundaries for each issue.

Table 3-1. Reasonably Foreseeable Environmental Trends Study Areas by Issue

Issue	RFETSE Boundary Description	Acreage
1	Air RFETSA (Huntington Valley Air Basin)	503,105
2	GRSG RFETSA (NDOW South Fork PMU) Raptor RFETSA (A four-mile radius of the Project Area) Big Game RFETSA (NDOW Hunt Unit 065) Migratory Birds/Special Status Species RFETSA (Watershed RFETSA)	1,396,251 81,250 625,213 106,022
3	Noxious Weeds RFETSA (A combination of the following three grazing allotments: Browne, Railroad Pass, and Red Rock)	117,856
4	Soils RFETSA (Based on Watershed RFETSA)	106,002
5	Groundwater RFETSA (Upper Humboldt River Basin)	2,793,000
6	Pygmy Rabbit RFETSA (A four-mile radius of the Project Area)	81,250

3.2 *Issue 1: How would approval of the APD affect air quality and contribute to climate change?*

3.2.1 Affected Environment

3.2.1.1 Air Quality

Ambient air quality and air pollution emissions are regulated under federal and state laws and regulations. In Nevada, the Nevada Division of Environmental Protection (NDEP) Bureau of Air Pollution Control and Air Quality Planning (BAPC) has primary responsibility for managing air quality through state regulations. NDEP-BAQP has also

been delegated authority by the EPA to implement federal programs of the Clean Air Act (CAA).

The CAA requires EPA to set NAAQS for air pollutants considered harmful to public health and the environment. The EPA has set NAAQS for six criteria pollutants, including carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), sulfur dioxide (SO_2), and particulate matter (PM). Primary standards are established to protect public health, and secondary standards are established to protect public welfare. These standards define the maximum level of air pollution allowed in the ambient air. The CAA and subsequent amendments allow states to promulgate additional air quality standards that are the same or more stringent than the NAAQS. Two additional pollutants of concern, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), contribute to the formation of ozone in the atmosphere, which is a regulated criteria pollutant with a NAAQS. The applicable NAAQS and Nevada AAQS for criteria pollutants are provided in Table 3-2.

Table 3-2. National and Nevada Ambient Air Quality Standards

Pollutant	Averaging Period	Primary NAAQS	Secondary NAAQS	Nevada AAQS
NO_2	1-hour	0.100 ppm[1,2]	---	0.100 ppm[1,2]
	Annual	0.053 ppm[1]	0.053 ppm[1]	0.053 ppm[1,3]
SO_2	1-hour	0.075 ppm[1,4]	---	---
	3-hour	---	0.50 ppm[1,5]	0.5 ppm[1,6]
	24-hour	---	---	0.14 ppm[1,6]
	Annual	---	---	0.03 ppm[1,3]
PM_{10}	24-hour	150 µg/m^3 [7,8]	150 µg/m^3 [7,8]	150 µg/m^3 [7,8]
$PM_{2.5}$	24-hour	35 µg/m^3 [7,9]	35 µg/m^3 [7,9]	35 µg/m^3 [7,9]
	Annual	12 µg/m^3 [7,10]	15 µg/m^3 [7,10]	12 µg/m^3 [7,10]
CO	1-hour	35 ppm[1,5]	---	35 ppm[1,5]
	8-hour	9 ppm[1,5]	---	6 ppm[1,6,11]
Pb	3-month	0.15 µg/m^3 [6,7]	0.15 µg/m^3 [6,7]	0.15 µg/m^3 [6,7]
O_3	8-hour	0.070 ppm[1,12]	0.070 ppm[1,12]	0.070 ppm[1,12]
H_2S	1-hour	---	---	0.08 ppm[1,6]

Notes:
--- Not applicable
[1] Parts per million.
[2] The standard is based on the 3-year average of the 98th percentile of the daily maximum 1-hour average.
[3] Annual mean value.
[4] The standard is based on the 3-year average of the 99th percentile of the daily maximum 1-hour average.
[5] Not to be exceeded more than once per calendar year.
[6] Not to be exceeded.
[7] Micrograms per cubic meter.
[8] Not to be exceeded more than once per calendar year on average over 3 years.
[9] The standard is based on the 3-year average of the 98th percentile of the 24-hour average.
[10] The standard is based on the 3-year average of the weighted annual mean.
[11] The standard is 9 ppm for areas with an elevation less than 5,000 feet above mean sea level.
[12] The standard is based on the fourth-highest daily maximum 8-hour concentration averaged over 3 years.
Sources: EPA 2021a; NAC 445B.22097

CAA regulations also control the release of hazardous air pollutants (HAPs): chemicals that are known or suspected to cause cancer or other serious health effects, such as reproductive effects, birth defects, or adverse environmental effects. EPA currently lists 189 compounds as HAPs, some of which, such as benzene, toluene, and formaldehyde, can be emitted from oil and gas development operations. NAAQS have not been set for HAPs; rather HAP emissions are controlled by source type- or industrial sector-specific regulations. Hydrogen sulfide (H_2S) gas is not regulated under the NAAQS or as a HAP. However, it is known to be hazardous, and is monitored for health and safety at oil and gas sites. There has been no H_2S discovered in oil wells drilled in Nevada since required monitoring began in 2000.

Triennially, the EPA publishes a comprehensive summary of air emissions data, known as the National Emissions Inventory (NEI). The most recent NEI data that is available is from 2017. Table 3-3 provides the 2017 emissions for the six criteria air pollutants for the U.S., Nevada, and Elko County.

Table 3-3. NEI 2017 Emissions Data

Pollutant	U.S. (tons)	Nevada (tons)	Elko County (tons)
NO_x	11,785,882	111,211	13,713
CO	70,794,464	617,369	73,119
VOC	43,073,060	459,862	44,948
PM_{10}	17,062,926	169,595	22,539
$PM_{2.5}$	5,706,842	46,285	8,061
SO_2	2,714,860	6,087	707

Source: EPA 2021b

Pursuant to the CAA, EPA has developed a method for classifying existing air quality in distinct geographic regions know as air basins, or air quality control regions. For each federal criteria pollutant, each air basin is classified as in "attainment" if the area is in compliance with NAAQS or classified as "non-attainment" if one or more NAAQS is exceeded. The Proposed Action is located in White Pine and Elko counties. Both counties are designated as in attainment with all criteria pollutant NAAQS.

In addition to the NAAQS, the EPA has established Prevention of Significant Deterioration (PSD) rules to prevent deterioration of air quality in attainment areas. As set forth in the CAA, the Federal Land Manager (FLM) for each Class I area has the responsibility to protect the air quality related values (AQRVs) at the area, and to consider whether the new emissions from proposed major facilities will have an adverse impact on those values. Class I areas are defined in the CAA as National Parks over 6,000 acres and wilderness areas and memorial parks over 5,000 acres that were established as of 1977. The nearest Class I areas to the Proposed Action is the Jarbidge Wilderness, located approximately 100 miles to the north.

The EPA air quality index (AQI) is used for reporting daily criteria pollutant levels to the public. The AQI index is one way to evaluate how clean or polluted an area's air is and whether associated health effects might be a concern. The EPA calculates a daily AQI based on local air monitoring data. When the AQI value is between 0 and 50, air quality is categorized as "good" and criteria air pollutants pose little or no risk. AQI data provided in Table 3-4 shows that air quality is generally good within Elko County and that there is little risk to the general public from poor air quality based on available data for the most recent 5-year period (2016-2020).

Table 3-4. Annual Air Quality Index for Elko County, Nevada

Year	# Days with AQI	# Days Good	# Days Moderate	#Days Unhealthy1	% Days Rated Good	% Days Rated Moderate	% Days Rated Unhealthy
2016	345	340	4	1	98.6	1.2	0.3
2017	361	332	28	1	92.0	7.8	0.3
2018	346	297	45	4	85.8	13.0	1.2
2019	365	363	2	-	99.5	0.5	-
2020	363	336	26	1	92.6	7.2	0.3

Source: AirNow 2021

3.2.1.2 Greenhouse Gases

Greenhouse gases (GHGs) include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several fluorinated species of gas (EPA 2021c). CO_2 is emitted primarily from the combustion of fossil fuels; CH_4 is emitted from the production and transport of coal, natural gas, and oil; and N_2O is emitted during agricultural and industrial activities. Fluorinated gases, which are synthetic, are emitted from a variety of industrial processes. CO_2 and other GHGs are naturally occurring gases in the atmosphere; their status as a pollutant is not related to their toxicity but instead is due to the added long-term impacts on climate because of their increased incremental levels in the earth's atmosphere.

The global warming potential (GWP) of gases was developed to allow comparison of global warming impacts between different gases. The GWP of a gas depends on how well the gas absorbs energy and how long the gas stays in the atmosphere. It is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years) compared with CO_2. which has a GWP of 1. The larger the GWP, the more warming the gas causes. For example, CH_4 has a 100-year GWP estimated to be 28 to 36, meaning that CH_4 will cause 28 to 36 times as much warming as an equivalent mass of CO_2, over a 100-year time period (EPA 2021d). The GWP for N_2O is estimated to be 265 to 298.

The term carbon dioxide equivalent (CO_2e) is used to describe different GHGs in a common unit. For any quantity and type of GHG, CO_2e represents the amount of CO_2 that would have the equivalent global warming impact (Brander 2012).

The EPA's Inventory of the U.S. Greenhouse Gas Emissions and Sinks provides annual GHG emissions. Table 3-5 lists the industry sector and total GHG emissions for the U.S. for the most recent reporting year (2019) and the most recent comparison year (2017). NDEP's Air Program prepares a greenhouse gas emissions inventory for the State of Nevada (NDEP 2021). Data for 2017 are also provided in Table 3-5. These data are useful to understand which large sources of anthropogenic emissions are contributing to GHG emissions both nationally and at the state level.

Table 3-5. 2017 and 2019 Greenhouse Gas Emissions by Sector

Sector	2019 U.S. GHG Emissions (million metric tons CO_2e)	2017 U.S. GHG Emissions (million metric tons CO_2e)	2017 Nevada GHG Emissions (million metric tons CO_2e)
Transportation	1,875.73	1,847.33	15.72
Electrical Generation	1,636.33	1,767.07	12.86
Industry	1,504.83	1,423.41	6.69
Residential and Commercial	682.88	614.53	4.81
Waste	163.75	159.04	1.90
Agriculture	669.46	646.56	1.84
U.S. Territories	25.36	25.35	N/A
Land Use, Land-use Change, and Forestry	-789.23	-766.06	-5.75
TOTAL (Gross)	**6,558.34**	**6,483.29**	**43.82**
TOTAL (Net)	**5,769.11**	**5,717.23**	**38.07**

Source: EPA 2021e, NDEP 2021

According to Nevada Division of Minerals data (NDOM 2021), 54,466,410 barrels of oil were produced in Nevada 1955-2019. Nevada's oil production in 2019 increased by 5.2 percent from 251,021 barrels in 2018 to 264,115 barrels sold in 2019. As of July 7, 2021, there were 488 authorized oil and gas leases in the State of Nevada, totaling 875,492 acres.

3.2.2 Proposed Action

Under the Proposed Action the greatest potential for air quality impacts would be from fugitive dust that is generated from the existing road improvements, construction of the new access road, and operation of truck and heavy equipment. Large particles would also be released by wind blowing over disturbed areas and stockpiles. Emissions associated with land-disturbing activities and vehicle traffic during construction would be short term and reduced through BMPs (e.g., speed limit controls, strategically placing

water loadout facilities, prompt revegetation, and use of water on roads). The NDEP BAPC regulates particulate matter emissions from construction projects disturbing areas greater than 5 acres. Since the area of disturbance for the Proposed Action is greater than 5 acres the Applicant would complete the Surface Area Disturbance (SAD) application. NAC 445B.22037 requires fugitive dust to be controlled (regardless of the size or amount of acreage disturbed), and requires an ongoing program, using best practical methods, to prevent particulate matter from becoming airborne.

Another source of potential air quality impacts is combustion emissions. During improvement of the existing road, access road construction, and well pad construction and drilling, diesel emissions would be emitted from diesel-powered water trucks, other heavy equipment, and drill rigs. Employee vehicles and trucks transporting equipment to the site would also emit fuel combustion products. This phase would also produce short term emissions of HAPs and GHGs from vehicle and construction equipment exhausts.

Well-site sources would contribute to potential short- and long-term increases in the following criteria pollutants: CO, O_3, NO_2, and SO_2. During drilling, if oil is encountered, the oil could contain VOCs and HAPs, which could also be emitted by oil in the emergency pit and tanks located at the site.

3.2.2.1 Emissions Inventory

Construction and drilling emissions sources would include vehicle traffic, well pad and road construction, road improvement, well drilling, and well completion. Pollutant emissions for the Proposed Action would be similar to the emissions estimated in the Huntington Valley EA for a single well (BLM 2014). Pollutant emissions from the construction/drilling phase for that project were quantified using accepted methodologies, including EPA emission factors and engineering estimates. Drill rig engines, completion engines, and water well generator engines were estimated using the appropriate EPA Tier emissions standard. The results from the single well analysis are reproduced in Table 3-6.

The Huntington Valley EA also estimated emissions during the production/operation phase using accepted methodologies (BLM 2014). The results from the single well analysis are reproduced in Table 3-7.

Table 3-6. Estimated Emissions During Construction/Drilling

Activity	Tons per year					
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC
Well Pad and Road Construction	0.16	0.07	0.14	0.05	0.01	0.01
Rig-up and Drilling	3.87	0.47	3.30	3.57	0.00	0.41
Well Completion	8.95	0.89	0.54	0.83	0.01	0.25
Water Well and Misc. Traffic	3.54	0.35	0.10	0.12	0.00	0.01

Activity	Tons per year					
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC
Annual Emissions	**16.52**	**1.78**	**4.08**	**4.57**	**0.02**	**0.68**

Table 3-7. Estimated Emissions During Operation/Production

Activity	Tons per year					
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC
Oil Tanks	--	--	--	--	--	17.11
Water Tanks	--	--	--	--	--	0.02
Diesel Generator	0.42	0.42	0.72	0.63	--	0.24
Pumping Unit	0.11	0.11	0.48	0.96	--	0.24
Line Heater	--	--	0.73	0.61	--	0.04
Flare	--	--	3.60	3.02	--	0.20
Truck Loading	--	--	--	--	--	2.58
Production Traffic	6.62	0.66	0.11	0.09	0.00	0.01
Wind Erosion	0.16	0.02	--	--	--	--
Annual Emissions	**7.31**	**1.21**	**5.64**		**0.00**	**20.44**

Ambient air quality impacts associated with emissions during the construction/drilling phase would be temporary in nature, persisting only during the short-term construction/drilling period at the well pad and temporary water supply wells and locations of road construction and road improvements. Ambient air quality impacts would be localized within the area immediately surrounding the fugitive or point emissions source, with concentrations decreasing substantially with distance from the source. Similarly, emissions during the operation/production phase would be localized at the well pad, with the exception of vehicles traffic on roads during routine field operations and maintenance. A comparison of the estimated emissions to the U.S., Nevada, and Elko County 2017 emissions (Table 3-2), shows that emissions from the proposed well would be negligible (less than 1 percent) for all pollutants during both the construction/drilling and operation/production phases. In addition, emissions from the Proposed Action would be below NAAQS and Nevada AAQS.

The Huntington Valley EA also calculated GHG emissions in terms of CO_2e. The CO_2e during construction/drilling and operation/production phases were calculated as 0.049 and 0.056 million metric tons per year, respectively. By comparison, Table 3-5 indicated that in 2017 annual CO_2e emissions from the State of Nevada totaled 43.82 million metric tons per year and annual CO_2e emissions in the U.S. totaled 6,483.29 million metric tons per year. Based on this, estimated CO_2e emissions from the construction/drilling phase of the Proposed Action would comprise less than 0.11 percent of total Nevada CO_2e emissions and 0.0008 percent of U.S. CO_2e emissions. Estimated CO_2e emissions from the operation/production phase of the Proposed Action would comprise less than 0.13 percent of total Nevada CO_2e emissions and 0.0009 percent of U.S. CO_2e emissions. Based on this, GHG emissions from the

Proposed Action would be negligible when compared to Nevada and U.S. CO_2e emissions.

3.2.2.2 Climate Change Impacts

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially CO_2 and CH_4) from fossil fuel development, large wildfires and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs could have a sustained climatic impact over different temporal scales. For example, recent emissions of CO_2 may influence climate for 100 years.

Additional discussion of climate change science and predicted impacts as well as the reasonably foreseeable and cumulative GHG emissions associated with oil production from BLM lands are included in the 2020 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends from Coal, Oil, and Gas Exploration and Development on the Federal Mineral Estate (BLM 2020). This report presents the estimated emissions of greenhouse gases attributable to fossil fuels produced on lands and mineral estate managed by the BLM.

Many Project activities would be subject to a specific list of requirements per the Oil & Gas NSPS, Subpart OOOOa. In addition, the NDEP would require pre-construction operating permits for almost all well site equipment. Examples of these requirements include, but are not limited to the following:

- Atmospheric oil storage tanks at oil and gas exploration and production operations with VOC emissions of > 6 tpy are required to be reduced by 95 percent or greater within 60 days of startup.
- Continuous bleed pneumatic controllers placed in service on or after September 18, 2015, shall emit VOCs in an amount equal to or less than 6 standard cubic feet per hour.
- VOC combustion control devices shall be operated with no visibility emissions greater than 1 minute in any 15-minute period.
- NDEP requires a Class II Air Quality Operating Permit for projects disturbing over 5 acres.
- Nevada Administrative Code 445B.22037 requires fugitive dust to be controlled, and requires an ongoing program, using best practical methods, to prevent particulate matter from becoming airborne.

3.2.2 No Action Alternative

Under the No Action Alternative, there would be no impacts to air quality or climate change in the project area.

3.2.3 Reasonably Foreseeable Environmental Trends

Past and present actions with impacts to air quality and climate change within the RFETSA include wildland fires, wind, and anthropogenic effects. Table 3.8 provides a summary of industrial sources of criteria air pollutants as given in EPA's 2017 NEI (EPA 2021b) which are located within the RFETSA.

Table 3-8. Industrial Emission Sources within Groundwater RFETSA

Site Name	Facility Type	2017 NEI Emission Rate (tpy)					
		PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC
Red Rock Ranch	Airport	0.00	0.00	0.00	0.00	0.00	0.00
Emigrant Mine	Gold Mining and/or Processing	0.18	0.10	0.54	0.19	0.08	0.34

Source: EPA 2021b

Historic fires (1981 to 2020) have burned approximately 150,847 acres in the 503,105-acre Air RFETSA.

RFFAs: Potential impacts to air quality and climate change from ROW construction and maintenance, mineral exploration activities, and potential wildland fires are expected to continue. The Proposed Action would contribute a negligible amount of air pollutants and GHGs. Therefore, based on the above analysis and findings, incremental impacts to air quality and climate change as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact to air quality or climate change. Impacts to air quality and climate change from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.3 *Issue 2:* How would approval of the APD affect the following wildlife resources within and in the vicinity of the proposed disturbance area: Greater sage-grouse (*Centrocercus urophasianus*), crucial winter range for mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*), special status species (species listed or proposed for listing under the Endangered Species Act (ESA), and BLM-designated sensitive species), migratory birds, and raptors ,including burrowing owls (*Athene cunicularia*)?

3.3.1 Affected Environment

3.3.1.1 Greater Sage-grouse

The 2019 Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA) incorporates delineations of GRSG HMAs (BLM 2019). The Nevada and Northeastern California Greater Sage-Grouse Final Supplemental Environmental Impact Statement and Record of Decision reaffirmed the findings of the 2019 ARMPA (BLM 2020 and 2021a, respectively). BLM and the Nevada

Sagebrush Ecosystem Program (SEP) utilize habitat management areas (HMAs) to evaluate the suitability of GRSG habitat on BLM- and State-administered lands (BLM 2019 and SEP 2021a, respectively). BLM classifies HMAs as:

- **Priority Habitat Management Areas (PHMA)** – Areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations;
- **General Habitat Management Areas (GHMA)** – Areas that are likely to be occupied seasonally or year-round, outside of a PHMA, and where management will apply to sustain the GRSG populations;
- **Other Habitat Management Areas (OHMA)** – Areas with appropriate environmental conditions for GRSG that are less used by GRSG or have marginal habitat suitability; and
- **Non-habitat areas** – Areas that are located outside of areas determined to be suitable for GRSG.

