

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

**Environmental Assessment
DOI-BLM-NV-B000-2019-0006-EA
June 2019 Competitive Oil and Gas
Lease Sale**

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PREPARING OFFICE

U.S. Department of the Interior
Bureau of Land Management
Battle Mountain District,
Nevada



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Chapter 1. Introduction

1.1 Background and Summary

It is the policy of the Bureau of Land Management (BLM), as mandated by various laws including the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976 (FLPMA), to make mineral resources available and to encourage their development to meet national, regional and local needs. The BLM Nevada State Office (NVSO) conducts competitive sales for oil and gas lease parcels in the Battle Mountain District (District). The NVSO publishes a Notice of Competitive Lease Sale that lists lease parcels to be offered at the sale at least 45 days before it is held. The BLM decides which parcels to offer based on current resource and land use information and the management framework developed in the applicable Resource Management Plan (RMP).

In preparing a lease sale the NVSO sends a list of land parcels, based on land nominated by the public, to the district where the parcels are located. As part of the Environmental Assessment (EA), in conformance with the National Environmental Policy Act (NEPA), the district staff reviews the parcels to determine:

- if they are in areas open to leasing, according to the applicable approved RMP;
- current best available scientific information for resources on the parcels;
- what consultations should be conducted;
- what resource-protective stipulations, if any, should be attached to each parcel; and
- if there are special resource conditions and applicable existing laws of which potential bidders should be made aware, via lease notices.

Based on the EA, BLM management will decide which parcels to make available for leasing and which stipulations and lease notices to attach. Those parcels that are included in the State Director's decision would then be made available to the public through a Notice of Competitive Lease Sale, which would specify stipulations applicable to each parcel. (Here and throughout this EA the term "parcels" refers to "parcels or parts of parcels," as stipulations are applied to the smallest appropriate part of a parcel, down to 40-acre quarter-quarter section or lot, or smaller if specified in the applicable RMP.)

In June 2019, the NVSO will conduct a three day Competitive Oil and Gas Lease Sale. This EA documents the review and environmental analysis of the 123 parcels on the preliminary parcel list that are administered by Battle Mountain District Office, which consists of the Tonopah and Mt. Lewis Field Offices (Figures 1-3, parcel maps; Appendix A, legal land descriptions). These 123 parcels total approximately 264,000 acres and include one parcel that overlap the Battle Mountain and Ely District boundary. Figures 4 and 5 in Appendix K show land status. The EA verifies conformance with the approved RMPs and provides the rationale for any stipulations or lease notices applied to specific parcels. An interdisciplinary team (ID Team) of resource specialists considered historical data, existing databases, file information and personal knowledge of the areas involved to assess potential environmental effects and identify appropriate stipulations and lease notices.

At the time of this review it is not known whether the nominated parcels will receive bids, if leases would be issued, or what types of lease operations might be proposed in the future, if any. BLM would conduct additional site-specific, project-specific NEPA analysis whenever an exploration or development proposal is submitted. However, for this EA, we can make some general assumptions about what type of activities

could occur on oil and gas leases, and provide general analysis of potential impacts associated with those types of activities. A reasonably foreseeable development (RFD) scenario is described in Section 3.1 and Appendix G. In summary, based on historic information and anticipated activity, over the next ten years approximately 25 wells would be drilled and 65-100 acres of surface disturbance associated with potential oil and gas exploration and production activities could be expected to occur in the District. For the purpose of this analysis, we assume that over the next 10 years:

- **Under the Proposed Action:** Oil and gas exploration and production would disturb 65-100 acres within the District, potentially including any of the nominated June 2019 lease parcels.
- **Under the No Leasing Alternative:** Oil and gas exploration and production would occur elsewhere in the District; no surface disturbance would occur within the nominated parcels.

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, along with any stipulations specified for each lease parcel (Appendix B).

1.2 Purpose and Need for Action, and Decision to be Made

Oil and gas leasing is necessary to provide oil and gas companies with new areas to explore and potentially develop, and is recognized as an acceptable use of the public lands under FLPMA. Leasing is authorized under the Mineral Leasing Act of 1920, as amended and modified by subsequent legislation, and regulations found at 43 CFR part 3100. BLM authority for leasing public mineral estate for the development of energy resources, including oil and gas, is described in 43 CFR 3160.0-3. Offering parcels for competitive lease sale provides for orderly development of fluid mineral resources under BLM's jurisdiction in a manner consistent with multiple use management and consideration for the natural and cultural resources that may be present. This requires that adequate provisions are included with the leases to protect public health and safety and assure full compliance with the spirit and objectives of NEPA and other federal environmental laws and regulations.

This action is being initiated to facilitate Battle Mountain District's implementation of the requirements in Executive Order (EO) 13212 (2001) and the National Energy Policy Act (2005). The BLM is required by law to consider leasing of nominated areas if leasing is in conformance with the applicable BLM land use plan. The District must provide a recommendation to the Nevada BLM State Director who will decide which parcels will be included in the upcoming June 2019 Competitive Oil and Gas Lease Sale, and which stipulations will be applied, based on the analysis in this EA.

1.3 Land Use Plan Conformance

The Proposed Action is in conformance with the Tonopah RMP and Shoshone Eureka (Mt. Lewis) RMP, their associated Records of Decision, and all subsequent applicable amendments. Each RMP addresses land use goals and objectives, allowable uses and management actions for the respective field office.

Tonopah RMP (Tonopah Field Office), approved 1997

Fluid Minerals Objective: "To provide opportunity for exploration and development of fluid minerals such as oil, gas, and geothermal resources, using appropriate stipulations to allow for the preservation and enhancement of fragile and unique resources" (p.22).

It has been determined that the nominated lease parcels are a subset of “[The] total of 5,360,477 acres (88% of the Tonopah Field Office area)[that] is open to fluid minerals leasing subject to standard terms and conditions” (RMP p.22). The RMP and parcel list have been reviewed for applicability of RMP decisions imposing restrictions on fluid minerals activities.

Shoshone Eureka RMP (Mt. Lewis Field Office), approved 1986

The Proposed Action is in conformance with the Shoshone Eureka RMP Part II, Section E, Management Actions Not Expressly Addressed by the Resource Management Plan, which includes Minerals Objectives and Management Decisions brought forward unaltered from the Management Framework Plan (Record of Decision p. 29). Minerals Objectives 1, 2 and 3 led to Management Decisions 1 through 5 for leasable minerals (oil and gas). The objectives are as follows:

- Objective 1: Make available and encourage development of mineral resources to meet national, regional and local needs consistent with national objectives for an adequate supply of minerals.
- Objective 2: Assure that mineral exploration, development and extraction are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands.
- Objective 3: Develop detailed mineral resource data in areas where different resources conflict so that informed decisions may be made that result in optimum use of the lands.

Management Decision #4 states, “All areas designated by the BLM as prospectively valuable for oil and gas will be open to leasing except as modified by other resources.” The RMP has been reviewed for modifications by other resources; none were identified for the nominated parcels.

Ely District Record of Decision and Approved Resource Management Plan, approved 2008

For the parcel overlapping the Battle Mountain District and Ely District boundary: The Proposed Action is in conformance with the Goals and Objectives of the Ely RMP, as amended, which are to: “provide for the responsible development of mineral resources to meet local, regional, and national needs, while providing for the protection of other resources and uses (page 92).” The RMP also states in part, “It is BLM policy to apply the least restrictive constraint to meet the resource protection objective (page 97)” and “Timing limitations indicate that a leased area generally is open to development activities except during a specified period of time to protect identified resource values such as wildlife (page 92).” The stipulations and lease notices for Fluid Minerals in Appendix A, Section 2 of the Ely RMP were updated February 11, 2015 under a maintenance action.

Greater Sage-Grouse Approved Resource Management Plan Amendment

The Proposed Action and alternative are in conformance with the 2015 *Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment* (GRSG Plan Amendment), which amends several BLM land use plans including the Tonopah and Shoshone-Eureka RMPs. The proposed parcels include some areas mapped as Priority Habitat Management Area (PHMA), General Habitat Management Area (GHMA) or Other Habitat Management Area (OHMA).

- GRSG Plan Amendment Section 2.2, Management Decisions (MD) for Mineral Resources (MR), Unleased Fluid Minerals include the following applicable MD:
 - MD MR 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. [These would be applied at the time of additional project-specific analysis.]

- MD MR 3: In PHMAs outside of SFA, no waivers or modifications to an oil and gas lease no-surface occupancy stipulation will be granted.
- MD MR 5: In GHMAs, manage oil and gas and geothermal fluid minerals with moderate constraints, timing limitations, and controlled surface use stipulations.
- GRSG Plan Amendment Appendix G, Fluid Mineral Stipulations, Waivers, Modifications, and Exceptions, specifies the stipulations to apply to each habitat type. See Appendix B of this EA.