These HMAs are based on composite management categories contained with the United States Geological Survey's (USGS's) *Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (Centrocercus urophasianus) in Nevada and Northeastern California—An Updated Decision-Support Tool for Management* (Coates et al. 2016). Both the BLM and the SEP have adopted the USGS habitat categories within the ARMPA.

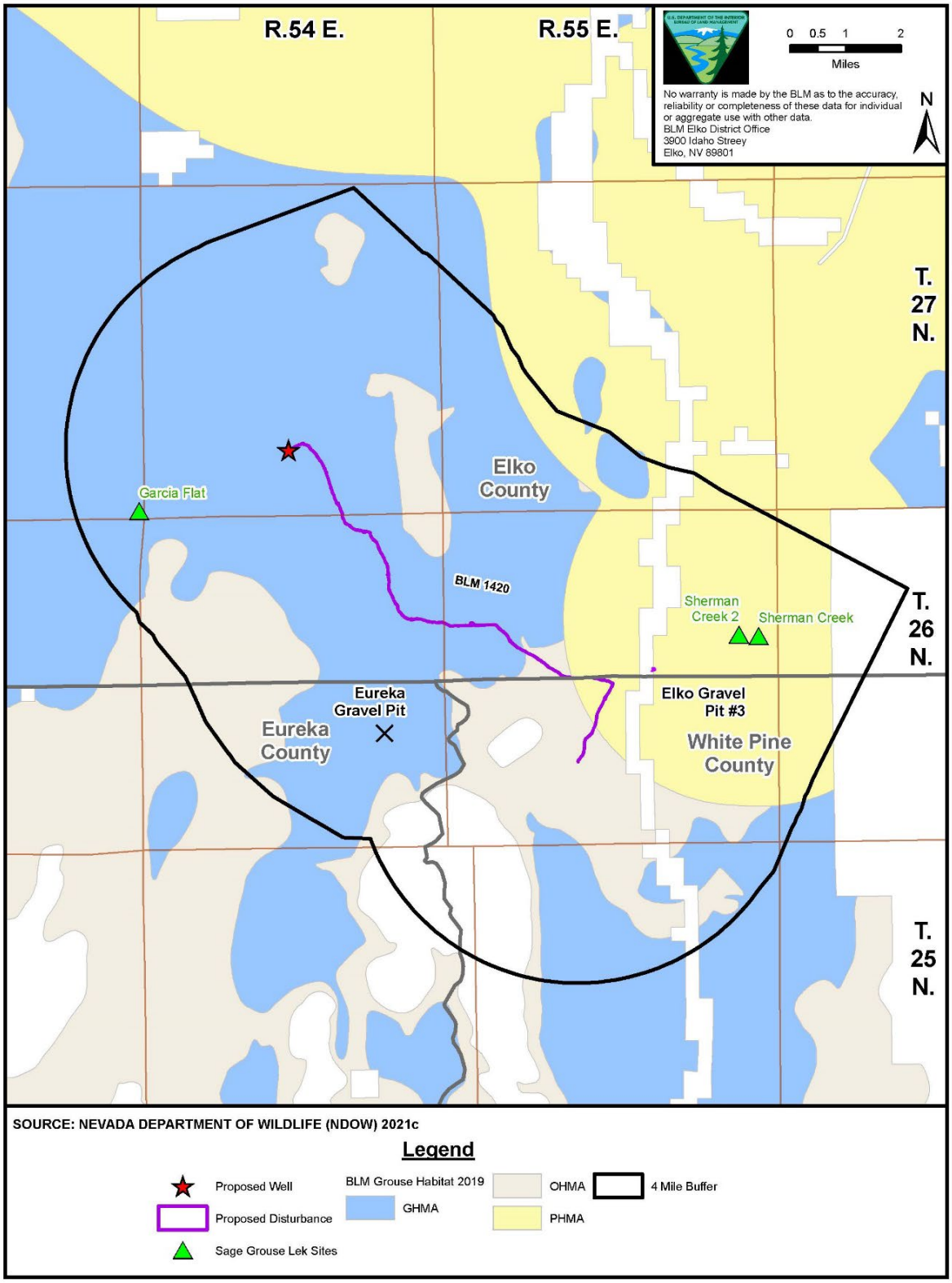
The Nevada and Northeastern California Greater Sage-grouse Approved Resource Management Plan Amendment (GRSG ARMPA; BLM 2019) includes management decisions related to leased federal fluid minerals (MD MR 8-14) and ROW (MD LR 8-10) and best management practices to minimize the loss of or enhance GRSG habitat through the Sagebrush Ecosystem Technical Team (SETT) Conservation Credit System (CCS). CCS is an approach to GRSG habitat protection that ensures habitat impacts from man-made disturbances are fully compensated by long-term enhancement and protection of habitat that results in an overall benefit for the species, while allowing for appropriate anthropogenic disturbances that are vital to the Nevada economy and the Nevada way of life (SEP 2021b).

As shown on Map 3-1, the proposed drill pad and the new access road are within an area classified by SEP as GHMA (6.2 acres). The access road that utilizes an existing two-track road is primarily within GHMA (12.3 acres), although portions are within OHMA (3.4 acres) and PHMA (3.0 acres) (BLM 2019). The proposed gravel pit is located within PHMA (2.0 acres). There are three known GRSG lek sites (Garcia Flats, Sherman Creek, and Sherman Creek 2) within 4 miles of the project area (Map 3-1). The current status of the Garcia Flats lek is unknown, with the last lek survey completed in 2009 (NDOW 2021a). The current status of the Sherman Creek lek is active, with the last lek survey completed in 2019. The current status of the Sherman Creek 2 lek is pending, with the

last lek survey completed in in 2018. There are no known radio-marked GRSG tracking locations in the vicinity of the project area.

3.3.1.2 Raptors

Various raptor species have the potential to occur in the vicinity of the project area. American kestrels (*Falco sparverius*), bald eagles (*Haliaeetus leucocephalus*), barn owls (*Tyto alba*), burrowing owls (*Athene cunicularia*), Cooper's hawks (*Accipiter cooperii*), ferruginous hawks (*Buteo regalis*), flammulated owls (*Psiloscops flammeolus*), golden eagles (*Aquila chrysaetos*), great horned owls (*Bubo virginianus*), long-eared owls (*Asio otus*), merlins (*F. columbarius*), northern goshawks (*Accipiter gentilis*), northern harriers (*Circus hudsonius*), northern saw-whet owls (*Aegolius acadicus*), ospreys (*Pandion haliaetus*), peregrine falcons (*F. peregrinus*), red-tailed hawks (*B. jamaicensis*), rough-legged hawks (*B. lagopus*), sharp-shinned hawk (*A. striatus*), short-eared owls (*A. flammeus*), Swainson's hawks (*B. swainsoni*), turkey vultures (*Cathartes aura*), and western screech owls (*Megascops kennicottii*) have distribution ranges that include the project area and 4-mile buffer area.



Map 3-1. Greater Sage-grouse Management Areas

Eighteen raptor nests are known to occur within 10 miles of the project area and are characterized as belonging to the following species or probable species groups: burrowing owl, *Buteo*/*Corvus* (species not specified), *Corvus* (species not specified), eagle (species not specified), and eagle/*Buteo* (species not specified) (NDOW 2021b).

3.3.1.3 Big Game

Mule deer and pronghorn are known to exist throughout the project area and within a 4-mile buffer (NDOW 2021c). Occupied elk (*Cervus canadensis*) distribution exists outside of the project area but within portions of the 4-mile buffer. No known bighorn sheep (*Ovis canadensis*) distribution exists within the 4-mile buffer.

The entire 26.9-acre disturbance related to the Proposed Action is located within NDOW Hunt Unit 065, which is west of Nevada State Route 228. Summer 2020 range conditions were extremely dry. Hot and dusty conditions persisted well into November. Snowpack and moisture totals in 2020 were well below average for much of this unit. Drought conditions are expected to persist well into 2021 (NDOW 2021d).

3.3.1.3.1 Mule Deer

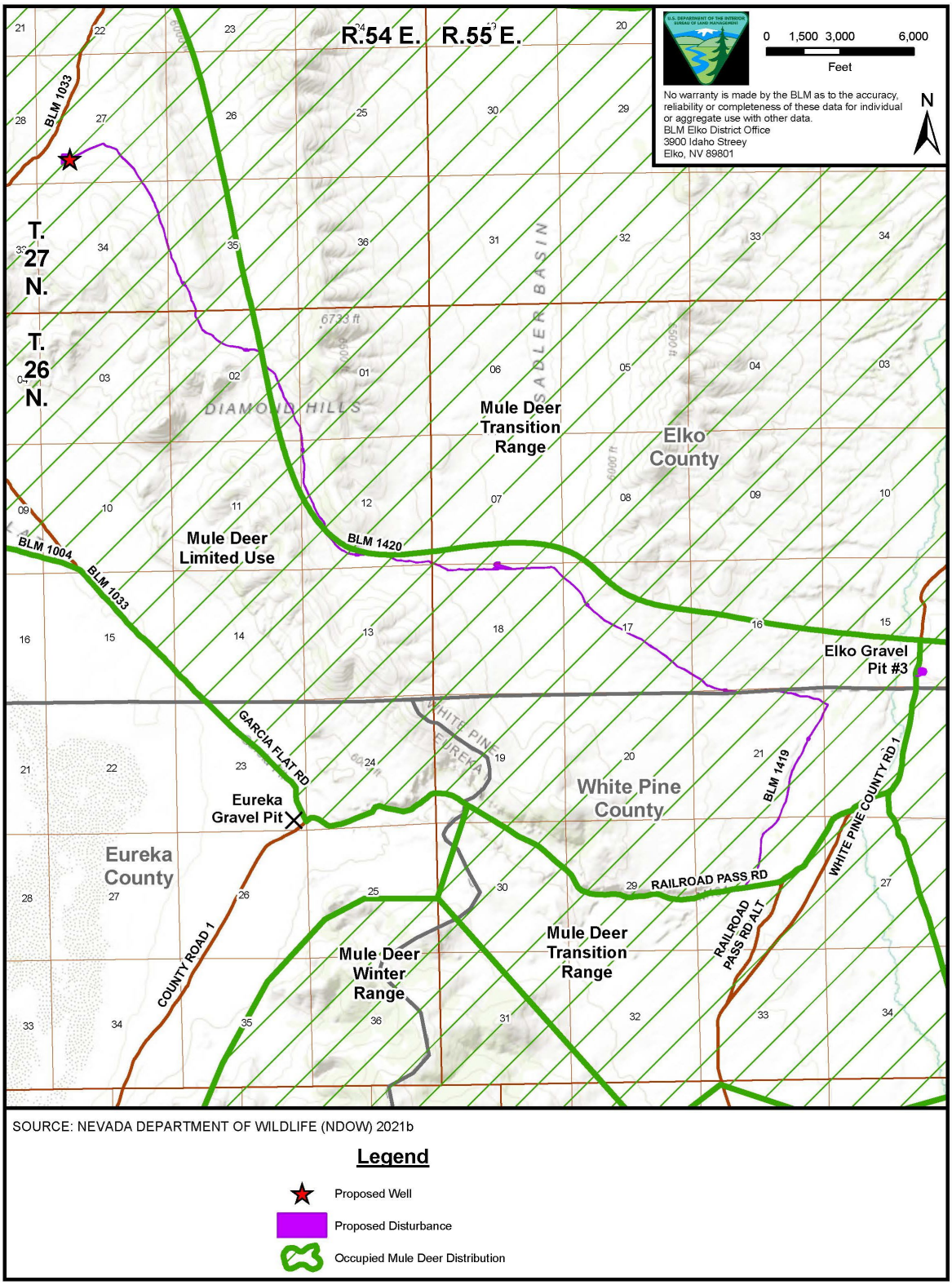
The area around the project area is occupied by mule deer, and both mule deer transitional range and limited use range are crossed by the project area (Map 3-2).

Population estimates for mule deer inhabiting Hunt Unit 065 indicates 800 mule deer in 2020 and 650 mule deer in 2021 (NDOW 2021d). The population of this deer herd has been relatively static over the past decade.

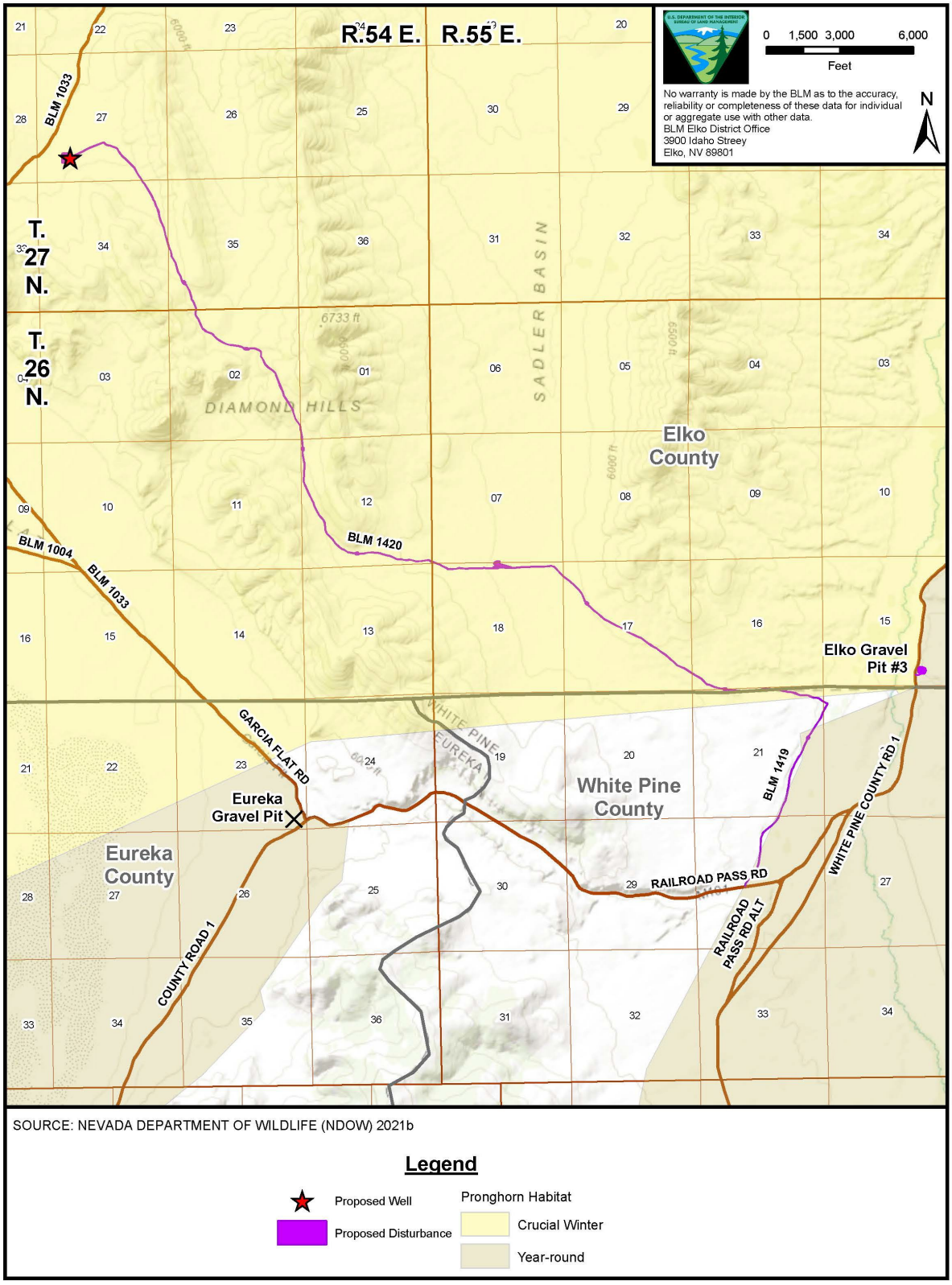
3.3.1.3.2 Pronghorn

Pronghorn populations utilize the region around the project area. The project area itself falls within both crucial winter range and summer range (Map 3-3).

In 2020, the population estimate for pronghorn within Hunt Unit 065 was 850 animals. The estimated 2021 pronghorn population that includes Hunt Unit 065 is 700 (NDOW 2021d). The population estimate is below that of previous years, primarily due to 3 years of low fawn recruitment. The fawn ratio documented in late 2020 tied the record for the lowest since 2012 and the observed buck ratio was the lowest on record. The low fawn ratio is likely attributed to drought conditions and a lack of green up last spring.



Map 3-2. Mule Deer Seasonal Use



Map 3-3. Pronghorn Seasonal Use

3.3.1.4 Migratory Birds

A wide variety of bird species protected by the Migratory Bird Treaty Act (MBTA) are potentially found near the project area. BLM's conservation efforts focus on migratory species that are listed as Birds of Conservation Concern (BCC). BCC have been identified by the U.S. Fish and Wildlife Service (USFWS 2021a) for different Bird Conservation Regions (BCR) in the United States. The entire project area is in BCR 9 of the Great Basin region (USFWS 2021a). As indicated in Appendix C, 13 species listed by USFWS as Great Basin Region 9 BCR as having the potential to occur within or near the project area, based on their known distribution and habitat associations. These species include bald eagle, ferruginous hawk, golden eagle, long-billed curlew (*Numenius americanus*), Lewis' woodpecker (*Melanerpes lewis*), willow flycatcher (*Empidonax trailli*), loggerhead shrike (*Lanius ludovicianus*), pinyon jay (*Gymnorhinus cyanocephalus*), sage thrasher (*Oreoscoptes montanus),* green-tailed towhee (*Pipilo chlorurus*), Brewer's sparrow (*Spizella breweri*), sage sparrow (*Amphispiza belli*), and GRSG.

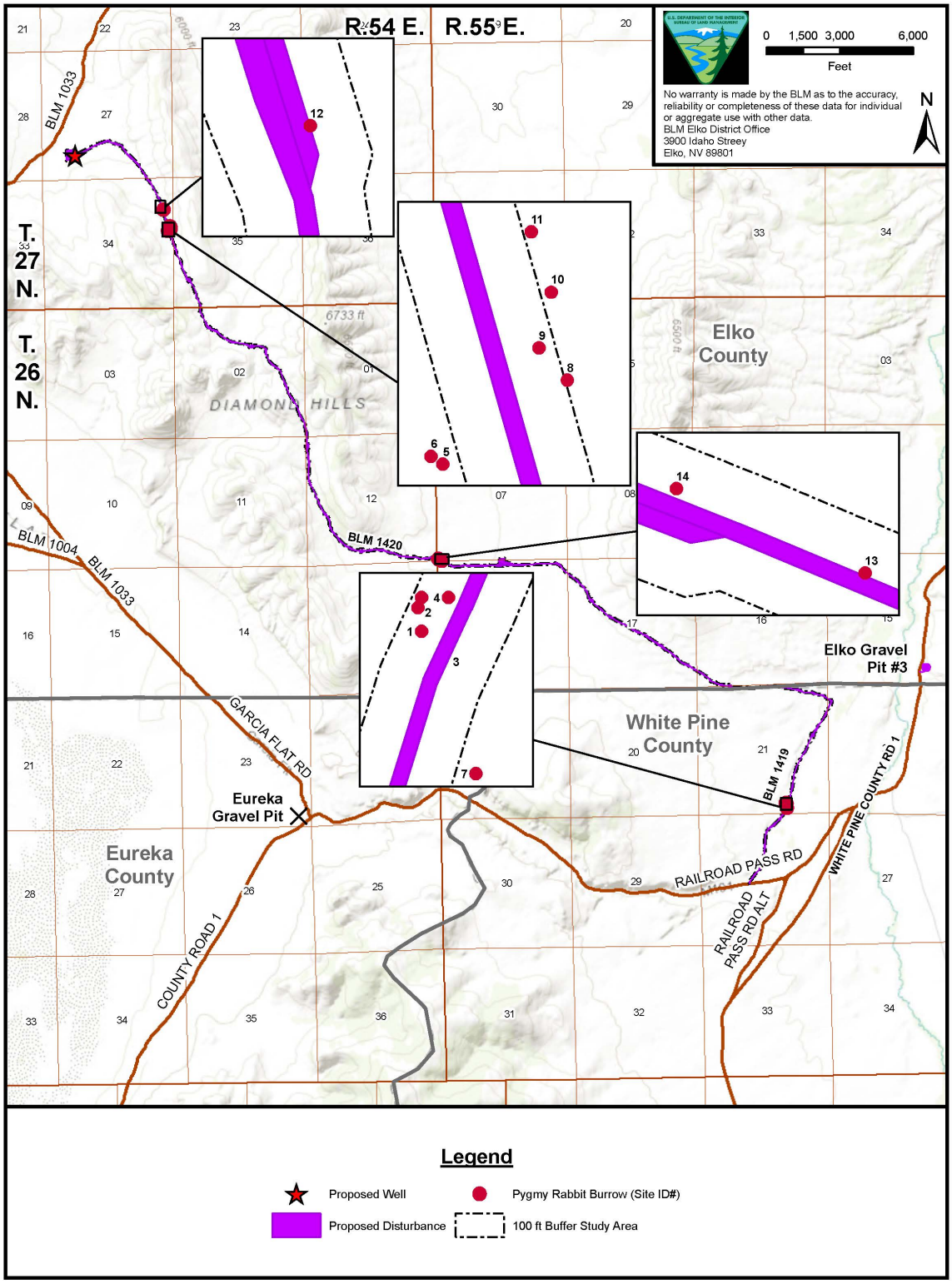
3.3.1.5 Special Status Species

BLM Manual 6840 defines special status species as species that are listed or proposed for listing under the Endangered Species Act (ESA), species listed by a state in a threatened or endangered category implying potential endangerment or extinction, and BLM sensitive species as designated by the State Director (BLM 2008). BLM sensitive species are species that are given special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. The State of Nevada classifies special status species under Nevada Administrative Code (NAC) Chapter 503 as endangered, protected, sensitive, or threatened.

Special status species include species that occur within the project area or may be affected by the Proposed Action are listed in Appendix C. Some of the more common special status species that could be observed in the project area include golden eagles, burrowing owls, ferruginous hawks, peregrine falcons, sage thrashers (*Oreoscoptes montanus*), Brewer's sparrows, desert pocket mice (*Chaetodipus penicillatus*), desert kangaroo rats (*Dipodomys deserti*), sagebrush voles (*Lemmiscus curtatus*), Crawford's gray shrews (*Notiosorex crawfordi*), and desert horned lizards (*Phrynosoma platyrhinos*).

Since pygmy rabbits (*Brachylagus idahoensis*), a BLM and Nevada Natural Heritage Program (NNHP) sensitive species, were suspected as occurring within or near the project area, BLM requested that pygmy rabbit surveys be conducted. The surveys were conducted between June 15 and 18, 2021 by qualified biologists using protocol approved by BLM (McGinley & Associates 2021). No burrows were found in the proposed disturbance areas for the drill pad or the new access road or in the respective 100-ft buffers. Fourteen probable pygmy rabbit burrows (sites) were located in three clusters along the existing access road (Map 3-4). Although most probable burrows occurred

away from the existing access road, two burrows occurred within several feet of the road. Detailed discussions of pygmy rabbits can be found under Issue 6.



Map 3-4. Pygmy Rabbit Survey Results

3.3.2 Proposed Action

The Proposed Action would have the potential to cause direct and indirect impacts on local wildlife populations. Potential impacts are short-term (until the interim reclamation is complete) and long-term (throughout the operation of the well). Indirect impacts typically affect more than a single individual and often persist longer than direct impacts. Direct, project-related impacts may be experienced by all wildlife species to varying degrees. Individuals may be injured or killed due to collisions with drilling and/or heavy construction equipment and related traffic. The likelihood for impacts resulting in injury or mortality is greatest during the construction phase. Noise, dust, and human and mechanical presence would all be considered indirect effects. These elements can cause wildlife to avoid the disturbance area within their territories and/or result in their displacement into adjoining habitats. The latter result can negatively impact both the animals leaving the affected area as well as the population of animals upon which newly displaced individuals encroach.

As described in Section 2.2.6, approximately 15 workers would be required for construction and drilling operations. The drilling contractor personnel, mud loggers, and Applicant supervisors would be housed on-site in trailers. Potential impacts to wildlife species resulting from workers staying on-site would be avoidance, which may result in displacement and stress of individuals from an area larger than the actual disturbance. The impacts would be short-term, lasting only during the construction phase (approximately 30 days). The Applicant would implement guidelines for workers and would have a supervisor on-site continuously throughout the construction phase.

The alternative to workers staying on-site would be to have workers commute to and from Elko, Nevada, which is approximately 45 miles north of the Project. Potential impacts to wildlife from workers commuting would include wildlife mortalities resulting from vehicle collisions. Between 2015-2017 there were approximately 2,085 automobile accidents in Elko County, of which approximately 15 percent involved wildlife (NDOT 2021a). In addition, of the 22 accidents on Nevada State Route 228 in 2016, approximately 10 percent involved wildlife. In 2016 the annual average daily traffic (AADT) on Nevada State Route 228 was 500 vehicles (NDOT 2021b). Under the Proposed Action, the AADT would increase by 30 vehicles, which would also increase the potential for additional collisions with wildlife. However, since it is standard industry practice for exploration oil wells to be manned 24 hours a day, 7 days a week, the potential impacts to wildlife associated with commuting to and from Elko would be reduced since the majority of workers would stay on-site throughout the construction phase.

3.3.2.1 Greater Sage-grouse

Lease timing stipulations and PDFs included in Appendix A would be applied to the proposed Project to avoid and/or minimize disturbance to GRSG. Applicable GRSG

timing stipulations include breeding (lek and nesting) from March 1-June 30, early brood rearing from May 15-June 15, and winter from November 1-February 28. The AO may grant exceptions, modifications, or waivers to these stipulations where an environmental review and consultation with the appropriate state agency (NDOW, SETT) determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat. GRSG surveys would be needed if construction or drilling operations related to the Proposed Action occurred during the March 1-July 30 GRSG nesting or brood rearing seasons (BLM 2021b).

To reduce potential impacts to GRSG habitat mapped as PHMA and GHMA (Map 3-1), the Applicant has contacted SETT, as stipulated by NAC 232.470, and has submitted geographic information systems data, including the proposed disturbance within project area, to SETT. SETT administers the Nevada Conservation Credit System that quantifies the direct and indirect impacts on GRSG habitat from human disturbances (debits) and the outcomes of habitat conservation efforts (credits). Using the Habitat Quantification Tool desktop analysis, the SETT has determined the direct and indirect impacts from Phase I (exploration) activities resulted in 16 term debits. Prior to receiving a Notice to Proceed (or equivalent), the Applicant must offset the credit obligation in its entirety, complete an authorized Phased Purchase Agreement, or develop a mitigation plan in coordination with the SETT. If a mitigation plan is developed, it must be approved by the Sagebrush Ecosystem Council. If the entire credit obligation is not mitigated for up front, at least 1/3 of the total required compensatory mitigation must be offset prior to receiving a Notice to Proceed. Any balance of a credit obligation (including a five percent phasing factor applied to a balance) would be required to be offset within 3 years. The Applicant would continue to work with the SETT to offset the debit obligation of the Proposed Action in its entirety, complete an authorized Phased Purchase Agreement, or develop a mitigation plan in coordination with the SETT. If a mitigation plan is developed, it would be approved by the Sagebrush Ecosystem Council.

Approximately 26.9 acres would be disturbed as a result of implementation of the Proposed Action. If the exploration project does not result in producible oil, the entire disturbance area would be reclaimed as soon as possible. If the exploration project evolves to production, the long-term disturbance would be reduced to approximately 23.8 acres. Direct impacts to GRSG related to the Proposed Action would be minor but long term if construction or drilling operations related to the Proposed Action adhere to the BLM-approved timing stipulations described herein and in Appendix A.

Indirect impacts resulting from habitat loss associated with vegetation removal from surface disturbing activities would result in the reduction of 26.9 acres of GRSG habitat. The disturbance related to the Proposed Action would be reclaimed and revegetated, returning the 26.9 acres of land to wildlife access and habitat. Indirect impacts to wildlife are expected to be minor, long term, and localized.

3.3.2.2 Raptors

As discussed above, raptor nests have been identified associated with the project area. Approximately 26.9 acres would be disturbed as a result of implementation of the Proposed Action. If the exploration project does not result in producible oil, the entire disturbance area would be reclaimed as soon as possible. If the exploration project evolves to production, the long-term disturbance would be reduced to approximately 23.8 acres. The PDFs and lease stipulations noted in Appendix A to prevent mortality and potential disturbance of raptors would be incorporated into the design of the proposed project. Disturbance restrictions apply up to a 0.5-mile radius around any active nesting site, according to the exclusion periods listed in Appendix A.

Direct impacts to wildlife related to the Proposed Action would be minor but long term if construction and drilling operations were conducted outside of the species-specific raptor nesting seasons listed in Appendix A.

Indirect impacts resulting from habitat loss associated with vegetation removal from surface disturbing activities would result in the reduction of 26.9 acres of raptor foraging habitat. The disturbance related to the Proposed Action would be reclaimed and revegetated, returning the 26.9 acres of land to wildlife access and habitat. Indirect impacts to wildlife are expected to be minor, long term, and localized.

3.3.2.3 Big Game

NDOW data indicates the area is a mule deer migration corridor and crucial winter range for pronghorn (NDOW 2021c). Approximately 26.9 acres would be disturbed as a result of implementation of the Proposed Action. If the exploration project does not result in producible oil, the entire disturbance area would be reclaimed as soon as possible. If the exploration project evolves to production, the long-term disturbance would be reduced to approximately 23.8 acres.

Impacts to big game winter use areas related to the Proposed Action would be reduced since construction and drilling operations would be conducted outside of the mule deer and pronghorn winter season (November 15-March 16). The PDFs and lease stipulations noted in Appendix A to prevent mortality and potential disturbance of wildlife would be incorporated into the design of the proposed project. Direct impacts to big game related to the Proposed Action would be minor but long term since construction and drilling operations would be conducted outside of the pronghorn winter season (November 15-March 16).

Indirect impacts resulting from habitat loss associated with vegetation removal from surface disturbing activities would result in the reduction of 26.9 acres of wildlife habitat. The disturbance related to the Proposed Action would be reclaimed and revegetated, returning the 26.9 acres of land to wildlife access and habitat. Indirect impacts to big game are expected to be minor, long term, and localized.

3.3.2.4 Migratory Birds

The MBTA mandates protection of migratory birds, with the exception of native resident game birds (16 U.S.C. 703 et seq.). Under this act, migratory bird nests with eggs or the young may not be harmed, nor may any migratory birds be killed. To comply with the MBTA, BLM requires that any land clearing or other surface disturbance associated with proposed actions on BLM-administered lands be conducted outside the avian breeding season, which for most songbirds is March 1–July 31. Protocol does exist to allow disturbance within the migratory bird nesting season. The Applicant does not anticipate performing ground clearing or other habitat disturbance activities (such as road and drill pad construction) during the migratory bird nesting season; however, if it cannot be avoided, the Applicant will hire a qualified biologist to conduct nest surveys prior to any surface disturbing activity during the avian breeding season.

The Proposed Action would create surface disturbance and associated removal of vegetation, which could potentially result in the destruction of active nests or disturb the breeding behavior of migratory bird species. Vegetation removal and ground disturbance would result in a temporary reduction of 26.9 acres of foraging and breeding habitat for migratory birds within the disturbance related to the Proposed Action. All surface disturbance associated with project related activities would be reclaimed, and post-exploration land use is expected to return disturbed land to a level of productivity comparable to pre-exploration levels.

The PDFs and lease stipulations noted in Appendix A to prevent bird mortality and potential disturbance of breeding birds or their nests and young would be incorporated into the design of the proposed project. These PDFs and lease stipulations, specifically the commitment to conduct ground-clearing disturbance outside the avian breeding season (March 1–July 31) or requirements for nesting surveys prior to disturbance during the nesting season and restrictions on disturbance within a buffer around any active nests, will help reduce the direct impacts to migratory birds. The disturbance related to the Proposed Action would be reclaimed and revegetated, returning the 26.9 acres of land to wildlife access and habitat. Direct impacts from the loss of potential foraging and breeding habitat in the project area would be minor, long term, and localized. Impacts to individual migratory birds in the project area would be minor, long term, and localized.

Indirect impacts as a result of the Proposed Action could lead to temporary spatial redistribution of individuals or habitat-use patterns over the life of the project. It is unlikely that implementing the Proposed Action would result in a decline in local or regional migratory bird populations because birds would be able to redistribute to undisturbed and suitable habitat outside of the project area. Indirect impacts to migratory birds are expected to be minor, long term, and localized.

3.3.2.5 Special Status Species

The Proposed Action has the potential to cause mortality, disturbance, and displacement to individual animals; and to affect their habitat within the projected disturbance area until post-project restoration is completed. Direct impacts to special status wildlife species would consist of habitat loss and disturbance from human activity and noise. Approximately 26.9 acres would be disturbed as a result of implementation of the Proposed Action. If the exploration project does not result in producible oil, this disturbance area would be reclaimed as soon as possible. If the exploration project evolves to production, the long-term disturbance would be reduced to approximately 23.8 acres.

The PDFs and lease stipulations noted in Appendix A to prevent mortality and potential disturbance of special status species would be incorporated into the design of the proposed project. The disturbance related to the Proposed Action would be reclaimed and revegetated, returning the 26.9 acres of land to wildlife access and habitat. Direct and indirect impacts to special status species related to the Proposed Action would be minor, long term, and localized.

3.3.3 No Action Alternative

Under the No Action alternative, there would be no surface disturbance associated with the Proposed Action and, therefore, no direct or indirect effects to wildlife, migratory birds, or special status species or their habitat.

3.3.4 Reasonably Foreseeable Environmental Trends

3.3.4.1 Greater Sage-grouse

Past and present actions that could have impacted and may be currently impacting GRSG habitat management areas in the GRSG RFETSA, include livestock grazing, wildland fires, dispersed recreation, ROW construction and maintenance, and mineral exploration and mining. The Applicant acknowledges that the Proposed Action could contribute to the reasonably foreseeable environmental trends related to these activities. Impacts to GRSG habitat primarily have resulted from wildland fires and livestock grazing. Dispersed recreation, ROW construction and maintenance, and mineral exploration and mining would likely contribute little to the reasonably foreseeable environmental trends due to the limited amount of these activities within the GRSG RFETSA.

Historic fires (1981 to 2020) have burned approximately 3,400 acres in the 1,396,251-acre GRSG RFETSA (approximately 0.2 percent of the RFETSA).

Livestock grazing and associated management in the GRSG RFETSA could have contributed to the establishment and spread of noxious weeds, invasive and non-native species, which could have had an indirect effect on GRSG habitat management areas.

There are 70 grazing allotments within the RFETSA. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in the permits and leases issued by the BLM to public land ranchers.

RFFAs: Potential impacts to GRSG habitat management areas from livestock grazing, ROW construction and maintenance, mineral exploration activities, dispersed recreation, or loss of native vegetation associated with potential wildland fires are expected to continue. There are no specific data to quantify impacts to GRSG habitat within the RFETSA as a result of dispersed recreation, livestock grazing, or potential wildland fires. There are no pending ROW or minerals projects, as reported in LR2000 in the GRSG RFETSA.

The Proposed Action (approximately 26.9 acres of additional GRSG habitat management area disturbance in the RFETSA) would impact approximately 0.002 percent of the GRSG RFETSA. Project-related impacts to GRSG habitat management areas would be localized and minimized due to implementation of the PDFs and lease stipulations noted in Appendix A and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to GRSG habitat management areas as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact to GRSG. Impacts to GRSG from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.3.4.2 Raptors

Past and present actions that could have impacted and may be currently impacting raptors in the 81,250-acre Raptor RFETSA include wildland fires, livestock grazing, dispersed recreation, ROW construction and maintenance, and mineral exploration and mining. The Applicant acknowledges that the Proposed Action could contribute to the reasonably foreseeable environmental trends related to these activities. Impacts to raptors and their habitat primarily have resulted from wildland fires and livestock grazing. Dispersed recreation, ROW construction and maintenance, and mineral exploration and mining would likely contribute little to the reasonably foreseeable environmental trends due to the limited amount of these activities within the Raptor RFETSA.

Historic fires (1985 to 2020) have burned approximately 43,880 acres in the 81,250-acre Raptor RFETSA (approximately 54.0 percent of the RFETSA). Two noteworthy fires occurred in the Raptor RFETSA during 2020: Basin (3,671 acres) and Railroad (827 acres).

Livestock grazing and associated management in the Raptor RFETSA could have contributed to direct disturbance to nesting raptors and the establishment and spread

of noxious weeds/invasive and non-native species, which could have had an indirect effect on raptor habitat. There are eight grazing allotments within the RFETSA. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in the permits and leases issued by the BLM to public land ranchers.

RFFAs: Potential impacts to raptors from ROW construction and maintenance, mineral exploration activities, dispersed recreation, or loss of native vegetation associated with potential wildland fires are expected to continue. There are no specific data to quantify impacts raptors within the RFETSA as a result of dispersed recreation or potential wildland fires. There are no pending ROW or minerals projects in the Raptor RFETSA, as reported in LR2000.

The Proposed Action (approximately 26.9 additional acres of surface disturbing activities that could create impacts from anthropogenic activities) would impact approximately 0.03 percent of the RFETSA. Project-related impacts would be localized and minimized due to implementation of the PDFs and lease stipulations noted in Appendix A. Therefore, based on the above analysis and findings, incremental impacts to raptors as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor. All project-related activities would be subject to the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668 et seq.).

The No Action alternative would not add to the incremental impact to raptors. Impacts to raptors from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.3.4.3 Big Game

Past and present actions that could have impacted and may be currently impacting big game and their habitat in the 625,213-acre Big Game RFETSA, include wildland fires, livestock grazing, dispersed recreation, ROW construction and maintenance, and mineral exploration and mining. The Applicant acknowledges that the Proposed Action could contribute to the reasonably foreseeable environmental trends related to these activities. Impacts to big game and their habitat have primarily resulted from wildland fires and livestock grazing. Dispersed recreation, ROW construction and maintenance, and mineral exploration and mining would likely contribute little to the reasonably foreseeable environmental trends due to the limited amount of these activities within the Big Game RFETSA.

Historic fires (1981 to 2020) have burned approximately 374,752 acres in the 625,213-acre Big Game RFETSA (approximately 59.9 percent of the RFETSA). Two noteworthy fires occurred in the Big Game RFETSA during 2020: Pine (866 acres) and Cedar (5,989 acres). Wildfires have impacted approximately 82,353 acres (45.7 percent)

of the 180,331 acres of crucial pronghorn winter range in the RFETSA. In addition, impacts to big game winter range have the potential to negatively impact big game by limiting the ability of big game to build adequate fat stores needed to survive winters on compromised winter range. A coordinated effort was made to reseed approximately 6,000 acres of the fire-related disturbance during the 2018-2019 winter (NDOW 2019). Approximately 120,840 acres of vegetation treatments have been conducted in the Big Game RFETSA to aid in habitat restoration.

Livestock grazing and associated management in the Big Game RFETSA could have contributed to the establishment and spread of noxious weeds, invasive and non-native species, which could have had an indirect effect on big game and their habitat. However, disturbance to big game and their habitat from past and present actions would have been reduced through reclamation and seeding of disturbed areas and natural recolonization of native species. There are 52 grazing allotments within the RFETSA. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in the permits and leases issued by the BLM to public land ranchers.

RFFAs: Potential impacts to big game and their habitat from livestock grazing, ROW construction and maintenance, mineral exploration activities, dispersed recreation, or loss of native vegetation associated with potential wildland fires are expected to continue. There are no specific data to quantify impacts to big game habitat within the RFETSA as a result of dispersed recreation, livestock grazing, or potential wildland fires. There are no pending ROW or minerals projects, as reported in LR2000 in the Big Game RFETSA.