Greater Sage-Grouse Conservation and Cooperation with Western States

On June 7, 2017, Secretary of the Interior Ryan Zinke signed Secretarial Order 3353, “Greater Sage-Grouse Conservation and Cooperation with Western States.” The Order’s aim is to improve sage grouse conservation by strengthening communication and collaboration between states and the federal government, with the shared goal of conserving and protecting sage grouse and its habitat while also ensuring that conservation efforts do not impede local economic opportunities. The GRSG Plan Amendment and Final EIS could modify the 2015 GRSG Plan Amendment to align BLM and State conservation plans by modifying habitat management areas, Sagebrush Focal Area designations, adaptive management, allocated exceptions, mitigation, seasonal timing restrictions and habitat objects. If the Record of Decision is adopted prior to the June 2019 Oil and Gas lease sale, the stipulations and lease notices for resources related to greater sage grouse will be modified to reflect the updated information and changes to the plan.

A portion of the Proposed RMP and FEIS addresses mitigation and consistency between State of Nevada's mitigation strategy to the extent allowable by federal law and regulation on Nevada BLM-administered lands. The BLM shall consider and analyze the State of Nevada's and California's recommendations for project level mitigation in relevant NEPA documentation. During the project stage, BLM applications in Greater Sage-Grouse habitat on BLM-administered lands, BLM would notify State of Nevada to determine if the State requires or recommends any additional mitigation, including compensatory mitigation, under State regulations, policies, or programs related to the conservation of Greater-Sage grouse and its habitat. This action aligns BLM with the State of Nevada to implement Governor Sandoval’s Executive Order 2018-32 related to the application of the State of Nevada’s Conservation Credit System (CCS). The leasing process does not directly affect sage-grouse habitats; protective stipulations are attached to proposed lease parcels in those habitats, and at the time that any future projects are proposed on leased parcels in sage-grouse habitat, those projects would not only be required to adhere to the stipulations but would also be analyzed for the need and opportunity to apply other measures, including compensatory mitigation.

1.4 Relationship to Statutes, Regulations and Policy

The Proposed Action is in conformance with the NEPA of 1969 (P.L. 91-190 as amended; 42 USC §4321 et seq.); the Mineral Leasing Act of 1920 as amended and supplemented (30 USC 181 et seq.); the Federal Oil and Gas Leasing Reform Act of 1987, with regulatory authority under 43 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, Rights-of-Way (ROW), with regulatory authority under 43 CFR Part 2800, ROW. Purchasers of oil and gas leases are required to abide by all applicable federal, state and local laws and

regulations. This includes obtaining all required permits if they develop the lease. All activities will be subject to regulations including, but not limited to, the following.

Executive Order (EO) 11988 – Floodplain management instructs all federal agencies to avoid development in a floodplain whenever possible; ***EO 13690*** provides further instruction, along with FEMA guidelines for implementing both (FEMA 2015).

EO 11990 – Protection of wetlands tells agencies to “minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands” and instructs, “when Federally-owned wetlands or portions of wetlands are proposed for lease, easement, right-of-way or disposal to non-Federal public or private parties, the Federal agency shall (a) reference in the conveyance those uses that are restricted under identified Federal, State or local wetlands regulations; and (b) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successor, except where prohibited by law; or (c) withhold such properties from disposal.”

The Clean Water Act of 1972 provides extensive direction regarding the degradation of water sources. The Clean Water Act originally applied to “navigable waters”; the United States Supreme Court determined in the 2006 case *Rapanos v. United States* that it also held for “waters of the United States,” defined as “including only those relatively permanent, standing or continuously flowing bodies of water forming geographic features” that are described as “streams[,] ... oceans, rivers, [and] lakes.”

The Safe Drinking Water Act is the federal law that protects public drinking water supplies throughout the nation. The U.S. Environmental Protection Agency (EPA) sets standards for drinking water quality and, with its partners, implements various technical and financial programs.

The Endangered Species Act (ESA), Section 7, requires federal agencies to “insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species.”

BLM Special Status Species (SSS) are designated by the State Director for each state and are defined as those plant and animal species for which population viability is a concern, as evidenced by a significant current or predicted downward trend in population numbers or density, or in habitat capability that would reduce the species’ existing distribution. BLM manages SSS habitats so as to promote their continuing viability. BLM Manual 6840, Special Status Species Management provides additional guidance.

BLM and Nevada Department of Wildlife (NDOW) Memorandum of Understanding (MOU) directs the agencies’ cooperative management of wildlife and fish resources and their habitat on public lands, as established in 1971. The BLM meets its obligations under the MOU by managing public lands to protect and enhance food, shelter and breeding areas for wild animals.

Migratory Bird Treaty Act (MBTA) of 1918 protects migratory birds, with the exception of native resident game birds. Under this act, nests with eggs or the young of migratory birds may not be harmed, nor may any migratory birds be killed. ***EO 13186*** (2001) provided federal agencies with further direction to implement the MBTA.

Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668) prohibits the direct or indirect take of an eagle, eagle part or product, nest, or egg. The term “take” includes “pursue, shoot, shoot at, poison,

wound, kill, capture, trap, collect, molest, or disturb.” The U.S. Fish and Wildlife Service (USFWS) has guidance for proposed projects that have the potential to impact eagles or their habitat; BLM biologists and USFWS would address this at the time of additional project-specific analysis.

Wild Free-Roaming Horse and Burro Act of 1971 (WFRHBA) directs the BLM’s responsibility for the protection, management and control of wild horses and burros “in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands.” The BLM is mandated to manage wild horses and burros only within those areas on public lands where they were found in 1971 when the WFRHBA was passed. They cannot be relocated elsewhere in the District; new Herd Management Areas (HMAs) cannot be created; and BLM cannot expand the HMAs to replace habitat lost. Management guidance includes 43 CFR 4700 and the Wild Horses and Burros Management Handbook H-4700-1.

Section 106 of National Historic Preservation Act (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties. The BLM also must comply with the Nevada State Historical Preservation Office (SHPO) protocol agreement, which is authorized by the National Programmatic Agreement between the BLM, the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers.

1.5 Scoping and Public Involvement

Internal scoping: In preparing the preliminary EA that would be released for public comment, the Battle Mountain District ID Team conducted internal scoping and identified potential issues.

Native American Coordination: The District initiated coordination regarding the proposed lease parcels with the Battle Mountain Band of Western Shoshone; the Duckwater Shoshone Tribe, the South Fork Band; the Te-Moak Tribe of Western Shoshone; and the Yomba Shoshone Tribe, via letters sent on 02/04/2019. Coordination with the Tribes is always ongoing. If any lease parcel is later found to contain resources protected under the NHPA, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders, BLM will not approve ground-disturbing activities that may affect such resources until completing its tribal consultation obligations; and may require modification to exploration or development proposals or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

Nevada Department of Wildlife and U.S. Fish and Wildlife Service input: During the same time period as internal scoping, Battle Mountain District provided the proposed lease sale parcel locations to Nevada Department of Wildlife (NDOW) and U.S. Fish and Wildlife Service (USFWS), and requested their input. NDOW provided input, which BLM has incorporated into the Wildlife sections of the EA.