The Proposed Action (approximately 26.9 acres of habitat removal in the Big Game RFETSA) would impact approximately 0.004 percent of the RFETSA. Project-related impacts would be localized and minimized due to implementation of the PDFs and lease stipulations noted in Appendix A and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to big game and their habitat as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact to big game. Impacts to big game from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.3.4.4 Migratory Birds/Special Status Species

Past and present actions that could have impacted and may be currently impacting migratory birds/special status species habitat in the Migratory Birds/Special Status Species RFETSA include wildland fires, livestock grazing, dispersed recreation, ROW construction and maintenance, and mineral exploration and mining. The Applicant

acknowledges that the Proposed Action could contribute to the reasonably foreseeable environmental trends related to these activities. Impacts to migratory birds/special status species and their habitat primarily have resulted from wildland fires and livestock grazing. Dispersed recreation, ROW construction and maintenance, and mineral exploration and mining would likely contribute little to the reasonably foreseeable environmental trends due to the limited amount of these activities within the Migratory Birds/Special Status Species RFETSA.

Historic fires (1981 to 2020) have burned approximately 56,172 acres in the 106,002-acre Migratory Birds/Special Status Species RFETSA (approximately 53.0 percent of the RFETSA). A small portion of one noteworthy fire occurred in the RFETSA during 2020: Cherry (121 acres of the 3,494 acre-fire).

Livestock grazing and associated management in the Migratory Birds/Special Status Species RFETSA could have contributed to the establishment and spread of noxious weeds, invasive and non-native species, which could have had an indirect effect on migratory birds/special status species habitat. There are nine distinct grazing allotments within the RFETSA. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in the permits and leases issued by the BLM to public land ranchers.

RFFAs: Potential impacts to migratory bird/special status species habitat from livestock grazing, ROW construction and maintenance, mineral exploration activities, dispersed recreation, or loss of native vegetation associated with potential wildland fires are expected to continue. There are no specific data to quantify impacts to migratory bird/special status species habitat within the RFETSA as a result of dispersed recreation, livestock grazing, or potential wildland fires. There are no pending ROW or minerals projects, as reported in LR2000 in the Migratory Birds/Special Status Species RFETSA.

The Proposed Action (approximately 26.9 acres of additional temporary foraging habitat removal in the Migratory Birds/Special Status Species RFETSA) would impact approximately 0.02 percent of the RFETSA. Project-related impacts would be localized and minimized due to implementation of the PDFs and lease stipulations noted in Appendix A and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to special status species/migratory bird habitat as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact to migratory bird/special status species. Impacts to migratory bird/special status species from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.4 Issue 3: What effect would approval of the APD have on invasive species/noxious weeds within and in the vicinity of the project?

Clearing vegetation and exposing bare ground surfaces allows invasive species, particularly annuals, to become established. Approval of the Proposed Action would result in surface disturbance, increased vehicle traffic, equipment placement and operation, foot traffic, and other activities, which could introduce new invasive species and/or increase the distributions of established weed species into areas that are not currently infested.

3.4.1 Affected Environment

Noxious weeds are defined and managed in accordance with federal and state regulations. The Nevada Department of Agriculture (NDA) has responsibility for jurisdiction, management, and enforcement of the state's noxious weed law, while the Federal Noxious Weed Act (7 U.S.C. 2801 et seq.) provides regulation and guidance on federal lands. Species identified on Nevada's noxious weed list must be controlled on both private and public lands. Additionally, under Invasive Species EO 13112, it is the policy of the land management agencies to prevent introduction of noxious weeds, invasive and non-native species, and to control their impact. Elko District BLM is actively engaged with federal, state, and local partners and working groups to help control and minimize weed infestations through integrated pest management.

According to a current list of invasive species and noxious weeds provided by BLM, there are 54 noxious weed species included on Nevada's list, of which 31 species are designated as Category A, 12 species are Category B, and 11 species are Category C weeds (BLM 2021c). Category A weeds include species that are not found or are limited in distribution within Nevada and must be eradicated. Successful treatment options generally exist for these species. Category B weeds are species that may be abundant in localized areas but generally are not well established in Nevada. Reasonable treatment options for these species exist and they are generally required to be treated where possible, especially in areas where populations are not well established or previously unknown to occur. Category C weeds are generally widespread and established in many counties of the state, and treatment is done at the discretion of the state quarantine officer.

BLM requested that pre-disturbance invasive species and noxious weed surveys be conducted within all areas to be disturbed or traveled on related to the Proposed Action. The surveys were conducted between June 15-18, 2021 by qualified biologists using protocol approved by BLM (McGinley & Associates 2021). Eighteen noxious weed infestations were documented during the survey (Map 3-5). The infestations were made up of two species: hoary cress (*Cardaria draba*) and scotch thistle (*Onopordum acanthium*). Both of these species are Category C species of noxious weeds.

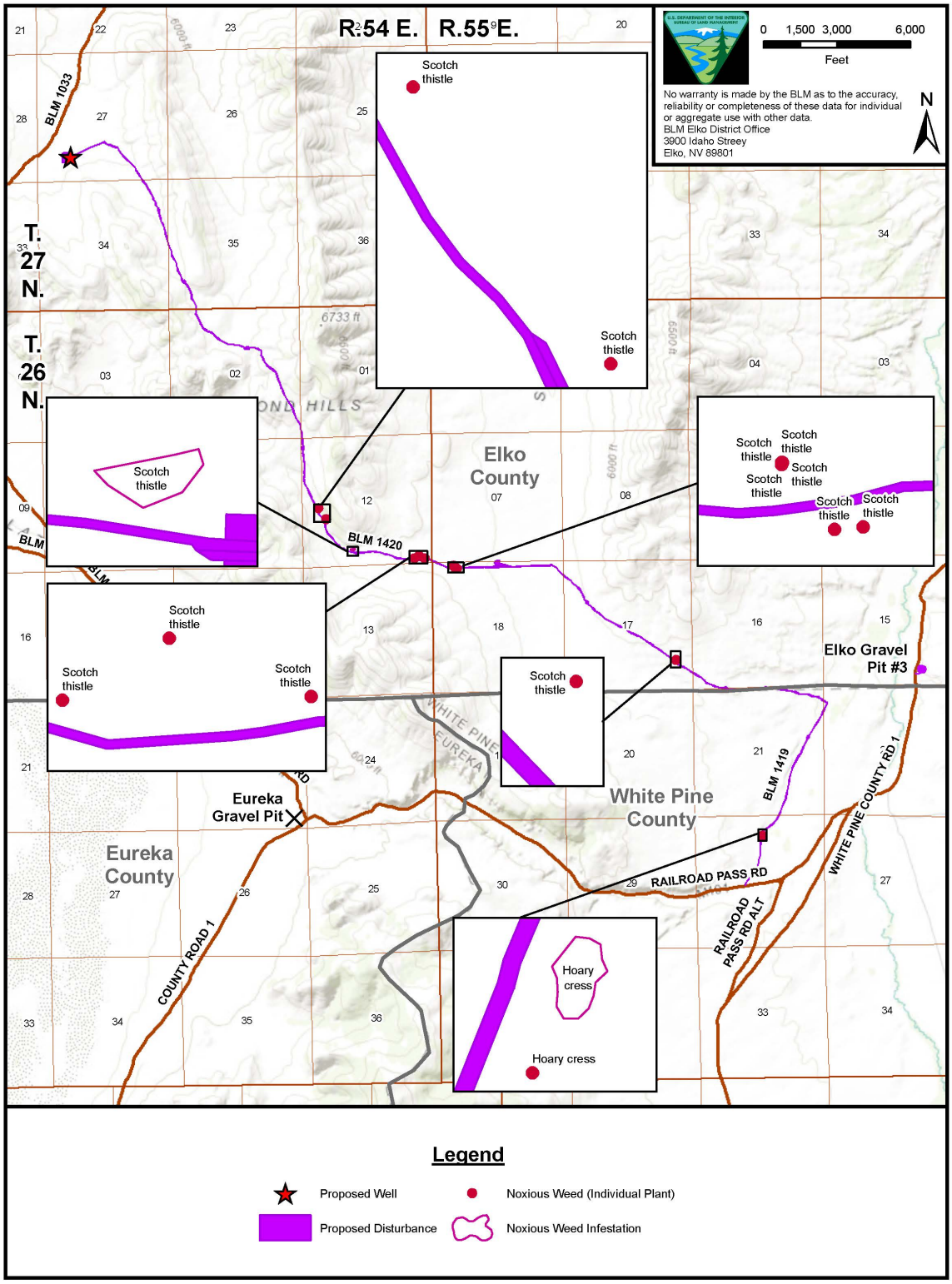
Several additional non-native (non-noxious) invasive weed species were observed, the most common of which were burr buttercup (*Ceratocephala testiculata*), cheatgrass (*Bromus tectorum*), clasping pepperweed (*Lepidium perfoliatum*), prickly lettuce (*Lactuca serriola*), and tall tumble mustard (*Sisymbrium altissimum*) (McGinley & Associates 2021).

3.4.2 Proposed Action

Surface disturbance, increased vehicle traffic, equipment placement and operation, foot traffic, and other activities associated with the Proposed Action could increase the distributions of established weed species and/or introduce new invasive species into areas that are not currently infested.

The Proposed Action could affect abundance and diversity of invasive non-native species and noxious weeds through one or more of the following:

- Clearing native vegetation and exposing bare ground surfaces;
- Introduction and translocation of weeds from established infestations to newly cleared ground by personnel vehicles and construction equipment; and
- Facilitating competition between weeds and native plants though adversely affecting native plant vigor and reproduction through dust deposition along roadsides.



Map 3-5. Weed Survey Results

Approximately 26.9 acres would be disturbed as a result of implementation of the Proposed Action. If the exploration project does not result in producible oil, the entire disturbance area would be reclaimed as soon as possible. If the exploration project evolves to production, the long-term disturbance would be reduced to approximately 23.8 acres. The PDFs and lease stipulations noted in Appendix A to prevent or reduce the spread of invasive and noxious weed species would be incorporated into the design of the proposed project. These protection measures include monitoring and mitigation stipulations required by BLM. Impacts from invasive species or noxious weed species related to the Proposed Action would be minor but long term.

3.4.3 No Action Alternative

Under the No Action alternative, there would be no surface disturbance associated with the Proposed Action and therefore, no effects from invasive or noxious weed species.

3.4.4 Reasonably Foreseeable Environmental Trends

Past and present actions with impacts created from noxious weeds, invasive, and non-native species in the 117,856-acre Invasive Species/Noxious Weeds RFETSA could have included and may currently include livestock grazing, wildland fires, ROW construction and maintenance, mineral exploration and mining, and dispersed recreation. The Applicant acknowledges that the Proposed Action could contribute to the reasonably foreseeable environmental trends related to these activities. Impacts to raptors and their habitat primarily have resulted from wildland fires and livestock grazing. Dispersed recreation, ROW construction and maintenance, and mineral exploration and mining would likely contribute little to the reasonably foreseeable environmental trends due to the limited amount of these activities within the Invasive Species/Noxious Weeds RFETSA.

Historic fires (1981 to 2020) have burned approximately 80,872 acres in the Invasive Species/Noxious Weeds RFETSA (approximately 68.6 percent of the RFETSA). No noteworthy fires occurred in the RFETSA during 2020. A coordinated effort has been made to reseed fire-related disturbance.

Livestock grazing and associated management in the Invasive Species/Noxious Weeds RFETSA could have contributed to the establishment and spread of noxious weeds, invasive and non-native species. There are three grazing allotments within the RFETSA. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in the permits and leases issued by the BLM to public land ranchers.

RFFAs: Potential impacts from noxious weeds, invasive, and non-native species as a result of livestock grazing, wildland fires, ROW construction and maintenance, mineral exploration activities, and dispersed recreation, are expected to continue. There are no specific data to quantify impacts as a result of livestock grazing, dispersed recreation,

or potential wildland fires. There are no pending ROW or minerals projects reported in LR2000 in the RFETSA.

The Proposed Action (approximately 26.9 additional acres of surface disturbance) would impact approximately 0.02 percent of the RFETSA. Project-related impacts would be localized and minimized due to implementation of the PDFs and lease stipulations noted in Appendix A and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts from invasive species/noxious weeds as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact from invasive species/noxious weeds. Impacts from invasive species/noxious weeds from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.5 Issue 4: How would approval of the APD affect soils within and in the vicinity of the proposed disturbance area?

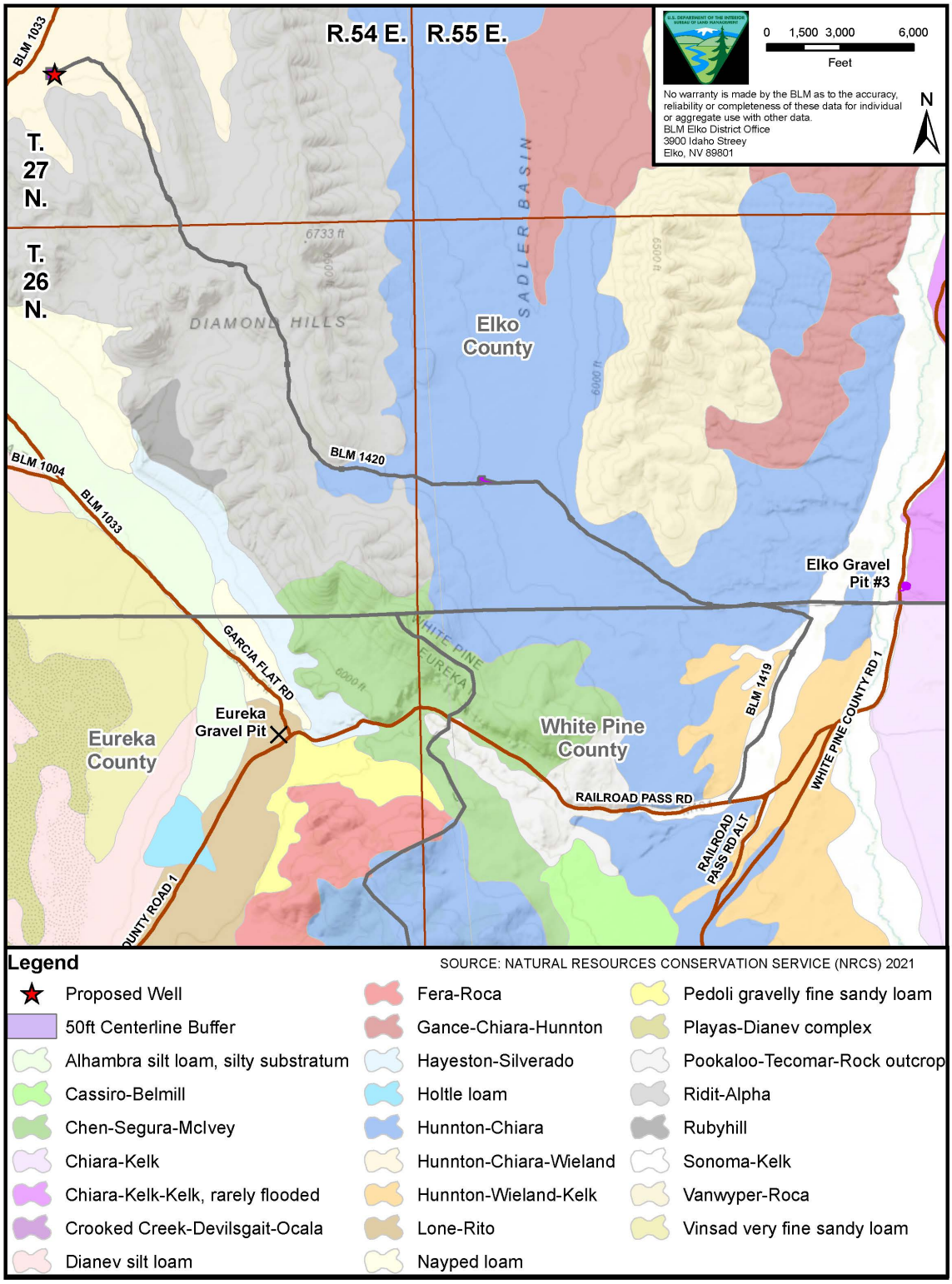
Approval of the Proposed Action would impact soils during the construction of the well pad and associated infrastructure, construction or upgrade of access routes, and drilling of the proposed well.

3.5.1 Affected Environment

Detailed information on soils occurring in the project area was obtained from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS 2021). As shown on Map 3-6, five soil units were identified within the soil survey area: Hunnton-Chiara, Hunnton- Chiara-Wieland, Ridit-Alpha, Sonoma-Kelk, and Chiara-Kelk-Kelk. These are predominantly loamy soils composed of alluvium derived from igneous, metamorphic, or sedimentary rock, mixed rocks, loess, or volcanic ash. Most of the soils are well-drained, and some have a restrictive layer beginning at depths between 10-20 inches.

3.5.2 Proposed Action

The majority of impacts to soils would occur in association with the construction of the well pad and construction or upgrade of the access roads. Construction/upgrade of these facilities requires grading and leveling, with the greatest level of effort required on more steeply sloping areas. Construction activities would mix the soil profiles resulting in a corresponding loss of soil structure. Mixing could result in removal, dilution, or relocation of organic matter and nutrients to depths where the disturbed soil would be unavailable for vegetative use. Less desirable inorganic compounds such as carbonates, salts, or weathered materials could be relocated and affect revegetation.


R.54 E.
R.55 E.
T. 27 N.
T. 26 N.
BLM 1033
DIAMOND HILLS
SADLER BASIN
6733 ft
6000 ft
Elko County
BLM 1420
BLM 1004
BLM 1033
Elko Gravel Pit #3
GARCIA FLAT RD
WHITE PINE
EUREKA
Eureka Gravel Pit
Eureka County
White Pine County
BLM 1419
WHITE PINE COUNTY RD 1
RAILROAD PASS RD
RAILROAD PASS RD ALT
0 1,500 3,000 6,000
Feet
No warranty is made by the BLM as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data.
BLM Elko District Office
3900 Idaho Streey
Elko, NV 89801
N
Legend
SOURCE: NATURAL RESOURCES CONSERVATION SERVICE (NRCS) 2021
Proposed Well
50ft Centerline Buffer
Alhambra silt loam, silty substratum
Cassiro-Belmill
Chen-Segura-McIvey
Chiara-Kelk
Chiara-Kelk-Kelk, rarely flooded
Crooked Creek-Devilsgait-Ocala
Dianev silt loam
Fera-Roca
Gance-Chiara-Hunnton
Hayeston-Silverado
Holtle loam
Hunnton-Chiara
Hunnton-Chiara-Wieland
Hunnton-Wieland-Kelk
Lone-Rito
Nayped loam
Pedoli gravelly fine sandy loam
Playas-Dianev complex
Pookaloo-Tecomar-Rock outcrop
Ridit-Alpha
Rubyhill
Sonoma-Kelk
Vanwyper-Roca
Vinsad very fine sandy loam

Map 3-6. Soils

Compaction of soils would result from the construction of the pad and associated facilities, continued vehicle and foot traffic, and operational activities. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction leads to a loss of soil structure; decreased infiltration, permeability, and soil aeration; and increased runoff and erosion.

Under the Proposed Action, approximately 26.9 acres of soil would be disturbed. Table 3-9 provides a summary of the soil units within the proposed disturbance area and lists the ratings for the various soil characteristics. As indicated in Table 3-9, soils are present within the proposed disturbance area that have suitability limitations for disturbance. BLM has specified that due to limiting factors, roads would need regular and constant maintenance (dust suppression and gravel placement) (BLM 2021b).

In general, impacts to soils from construction, drilling, and completion activities would be short term, whereas impacts from production activities would be long term, occurring for the duration of the project. Soil impacts would be reduced in the long term since areas not needed for production would be reclaimed as soon as possible after the initial disturbance. Impacts would be minimized by rigorous compliance with reclamation plans. Soil loss due to surface disturbance and implementation of the Proposed Action would be minor, long-term, and localized.

3.5.3 No Action Alternative

Under the No Action Alternative, there would be no surface disturbance associated with the Proposed Action and therefore, no effects to the soils within the project area.

3.5.4 Reasonably Foreseeable Environmental Trends

Past and present actions with impacts to soils within the Soils RFETSA could have included and may currently include wildland fires, livestock grazing, dispersed recreation, ROW construction and maintenance, and mineral exploration and mining. The Applicant acknowledges that the Proposed Action could contribute to the reasonably foreseeable environmental trends related to these activities. Impacts to soils primarily have resulted from wildland fires and livestock grazing. Dispersed recreation, ROW construction and maintenance, and mineral exploration and mining would likely contribute little to the reasonably foreseeable environmental trends due to the limited amount of these activities within the Soils RFETSA.

Historic fires (1981 to 2020) have burned approximately 56,172 acres in the 106,002-acre Soils RFETSA (approximately 53.0 percent of the RFETSA). A small portion of one noteworthy fire occurred in the RFETSA during 2020: Cherry (121 acres of the 3,494 acre-fire).

RFFAs: Potential impacts to soils as a result of livestock grazing, wildland fires, ROW construction and maintenance, mineral exploration activities, and dispersed recreation, are expected to continue. There are no specific data to quantify impacts as a result of livestock grazing, dispersed recreation, or potential wildland fires. There are no pending ROW or minerals projects reported in LR2000 in the Soils RFETSA.

Livestock grazing and associated management in the Soils RFETSA could have contributed reasonably foreseeable environmental trends, particularly around water sources where vegetation is trampled and soil compacted and eroded. There are nine distinct grazing allotments within the RFETSA. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in the permits and leases issued by the BLM to public land ranchers.

Table 3-9. Soil Units Associated with the Proposed Action and Ratings for Soil Suitability

Map unit name	Acres in Disturbance	Percent of Disturbance	Erosion Hazard[1]	Wind Erodibility Group[2]	Erodibility Index (Tons/Yr)[3]	Slope[4]	Topsoil Source[5]	Restoration Potential[6]	Unpaved Road Rating[7]	Shrink-Swell Index[8]	Low Strength Index[9]	Frost Action[10]	Dust Generation Rating[11]
Hunnton-Chiara Association	9.71	36.1	Moderate	5	56	5	Fair	Moderate	**Very Limited**	**1**	1	Low	0.42
Hunnton-Chiara-Wieland Association	5.78	21.5	Moderate	5	56	5	Fair	Moderate	**Very Limited**	**1**	1	Moderate	0.40
Ridit-Alpha Association	6.38	23.7	**Severe**	7	38	19	**Poor**	Moderate	**Very Limited**	0.13	ND	Moderate	0.27
Sonoma-Kelk Association	3.85	14.3	Slight	4L	86	1	Fair	Low	**Very Limited**	0.55	1	**High**	0.50
Chiara-Kelk-Kelk	1.20	4.4	Moderate	5	56	3	Fair	**Poor**	**Somewhat Limited**	0.5	1	Moderate	0.40

Source: NRCS 2021

1 A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and "severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

2 A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

3 The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion.

4 Representative percent slope.

5 The soils are rated "good," "fair," or "poor" as potential sources of topsoil.

6 Rating class terms indicate the extent to which the soils are made suitable by all of the soil features that affect the soil's ability to recover. "High potential" indicates that the soil has features that are very favorable for recovery. Good performance can be expected. "Moderate potential" indicates that the soil has features that are generally favorable for recovery. Fair performance can be expected. "Low potential" indicates that the soil has one or more features that are unfavorable for recovery. Poor performance can be expected.

7 This category evaluates the suitability for unpaved roads based on subsidence, shrink-swell behavior, potential frost action, depth to the seasonal high water table and the dust generating tendency of the soil.

8 The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

9 The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity.

10 Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Low: Soils are rarely susceptible to the formation of ice lenses. Moderate: Soils are susceptible to the formation of ice lenses, which results in frost heave and subsequent loss of soil strength. High: Soils are highly susceptible to the formation of ice lenses, which results in frost heave and subsequent loss of soil strength.

11 Numerical ratings indicate the level of vulnerability of the soil for dust formation. The ratings are shown in decimal fractions ranging from 1.00 to 0.01. They indicate gradations between the point at which a soil feature resists dust formation (1.00) and the point at which the soil feature is favorable to the formation of dust (0.00).

The Proposed Action (approximately 26.9 acres of additional temporary disturbance in the Soils RFETSA) would impact approximately 0.02 percent of the RFETSA. Project-related impacts would be localized and minimized due to implementation of the PDFs and lease stipulations noted in Appendix A and concurrent reclamation. Therefore, based on the above analysis and findings, incremental impacts to soils as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact to soils. Impacts soils from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.6 Issue 5: What effect would approval of the APD have on the quantity of groundwater and existing water rights?

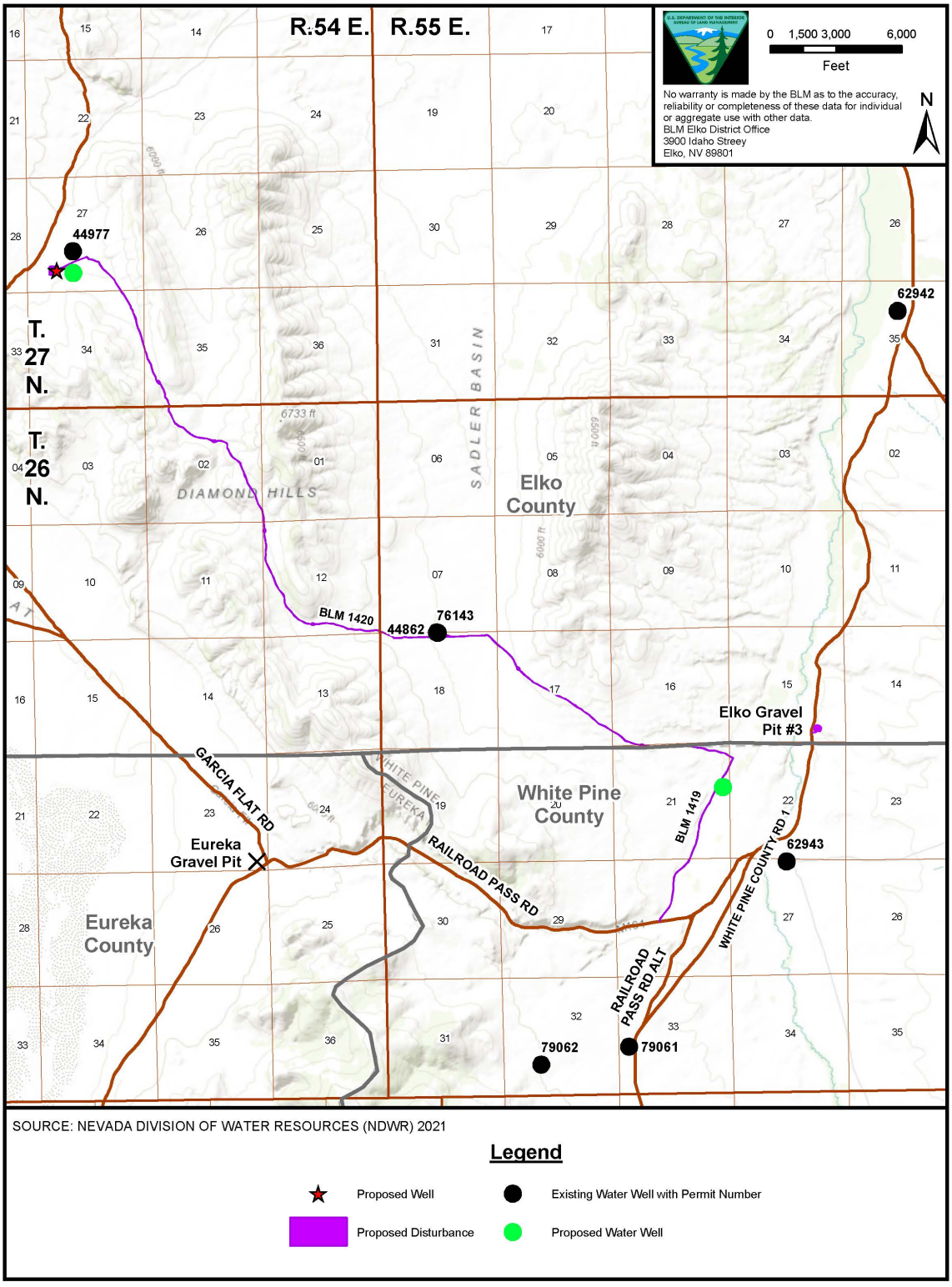
3.6.1 Affected Environment

The project is located within the Huntington Valley hydrographic basin (Area 047) of the upper Humboldt River hydrographic basin (Region 04). The State Engineer designated the Huntington Valley basin on July 10, 1985, under the provisions of Nevada Revised Statute § 534.030, as a basin in need of additional administration. The Huntington Valley basin is approximately 787 square miles with a perennial groundwater yield of 14,000 acre-feet. The NDWR Hydrographic Area Summary indicates that the current committed usage is 8,897.56 acre-feet (NDWR 2021). The majority of groundwater withdrawal in the Huntington Valley basin is used for irrigation (approximately 91 percent).

Groundwater movement in Huntington Valley basin is in the general direction of surface water flow, which is from the mountain areas (Ruby and Diamond mountains), northward toward the axis of the valley and the channel of Huntington Creek (Rush and Everett 1966, Plume 2009, and Plume and Smith 2013). The principal aquifers in the Huntington Valley basin are in younger and older basin-fill deposits (Quaternary and Tertiary). Annual precipitation is the only source of inflow to the Huntington Valley basin. Discharge occurs mostly on valley floors by evaporation from open water and moist soils and transpiration by plants.

3.6.1.1 Groundwater Use

A review of the NDWR water rights indicate that there are eight water supply wells within one mile of the project area: six are for stock watering and two are for irrigation. All wells are shown on Map 3-7 and Table 3-10 provides a summary of the groundwater well water rights within the vicinity of the Project.



Map 3-7. Water Rights and Proposed Water Supply Wells

3.6.2 Proposed Action

Potential impacts to groundwater would contamination of shallow aquifers, depletion of shallow aquifers by penetration, depletion of valley fill aquifer by diversions, and cross-aquifer leaks.

Table 3-10. Groundwater Wells in the Project Area

Permit Number	Owner	Well Name	Qtr Qtr	Sec	Tnp	Rng	Use	Permit Date	Total Depth (feet)	Perforation (feet)	Static Water Level (feet)	Yield (gpm)
44862	BLM	Browne Well	SESW	7	26N	55E	Stock Watering	11/29/83	N/A	N/A	N/A	N/A
44977	BLM	Red Rock Pass Well	NWSW	27	27N	54E	Stock Watering	3/29/89	270	230-250	230	17
62942	KG MINING (BALD MOUNTAIN) INC.		SENW	35	27N	55E	Irrigation	6/5/98	N/A	N/A	N/A	N/A
62943	KG MINING (BALD MOUNTAIN) INC.		NENW	27	26N	55E	Irrigation	6/5/98	N/A	N/A	N/A	N/A
76143	HAROLD ROTHER FARMS, INC.		SESW	7	26N	55E	Stock Watering	4/11/08	N/A	N/A	N/A	N/A
79061	HAROLD ROTHER FARMS INC		NWSW	33	26N	55E	Stock Watering	7/13/10	580	260-580	132	200
79062	HAROLD ROTHER FARMS INC		NESW	32	26N	55E	Stock Watering	7/13/10	410	230-390	160	80

N/A – not available
Source: NDWR 2021

3.6.2.1 Contamination of Shallow Aquifers

Leachates from cuttings have also historically been of concern as potential sources of contamination of shallow aquifers. Contamination would be prevented by following standard operating procedures as described in the Proposed Action. The water-based mud used in drilling would not be expected to contain toxic materials, but the cuttings produced would be sampled before disposal to ensure they are disposed of properly. If it is determined they are non-toxic, these cuttings would be buried on site at depths greater than 3 feet to avoid potential impacts to plant root zones. All materials would attain pertinent State of Nevada waste standards prior to on-site burial. Cuttings may also be disposed at an approved facility.

Drilling fluid balance would be monitored during drilling to identify and mitigate losses to the formation. Mud loss would be quickly stopped by addition of an inert plugging agent (e.g., wood fiber and mica). Solutes in the drilling mud that do enter the formation would be

retarded by the bentonite host. Most mud constituents would be adsorbed to aquifer matrix in short distances, but tracer concentrations would decrease only by dilution and dispersion.

3.6.2.2 Depletion of Shallow Aquifers by Penetration

Drilling of wells through aquitards between different aquifers introduces the potential for movement of water from one aquifer to another along the well borehole. Contamination, or drainage of the shallow aquifer via leaky boreholes to lower aquifers is precluded by the casing schedule. Surface casing would be set to a depth of 1,000 feet, well below the surface, unconfined aquifer, and cemented in before proceeding through the lower section.

3.6.2.3 Depletion of Valley Fill Aquifer by Diversion

Under the Proposed Action, the Applicant propose to complete two temporary water supply wells (Map 3-7). The proposed diversion of groundwater for drilling, hydraulic fracturing, and dust suppression purposes, could potentially lower groundwater levels temporarily. Such extractions could diminish the groundwater, reducing the quantity of water available to groundwater users.

The proposed diversion of 2.5 acre-feet is less than 0.1 percent of the groundwater estimated to be available in the Huntington Valley basin (5,102.44 acre-feet not currently appropriated). Impacts to basin groundwater levels are not expected to impact other groundwater users since only a small fraction of water available in the basin would be diverted.

3.6.2.4 Cross-aquifer Leaks

The potential exists for the proposed well to act as conduits for water and gas to move between deep and shallow aquifers and potentially to the surface. If this were to occur, shallow aquifer water, which supplies water for irrigation and livestock use, could be contaminated by water and gas of naturally poor quality from deep aquifers. These cross-aquifer leaks would be precluded by cemented casing sealing the well off from shallow and valley fill aquifers, and sealing the boring between them. Each piece of casing would be cemented and integrity of the cement seal would be verified by geophysical logs. During drilling, the open section of borehole beyond the last casing would be controlled by mud pressure. Should high formation pressures be encountered greater than the mud column weight, the BOPE would be ready to cut off the drilling pipe and seal the borehole with hydraulic rams at the collar.

3.6.3 No Action Alternative

Under the No Action Alternative, there would be no groundwater use associated with the Proposed Action and therefore, no effects on the groundwater within the project area.

3.6.4 Reasonably Foreseeable Environmental Trends

Past and present actions that could have impacted and may be currently impacting groundwater resources in the Groundwater RFETSA include irrigation, municipal, mining,

industrial, and stock watering. According to NWDR, approximately 98,323 acre-feet of the 375,000 acre-feet groundwater in the RFETSA are permitted (NDWR 2021). The groundwater utilization related to the Proposed Action (approximately 2.5 acre-feet of groundwater for drilling and dust control) would impact approximately 0.003 percent of the remaining available perennial yield.

RFFAs: Potential impacts to groundwater from mineral exploration activities are expected to continue. The Pony Creek Exploration Project, Cedar Ridge Exploration Project, and Huntington Valley Oil and Gas Exploration Project, when combined with the Proposed Action, would only use a fraction of the available perennial yield in the Groundwater CESE.

Therefore, based on the above analysis and findings, incremental impacts to groundwater as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact to groundwater. Impacts to groundwater from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

3.7 Issue 6: How would approval of the APD affect pygmy rabbits and their habitat?

Pygmy rabbit populations can be threatened by habitat loss and fragmentation caused by conversion of sagebrush rangeland to agriculture; development, including oil and gas production; and wildfire frequency in some areas. Approval of the Proposed Action would result in habitat loss and displacement of pygmy rabbits and could result in disturbance-related mortality. Increased vehicle traffic on roads and highways leading to the project area could contribute to additional rabbit mortalities.

3.7.1 Affected Environment

Pygmy rabbits are BLM and NNHP sensitive species. The species was petitioned for listing under the ESA; however, the USFWS concluded in 2010 that it did not warrant protection under the ESA in California, Nevada, Oregon, Idaho, Utah, Wyoming, and Montana (USFWS 2010).

Pygmy rabbits are typically found in areas of tall, dense sagebrush (*Artemisia spp.*) cover and are highly dependent on sagebrush to provide both food and shelter throughout the year. Their diet in the winter consists of up to 99 percent sagebrush (USFWS 2021b). Pygmy rabbit burrows are typically found in relatively deep, loose soils of wind-borne or water-born origin. They occasionally make use of burrows abandoned by other species and as a result, may occur in areas of shallower or more compact soils that support sufficient shrub cover.

Since species distribution and population trends within or near the proposed project area were largely unknown, BLM requested that pygmy rabbit surveys be conducted. The surveys were conducted between June 15 and 18, 2021 by qualified biologists using protocol

approved by BLM (McGinley & Associates 2021). No burrows were found in the proposed disturbance areas for the drill pad or the new access road or in the respective 100-ft buffers. Fourteen probable pygmy rabbit burrows (sites) were located in three clusters along the existing access road (Map 3-4). Although most probable burrows occurred away from the existing access road, two burrows occurred within several feet of the road.

3.7.2 Proposed Action

Direct impacts to pygmy rabbits in the project area would result in habitat loss and displacement of pygmy rabbits and could result in disturbance-related mortality. Increased vehicle traffic on roads and highways leading to the project area could also contribute to rabbit mortalities.

BLM has reviewed the pygmy results of the rabbit survey conducted by McGinley & Associates and formulated the following avoidance buffer requirements (BLM 2021d):

- Pygmy Rabbit Site Identification (ID) #'s 1,2,3,4, and 7 (southern cluster): According to the Applicant, there will be no traffic turn out at or within 100 feet to either side of the colony site. Road upgrade should focus to the east of the road, but Site ID #'s 1, 2, 3, and 7 must have a minimum 10-foot disturbance buffer. Site ID #4 can be impacted if there is need.
- Pygmy Rabbit Site ID #'s 5, 6, 8, 9, 10, 11, and 12 (northern cluster): According to the Applicant, there will be no traffic turn out at or within 100 feet to either side of the colony site. Road upgrade must be to be kept to the minimum footprint possible through this area. Site ID #'s 5 and 6 have been disturbed, but the habitat potential is still there. Road upgrades must maintain a minimum 10-foot disturbance buffer from these sites. The burrow at Site ID #12 is isolated but in an area with high habitat potential. The proposed turn out near this site must be moved 100 feet further to the west and road upgrades must maintain a minimum 10-foot disturbance buffer.
- Pygmy Rabbit Site ID #'s 13 and 14 (middle cluster): This area appears to be transitory habitat utilized by wandering juveniles. No remediation needed.

The BLM-required avoidance buffer requirements listed above and the PDFs and lease stipulations noted in Appendix A to prevent mortality and potential disturbance of pygmy rabbits would be incorporated into the design of the proposed project. Approximately 26.9 acres would be disturbed as a result of implementation of the Proposed Action. If the exploration project does not result in producible oil, the entire disturbance area would be reclaimed as soon as possible. If the exploration project evolves to production, the long-term disturbance would be reduced to approximately 23.8 acres. Direct impacts to pygmy rabbits related to the Proposed Action would be minor but long term.

Indirect impacts resulting from habitat loss associated with vegetation removal from surface disturbing activities would result in the reduction of 26.9 acres of pygmy rabbit habitat. The disturbance related to the Proposed Action would be reclaimed and revegetated, returning

the 26.9 acres of long-term disturbance to wildlife access and habitat. Indirect impacts to pygmy rabbits are expected to be minor, long term, and localized.

3.7.3 No Action Alternative

Under the No Action alternative, there would be no surface disturbance associated with the Proposed Action and, therefore, no effects to pygmy rabbits or their habitat.

3.7.4 Reasonably Foreseeable Environmental Trends

Past and present actions that could have impacted and may be currently impacting rabbit habitat in the Pygmy Rabbit RFETSA include wildland fires, livestock grazing, dispersed recreation, ROW construction and maintenance, and mineral exploration and mining. The Applicant acknowledges that the Proposed Action could contribute to the reasonably foreseeable environmental trends related to these activities. Impacts to pygmy habitat primarily have resulted from wildland fires and livestock grazing. Dispersed recreation, ROW construction and maintenance, and mineral exploration and mining would likely contribute little to the reasonably foreseeable environmental trends due to the limited amount of these activities within the Pygmy Rabbit RFETSA.

Historic fires (1985 to 2020) have burned approximately 43,880 acres in the 81,250-acre Pygmy Rabbit RFETSA (approximately 54.0 percent of the RFETSA). Two noteworthy fires occurred in the RFETSA during 2020: Basin (3,671 acres) and Railroad (827 acres).