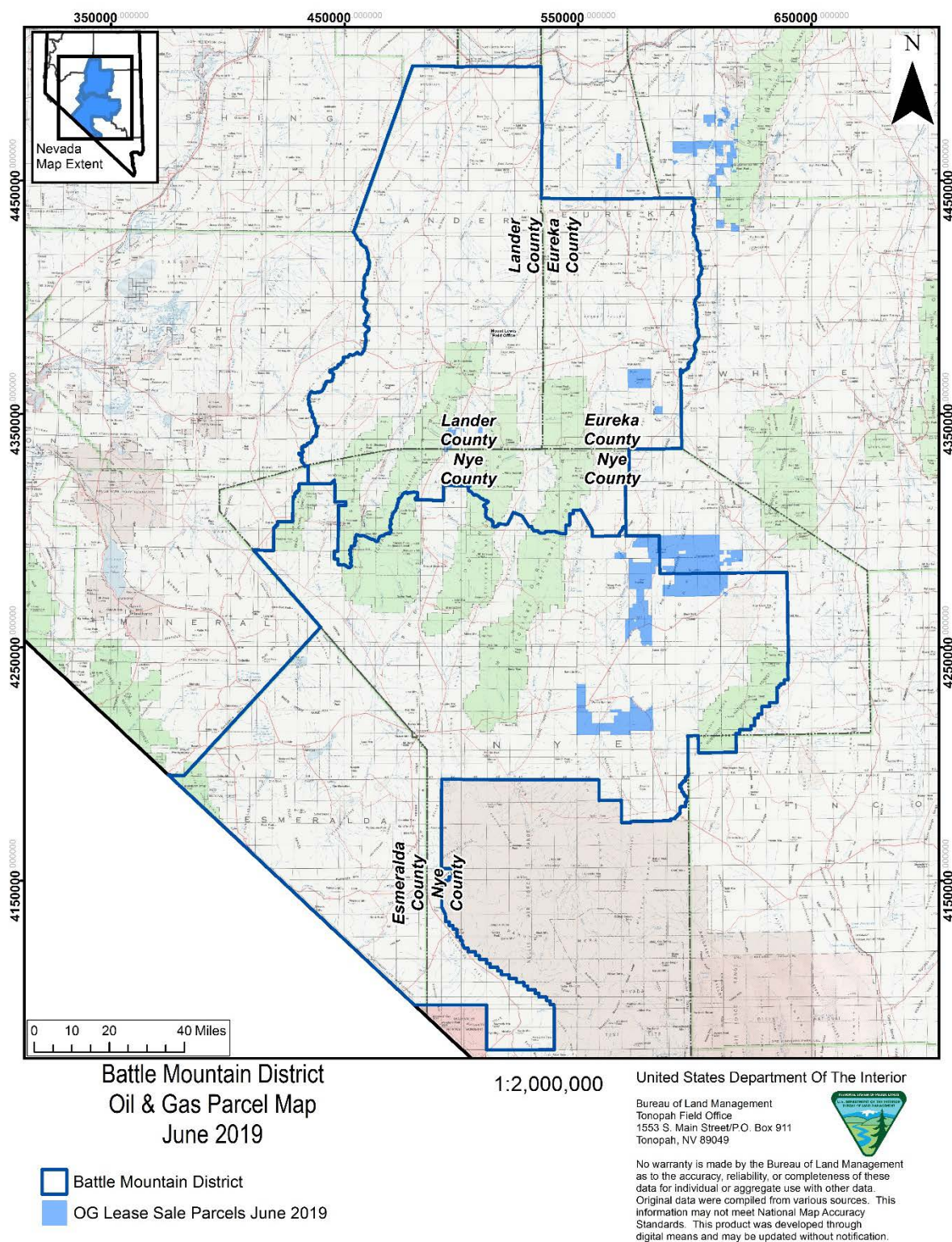


Figure 1. June 2019 Oil and Gas Lease Sale proposed lease parcels overview, Battle Mountain District (parcels outside District are not analyzed in this EA except one that overlaps Ely District).

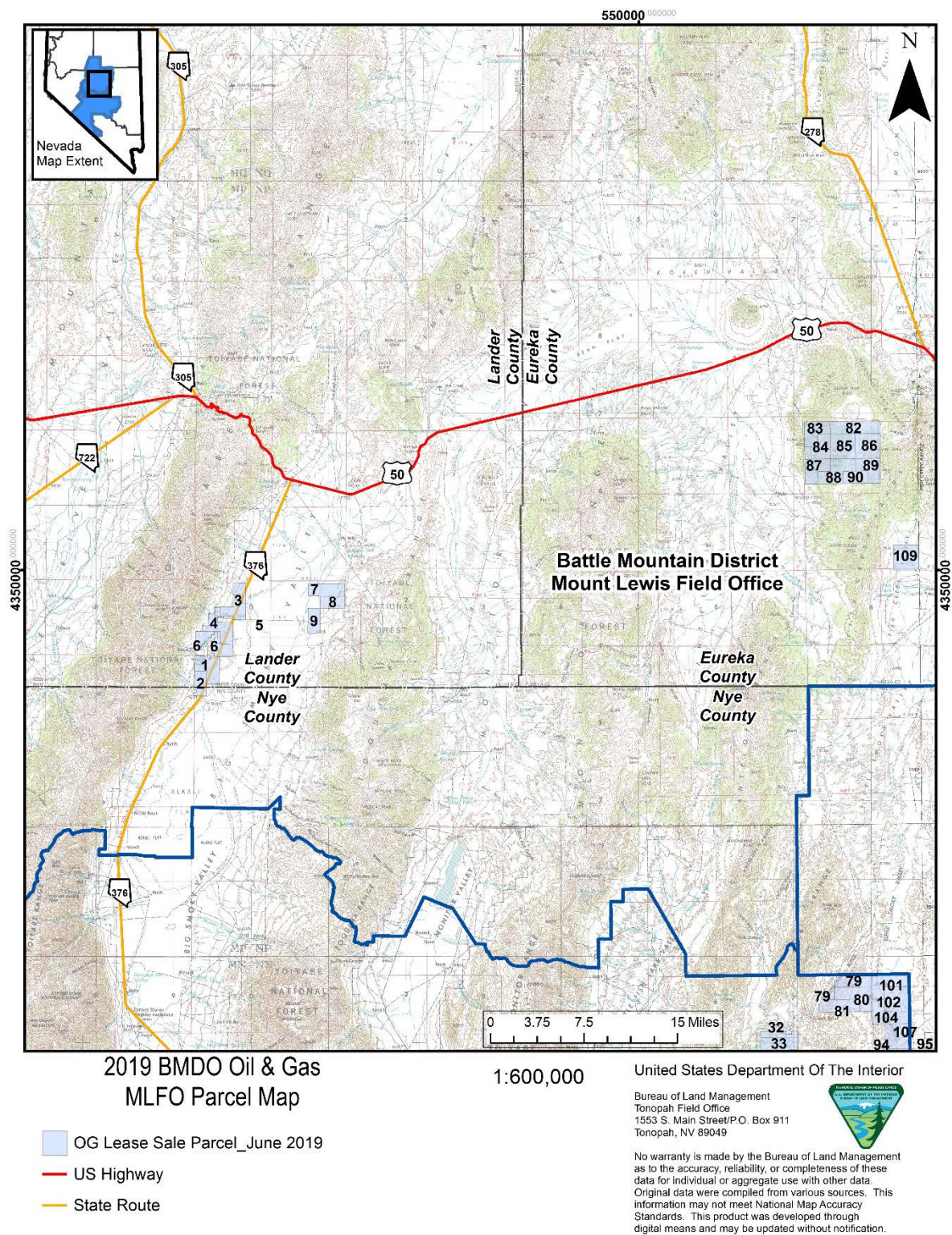


Figure 2. June 2019 proposed lease parcels, Mt. Lewis Field Office

Figure 3. June 2019 proposed lease parcels, Tonopah Field Office (including one parcel which overlaps Ely District)

Chapter 2. Proposed Action and No Leasing Alternative

2.1 Description of the Proposed Action

The Proposed Action is to offer for competitive sale all of the 123 nominated parcels that the BLM NVSO provided to Battle Mountain District for review, including one parcel that overlaps the Battle Mountain and Ely District boundary (parcel NV-19-06-95). These 123 parcels total approximately 264,000 acres in Kawich Range, Hot Creek Range and Valley, Reveille Range and Valley, Railroad Valley, Big Sand Springs Valley, Pancake Range, Fish Creek Range and Valley, and Big Smoky Valley (overview map, Figure 1; parcels in relation to topography, Figures 2-3; parcels in relation to land status, Figures 4 and 5 in Appendix K; legal land descriptions, Appendix A).

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease; ownership of the minerals revert back to the federal government and the lease can be resold.

Stipulations and/or lease notices would be attached to each offered lease parcel; these are listed in Appendix B, with the parcels to which each stipulation would apply. The Ely District would apply stipulations to the part it administers of the parcel that overlaps the District boundary.

If leases are issued and lease operations are proposed in the future, BLM would conduct additional site-specific, project-specific NEPA analysis when an Application for Permit to Drill (APD) or other exploration, development or production project application is submitted. In addition to the stipulations and notices attached to the parcel, Gold Book standards, guidelines and Best Management Practices (DOI and USDA 2007) would be applied.

2.2 Description of the No Leasing Alternative

In accordance with BLM NEPA guidelines H-1790-1, Chapter 6, this EA evaluates a No Leasing Alternative. This alternative forms a baseline for assessing and comparing the potential impacts of the other alternatives. Under this alternative, no parcels on the Battle Mountain District would be offered for lease sale in June 2019. Any new oil and gas development would take place on parcels that were leased in other lease sales (151 authorized leases in Battle Mountain District the time of this EA).

Chapter 3. Affected Environment and Environmental Consequences

3.1 Analysis Process Overview

Since there is no specific project proposal at the time of a lease sale, likely effects are predicted based on the RFD scenario and current knowledge and technologies. The process used is summarized in this section. This section also identifies which resources may be affected. The ID Team considered all resources that various supplemental authorities require BLM to address in EAs, and others deemed appropriate for evaluation. If a resource is not present or would not be affected, the rationale is provided here and the resource is not discussed further.

3.1.1 Methods and Assumptions

An oil and gas lease sale does not involve a specific project proposal, but rather is a first step in making certain lands available for future oil and gas development. Therefore, a meaningful analysis of the differences between alternatives requires that the Proposed Action include assumptions based on current exploration and development trends and projections. The assumptions used in this analysis include the RFD scenario, which predicts the number of wells and amount of surface disturbance likely to occur (Appendix G, summarized below), and the assumption that current technologies, methods, and requirements will be applied in the foreseeable future. This analysis extends the RFD scenario to those parts of one parcel that overlap the Ely District. This analysis also assumes that the stipulations listed in Appendix B will be applied to the parcels listed under each stipulation.

Reasonably Foreseeable Development (RFD) Scenario Summary

The surface disturbance estimate used to analyze the alternatives in this EA is based on the RFD scenario in Appendix G. In summary: Conservatively, based on historic information and anticipated activity, approximately 25 wells would be drilled and 65-100 acres of surface disturbance associated with potential oil and gas exploration and production activities could be expected to occur in the Battle Mountain District over the next ten years. If 100 acres of surface disturbance were to occur on the currently-proposed parcels, this would constitute approximately 0.04% of their total acreage. Types of disturbance that could occur are assumed to be those associated with technologies currently in use in geologically similar areas, as described below; and would be limited by the stipulations applied (see Appendix B).