Livestock grazing and associated management in the Pygmy Rabbit RFETSA could have contributed to direct disturbance to pygmy rabbit habitat and the establishment and spread of noxious weeds/invasive and non-native species, which could have had an indirect effect on rabbit habitat. There are eight grazing allotments within the RFETSA. The terms and conditions for grazing on BLM-managed lands (such as stipulations on forage use and season of use) are set forth in the permits and leases issued by the BLM to public land ranchers.

RFFAs: Potential impacts to pygmy rabbit habitat from livestock grazing, ROW construction and maintenance, mineral exploration activities, dispersed recreation, or loss of native vegetation associated with potential wildland fires are expected to continue. There are no specific data to quantify impacts to pygmy rabbit habitat within the RFETSA as a result of dispersed recreation, livestock grazing, or potential wildland fires. There are no pending ROW or minerals projects reported in LR2000 in the RFETSA.

The Proposed Action (approximately 26.9 additional acres of surface disturbing activities that could create impacts from anthropogenic activities) would impact approximately 0.03 percent of the Pygmy Rabbit RFETSA. Project-related impacts would be localized and minimized due to implementation of the PDFs and lease stipulations noted in Appendix A. Therefore, based on the above analysis and findings, incremental impacts to raptors as a

result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs, are expected to be minor.

The No Action alternative would not add to the incremental impact to pygmy rabbit. Impacts to pygmy rabbit from this alternative, in combination with past and present actions and RFFAs disturbance, would be negligible.

4.0 CONSULTATION

4.1 Consultation

BLM identified state agencies, local governments, and other federal agencies with jurisdiction or special expertise for potentially impacted environmental resources associated with this EA. These agencies were extended the opportunity to become cooperating agencies for the development of this EA and to be involved in the development of alternatives and mitigation measures. Agencies requesting cooperating agency status include NDOW, SETT, and the White Pine County Road Department.

Information sharing letters were set to the Te-Moak Tribe of Western Shoshone and the four constituent Bands (Battle Mountain, Elko, South Fork, and Wells) inviting them to request additional information or engage in formal government to government consultation.

4.2 List of Preparers

As required by NEPA regulations (40 CFR § 1506.5), a list of the individuals responsible for preparing this EA is included in Table 4-1.

Table 4-1. List of Preparers

Agency/Company	Title/Role	Area of Responsibility
BLM		
Thomas Schmidt	Geologist/Project Lead	Geology
Elizabeth Puentes	Assistant Field Manager	Document Review
Melanie Peterson	Field Manager	Document Review, Authorized Officer
Ryan Brown	Archaeologist	Cultural Resources
Kyle Martin	Weed Management Specialist	Weeds
Jessica Montcalm	Native American Tribal Liaison	Native American Coordination
Mandy Dimick	Realty Specialist	Lands
Nycole Burton	Wildlife Biologist	Wildlife
Tammy Owens	Outdoor Recreation Planner	Wilderness Characteristics
John Daniel	Hydrologist	Hydrology
Terri Dobis	Planning and Environmental Coordinator	Document review, NEPA and Land Use Plan Conformance
Kyle Davies	Rangeland Management Specialist	Range Resources
WWC Engineering		
Beth Kelly	Project Manager	Project Management
John Berry		Document Preparation/QAQC
Chris McDowell		Groundwater
Rodney Ventling		Graphics/ArcGIS

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APPENDIX A
PROJECT DESIGN FEATURES

The Applicant would commit to the following Project Design Features (PDFs) to prevent unnecessary or undue degradation during construction, operation, and reclamation of the Project. The measures are derived from the general requirements established in the BLM's Surface Management Regulations at 43 CFR 3809 and BMRR mining reclamation regulations, and water quality, air quality and other environmental protection regulations and guidelines.

Air Quality

- Emissions of fugitive dust from disturbed surfaces would be minimized by the application of water from a water truck as a method of dust control. A Surface Area Disturbance (SAD) Permit would be required when surface disturbance exceeds 5 acres in size.

Cultural and Paleontological Resources

- Pursuant to 43 CFR 10.4(g), the Applicant would notify the BLM authorized officer, by telephone, and with written confirmation, immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR 10.2). Further pursuant to 43 CFR 10.4, the Applicant would immediately stop all activities in the vicinity of the discovery and not commence again until a notice to proceed is issued by the BLM AO.
- GBO would avoid all NRHP-eligible sites and unevaluated sites by a buffer zone of 100 feet. Prior to GBO initiating activities under each phase, the BLM would review the work plan for each phase to ensure the protection of all NRHP-eligible sites and unevaluated sites. If deemed necessary by the BLM, GBO would place a qualified archaeologist on site during surface disturbing activities near known cultural resources to monitor Project implementation and ensure NRHP-eligible sites and unevaluated sites are avoided.
- GBO would inform all field personnel of the Archaeological Resources Protection Act of 1979 and the Native American Graves Protection and Repatriation Act (Public Law 101-601) responsibilities and their associated penalties.
- Any undiscovered cultural resources discovered by GBO, or any person working on their behalf, during the course of activities on federal land would be immediately reported to the authorized officer by telephone, and with written confirmation. The permit holder would suspend all operations in the immediate area of such discovery and protect it until an evaluation of the discovery can be made by the authorized officer. This evaluation would determine the significance of the discovery and what mitigation measures would be necessary to allow activities to proceed. GBO would be responsible for the cost of evaluation and mitigation. Operations would resume only upon written authorization to proceed from the authorized officer.

- GBO would not knowingly disturb, alter, injure, or destroy any scientifically important paleontological deposits. In the event that previously undiscovered paleontological resources are discovered by GBO in the performance of any surface disturbing activities, the item(s) or condition(s) would be left intact and immediately brought to the attention of the authorized officer of the BLM. If significant paleontological resources are found, avoidance, recordation, and/or data recovery would be required.

Fire Management

- All applicable state and federal fire laws and regulations would be complied with and all reasonable measures would be taken to prevent and suppress fires in the Project Area.
- The following precautionary measures would be taken to prevent and report wildland fires:
    - All vehicles would carry fire extinguishers and a minimum of ten gallons of water;
    - Adequate fire-fighting equipment (i.e., shovel, Pulaski, extinguishers), and a minimum ten gallons of water would be kept at each drill site;
    - Vehicle catalytic converters would be inspected often and cleaned of brush and grass debris;
    - Welding operations would be conducted in an area free from or mostly free from vegetation. A minimum of ten gallons of water and a shovel would be on hand to extinguish any fires created from the sparks. Extra personnel would be at the welding site to watch for fires created by welding sparks. Welding aprons would be used when conditions warrant (i.e., during red flag warnings); and
    - Wildland fires would immediately be reported to the Elko Interagency Dispatch Center at (775) 748-4000. Information reported would include the location (latitude and longitude if possible), fuels involved, time started, who or what is near the fire, and the direction of fire spread.

Hazardous or Solid Wastes

- Pursuant to 43 CFR 8365.1-1(b)(3) and 43 CFR 3809.420(b)(5) and (6), no sewage, petroleum products, or refuse would be dumped from any trailer or vehicle.
- Hazardous or solid wastes would primarily consist of petroleum products, including greases, oils, etc., used in the maintenance of equipment and would therefore be stored on drill support vehicles or on the drill rig itself. Therefore, the petroleum products would leave the site when the support vehicles and/or drill rig leaves the site.
- All regulated wastes, including hazardous and miscellaneous solid wastes, would be removed from the Project Area and disposed of in a state, federal, or local designated area on a daily basis, or as appropriate.
    - No solid waste would be permitted in sumps.

- All spills, regardless of quantity, would be addressed and the material would be removed for proper disposal.
- If a spill of a petroleum constituent is considered to meet the reportable quantity per the NDEP's guidelines (greater than 25 gallons or greater than three cubic yards of impacted material or any quantity if a water body is impacted), or a reportable quantity for hazardous waste is released based on the Federal Environmental Protection Agency guidelines established under Title III List of Lists (40 CFR Part 302), the NDEP would be notified within 24 hours, and the appropriate remedial actions and confirmation sampling would be conducted under direction of the NDEP.

Migratory Birds

- To avoid potential impacts to breeding migratory birds, a nest survey would be conducted by a BLM-approved biologist prior to any surface disturbance associated with exploration activities during the avian breeding season (March 1 through July 31 for raptors, other migratory birds, and burrowing owls). Pre-disturbance surveys for migratory birds are only valid for 14 days. If the disturbance for the specific location does not occur within 14 days of the survey, another survey would be needed. If active nests are located, or if other evidence of nesting (i.e., mated pairs, territorial defense, carrying nest material, transporting food), a protective buffer (the size depending on the habitat requirements of the species) would be delineated after consultation with the BLM resource specialist, and the buffer area avoided to prevent destruction or disturbance to nests or birds until they are no longer actively breeding or rearing young.

Night Skies

- To minimize effects from lighting, GBO would utilize hooded stationary lights and light plants. Lighting would be directed onto the pertinent site only and away from adjacent areas not in use, with safety and proper lighting of the active work areas being the primary goal. Lighting fixtures would be hooded and shielded as appropriate. GBO would utilize lighting designed to reduce the impacts to night skies.

Noise

- Suitable mufflers would be installed on all internal combustion engines and certain compressor components. Other noise reduction techniques would include siting wells, production facilities, compressors, roads to take advantage of topography and distance, and constructing engineered sound barriers or sound-insulated buildings, as needed. The placement of tank batteries and other facilities offsite and the use of remote well monitoring systems would reduce vehicle traffic in the field and the associated noise.

Noxious Weeds & Invasive, Non-Native Plants

- GBO would implement the Noxious Weed Management Plan (McGinley & Associates 2021b) prepared for the Project during construction and continuing through operations and reclamation. Management strategies include prevention (i.e., education and best management practices), treatment (i.e., mechanical and chemical treatment), and monitoring.

Public Safety and Access

- Public safety would be maintained throughout the life of the Project. All equipment and other facilities would be maintained in a safe and orderly manner.
- Drill sites, sumps, and excavations would be reclaimed concurrently after the completion of sampling and logging and upon determination that the disturbance is no longer needed for exploration activities. Sumps would be backfilled once the previously stated criteria are met and there is no standing water present in the excavation. Sumps would be closed no later than the end of seasonal activities.
- Any survey monuments, witness corners, or reference monuments would be protected to the extent economically and technically feasible.
- Final reclamation of constructed roads, sumps, and drill sites would consist of, fully recontouring disturbances to their original grade, and reseeding in the late fall and/or early spring season immediately following completion of exploration activities.
- In the event that any existing roads are degraded as a result of GBO activities, GBO would return them to their original condition.

Sensitive Species

<u>Greater Sage-grouse</u>

- Work with the Sagebrush Ecosystem Technical Team (SETT), as stipulated by NAC 232.400-232.480 (October 2019), to quantify the debits incurred by the action using the Nevada Conservation Credit System.
- To reduce potential impacts to GRSG, GBO would implement the following fluid mineral stipulations. The AO may grant exceptions, modifications, or waivers to these stipulations where an environmental review and consultation with the appropriate state agency (NDOW, SETT) determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat.
    - SG-02-NV-OG-NSO: No surface occupancy (NSO) in priority habitat management areas outside of sagebrush focal area (SFA).
    - Stipulation SG-03-TL: NSO would be allowed within 4.0 miles of active or pending GRSG leks from March 1 through May 15.
    - Stipulation SG-04-TL: NSO would be allowed in GRSG winter habitat from November 1 through February 28.
    - Stipulation SG-05-TL: NSO would be allowed in GRSG early brood-rearing habitat from May 15 through June 15.

    - Stipulation SG-06-TL: NSO would be allowed in GRSG late brood-rearing habitat from June 15 through September 15.
- Stipulation SG-08-CSU: Authorizations/permits would limit noise from discretionary activities (during construction, operation, or maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season from March 1 through May 15.Monitoring would be conducted to ensure that construction activities commensurate with timing stipulations of GRSG leking and brood rearing periods.

Pygmy rabbits

- To minimize potential impacts to pygmy rabbits (*Brachylagus idahoensis*), a pre-disturbance clearance survey of the proposed disturbance in mapped suitable pygmy rabbit habitat would be conducted. If active burrows are found, a no disturbance buffer would be applied, the size of which would be determined in consultation with the BLM. These surveys would be conducted in conjunction with the migratory bird clearance surveys.
- During the construction phase, monitoring would be conducted to ensure that pygmy rabbit locations would be avoided.

Water Quality

- All drill holes would be plugged in accordance with NRS 534, NAC 534.4369 and NAC 534.4371 with the exception of drill holes collared with a mud rotary or RC drill rig and completed with a core rig, which would be plugged prior to the core rig moving from the drill site. If any drill hole produces artesian flow, the drill hole would be contained pursuant to NRS 534.060 and NAC 534.378 and would be sealed by the method described in NAC 534.4371. If casings are set in a drill hole, either the drill hole must be completed as a well and plugged pursuant to NAC 534.420, or the casings would be completely removed from the drill hole and then plugged in accordance with NAC 534.4369 and NAC 534.4371.
- Storm water BMPs would be used at construction sites to minimize storm water erosion.
- Drill cuttings would be contained on site and fluids managed utilizing appropriate control measures. Sediment traps would be used as necessary and filled at the end of the drill program.
- GBO would follow the Spill Response and Contingency Plan included as Appendix Din the Plan.
- Only nontoxic fluids would be used in the drilling process.

Wildlife

- All trenches, sumps, and other small excavations that pose a hazard or nuisance to the public, wildlife, or livestock would be constructed with a sloped end for egress and/or adequately fenced to preclude access.
- Lease Stipulation OG-010-05-13: Seasonal restrictions from disturbance to pronghorn antelope crucial winter ranges apply during the period November 15-March 16.

APPENDIX B
INTERDISCIPLINARY TEAM CHECKLIST

Table B1. Supplemental Authorities Considered in the Analysis

Supplemental Authority Element	Not Present	Present / Not Affected	Present/ May be Affected	Rationale
Area of Critical Environmental Concern (ACEC)	●			There are no ACECs within or near the area of the Proposed Action.
Air Quality			●	Carried forward for analysis.
Cultural Resources	●			A Class III inventory of the direct Area of Potential Effects (APE) was conducted between June 12-15, 2021 and September 3, 2021. No historic properties were identified within the direct APE and resulted in a finding of No Historic Properties Affected (36 CFR 800.4(d)(1)).
Environmental Justice		●		No minority or low-income populations are expected to be disproportionately affected by the Proposed Action.
Farmlands, Prime or Unique	●			No prime or unique farmlands are located within the area of the Proposed Action.
Floodplains	●			No floodplains are located within the area of the Proposed Action.
Human Health and Safety		●		The Project may use herbicides to eradicate noxious weeds; however, EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks," would not apply to this Project as there would be no children on the site during application of the herbicides.
Migratory Birds			●	Carried forward for analysis.
Native American Concerns		●		Information sharing efforts with potentially impacted Tribes remain on-going. Exact locations or areas of importance have not yet been disclosed within the area of potential effect.

Supplemental Authority Element	Not Present	Present / Not Affected	Present/ May be Affected	Rationale
Noxious Weeds/ Invasive Nonnative Species			•	Carried forward for analysis.
Threatened and Endangered Species		•		No Threatened or Endangered plants or animals or their habitats are known to exist within or near the area of the Proposed Action.
Waste – Hazardous/Solid		•		The operator and any contractor would have Safety Data Sheets available for all chemicals, compounds, or substances used.
Water Quality		•		Water quality is protected through BMPs that isolate water sources from drilling equipment, fluids, and contamination.
Wetlands and Riparian Areas	•			There are no wetlands or riparian areas located within the area of the Proposed Action.
Wild & Scenic Rivers	•			There are no rivers or river segments, designated, or eligible to be designated, for inclusion in the National Wild and Scenic Rivers System within or near the area of the Proposed Action.
Wilderness/ Wilderness Study Areas/Lands with Wilderness Characteristics	•			The area of the Proposed Action is not in a designated Wilderness, Wilderness Study Area, or Inventory Unit with Wilderness Characteristics.

Table B2. Other Resources that may be Affected by the Proposed Action

Other Resources	Not Present	Present / Not Affected	Present/ May be Affected	Rationale
Access		●		ROW approval is part of this Proposed Action. GBO would work with Elko County and White Pine County road departments for maintenance on County roads.
Aquatic Species	●			There are no aquatic species located within the area of the Proposed Action.
Climate Change			●	Carried forward for analysis.
Fire Management		●		Fuel loading would be reduced within the disturbance boundary, which could reduce burn impacts to residual vegetation if a wildfire were to occur.
Grazing Management		●		The Proposed Action would affect 4.3 acres of the 66,323 acres Red Rock Allotment, which is a negligible percentage that would not result in a reduction of AUMs or management of the allotment. The Red Rock Allotment is meeting Standard 1 for Rangeland Health. Livestock management in the Red Rock Allotment is in conformance with guidelines for rangeland health associated with achievement of the standards. GBO would work with BLM to determine if installation of appropriate temporary fencing and lighting is required to ensure no livestock are injured due to the Proposed Action during drilling operations. The BLM would coordinate with the livestock grazing permittee on any future proposals in the lease area to minimize impacts to the operation.
Realty – Land Use		●		BLM lease number NVN94067. ROW is part of this Proposed Action. GBO working with BLM on improvements to BLM roads.

Other Resources	Not Present	Present / Not Affected	Present/ May be Affected	Rationale
Minerals		●		Potential oil reserves on adjacent oil and gas leases are protected through State and Federal Oil and Gas regulations. There are no potential impacts to mineral materials or locatable minerals projects from this Proposed Action. See the Minerals Development Act of 1954 consists of the Act of August 13, 1954 (68 Stat. 708) and subsequent amendments thereto (30 U.S.C. 521–531) for additional details.
Recreation	●			There is no Special Recreation Management Area (SRMA) and there are only dispersed recreation resources in the general project area. Impacts to dispersed recreation opportunities, if any, would be very slight.

Other Resources	Not Present	Present / Not Affected	Present/ May be Affected	Rationale
Sensitive Species			•	Nevada Natural Heritage Program (NNHP): No at risk taxa have been recorded within the survey area. Habitat may be available for pygmy rabbit and western burrowing owl (*Athene cunicularia hypugaea*), both of which are Nevada BLM Sensitive Species1. U.S. Fish and Wildlife Service (USFWS): No listed or proposed species are known to occur in the survey area. Gray wolf (*Canis lupus*), Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*), and monarch butterfly (*Danaus plexippus*) are noted on the list. The former two species do not occur within the survey area, whereas monarch may occur where milkweed (Asclepias spp.) is present. No critical habitat has been designated for these species within the survey area 2. Carried forward for analysis.
Socio-Economic Values		•		The Proposed Action will benefit the surrounding areas economy in the short term and, if a successful well is drilled, will have long term benefits.