Types of Activities Anticipated

At any point during the 10-year term of the lease, the lessee, or operator may submit specific plans for some level of proposed development. Typical oil and gas development operations occur in phases, in a more or less predictable sequence that is contingent on the success or failure of the previous phase. This section discusses types of activities that may be anticipated based on current technology and trends, and that are therefore taken into account as potential causes of impacts in this EA's analysis of alternatives.

Geophysical Exploration uses physical methods at the surface of the Earth to obtain detailed information about physical properties of the subsurface. A variety of methods are used, including placing electrodes or geophones in the ground; detonating explosives to create shockwaves; and using specially constructed off-road vehicles to produce vibrations. Currently, the most common method in eastern Nevada is the

seismic vibrator technique: a large vehicle-mounted “thumper” or “shaker” generates a controlled vibration which is recorded by small, typically hand-placed sensors. This is repeated in a grid pattern across an area, and resulting seismogram readouts provide information about subsurface properties.

Exploration Drilling (a wildcat well) begins development of a lease. An APD is filed with the BLM. A field examination is conducted by BLM resource specialists and NEPA review is completed before a drilling permit is issued. An access road and a well pad are constructed, if needed, with total disturbance usually less than 10 acres. An operator must secure enough water to drill the well and to maintain dust control on the pad and access road(s). Conventional oil wells in Nevada are typically drilled between 4,000 and 12,000 feet in depth and can typically require 50,000-300,000 gallons of fresh water. Over 95% of exploration wells in Nevada have been dry holes, that is, not producing oil or gas in commercially worthwhile amounts.

In-Field Drilling of additional exploration wells typically occurs in order to define the limits of the oil or gas reservoir when initial drilling has located oil or gas. The process is the same as initial exploratory drilling, although new roads and pads may not be required in every instance.

Production only occurs if oil or gas can be transported and sold at a profit. In the Battle Mountain District, pumped oil is generally piped a short distance for temporary storage, then trucked to a refinery for processing. This basic method of transport is unlikely to change, due to the small quantity of resource estimated to be present in the District. Production facilities may include a well head; pumping equipment; a separation system; pipelines; a metering system; storage facilities; water treatment and injection facilities; cathodic protection systems; electrical distribution lines; compressor stations; communication sites; roads; salt water disposal systems; dehydration sites; and fresh and salt water plant sites.

Well Stimulation and Hydraulic Fracturing (HF) may be used to enhance oil recovery once a well is successfully drilled. Several methods of well stimulation are common practice in today’s industry. HF is one of these methods that may be reasonably foreseeable for leases proposed for this sale. HF is the process of applying high pressure fluid to a subsurface formation via a wellbore, so that the pressurized fluid opens fractures in the rock. The opened fractures are propped open with a “proppant,” a granular material (typically sand, treated sand or man-made ceramic materials), to enhance fluid connectivity between the wellbore and formation. The process can increase the yield of a well and enable production of oil and gas from tight formations that would not otherwise be economically feasible to develop. The conventional HF process has been used routinely since 1950. HF is sometimes combined with horizontal drilling in which a drill hole is completed as a “lateral” parallel with the rock layer containing the fluid mineral to be extracted. (High-volume HF is a more recent method typically used in certain types of “unconventional” geologic formations such as shale oil and shale gas which are not present in the District, so this method is not reasonably foreseeable in the District.)

Appreciable amounts of water (800,000 – 10,000,000 gallons) can be consumed during HF operations. Much of it returns to the surface as backflow and can be recycled for reuse on other wells or projects. To date, Nevada has documented the use of HF on five separate vertical wells where less than 350,000 gallons of freshwater was consumed per well. HF procedures for mitigating potential environmental impacts may include the following:

- Wells have multiple casing and sealed in place with cement between the wellbore and the formation. Wellbore integrity is tested throughout the process.

- HF fluids are either contained in above ground tanks or a lined pit.
- HF fluids are recovered to a large degree in “flowback” or produced water when the well is tested or produced.
- All recovered fluids are generally handled by one of four methods:
 - Underground injection;
 - Captured in steel tanks and disposed of in an approved disposal facility;
 - Treatment and reuse;
 - Surface evaporation pits.

Please refer to the Hydraulic Fracturing Technology discussion (Appendix E) for more information. Also, the State of Nevada has adopted hydraulic fracturing regulations which are more stringent than federal requirements, and would be applicable to any HF operation proposed in the state. These have been incorporated into the Nevada Revised Statutes (NRS 522, <https://www.leg.state.nv.us/NRS/NRS-522.html>) and Nevada Administrative Code (NAC 522.700, <https://www.leg.state.nv.us/NAC/NAC-522.html>); also see the Nevada HF fact paper, http://minerals.nv.gov/uploadedFiles/mineralsnv.gov/content/Programs/OG/HF_Facts_4-10-2017.pdf

Well Abandonment may be temporary or permanent. Wells are sometimes abandoned because the cost of constructing pipelines or roads needed for marketing is not justified by the quantity of oil discovered. These wells may later be reentered when their production can be marketed. Permanent abandonment occurs when the well is determined to no longer have a potential for economic production, or when the well cannot be used for other purposes.

Reclamation includes removing all manmade objects and restoring the surface disturbance area to pre-disturbance conditions. In the case of a producing well, interim reclamation follows completion of drilling and well stimulation; final reclamation would be done after production has ceased. In the case of exploration wells which do not find economically recoverable amounts of oil, initial reclamation (re-contouring) is usually completed the following year, which provides for sufficient time for the reserve pit (which contains drilling fluids) to dry out. After re-vegetation is successful, reclamation is complete.

Gold Book Standards and Guidelines: The publication *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (DOI and USDA 2007; commonly referred to as the Gold Book) provides information on the requirements for obtaining permit approval and conducting environmentally responsible oil and gas operations on Federal lands. In 2007 the Gold Book was updated to incorporate changes resulting from the new Onshore Oil and Gas Order No. 1 regulations. All applicable Gold Book standards, guidelines and Best Management Practices (BMPs) would be required for any future oil and gas exploration or development on the proposed lease parcels.

3.1.2 Direct and Indirect Effects

An EA must analyze and describe the direct effects and indirect effects of the proposed action and alternatives on the quality of the human environment. Direct effects “are caused by the action and occur at the same time and place,” while indirect effects “are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR 1508.8). The sale of parcels and issuance of oil and gas leases is strictly an administrative action. There would be no direct impacts from issuing leases because leasing does not directly authorize ground disturbing activities; no authorization for surface disturbance would be granted. However, if a lease is sold, the lessee retains certain rights. For example, according to 43 CFR § 3101.1-2, once a lease is issued to its owner, that owner has the “right to

use as much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold" subject to specific nondiscretionary statutes and lease stipulations. Thus, a lease sale makes the offered parcels available to indirect effects (occurring at a later time). This chapter addresses those indirect effects. Additional site-specific, project-specific NEPA analysis would address direct and indirect effects of any future exploration, development or production.

3.1.3 Time Period Considered

The time period considered in this analysis is ten years, June 2019 to June 2029. This represents the initial term for an oil and gas lease, which expires at that time if it has not been developed. If there is a proposal to develop a lease parcel, then additional project- and site-specific NEPA analysis would consider effects for a time frame appropriate to that project.

3.1.4 Analysis Area

The term Analysis Area refers to the parts of the Battle Mountain and Ely Districts in which the lease parcels occur, in central Nevada. It includes parts of northeastern Nye County, in the Tonopah Field Office area; eastern Eureka County, in the Mt. Lewis Field Office area; and, in the one parcel that overlaps with the Ely District, western White Pine County in the Bristlecone Field Office area (Figures 1-3).

3.1.5 Other Terms Used

The term “mitigation” as used in this document refers to resource protection measures that could be included in a specific proposal and implemented when leases are developed. The terms “effects,” “impacts,” and “consequences” are synonyms and may be used interchangeably. Definitions of other terms, abbreviations and acronyms used in this document are in Appendix F.

3.1.6 Supplemental Authorities and Other Resources Considered

To comply with NEPA, BLM is required to address certain elements of the environment that are subject to requirements, called “supplemental authorities,” which are specified in statute, regulation or by executive order (BLM 1988, BLM 1997, BLM 2008). Table 1 outlines these elements. Other resources considered are shown in Table 2. Resources not present or not affected are not addressed further.

Table 1. Supplemental authorities considered in the EA.

| Supplemental Authority Element | Not Present | Present/Not Affected | Present/May be Affected | Rationale |
|--|-------------|----------------------|-------------------------|--|
| Air quality, climate change and greenhouse gases | | | √ | See Sections 3.2.1 and 4.2.1 |
| Areas of Critical Environmental Concern | √ | | | The proposed lease parcels are not located in or near any Area of Critical Environmental Concern. |
| Cultural resources | | | √ | See Sections 3.2.11 and 4.2.9 |
| Environmental justice | | √ | | A low-income population is present, and is not expected to be disproportionately affected. See Appendix J. |
| Farmlands, prime or unique | √ | | | There are no Prime or Unique Farmlands, as defined by the Farmland Protection Policy Act, in the Battle Mountain District. |

| Supplemental Authority Element | Not Present | Present/Not Affected | Present/May be Affected | Rationale |
|--|--------------------|-----------------------------|--------------------------------|---|
| Noxious weeds and invasive, non-native species | | | √ | See Sections 3.2.7 and 4.2.5 |
| Native American cultural concerns | | | √ | See Sections 3.2.12 and 4.2.10 |
| Floodplains | | | √ | See Sections 3.2.4 and 4.2.4 |
| Riparian/wetlands | | | √ | See Sections 3.2.4 and 4.2.4; see 3.2.8 and 4.2.6 for riparian/wetland wildlife habitat |
| Threatened or endangered species | | | √ | See Sections 3.2.8 and 4.2.6 |
| Migratory birds | | | √ | See Sections 3.2.8 and 4.2.6 |
| Waste, hazardous/solid | | | √ | See Sections 3.2.19 and 4.2.14 |
| Water quality | | | √ | See Sections 3.2.4 and 4.2.4 |
| Wild and Scenic Rivers | √ | | | The proposed parcels are not located in or near any designated Wild and Scenic Rivers. |
| Wilderness and Wilderness Study Areas (WSAs) | √ | | | None of the proposed parcels are within a designated Wilderness or WSA. |
| Lands with wilderness characteristics | | | √ | See Section 3.2.15 |

Table 2. Other resources considered in the EA.

| Other Resources | Not Present | Present/Not Affected | Present/May be Affected | Rationale |
|--------------------------------|--------------------|-----------------------------|--------------------------------|--|
| Fire management | | √ | | Standard fire management stipulations would be included in any lease sale. Any potential impacts from subsequent exploration and development activities would be analyzed under a separate, project specific analysis. |
| Forestry and woodland products | | | √ | See Sections 3.2.6 and 4.2.4 |
| Geology and minerals | | | √ | See Sections 3.2.16 and 4.2.12 |
| Land use authorization | | | √ | See Sections 3.2.17 and 4.2.12 |
| Paleontological resources | | | √ | See Sections 3.2.3 and 4.2.3 |
| Rangeland resources | | | √ | See Sections 3.2.10 and 4.2.8 |
| Recreation | | | √ | See Sections 3.2.13 and 4.2.11 |

| Other Resources | Not Present | Present/Not Affected | Present/May be Affected | Rationale |
|----------------------------|-------------|----------------------|-------------------------|--|
| Socioeconomic values | | | √ | See Sections 3.2.18 and 4.2.13 |
| Soils | | | √ | See Sections 3.2.2 and 4.2.2 |
| Specially designated areas | | | √ | Some parcels are intersected by a National Historic Trail; Sections 3.2.13, 3.2.14, 4.2.11 |
| Special status species | | | √ | See Sections 3.2.8 and 4.2.6; list, Appendix D |
| Vegetation | | | √ | See Sections 3.2.5 and 4.2.2 |
| Visual resources | | | √ | See Sections 3.2.14 and 4.2.11 |
| Wild horses and burros | | | √ | See Sections 3.2.9 and 4.2.7 |
| Wildlife | | | √ | See Sections 3.2.8 and 4.2.6 |

3.1.7 Environmental Consequences of the No Leasing Alternative (All Resources)

Under this alternative, no parcels would be offered for leasing in 2019. Because the RFD scenario applies to the entire Battle Mountain District, potential effects that are the same or essentially similar to those of the Proposed Action described for each resource would be expected to occur on other already leased parcels in the District, although the total number of wells may be slightly decreased if less lands or lower potential lands are available for leasing. As oil and gas production is demand driven, additional production may take place in other states or regions of the world to produce the required fossil fuels.

3.2 Environmental Effects of the Proposed Action

3.2.1 Air Quality, Climate Change, and Greenhouse Gases

These interrelated resources are combined here for discussion and analysis. Air quality is affected by various natural and anthropogenic factors. Industrial sources such as power plants, mines, and oil and gas extraction activities in Nevada contribute to local and regional air pollution.

Affected Environment

Air quality: The EPA has established national ambient air quality standards (NAAQS) for criteria pollutants, including carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), sulfur dioxide (SO₂), and lead (Pb). Exposure to air pollutant concentrations greater than the NAAQS has been shown to be detrimental to human health and the environment. The EPA has delegated regulation of air quality under the federal Clean Air Act to the State of Nevada. Other regulations 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 188 compounds as HAPs, some of which can be emitted from oil and gas development operations, such as benzene, toluene, and formaldehyde. NAAQS for HAPs do not exist; rather these are regulated by the source type, or specific industrial sector responsible for the emissions. Hydrogen sulfide (H₂S) is not regulated as NAAQS or HAP but considered and monitored for health and safety, although there has been no H₂S discovered in oil wells drilled in Nevada since monitoring was required in 2000.

Ambient air quality is demonstrated by monitoring for ground level (i.e. receptor height) atmospheric air pollutant concentrations. In general, these measurements show that existing air quality in the region is good. Concentrations for all the criteria pollutants are below the applicable state and federal ambient air quality standards. The Battle Mountain District has varying existing sources of pollution, mainly regional ozone and particulate matter. Regional ozone is typical in the western states as emissions from forest fires, transport from shipping lanes, electric power generation and other sources combine under certain meteorological conditions. Particulate matter is an issue during dust storms or when dust is raised by other activities in this dry region. For more information on pollutant monitoring values, including the other criteria pollutants not shown below, please visit the EPA's Air Data website at: www.epa.gov/airdata.

Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a standard period of 30 years. Climate change includes both historic and predicted climate shifts that are beyond normal weather variations.

Greenhouse gas (GHG) emissions worldwide are estimated to be Global Warming Potential (GWP) 15,347,480,381 tons per year (tpy) mainly from CH₄ (International Panel on Climate Change Fourth Assessment Report). According to Nevada Division of Minerals data (NDOM 2017), 53,363,806 barrels of oil were produced in Nevada 1954-2017, and there are currently 96 active oil wells and one oil refinery. None are identified as gas wells. The little gas produced is primarily used to power onsite pumping equipment; Nevada has no pipeline system to transport gas from wells to a major distribution site. Substantial uncertainties are associated with estimates of Nevada's GHG emissions from this sector.

Environmental Consequences of Proposed Action

The decision to offer the identified parcels for lease would not result in any direct emissions of air pollutants. However, any future exploration or development of these leases would result in emissions of criteria, HAP and GHG pollutants. These could result in an incremental increase in overall emissions of pollutants in the region, depending on any contemporaneous activities.

Air quality: Potential future development could lead to increases in area and regional emissions. As it is unknown if the parcels would be sold and developed, or the extent of development, it is not possible to reasonably quantify potential air quality effects via methods such as dispersion modeling. Specific locations, timing, construction and production equipment specifications and configurations are also unforeseeable at this time. Project specific air effects would be addressed in a subsequent analysis when exploration or development is proposed. All proposed activities would be subject to applicable local, State, Tribal and Federal air quality laws and regulations.

The BLM National Operations Center retained the Kleinfelder Team to prepare an emissions inventory estimate of criteria pollutants, GHG, and key HAPs for a representative oil and gas well in the western United States (Erbes 2013), designed to be used by BLM staff to evaluate emissions from small oil and gas projects, which for this purpose is approximately five wells or less. Defining a "representative" oil and gas well for the western US was challenging as there are many variables. Accordingly, five different well types (three natural gas wells and two oil wells) representative of five different major oil and gas basins were evaluated. Information that was not proprietary, not draft, and not pre-decisional

was reviewed for the five selected basins plus other oil and gas developments in the western US. The characteristics of the five basins selected are similar to a large portion of the oil and gas produced in the western United States.

The RFD scenario (Appendix G) predicts a maximum of 25 wells in the Battle Mountain District. The number in any given area is unknown but potential emissions would be multiplied appropriately.

Table 3. Air emissions inventory for a representative oil and gas well in the western U.S.

| Well Type | Gas | Gas | Gas | Oil | Oil |
|------------------------------------|----------------|----------------------|----------|-----------|--------|
| Basin Pollutant (tons per year) | Uinta/Piceance | Upper Green River | San Juan | Williston | Denver |
| NO _x | 15.6 | 14.6 | 5.6 | 15.6 | 6.3 |
| CO | 3.8 | 3.9 | 3.1 | 8.0 | 3.4 |
| VOC | 3.4 | 5.2 | 5.3 | 17.6 | 6.7 |
| SO ₂ | 0.0004 | 0.0004 | 0.001 | 0.001 | 0.001 |
| PM ₁₀ | 6.9 | 6.7 | 6.8 | 6.9 | 6.6 |
| PM _{2.5} | 0.8 | 0.8 | 0.5 | 0.8 | 0.5 |
| CO ₂ | 2,552.1 | 2,552.1 | 651.0 | 3156.4 | 1,049 |
| CH ₄ | 12.2 | 14.1 | 6.1 | 16.6 | 1.8 |
| N ₂ O | 0.05 | 0.05 | 0.04 | 0.6 | 0.04 |
| GWP | 2,825 | 3,194 | 791 | 3,682 | 1,099 |
| Benzene | 1.4 | 1.5 | 1.4 | 1.5 | 1.4 |
| Toluene | 1.0 | 1.2 | 1.0 | 1.0 | 1.0 |
| Ethylbenzene | 0.00003 | 0.01 | 0.0008 | 0.0008 | 0.0006 |
| Xylene | 0.6 | 0.7 | 0.6 | 0.6 | 0.6 |
| n-Hexane | 7.5 | 7.5 | 7.5 | 7.9 | 7.5 |
| Total HAPs | 10.4 | 10.9 | 10.5 | 11.0 | 10.5 |

Note: Sums may not precisely total due to rounding. A value of 0.00 indicates that pollutant is not emitted or emitted in *de minimis* amounts. If there is a non-zero value, at least one significant figure is reported. Greenhouse gas emissions are in terms of short tons CO₂, CH₄, and N₂O. Global Warming Potential (GWP) is in terms of short tons of CO₂ equivalent (CO₂e), using a GWP of 1 for CO₂, 21 for CH₄, and 310 for N₂O.