1 Nevada Division of Natural Heritage (NNHP), 2021, Nevada Natural Heritage GIS Data. https://heritage.nv.gov/gis

2 U.S. Fish and Wildlife Service, 2021, ECOS Environmental Conservation Online System, Listed Species believed to or known to occur in Elko County, Nevada. https://ecos.fws.gov/ecp/report/species-listings-by-state?stateAbbrev=NV&statusCategory=Listed&s8fid=112761032792&s8fid=112762573902

Other Resources	Not Present	Present / Not Affected	Present/ May be Affected	Rationale
Soils			●	According to Natural Resources Conservation Service (NRCS) information, some soils within the Project Area are susceptible to erosion by wind and surface runoff during storm events. Potential soil impacts include increased erosion due to clearance of local vegetation, compaction of soils from operation of heavy equipment, and disturbance of soil productivity due to grading and mixing activities. Carried forward for analysis.
Special Status Species		●		See discussion under Special Status Species (Wildlife). There are no Special Status Plant Species within the Project Area.
Vegetation		●		Due to the minimal amount of disturbance under the Proposed Action there would be negligible impacts to vegetation.
Visual Resources		●		The Proposed Action is located in VRM Class IV, which allows for major modifications of the existing character of the landscape. The project as designed would limit impacts to visual resource within the area of the Proposed Action.
Wild Horses and Burros		●		The Proposed Action would affect 4.8 acres of the 71,564 acres Diamond Hills North HMA and 0.3 acre of the 19,345 acres Diamonds Hills South HMA. This would be a negligible percentage and would not result in a reduction of AMLs or management of the HMA. GBO would work with BLM to determine if installation of appropriate temporary fencing would be required.
Wildlife			●	Carried forward for analysis

APPENDIX C

SPECIAL STATUS SPECIES AND REGION 9 BIRDS OF CONSERVATION CONCERN

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
Amphibians						
N	Boreal Toad	*Anaxyrus boreas ssp.*	Wide variety of habitats including desert springs and streams, meadows, marshes, woodland, mountain wetlands and agricultural land. It is also known from around ponds, lakes, reservoirs, and slow-moving rivers and streams; undertake seasonal migrations to and from breeding sites; newly metamorphosed young form large aggregations and migrate en masse to upland foraging areas. this species exhibits breeding site fidelity	No rankings		
N	Columbia Spotted Frog (Including Toiyabe Spotted Frog Subpopulation)	*Rana luteiventris*	Closely associated with clear, slow-moving or ponded surface waters, with little shade, and relatively constant water temperatures; Breeding and egg-laying occurs in waters with floating vegetation and larger ponds such as oxbows, lakes, stock ponds, and beaver-created ponds; overwintering occurs in spring heads and deep undercuts with overhanging vegetation and ice-covered deep ponds	NDOW (SP); USFS (S); NS-S (**S2S3**); NS (G4T2T3Q)		
N	Northern Leopard Frog	*Lithobates pipiens*	Permanent ponds, swamps, marshes, and slow-moving streams throughout forest, open, and urban areas; normally inhabit water bodies with abundant aquatic vegetation.	NDOW (SP); NS-S (**S2S3**); NS (G5)		
Arachnids						
N	Nevada Water Mite	*Thermacarus nevadensis*	Hot springs; distribution, and ecology are incomplete	**NDOW (EB)**; NS-S (SH); NS (GH)		
Birds						
Y	**Bald Eagle**	***Haliaeetus leucocephalus***	**Forested areas adjacent to large bodies of water. Winter foraging includes big game winter ranges**	**No ranking**		**X**
N	Black Rosy-finch	*Leucosticte atrata*	Breeds in alpine areas, usually near rock piles, and cliffs; winters in open country, including mountain meadows, high deserts, valleys, and plains	NS-S (**S3**); NS (G4)		
Y	Brewer's Sparrow	*Spizella breweri*	Arid sagebrush steppe; winter, occupy sagebrush shrublands similar to the breeding grounds, as well as a range of desert scrub habitats consisting mainly of saltbush and creosote	NDOW (SB); NS-S (S4B); NS (G5)		X
Y	Burrowing Owl (Includes Western Burrowing Owl)	*Athene cunicularia (A. c. hypugaea Western Burrowing Owl)*	Live in open habitats with sparse vegetation such as prairie, pastures, desert or shrub steppe, and airports. In parts of their range, they are closely associated with prairie dogs and ground squirrels, whose burrows they use for nests; western burrowing owls breed throughout Nevada in salt desert scrub, Mojave shrub, and some sagebrush habitat, as well as in agricultural landscapes;	NS-S (**S3**B); NS (G4); Western Burrowing Owl NS-S (**S3**B); NS (G4T4)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			winters most frequently in the southern half of Nevada, but has been recorded throughout the state during all months			
N	Columbian Sharp-tailed Grouse	*Tymanuchus phasianellus columbianus*	Sagebrush-grassland and mountain shrub habitats during summer; use areas dominated by perennial bunchgrasses like bluebunch wheatgrass or Idaho fescue and the shrub layer, if present is dominated by big sagebrush and/or antelope bitterbrush; tall, broad-leaved mountain shrub and riparian cover types are critical components of winter habitat for sharp- tailed grouse; often move to higher elevations to get into moister sites that support greater amounts of these types of shrubs.	NDOW (GB); NS-S (G4T3); NS (G4)		
Y	Ferruginous Hawk	*Buteo regalis*	Preferred habitat arid and semiarid grassland regions; open, level, or rolling prairies; foothills or middle elevation plateaus largely devoid of trees; and cultivated shelterbelts or riparian corridors	NS-S (**S2**); NS (G4)		X
Y	Flammulated Owl	*Psiloscops flammeolus*	Open pine forest in mountains	NS-S (S4B); NS (G4)		
Y	Golden Eagle	*Aquila chrysaetos*	Open country, especially around mountains, hills, and cliffs; use a variety of habitats ranging from arctic to desert, including tundra, shrublands, grasslands, coniferous forests, farmland, and areas along rivers and streams	NS-S (S4); NS (G5)		X
N	Gray-crowned Rosy-finch	*Leucostcte tephrocots*	Breeds in alpine areas, usually near snow fields or glaciers, talus, rockpiles, and cliffs; winters in open country, including mountain meadows, shrublands, roadsides, towns, cultivated areas, rocky hillsides, and margins of dry ditches	NS-S (**S3**N); NS (G5)		
Y	Green-tailed Towhee	*Pipilo chlorurus*	Open pinyon-juniper woodlands with shrub- dominated under stories, primarily sagebrush	No ranking		X
N	Great Basin Willow Flycatcher	*Empidonax traillii adastus*	Montane riparian habitat, with some spillover into lowland riparian areas; found in both lowland and montane riparian habitats, and occasionally in other inundated areas such as aspen stands or wet meadows; uses the lower Colorado River corridor during migration.	USFS (S); NS-S (**S1S2**); NS (G5T5)		
Y	Greater Sage-grouse (Including Bi-State DPS)	*Centrocercus urophasianus*	Sagebrush steppe; nest in areas with relatively dense cover from big sagebrush; may use areas with rabbitbrush, greasewood, and grassy areas; leks are located in clear areas such as broad ridgetops, grassy swales, dry lakebeds, and sometimes recently burned areas. Chick rearing areas include irrigated pastures, wet meadows, and alfalfa fields, in addition to sagebrush.	NDOW (GB); NS-S (**S3**); NS (**G3**G4)		X

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
Y	Lewis's Woodpecker	*Melanerpes lewis*	Open pine woodlands, and other areas with scattered trees and snags; unlike other American woodpeckers, it enjoys sitting in the open as opposed to sitting in heavy tree cover	NS-S (**S3**); NS (G4)		X
Y	Loggerhead Shrike	*Lanius ludovicianus*	Open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns; frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries; are often seen along mowed roadsides with access to fence lines and utility poles.	NDOW (SB); NS-S (S4); NS (G4)		X
N	Long-billed Curlew	*Numenius americanus*	High plains, rangeland; Breeds in Nevada but does not overwinter; breeding habitat is mostly native dry grassland and sagebrush prairie; may favor areas with some damp low spots nearby, to provide better feeding area for the young; may nest in pastures that are not too heavily grazed, rarely in agricultural fields; in migration and winter often in farm fields, marshes, coastal mudflats, in addition to grasslands; on mostly featureless terrain, often chooses site close to conspicuous rock, shrub, or other object; nest is shallow scrape in ground, usually with sparse lining of grass, weeds; may have slight rim built up around edge.	NS-S (**S2S3**B); NS (G5)		X
Y	Northern Goshawk	*Accipiter gentilis*	Nest in mature and old-growth forests with more than 60% closed canopy; often build nests near breaks in the canopy, such as a forest trail, jeep road, or opening created by a downed tree, and prefer sites with a creek, pond, or lake nearby; hunt in the forest, along riparian corridors, and in more open habitat, such as the sagebrush steppes	USFS(S); NDOW (SB); NS-S (**S2**); NS (G5)		
Y	Peregrine Falcon	*Falco peregrinus*	Breed in open landscapes with cliffs (or skyscrapers) for nest sites; nesting at elevations up to about 12,000 feet, as well as along rivers and coastlines or in cities; migration and winter in nearly any open habitat, but with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains.	USFS (S); FWS (delisted 1999); **NDOW (EB)**; NS-S (**S2**); NS (G4)		
Y	Pinyon Jay	*Gymnorhinus cyanocephalus*	Pinyon-juniper woodland, sagebrush, scrub oak, and chaparral communities, and sometimes in pine forests; specialized for feeding on pine seeds.	NS-S (**S3**S4); NS (G5)		X
Y	Sage Sparrow	*Amphispiza belli*	Close associate of big sagebrush shrublands; nests in shrub close to ground, forages on ground.	No ranking		X
Y	Sage Thrasher	*Oreoscoptes montanus*	Breeds exclusively in shrub steppe habitats; require relatively dense ground cover for concealment, but also some bare ground for foraging and for getting around on their feet, which they often	NDOW (SB); NS-S (S5B); NS (G4)		X

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			do in preference to flying; use arid or semiarid open country with scattered bushes, grasslands, and open pinyon- juniper woodlands.			
N	Sandhill Crane (Both Greater and Lesser)	*Antigone canadensis*	Breed in open wetland habitats surrounded by shrubs or trees; nest in marshes, bogs, wet meadows, prairies, burned-over aspen stands, and other moist habitats, preferring those with standing water; breeders gravitate toward the edges between wetland and upland habitats, while nonbreeders may prefer open, grassy sites; winter roosting on shallow lakes or rivers at night and spending the day in irrigated croplands, pastures, grasslands, or wetlands.	NS-S (**S2**B, **S3**M); NS (G5T5)		
Y	Short-eared Owl	*Asio flammeus*	Live in large, open areas with low vegetation, including prairie and coastal grasslands, heathlands, meadows, shrub steppe, savanna, tundra, marshes, dunes, and agricultural areas; winter habitat is similar, but is more likely to include large open areas within woodlots, stubble fields, fresh and saltwater marshes, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets.; if food is plentiful, winter areas often become breeding areas.	NS-S (S4); NS (G5)		
Y	Swainson's Hawk	*Buteo swainsoni*	Favor open habitats for foraging; hay and alfalfa fields, pastures, grain crops, and row crops, or perched atop adjacent fence posts and overhead sprinkler systems; they rely on scattered stands of trees near agricultural fields and grasslands for nesting sites.	NS-S (**S2**B); NS (G5)		
N	Western Snowy Plover	*Charadrius nivosus nivosus*	Barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat, levees and flats at salt-evaporation ponds, river bars, along alkaline or saline lakes, reservoirs, and ponds	NS-S (**S3**B); NS (**G3**T3)		
Y	Willow Flycatcher	*Empidonax trailli*	Moist, shrubby areas often with standing or running water, including streams in broad valleys	No ranking		X
Fish						
N	Bull Trout	*Salvelinus confluentus pop 4*	Cold-water fish of relatively pristine stream and lake habitats; most specific habitat requirements of salmonids, including the "Four c's": Cold, Clean, Complex and Connected habitat.	USFS (T); **FWS (T)**; NDOW (GF); NS-S (**S1**); NS (G4T1Q)	X	
N	Clover Valley Speckled Dace	*Rhinichthys osculus oligoporus*	Confined to three springs and outflows in the Clover Valley in Elko County	**FWS (E)**; NDOW (EF); NS-S (**S1**); NS (G5T1)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
N	Independence Valley Speckled Dace	*Rhinichthys osculus lethoporus*	Known only in Independence Valley Springs system in Elko County NV	**FWS (E)**; NDOW (EF); NS-S (**S1**); NS (G5T1)		
N	Independence Valley Tui Chub	*Siphateles bicolor isolata*	Known only in warm springs of Independence Valley in Elko County NV	NDOW (EF); NS-S (**S1**); NS (G4T1Q)		
N	Lahontan Cutthroat Trout	*Oncorhynchus clarki henshawi*	Found in a wide variety of cold-water habitats including large, terminal, alkaline lakes; alpine lakes; slow, meandering rivers; mountain rivers; and small headwater tributary streams : spawning occurs in streams, generally in riffle areas over gravel substrate; spawning and nursery habitat is characterized by cool water, approximate 1:1 pool-riffle ratio, well-vegetated and stable stream banks, and relatively silt-free rocky substrate in riffle-run areas: fry may move out of spawning tributaries shortly after emergence or may remain in nursery streams for 1- 2 years ; Humboldt cutthroat trout does well in streams with relatively unstable flow and can be found in summer in isolated pools in streambeds; evidently these trout are tolerant of relatively warm water temperatures, and they apparently do well also in relatively turbid, eutrophic reservoirs; introduced populations exist outside of native range.	USFS (T); **FWS (T)**; NDOW (GF); NS-S (**S3**); NS (G4T3)		
N	Northern Leatherside Chub	*Lepidomeda copei*	Sluggish pools and backwaters, usually over mud or sand, of creeks and small to medium rivers; adults occur in rocky flowing pools, sometimes riffles, of cold creeks and small to medium rivers; young occupy brushy areas or in quiet pockets near shore; occupied habitat: current usually moderate; vegetation frequently sparse; water depths usually 60-90 cm or less; substrate with low percentage of sand-silt or gravel.	NS-S (**S1**); NS (**G3**)		
N	Relict Dace	*Relictus solitarius*	Occupies isolated spring, spring/brook, and wetland habitats.	NDOW (SF); NS-S(**S2S3**); NS (**G2G3**)		
N	Yellowstone Cutthroat Trout	*Oncorhynchus clarki bouvieri*	Upper northeast part of Goose Creek; restricted in range; southernmost population.	NDOW (GF); NS-S (**S1**); NS (G4T4)		
Mammals						
N	American Water Shrew	*Sorex palustris*	Most abundant along small cold streams with thick overhanging riparian growth; around lakes, ponds, marshes, bogs, and other lentic habitats; normally associated with water, may disperse long distances away from water to establish new territories; nest sites	NS-S (**S2**); NS (G5)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			are near water in underground burrows, rafted logs, beaver lodges, and other areas providing shelter			
Y	Big Brown Bat	*Eptesicus fuscus*	Found throughout the state, from low to high elevations (720 to > 9,800 ft); occurs in a variety of habitats, including pinyon-juniper, blackbrush, creosote, sagebrush, agriculture, and urban habitats; better adapted to human habitation than most species; ROOST HABITAT: Selects a variety of day roosts including caves, trees (e.g., Ponderosa pine, quaking aspen and oaks), mines, buildings and bridges; often night roosts in more open settings in buildings, mines and bridges; roosts in groups up to several hundred; RESIDENT STATUS: year round resident; WINTER STATUS: Hibernates but periodically arouses to actively forage and drink in the winter; characteristics and locations of winter hibernacula in Nevada are completely unknown, and poorly understood throughout this species range.	NS-S (S4); NS (G5); WBWG (low)		
N	Bighorn Sheep (California, Desert, Rocky Mtn Subspecies)	*Ovis canadensis spp.*	In alpine meadows, mountain slopes, and foothills. They like areas with rocky slopes that they can climb to evade predators	for desert bighorn sheep USFS (S); NDOW (GM); NS-S (S4); NS (G4T4)		
Y	Brazilian (or Mexican) Free- tailed Bat	*Tadarida brasiliensis*	Found through most of the state, ranging from low desert to high mountain habitats; found in a wide variety of habitats; although predominantly a lower elevation species has been found from 720 to > 11,480 ft in the Sierra Nevada; recent acoustic surveys reveal it is more widespread and common, at least in southern Nevada, than previously thought; current Nevada records indicate this species is distributed between 690- 8,370 ft; ROOST HABITAT: selects a variety of day roosts including cliff faces, mines, caves, buildings, bridges, and hollow trees; although colonies number in the millions in some areas, colonies in Nevada are generally several hundred to several thousand (largest known colonies have been estimated at ca. 70,000- 100,000); some caves may be used as long term transient stopover roosts during migration; some evidence suggests that the colony at Rose Cave arrives in July and departs in mid-October; RESIDENT STATUS: summer resident; recent observations suggest pockets of year-round residents in southern Nevada; WINTER STATUS: Migrations of 1140 mi are documented	NDOW (PM); NS-S (**S3**S4B); NS (G5): WBWG (low to medium)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			for this species; migrates away from colder regions and winters in areas with predominantly non-freezing temperatures but has been found to hibernate in northern California; migratory animals appear to be active in the winter range; winter activity has been observed recently in the low desert of southern Nevada;			
Y	California Myotis	*Myotis californicus*	Found throughout Nevada, primarily at the low and middle elevations (to 6,000 ft), although occasionally found at higher elevations; more common in the southern half of the state; found in a variety of habitats from Lower Sonoran desert scrub to forests; current Nevada records indicate this species is distributed between 680-9,000 ft; ROOST HABITAT: crevice roosting; selects a variety of day roosts including mines, caves, buildings, rock crevices, hollow trees, and under exfoliating bark; night roosts in a wider variety of structures; generally roost singly or in small groups, although some mines in the Mojave Desert shelter colonies of over 100 in both the summer and winter; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates but periodically arouses to actively forage and drink in the winter	NS-S (S4); NS (G5); WBWG (low - medium)		
Y	Dark Kangaroo Mouse (Includes Desert Valley Kangaroo Mouse and Fletcher Dark Kangaroo Mouse *M.M. Albiventer* and *Nasutus)*	*Microdipodops megacephalus ssp.*	Dark kangaroo mice prefer loose sands and gravel; found in shadscale scrub, sagebrush scrub, and alkali sink plant communities; may occur in sand dunes near the margins of their range	NSOW (PM); NS-S (**S2**); NS (G4T2)		
Y	Hoary Bat	*Lasiurus cinereus*	Distribution patchy known mostly from the capture of single animals while foraging or acoustic records; **roosting locations are not well known**; tree-associated species; found primarily in forested upland habitats, as well as in gallery-forest riparian zones and agriculture habitats; in valley basins in pure stands of Rocky Mountain juniper (*Juniperus scopulorum*); may occur in park and garden settings in urban areas; current records indicate distributed between 1,870-8,270 ft; ROOST HABITAT: solitary; day roosts in trees, within foliage 10-40 ft above the ground in both coniferous and deciduous trees; unusual roosting situations have been reported in caves, beneath a rock ledge, in a woodpecker hole, and in a squirrel's nest; RESIDENT STATUS: summer	NS-S (**S3**N); NS (**G3**G4); WBWG (medium)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			resident; been captured at 5,900 ft in Spring Valley, east-central Nevada in Rocky Mtn juniper habitat; captured near Yucca Mountain at 3,250 ft; captured over a well pond (3,250 ft) in Mojave Desert scrub vegetation; captured in a dry wash; recent acoustic and capture surveys in the Muddy River and Meadow Valley Wash drainages documented arrival and continued presence from early April through late May; prolonged presence from March through June was recorded in the upper Moapa Valley; until recently, records from southern Nevada were from the spring; however, two localities at the Nevada Test Site and the Spring Mountains have yielded records in the fall ; records from the northeast span 15 July to 21 August; documented in July at Key Pittman Reservoir and in September in Eagle Valley, Lincoln County; WINTER STATUS: migrates but probably hibernates in parts of its winter range; records are primarily from the spring and fall but migratory patterns in Nevada are not known.			
N	Inyo Shrew	*Sorex tenellus*	Habitats include riparian zones and canyon bottoms; rocky mountain habitat in areas with logs, boulders, or sagebrush scrub; and red fir communities; species may be more tolerant of dry habitat than are closely related shrews. In great basin national park, this shrew was found at 3,000 m elevation in habitat dominated by Engelmann spruce	NS-S (**S2**); NS (G4)		
Y	Little Brown Bat	*Myotis lucifugus*	Found primarily throughout the northern part of the state, but little is known of its distribution and abundance. Found primarily at higher elevations and higher latitudes, often associated with coniferous forest; requires a nearby water source; occurrence in Dixie Valley, (4,400) has been documented acoustically: ROOST HABITAT: day roosts in hollow trees, rock outcrops, buildings, and occasionally mines and caves; one of the species most commonly found in human structures; night roosts may be same structures used for day roost but locations nearest the entrance are preferred; hibernacula elsewhere are generally mines or caves; often found in the same roost sites with *Myotis yumanensis* . RESIDENT STATUS: probably a year round resident; WINTER STATUS: hibernates but no hibernating colonies have been found in Nevada. It is suspected that there are elevational movements between summer and winter roosts; no large aggregations of this species, like those known in the eastern U.S. have been found.	NS-S (**S3**); NS (**G3**); WBWG (low to medium)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
Y	Long-eared Myotis	*Myotis evotis*	Found throughout the state, primarily at the higher elevations associated with coniferous forest; more widespread and common in the northern half of the state; primarily a forest- associated species. In southern Nevada, only found in ponderosa pine or above; found in pinyon-juniper in the northern portion of Nevada test site; in northern Nevada common in pinyon-juniper and above, but also found in sagebrush and desert scrub habitats; current Nevada records indicate this species is distributed between 2,300-10,100 ft; roost habitat: day roosts in hollow trees, under exfoliating bark, crevices in small rock outcrops, and occasionally in mines, caves, and buildings; night roosts have been found in caves, mines, and under bridges. Generally roost singly or in small groups; resident status: year-round resident; winter status; presumed to be non-migratory and to hibernate locally.	NS-S (S4); NS (G5): WBWG (low to medium)		
Y	Long-legged Myotis	*Myotis volans*	Found throughout the State but more widespread and common in the northern half; occurs from mid to high elevations. Absent from the low desert; found in pinyon-juniper, Joshua tree woodland, and montane coniferous forest habitats; occasionally found in Mojave and salt desert scrub, and blackbrush, mountain shrub, and sagebrush. Current Nevada records indicate this species is distributed between 930-3,420 m; ROOST HABITAT: day roosts primarily in hollow trees, particularly large diameter snags or live trees with lightning scars; uses rock crevices, caves, mines, and buildings when available; caves and mines may be used for night roosts; hibernacula elsewhere are generally mines or caves; RESIDENT STATUS: probably a year round resident; WINTER STATUS: hibernates but has the capability of winter activity; it is suspected that there are elevational and latitudinal movements between summer and winter roosts; transient colonies in the spring on the east side of the Sierra Nevada.	NS-S (S4); NS (G4G5); WBWG (low to medium)		
Y	Merriam's Shrew	*Sorex merriami*	Primarily in various grassland habitats, including grasses in sagebrush scrub/pinyon-juniper habitat, and also in mountain-mahogany and mixed woodlands	NS-S (**S3**); NS (G4)		
N	Northern River Otter	*Lontra canadensis pacifica*	Prefer bog lakes with banked shores containing semi-aquatic mammal burrows and lakes with beaver (Castor canadensis) lodges, and they avoid water bodies with gradually sloping shorelines of sand or gravel; during the dry season, will retreat from marshland and move to permanent ponds where water is	NDOW (FM); NS-S (**S2**); NS (G5TNRQ)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			available and food is more concentrated; habitat features preferred for latrine sites include large conifers, points of land, beaver bank dens and lodges, isthmuses, mouths of permanent streams, or any object that protrudes from the water			
Y	Pallid Bat	*Antrozous pallidus*	Found throughout the state, primarily in the low and middle elevations (5,900 ft), although has been found at over 10,200 ft; variety of habitats from low desert to brushy terrain to coniferous forest and non-coniferous woodlands; in pinyon- juniper, blackbrush, creosote, sagebrush, and salt desert scrub habitats; ROOST SITES: Selects a variety of day roosts including rock outcrops, mines (maternity colonies have been found in geothermally-influenced adits), caves, hollow trees, buildings, and bridges. Night roosts very commonly under bridges, but also caves and mines. Intolerant of roosts in excess of 40° C; RESIDENT STATUS: year-round resident WINTER STATUS: hibernates but periodically arouses to actively forage and drink in winter.	USFS (S); NDOW (PM); NS-S (**S3**); NS (G4); WBWG (medium to low)		
N	Preble's Shrew	*Sorex preblei*	Include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush, willow-fringed creeks, marshes, bunchgrass associations, sagebrush-aspen associations, sagebrush-grass associations, alkaline shrubland	NS-S (**S1S2**); NS (G4)		
Y	Pygmy Rabbit	*Brachylagus idahoensis*	Occurs in patches correlating positively to the density of sagebrush; found from the state border in the north to the northern end of Nye and Lincoln Counties in the south and from the state border in the east to Nye, Nevada in the west; still found in most of the higher intermountain regions in the Great Basin Desert of Nevada	USFS (S); NDOW (GM); NS-S (**S3**); NS (G4)		
Y	Silver-haired Bat	*Lasionycteris noctivagans*	Widely distributed in the state, but confined primarily to forested habitats; found in riparian habitats in the south and in woodland and riparian habitats in the central and northern portions of the state; forest-associated species, more common in mature forests; found primarily at higher latitudes and altitudes; found in coniferous and mixed deciduous/coniferous forests of pinyon juniper, subalpine fir, white fir, limber pine, aspen, cottonwood and willow; usually found at lower elevations in southern Nevada associated with riparian corridors; current Nevada records indicate this species is distributed between 1,570-8,200 ft. ROOST	NS-S (**S3**B); NS (**G3**G4); WBWG (medium)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			HABITAT: Roosts almost exclusively in trees in summer; maternity roosts are generally in woodpecker hollows and under the loose bark of large diameter snags. They are generally located at least 50 ft above ground; uses multiple roost sites, switching them frequently; small groups and single animals will roost under exfoliating bark; winter roosts include hollow trees, rock crevices, mines, caves, and houses; also has been found roosting under leaf litter; RESIDENT STATUS: Poorly understood; recent August records of seven post-lactating females and four juveniles in mixed subalpine fir/limber pine/aspen habitat (Bradley, 2000b) and four lactating females in mixed coniferous/deciduous forest indicates maternity activity in northeast Nevada; WINTER STATUS: Migrates but probably hibernates in some parts of its winter range; migratory patterns not well understood; recent October records of migrating individuals			
Y	Spotted Bat	*Euderma maculatum*	Known from only twelve localities, but scattered distribution throughout Nevada; distribution is patchy and linked to availability of cliff roosting-habitat. Recent studies have documented significant activity throughout the summer months in the Muddy River drainage; there are recent high elevation records from the Sierra Nevada in California; found in a wide variety of habitats from low elevation desert scrub to high elevation coniferous forest habitats, including pinyon- juniper, sagebrush, riparian and on urban high-rise (cliff analog) habitats; closely associated with rocky cliffs; current Nevada records indicate this species is distributed between 1770-7,000 ft; ROOST HABITAT: Day roosts primarily in crevices in cliff faces but some indication that mines and caves may occasionally be used, primarily in winter; has been found roosting on/in buildings but reliance on such roosts is unclear. Likely roosts singly; RESIDENT STATUS: year-round resident; WINTER STATUS: Hibernates but periodically arouses to actively forage and drink in the winter; **characteristics and locations of winter hibernacula in Nevada are completely unknown, and poorly understood throughout this species range**	USFS (S); NDOW (TM); NS-S (**S2**); NS (G4); WBWG (medium to high)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
Y	Townsend's Big-eared Bat	*Corynorhinus townsendii*	Found throughout the state, from low desert to high mountain habitats. Observed foraging in Krumholz bristlecone pine as high as 11,500 ft in the snake range of eastern white pine county; distribution is strongly correlated with the availability of caves and abandoned mines; highly associated with caves and mines; found primarily in rural settings from deserts to lower, mid to high-elevation mixed coniferous-deciduous forest. Current Nevada records indicate this species is distributed between 690-11,500 ft primarily in pinyon juniper- mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural, and occasionally in urban habitats. Roost sites: a cavern-dwelling species that uses mines, caves, trees and buildings; very dependent on mines and caves; trees and buildings must offer "cave-like" spaces in order to be suitable.; will night roost in more open settings, including under bridges; **recent studies indicate that use of roosts is variable within seasons and among years, and multiple surveys may be required before use can be documented**. Resident status: year-round resident; winter status; hibernates in mixed sex aggregations of a few to many hundred; periodically arouses to move to alternate roosts and to actively forage and drink in the winter; hibernation prolonged in colder areas, and intermittent where climate is predominantly non-freezing.	USFS (S); NDOW (SM); NS-S (**S2**); NS (G4); WBWG (high)		
N	Western Red Bat	*Lasiurus blossevillii*	Historically known from only two locations, one of which (Fallon area) yielded additional specimens in 1958; third location near Dyer was documented in September 1999; recent acoustic sampling in the Muddy River drainage in Clark County have yielded records of occurrence in late spring and early summer 2000, and three females and two males were captured between July and September in the same drainage; been detected acoustically in the northern portion of the Nevada Test Site during the summers of 1999 and 2000; two acoustic records were obtained near the Truckee River west of Fernley; acoustic records from two localities in Lincoln County were documented in 2003; found primarily in wooded habitats, including mesquite bosque and cottonwood/willow riparian areas; Current Nevada records indicate this species is distributed between 1,380-6,600 ft; ROOST HABITAT: solitary rooster; day roosts in trees, within the foliage and presumably in leaf litter on the ground; RESIDENT STATUS:	NDOW (SM); NS-S (**S1**M); NS (G4); WBWG (high)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			thought to be a migrant but may be a summer resident in the Fallon and Muddy River areas; WINTER STATUS: **winter behavior poorly understood**; thought to be migratory in NV, although migratory patterns are not well documented. This species is reported to be highly migratory throughout most of its range.			
Y	Western Small-footed Myotis	*Myotis ciliolabrum*	Found throughout the state; in the south, primarily found at the middle and higher elevations (> 5,900 ft), although occasionally found at lower elevations; in central and northern part of the State it is more common at valley bottoms (3,400-5,900 ft); inhabits a variety of habitats including desert scrub, grasslands, sagebrush steppe, and blackbrush, greasewood, pinyon-juniper woodlands, pine-fir forests, agriculture, and urban areas; current Nevada records indicate distribution between1,600- 9,000 ft; ROOST HABITAT: roosts have been found in caves, mines, and trees; roosting preferences expected to be similar to those for *Myotis californicus* ; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates; in some areas may tolerate drier and colder hibernacula than some other species; hibernates individually or in large colonies. A large colony (>100 individuals) was found at a depth of 450 ft in an abandoned mine near Eureka	NS-S (**S3**); NS (G5): WBWG (low to medium)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
Y	Yuma Myotis	*Myotis yumanensis*	Found at least in the southern and western half of the state, primarily at low to middle elevations; recent collection in east central Nevada and a large colony near Rye Patch Reservoir suggests a wider distribution in the state; found in a wide variety of habitats from low to mid-elevations, including sagebrush, salt desert scrub, agriculture, playa, and riparian habitats; one of the species that is most tolerant of human habitation and one of the few that thrives in a relatively urbanized environment; often considered to be a "building" bat, it is also found in heavily forested settings elsewhere; current Nevada records indicate this species is distributed between 1,500-10,900 ft; ROOST HABITAT: day roosts in buildings, trees, mines, caves, bridges, and rock crevices; night roosts usually associated with buildings, bridges, or other man- made structures; RESIDENT STATUS: year round resident; WINTER STATUS: hibernates; no large winter aggregations have been found in Nevada.	NS-S (**S3**S4); NS (G5); WBWG (low to medium)		
Reptiles						
Y	Desert Horned Lizard (Including Northern and Southern Subspecies)	*Phrynosoma platyrhinos (includes P.p. platyrhinos - northern desert horned lizard and P.p. calidiarum - southern horned lizard)*	Typically found in open sandy areas in deserts, chaparral, grassland, often near ant hills. Often seen basking on asphalt roads or low rocks in the morning or afternoon.			
Y	Great Basin Collared Lizard	*Crotaphytus bicinctores*	Occurs mainly in xeric, sparsely vegetated rocky areas, on alluvial fans, lava flows, hillsides, rocky plains, and in canyons; perches atop rocks and hides under rocks and be found from sea level to about 7,500 ft	NS-S (S4); NS (G5)		
Y	Greater Short-horned Lizard	*Phrynosoma hernandesi*	Ranges from semiarid plains to high mountains (2,000 - 10,500 ft above sea level); occupies a variety of habitats, including sagebrush, and open PJ, pine-spruce and spruce-fir forests; substrate may be stony, sandy, or firm but some fin loose soil is usually present.			