Future exploration or development activity could include soil disturbances from constructing well pads, access roads, pipelines, power lines, and drilling. Any disturbance is expected to cause increases in fugitive dust and particulate matter in the project area and immediate vicinity. Particulate matter, mainly dust, may become airborne when drill rigs and other vehicles travel on dirt roads. Air quality may also be affected by exhaust emissions from engines used for drilling, transportation, gas processing, compression for transport in pipelines, and other uses. These sources would contribute to potential short and long term increases in criteria pollutants: carbon monoxide, ozone (a secondary pollutant, formed photochemically by combining VOC and NO_x emissions), nitrogen dioxide, and sulfur dioxide. Non-criteria pollutants (for which no national standards have been set) such as carbon dioxide, methane, nitrous oxide, air toxics (e.g., benzene), and total suspended particulates (TSP) could also be emitted. Certain pollutants may be of concern when evaluating air quality related values (AQRVs) for effects on visibility and atmospheric deposition, depending on proximity to sensitive receptors, area meteorology, and background levels of an AQRV at any sensitive receptor. Dust control measures, such as watering or applying gravel over travel surfaces and reducing speed along roadways, can effectively mitigate dust issues.

“Natural gas,” if encountered in drilling, may at times be flared and/or vented from conventional and shale wells. The gas is likely to contain volatile organic compounds that could also be emitted from reserve pits, produced water disposal facilities, and/or tanks at the site. The development stage may likely include installing pipelines to transport raw product. New centralized collection, distribution and/or gas processing facilities may also be needed.

Development Direct Greenhouse Gas Emissions: The number of wells in any given area is unknown but potential emissions would be multiplied appropriately; for example, using the information from Erbes (2013), drilling 25 wells per the RFD scenario would produce between 16,275 tons and 78,900 tons of greenhouse gas emissions in terms of short tons of CO₂ equivalent (CO₂e).

Production Indirect Greenhouse Gas Emissions: Estimates based on the RFD scenario and current and historic oil production in the District are presented as low and high production scenarios (Table 4). An average emissions scenario is not provided due to the high uncertainty involved in drilling in Nevada; of 270 wells drilled since 1986, only 50 have produced commercial quantities of oil. Indirect GHG emissions are calculated only for carbon dioxide based on combustion of the product. Some end uses of fossil fuels extracted from Federal leases include combustion of transportation fuels, fuel oils for heating, and electricity generation; asphalt and road oil; and feedstocks used to make chemicals, plastics, and synthetic materials.

Table 4. Estimates for production indirect greenhouse gas emissions, Battle Mountain District.

| Indirect GHG Emissions | CO ₂ emissions from produced oil (tpy) ³ |
|------------------------|--|
| Low ¹ | 0 |
| High ² | 215,000 |

1. Assumes no successful development on a lease parcel (no wells or dryhole).
2. Assumes 25 wells with production of 20,000 barrels of oil per well per year, equal to Eagle Springs field in Nevada, from Nevada Bureau of Mines and Geology.
3. Oil well GHG indirect emission factor: 0.43 Metric Tons CO₂ per barrel of oil consumed by combustion.

Uncertainties of GHG Calculations: Although this EA presents a quantified estimate of potential GHG emissions associated with reasonably foreseeable oil and gas development, there is significant uncertainty in GHG emission estimates due to uncertainties with regard to eventual production volumes and variability in flaring, construction, transportation, and end uses. It is currently not feasible to predict the net impacts from the Proposed Action on climate, as leasing is an administrative action and has no direct effects. The inconsistency in results of scientific models used to predict climate change at the global scale, coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level.

Mitigation: The BLM encourages industry to incorporate and implement BMPs to reduce impacts to air quality by reducing emissions, surface disturbances, and dust. In accordance with a recent BLM MOU regarding air quality analysis and mitigation, BLM would coordinate with the EPA and State agencies early in the APD process to determine how best to model and mitigate for impacts to air quality. Measures may also be required as COAs on permits by either the BLM or the applicable state air quality regulatory agency. The BLM also manages venting and flaring of gas from federal wells as described in the provisions of Notice to Lessees (NTL) 4A, Royalty or Compensation for Oil and Gas

Lost. Any of the following measures could be required at the development stage:

- Flaring or incinerating hydrocarbon gases at high temperatures to reduce emissions of incomplete combustion;
- Emission control equipment of a minimum 95 percent efficiency on all condensate storage batteries;
- Emission control equipment of a minimum 95 percent efficiency on dehydration units, pneumatic pumps, produced water tanks;
- Vapor recovery systems where petroleum liquids are stored;
- Tier II or greater, natural gas or electric drill rig engines;
- Secondary controls on drill rig engines;
- No-bleed pneumatic controllers (most effective and cost effective technologies available for reducing VOCs);
- Gas or electric turbines rather than internal combustions engines for compressors;
- NO_x emission controls for all new and replaced internal combustion oil and gas field engines;
- Water dirt and gravel roads during periods of high use and control speed limits to reduce fugitive dust emissions;
- Interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads;
- Co-located wells and production facilities to reduce new surface disturbance;
- Directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- Gas-fired or electric pump jack engines;
- Velocity tubing strings;
- Cleaner technologies on completion activities (i.e. green completions), and other ancillary sources;
- Centralized tank batteries and multi-phase gathering systems to reduce truck traffic;
- Forward looking infrared (FLIR) technology to detect fugitive emissions; and,
- Air monitoring for NO_x and ozone.

3.2.2 Soils

Affected Environment

Differences in climate, relief, aspect, slope, landform, elevation and parent material among other factors contribute to the formation of different soil types. High variability of these factors within the Analysis Area creates a wide variety of represented soil types. Soils range from those typically found in valley floors, deep and poorly drained due to high clay content with a highly alkali pH, to those common in the higher mountain elevations which tend to be shallow gravely soils with near neutral pH.

Existing soils surveys are used to for evaluating land-use potential, potential plant communities and developing reclamation and rehabilitation plans. Three major soil orders dominate the Analysis Area: Aridisols, Entisols and Mollisols. A brief description of each soil order is provided in Appendix C.

Environmental Consequences of Proposed Action

There could be impacts to soils from future projects on any leased parcels, including such activities as seismic studies, exploratory drilling, developing a well for production (with or without using HF), production infrastructures, road construction, and gravel pit expansion. These actions would remove vegetation, potentially increasing wind and water erosion; cause soil compaction; and disturb microbiotic

crusts and top soil. Removal of top soil would change soil texture and structure by mixing soil horizons and breaking up soil aggregates. The impacts of this surface disturbance would include changes in nutrient and water cycling, bulk density, water holding capacity, percent organic matter, and microbial activity. Also, removal and crushing of vegetation would occur through exploration and development activities. Considering the amount of disturbance anticipated in the RFD scenario (65-100 acres), the impacts to soils are expected to be comparatively minor when compared to the areas offered for lease (approximately 264,000 acres), and temporary in nature because the majority of the disturbance (roads and pads) would be reclaimed.

Impacts to soil from these activities would be analyzed under additional site-specific EAs when an action is proposed and specifics such as location, well depth, water consumption needs, and area of disturbance are known. Through this process, specific mitigation measures and BMPs would be attached as Conditions of Approval (COAs) for each proposed activity.

Concurrent reclamation would be completed for all producing well locations; this feature would provide improved soil stability onsite and control of any soil erosion that may take place. Also, native vegetation would be restored during concurrent reclamation, partially restoring the site's vegetative productivity. As for final reclamation, sufficient topsoil would be maintained, allowing the site to be restored to its original landform; and native seed would be used, restoring the site's full vegetative productivity.

A CSU stipulation for slopes greater than 30 percent requires engineering and reclamation that would avoid impacts, wherever these slopes exist on a parcel. Using GIS, the stipulation is applied to all proposed parcels that have slopes greater than 30 percent (Appendix B). Also, sensitive riparian/wetland area soils generally have high susceptibility to disturbance and alteration; these would be protected by the Water Resources stipulation, applied to all or part of ten parcels (Appendix B). The degree of protection would be adequate, because vulnerable soils would not be expected to extend beyond the area within which impacts would not be allowed (within 500 feet of wetland/riparian areas, floodplains or playas).

3.2.3 Paleontological Resources

Affected Environment

Paleontological resources are defined in the federal Paleontological Resources Preservation Act (PRPA [also commonly known as the Omnibus Act]) as the “fossilized remains, traces, or imprints of organisms, preserved in or on the earth’s crust, that are of paleontological interest and that provide information about the history of life on earth” (16 United States Code [U.S.C.] 470aaa[1][c]). Formations or rock units which are known to yield vertebrate or significant invertebrate, plant, or trace fossils, have a high potential for containing significant paleontological resources. Most of the rock units within the nominated parcels have low to moderate potential for significant paleontological resources; 13 parcels have high to very high potential.