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Y	Long-Nosed Leopard Lizard	*Gambelia wislizenii*	Found in sandy and gravelly desert and semidesert areas with scattered shrubs or other low plants (e.g., Bunch grass, alkali bush, sagebrush, creosote bush) especially areas with abundant rodent burrows; occurs from sea level to approximately 6,000 ft	NS-S (S4); NS (G5)		
N	Mojave Desert Tortoise	*Gopherus agassizii*	Live in creosote bush scrub habitat at elevations ranging from 1,000 to 3,000 feet above sea level, although they are known to occur in suitable habitats up to about 5,000 feet in elevation; within suitable habitat they occur over a relatively large region including the Mojave and Sonoran Deserts of California, Nevada, Utah and portions of Arizona	USFS (T); **FWS (T)**; NDOW (TR); NS-S (**S2S3**); NS (**G3**)	X	
Insects						
N	Mattoni's Blue	*Euphilotes pallescens mattonii*	Found primarily in the upper and lower Sonoran Zones, prairies, and sand dunes; found in pinyon-juniper woodlands and rolling prairie grasslands; host plant for the larvae is the buckwheat (*Eriogonum microthecum nutt. Var. Laxiflorum).*	NS-S (**S1**); NS (**G3**G4T1)		
Y	Monarch Butterfly	*Danaus plexippus plexippus*	Widespread and scattered; requires milkweed (*Asclepiaecae*) or dogbane (*Apocynaceae*) as host plants for larvae; migratory in southern part of state	FWS (PETITIONED 2014); NS-S (SNR); NS (G4T3)		
N	California Floater	*Anodonta californiensis*	Shallow areas of clean, clear lakes, ponds and large rivers. They prefer lower elevations and a soft, silty substrate in which to burrow	NS-S (**S1**); NS (**G3**Q)		
N	Goshute Mountain Snail	*Oreohelix loisae*	Restricted to limestone features; mining in areas;	NS-S (**S2**); NS (**G1G3**)		
N	Humboldt Pyrg	*Pyrgulopsis humboldtensis*	Restricted to the Lahontan Basin	NS-S (**S1**); NS (**G1**)		
N	Median-Gland Nevada Pyrg	*Pyrgulopsis pisteri*	Located at Marsh Spring, North Scruggs Springs, and below School Springs all within 1.2 miles of each other	NS-S (**S1**); NS (**G1**)		
N	Sada's Pyrg	*Pyrgulopsis sadai*	Only in two locations in Elko north of Carlin;	NS-S (**S1S2**); NS (**G1G2**)		
N	Vinyards Pyrg	*Pyrgulopsis vinyardi*	Restricted to the Lahontan Basin	NS-S (**S1**); NS (**G1**)		
N	Western Ridged Mussel	*Gonidea angulata*	Found in abundance in Humboldt River Basin.			
Plants						
N	Alkali Ivesia	*Ivesia kingii var. kingii*	Sagebrush scrub, Alkali Sink, wetland-riparian; meadows, playas.	NS-S (**S3**); NS (G4)		

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Y	Barren Valley Collomia	*Collomia renacta*	Lightly disturbed north-sloping rocky soil near drainage bottom, ecotone between *Artemisia tridentata* and *A. Arbuscula* associations; known only from the Pequop Range in Nevada	NS-S (**S1**); NS (**G1**)		
Y	Beatley Buckwheat	*Eriogonum beatleyae*	Dry, volcanic outcrops	NS-S (**S3**); NS (**G2**Q)		
Y	Broad Fleabane	*Erigeron latus*	Shallow, relatively barren, vernally 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 with *Artemisia arbuscula, A. Tridentata etc.*	NS-S (**S1**); NS (**G3**)		
Y	Cottam Cinquefoil	*Potentilla cottamii*	Crevices or narrow ledges on outcrops of quartzite or other siliceous metamorphic or granitoid rocks, on all aspects but preferring northerly or shaded exposures, in the upper subalpine conifer zone	NS-S (**S1**); NS (**G1**)		
Y	Davis Peppercress	*Lepidium davisii*	Hard-bottomed clay playas on volcanic plains in the sagebrush zone with sparse associated *Atriplex confertifolia* and *Artemisia cana,* surrounded by *Artemisia tridentata* vegetation: during spring, the playas are usually inundated up to a foot deep; aquatic or wetland-dependent in Nevada	NS-S (**S1**); NS (**G3**)		
Y	Deeth Buckwheat	*Eriogonum nutans var. glabratum*	In sandy gravelly soil	NS-S (**S2S3**); NS (G5T2T3)		
Y	Eastwood Milkweed	*Asclepias eastwoodiana*	In open areas on a wide variety of basic (pH usually 8 or higher) 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.	USFS (S); NS-S (**S2S3**); NS (**G2**Q)		
Y	Elko Rockcress	*Boechera falcifructa*	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, dominated by moss, *Artemisia tridentata var. Wyomingensis, Chrysothamnus viscidiflorus var. Puberulus,* and *Poa secunda var. Secunda.* Also reported but not confirmed from rock crevices	NS-S (**S1S2**); NS (**G1G2**)		
Y	Goose Creek Milkvetch	*Astragalus anserinus*	Dry, open, deeply weathered sandy rhyolitic ash of an overall grayish color derived from the Salt Lake Formation, consisting of white rhyolitic ash overlain by a thin veneer of black glassy gravel	NS-S (**S2**); NS (**G2**)		

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			of apparent volcanic origin, mostly on south to west aspects, in sparse *Juniperus osteosperma* woodland			
Y	Grimy Mousetails	*Ivesia rhypara* var. *rhypara*	Mostly on 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 derived therefrom, in one case on unsorted cobbly riverbed deposits mixed with underlying volcanic ash, on gentle to steep side, shoulder, or toe slopes with east to south to west aspects, with few and sparse associated species such as *Trifolium andersonii, Poa secunda, Ericameria nauseosa* , and *Achnatherum hymenoides*	NS-S (**S2**); NS (**G2**T2)		
Y	Grimes Vetchling	*Lathyrus grimesii*	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 quartzite mudstone component of the Schoonover Formation, forming relatively barren patches on mostly steep slopes of all aspects, and supporting a sparse to moderately dense vegetation	USFS (S); NS-S (**S2**); NS (**G2**)		
Y	Idaho Beardtongue	*Penstemon idahoensis*	Dry, tuffaceous sediments of the Salt Lake Formation; soils are fine-textured and can be quite hard; occurs on gentle to steep slopes of all aspects, most commonly south to southwest; most commonly associated with open Utah juniper communities; from 4900 to 5700 feet elevation	NS-S (**S1**); NS (**G2**)		
N	Least Phacelia	*Phacelia minutissima*	Vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, at perimeters of *Veratrum californicum (*corn lily), *Wyethia amplexicaulis,* and/or *Populus tremuloides (*aspen) stands, in sagebrush swales, along creek bed high-water lines, or around springs, in flat to gently sloping areas; aquatic or wetland-dependent.	USFS (S); NS-S (**S2**); NS (**G3**)		
Y	Lewis Buckwheat	*Eriogonum lewisii*	Dry, exposed, shallow, relatively barren and undisturbed, rocky residual soils on convex ridge-line 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	USFS (S); NS-S (**S3**); NS (**G2G3**Q)		
Y	Meadow Pussytoes	*Antennaria arcuata*	Bare, periodically disturbed soil in marginal, seasonally dry parts of moist, often hummocky, alkaline meadows, seeps, and springs,	USFS (S); NS-S (**S1**) NS (**G3**)		

Occurs in Project Area	Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: NV Natural Heritage Program; US Forest Service; NV	Critical Habitat Designated	Region 9 Birds of Conservation Concern
			surrounded by sagebrush and grassland associations; aquatic or wetland dependent			
Y	Nachlinger Catchfly	*Silene nachlingerae*	Generally 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	USFS (S); NS-S (**S2**); NS (**G2**)		
N	Obscure Buttercup	*Ranunculus triternatus*	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	NS-S (**S1**?); NS (G5T2)		
Y	Owyhee Prickly Phlox	*Leptodactylon glabrum*	Bare rock/talus/scree; crevices in steep to vertical, coarse-crumbling volcanic canyon walls. Intolerant of water paths or seeps that may form in the rock crevices. 9,000-13,000 ft elevation	NS-S (**S1**); NS (**G2**)		
Y	Tiehm Blazingstar	*Mentzelia tiehmii*	Occupies white, alkaline clay badlands and flats	NS-S (**S2**); NS (**G1G2**)		
N	Whitebark Pine	*Pinus albicaulis*	Subalpine and timberline zones; grows in cold, snowy, and generally moist climates; on semiarid ranges it is most common on cold, moist sites, whereas it is most common on warm, dry sites on moist ranges; common on ridges and near timberline, where trees are exposed to strong, desiccating winds	FWS(C); USFS (S); NS-S (**S3**); NS (**G3**G4)		