Environmental Consequences of Proposed Action

Paleontological resources may be subject to impacts from potential oil and gas exploration and production activities; therefore, identification and evaluation of these resources would be required on a case-by-case basis prior to project implementation or ground disturbing activities. BLM Instruction Memorandum (IM) No. 2009-011 provides guidelines for assessing potential impacts to paleontological resources in order to

determine mitigation steps for federal actions on public lands under FLPMA (Public Law [PL] 94–579, codified at 43 U.S.C. 1701–1782 and 18 U.S.C. 641) and NEPA. This IM also provides procedures for field survey and monitoring to avoid adversely affecting significant paleontological resources.

To help minimize any potential effects to paleontological resources, a standard Lease Notice, NV-B-00-A-LN, regarding fossils is included in Appendix B) and attached to all parcels. This informs lessees of requirements to inform the BLM of fossil discoveries, and requirements for surveys, avoidance and/or data recovery prior to their disturbance. On-site monitoring may be necessary during construction activities.

Based on the above requirements, it is unlikely that indirect effects to paleontological resources from leasing the parcels would be substantial.

3.2.4 Water Resources

Affected Environment

Water is a fundamental component of ecosystem health, especially in arid regions where springs, seeps, wetlands and perennial streams are essential to biodiversity and play an important role in wildlife habitat and in the food chain for many wildlife taxa. The lease area is part of the Basin and Range Physiographic Province, a semiarid and arid desert environment with most precipitation originating as snow or occasional monsoon rainfall. Annual precipitation is highly variable: in Tonopah it is 4.95 inches and March and April are the wettest months (WRCC 2015b); in Battle Mountain it is 6.3 inches and April and May are the wettest months (WRCC 2015a). Water in the lease area is owned by the people of Nevada; however, the right to use surface and groundwater and management of water appropriations are administered by the Nevada Division of Water Resources (NDWR). The water quality standards of Nevada support other Federal laws such as the Clean Water Act of 1977, the Water Resources Planning Act of 1962, the Pollution Prevention Act of 1990 and the Safe Drinking Water Act of 1977 and are administered by the Nevada Division of Water Quality (NDWQ).

Watershed sub-basins: The proposed lease parcels are located in Hydrographic Region 16, Great Basin. The lease parcels are located within the following sub-basins (Figures 6 and 7 in Appendix K):

- Northern Big Smoky Valley sub-basin, HUC# 16060004
- Ralston-Stone Cabin Valleys sub-basin, HUC# 16060011
- Diamond-Monitor Valleys sub-basin, HUC# 16060005
- Little Smoky-Newark Valleys sub-basin, HUC# 16060006
- Hot Creek-Railroad Valleys sub-basin, HUC# 16060012

Groundwater: Runoff from upland areas of the Analysis Area will commonly infiltrate into pediment deposits as they transition into the low basins. Groundwater is either directed toward playas and is lost to the atmosphere as evapotranspiration, or seeps into deeper aquifers that compose larger regional flow systems. Perennial base flow from springs is largely driven by snowmelt runoff recharge. Depth to groundwater varies from a few feet to hundreds of feet depending on location.

Nevada's groundwater quality standards are based on the assumption that groundwater should be maintained suitable for use as a drinking water source, unless the natural water quality prevents this. The State adopts the Federal primary and secondary drinking water standards (maximum contaminant limits)

for groundwater resources. The chemical character and quality of groundwater varies in the lease area and depends largely on the mineral content of the rock, residence time, evapotranspiration and temperature.

Riparian/Wetland Zones: The health of riparian and wetland ecosystems is a function of water quality and supply. Riparian and wetland areas are the most productive and important ecosystems on the Battle Mountain District. While they represent less than one percent of the area, they contain the majority of the biodiversity and perform vital ecologic functions. Research has shown that riparian and wetland habitat characteristically has a greater diversity of plant and animal species than adjoining areas. According to the National Hydrography Dataset and the National Wetlands Inventory, numerous parcels proposed for lease contain springs and seeps, perennial streams, lakes, ponds, and/or playas.

Floodplains: The Federal Emergency Management Agency (FEMA) designates “Zone A” flood hazard areas. Zone A flood hazard areas are subject to inundation by the 1-percent-annual-chance flood event, and all perennial streams will have an associated floodplain. Any of the offered lease parcels with Zone A flood hazard areas will be subject to federal regulation and mitigation. Additional project-specific NEPA analysis to identify potential effects to floodplains and, if needed, alternative to avoid such effects, would be required prior to drilling in parcels that meet this designation, as per E.O. 11988 Section 2(a)(2) and FEMA guidelines (FEMA 2015).

Environmental Consequences of Proposed Action

Exploration and development of a lease may result in long- and short-term alterations to the hydrologic regime depending upon the location and intensity. Clearing, grading, and soil stockpiling could alter short-term overland flow and natural groundwater recharge patterns, but in most cases, these potential impacts can be mitigated by better location siting and engineering controls. The BLM may move a proposed well site up to 200 meters at its discretion to mitigate impacts, and the requirements of the Clean Water Act may necessitate relocating the well further. Thirteen of the proposed lease parcels have springs and seeps, perennial streams, floodplains, lakes, ponds, and/or playas (Figures 6 and 7, Appendix K). The Water Resources stipulation is applied to these parcels (Appendix B).

Groundwater: All activities would be subject to BMPs, State and Federal Regulations and COAs. Potential future impacts of developing a lease may include degradation of water quality and drawdown of existing water levels. Water quality issues may arise from either underground or surface contamination. The primary cause of underground degradation would be from improperly functioning well casings. Surface activities can degrade groundwater by infiltration of contaminants, particularly from sumps and spills. Areas with shallow groundwater levels would be at greater risk and may be subject to COAs. All required state and federal regulations would apply to any future development, and site-specific COAs and mitigation would be an integral part of the approval of any APD.

Hydraulic fracturing (HF) is one method of well stimulation used in oil and gas production. HF is designed to change the producing formations’ physical properties by increasing the flow of water, gas, and/or oil around the wellbore. This change in physical properties may open up new fractures or enhance existing fractures that could result in freshwater aquifers being contaminated by natural gas, condensate and/or chemicals used in drilling, completion and HF. Historically, impacts to groundwater resources are due to improper well construction including insufficient or poorly installed surface and/or borehole seals (cementing), unsuitable construction materials and/or inadequate construction practices, introduction of

surface contaminants into groundwater through surface spills, and/or loss of drilling, completion and hydraulic fluids into groundwater. Types of chemical additives used in completion activities may include acids, hydrocarbons, gelling or thickening agents, lubricants, and other additives that are specific for the well being treated.

The potential for negative impacts to groundwater caused by HF are continually being investigated by the Environmental Protection Agency. Onshore Oil and Gas Order #1 specifies that lessees and operators must comply with applicable state laws on federal leases (48 FR 56226, Dec. 20, 1983). All HF operations would be subject to the requirements of the State of Nevada, Adopted Regulation of the Commission on Mineral Resources R011-14, which hold the operator to a higher standard than the BLM's proposed HF rules. The Nevada HF rules require the use of multiple steel casing strings (Surface, Intermediate, and Production) with proper cementing jobs (with required testing for efficacy) to isolate any usable groundwater or other resources from the well bore. The Nevada HF rules also require the disclosure of all chemicals used in an HF treatment, and continued monitoring of the well bore for any signs of leaking during the treatment. Proper casing and cementing along with monitoring would prevent contamination of groundwater from any HF or other well stimulation treatment. Also see Appendix E.

Standard BMPs and COAs include the use of lined pits with secondary containment and monitoring features for any flow-back or produced fluids which are designed to prevent any infiltration or other contamination of groundwater or surface water resources.

Surface Waters: Potential impacts may include changes to water quantity and quality. Runoff associated with storm events could increase sediment and salt loads in surface waters down-gradient of the disturbed areas. Sediment may be deposited and stored in minor drainages where it could move downstream during heavy storms and may be carried into contained basins and sloughs. This would be especially true in areas with steep slopes, which would be more susceptible to erosion and consequent impacts to perennial streams, springs and seeps, and wetlands and riparian areas. The Water Resources and Slopes >30% stipulations are applied to parcels with these concerns (Appendix B, and see Soils section) and require projects to be designed to avoid these impacts. All activities would be subject to BMPs, state and federal regulations and COAs. If future surface disturbing activities are proposed near surface waters or wetlands and riparian zones, additional mitigation would be required. All operations would be required to comply with all state and federal regulations.

Springs, Seeps, Riparian and Wetland Areas: The consequences of oil and gas exploration or development in wetlands and riparian areas are potentially severe, as these environments are extremely sensitive to perturbation. The hydrogeology that results in spring discharge is often unique and complex. For springs, seeps, and spring-fed wetlands, there would be a slight risk that drilling would lead to subsurface modification due to the possibility that drilling would interfere with groundwater flow in a fault. For any future proposed drilling, geophysical studies may be required which provide a subsurface view of the strata and their permeability, in which case the likelihood of penetrating a fault with groundwater flow would be minimized.

The predicted surface disturbance, although minor in area, would have a disproportionate effect in these environments. Road building could redirect water flows; any loss or diversion of water or instream flow can affect wetland and riparian health and impact these ecosystems. Contaminants from any accidental

spillage are easily brought into solution and spread throughout the system. Human activity can affect turbidity and dissolved oxygen content, which in turn harm microbial life.

The Water Resources stipulation (Appendix B) has been applied to all or part of ten parcels. This stipulation has been applied those quarter-quarter sections having springs and seeps, perennial streams, 100-year floodplains, lakes, ponds, and/or playas (Figures 6 and 7, Appendix K). This stipulation employs Controlled Surface Use (CSU) restrictions with measures designed to protect water resources and prevent erosion by using avoidance buffers, engineering controls, and mitigation for these resources wherever they may occur within a parcel. Proper application of the stipulation will protect water resources from unnecessary or undue degradation. It is applied to the ¼ ¼ sections that encompass the target resource to ensure even the smallest area of surface water resources would be protected while maximizing the area available for lease. (It is not applied to the part of Parcel 95 that overlaps the Ely District which includes a 23-acre area of 100-year floodplain, because the Ely District uses different stipulations that are established by their own RMP; see stipulations lists in Appendix B). The proposed combination of avoidance buffers, engineering controls and mitigation requirements, along with the additional project and site-specific analysis and Conditions of Approval at the exploration and development stage, will meet the requirements of Executive Order 11988, Executive Order 11990, The Safe Drinking Water Act, and The Clean Water Act of 1972, and provide sufficient protection for water resources on the parcels.

3.2.5 Vegetation

Affected Environment

Vegetation in the Analysis Area provides forage and cover for wildlife, livestock, and wild horses. It also provides ground cover and root mass to stabilize soils and aids in infiltration of water into the ground. The type of vegetation in a particular area depends largely on soil types and average precipitation. The Natural Resource Conservation Service completed soil surveys and has developed ecological site descriptions from the information collected. Each ecological site description provides detailed information regarding vegetative communities and precipitation zones and is used for evaluating land-use potential, potential plant communities and developing reclamation and rehabilitation plans. Vegetative communities in the Analysis Area include Sodic Flats / Flood Plains, Salt Desert Shrub, Big Sagebrush, Black Sagebrush, Low Sagebrush, Pinyon-Juniper Woodlands, Riparian Wetlands, and Winterfat Bottoms; there are also areas dominated by annual plants. These vegetative communities are described in detail in Appendix C. Several SSS plant species occur in these communities (Appendix D).

Environmental Consequences of Proposed Action

There could be impacts to vegetation from future projects on any leased parcels. It is anticipated that the majority of the exploration is likely to occur in saltbush shrub or sagebrush type vegetation areas, rather than pinyon-juniper woodlands. Removal and crushing of vegetation would increase the amount of bare ground, thus increasing wind and water erosion; and increase the potential for invasion by nonnative and noxious species. Considering the amount of disturbance anticipated in the RFD scenario (65-100 acres), the impacts to vegetation are expected to be comparatively minor when compared to the areas offered for lease (approximately 313,715 acres), and temporary because most of the disturbance (roads and pads) would be reclaimed. Impacts would be considered under additional site-specific analysis when an action is proposed and specifics are known, like location, well depth, water consumption needs, and area of

disturbance. Special status plant surveys would be conducted as needed at that time. Through this process, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity. Impacts to most vegetation communities are expected to be relatively minor, short term, and localized.

Oil and gas development could potentially affect the quality and quantity of water in parcels where important wetland, springs, and playas occur. Riparian vegetation communities are fragile environments that could be impacted by disturbances to the timing and amount of water capture, water storage, and water release. If water resources were affected in these parcels, despite mitigation measures and BMPs, it could create changes in interspecies competition and potentially decrease biodiversity in riparian areas. There is a potential for more drought tolerant species and annual invasive species to outcompete native riparian species for limited nutrients and water. However, the Water Resources stipulation provides protection for riparian-wetland vegetation because it requires avoidance, minimization or mitigation of impacts within 500 feet of wetland/riparian areas (see Water Resources section above).

3.2.6 Forestry and Woodland Products

Affected Environment

The Analysis Area includes alluvial fans, foothills and valley bottoms which support mostly shrub and herbaceous species, and also consists of a large portion of barren or sparsely vegetated areas. Some of the parcels have pinyon and juniper woodlands, some of which have a very thick timber component, with canopy cover as great as 50% over the majority of the parcel. In addition there is the potential for riparian associated species such as cottonwood and willows, described in detail in Appendix C. Seeps, springs, and drainages can be found within parcel boundaries as described in the Water Resources Section, with the potential for impacts to riparian woodland species. While these are the predominant woodland species in the region, others may also be found.

Environmental Consequences of Proposed Action

There are minimal direct impacts associated with issuing an oil and gas lease. However, it is reasonably foreseeable that oil and gas exploration and development would occur over the next 10 years within the Analysis Area and 65-100 acres will be disturbed by activities associated with oil and gas exploration and production. The Water Resources CSU stipulation would be applied to areas with potential for cottonwoods and willows, and is sufficient to protect these resources because it requires avoiding impacts to riparian vegetation (see Appendix B). Current forestry policy states that timber, cacti, or Joshua trees that will be damaged or destroyed as a result of clearing will be appraised and sold at the appraised value in accordance with 43 CFR 5420.0-6 and IB-2012-097. Also, if parcels were developed in the future, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity, which would be analyzed under project-specific NEPA analysis. Even if it is assumed that all 100 acres of estimated potential future disturbance occurs within timbered landscapes, the effects would still be negligible. This represents less than 0.02% of the more than 500,000 acres of pinyon and juniper woodlands within the Mt. Lewis Field Office area alone, where most of the timbered parcels are located.

3.2.7 Noxious Weeds and Invasive, Non-Native Species

Affected Environment

The BLM defines noxious weeds, invasive plants, and weeds with different, interrelated definitions (Appendix F). The BLM's policy relating to the management and coordination of these species is set forth in the BLM Manual 9015 – Integrated Weed Management. The BLM's primary focus is providing adequate capability to detect and treat smaller weed infestations before they have a chance to spread. Noxious weed control is based on a program of prevention, early detection, and rapid response.

Noxious weeds and invasive exotic plants are highly competitive and aggressive, and spread easily. They typically establish and infest disturbed sites, along roadsides and waterways. Invasive exotic and noxious plants are commonly found in Nevada in areas where there are seeps and springs or year-round water; regardless of whether a site is heavily disturbed, readily available water will increase the likelihood of all plant life including weeds. Wind, water, animals, vehicles/equipment, and humans spread invasive exotic and noxious weeds. Movement of plants from one site to another is greatly increased by introducing humans and equipment to an area. Changes in plant community composition from native species to non-native species can change fire regimes, negatively affect habitat quality, biodiversity, and ecosystem structure and function. There are known infestations of noxious and invasive exotic plants within the Analysis Area. Invasive non-native species also include animals; however, there are no records of invasive non-native animal species in or near the Analysis Area.

The Diamond Valley Weed Control District encompasses nearly all of Diamond Valley and many areas adjacent to Diamond Valley. Any activities within this District would need to comply with applicable requirements.

Environmental Consequences of Proposed Action

There would be minimal direct impacts from issuing new oil and gas leases because leasing does not directly authorize oil and gas exploration and development activities, and no ground disturbance would be authorized. The only impact that may occur would be an increase of movement of humans and vehicles to, from, and around the proposed parcels, which could slightly expand any disturbed areas within the sites and assist with the movement of noxious and invasive exotic seeds and other plant matter both within the sites and from the sites to other areas, or vice versa. Wind, water, recreation vehicles, livestock and wildlife would also assist with the distribution of weed seed into the newly disturbed areas.

Parcels with extensive seeps, springs, and wetland-riparian areas – where weeds are particularly likely to become established – would be protected by the Water Resources CSU stipulation, effective immediately upon lease sale. The stipulation calls for avoiding impacts to the target resources, including an appropriate buffer (500 feet for water sources and riparian areas). Application of this stipulation would prevent disturbance to the soils and plant communities that could otherwise promote the spread of weeds in these areas, as described above.

If parcels were developed in the future, additional site-specific mitigation measures, BMPs, and COAs would be implemented to reduce impacts. These would include, but not be limited to, washing equipment at washing stations before bringing it to the project area, and after use; using certified weed-free seed to

stabilize any topsoil stockpiles and for interim and final reclamation; and monitoring and treatment programs to detect and halt the spread of any invasive weed species.

3.2.8 Wildlife Resources

Affected Environment

Several wildlife species of particular management concern are likely to occupy the Analysis Area. Parcels with water resources (e.g., streams, springs, seeps and wet meadows) are likely to support a higher density of wildlife, including endemic aquatic and amphibious species. Other important wildlife habitat types include big sagebrush (mountain and Wyoming big sagebrush), low sagebrush, pinyon-juniper woodlands, and salt desert scrub vegetation. The parcels also include seasonally flooded playas; the Great Basin region hosts several rare invertebrate species that occur nowhere else but in this otherwise inhospitable environment. Playas often have the only water available in the desert; pronghorn and other animals may gather there to drink. This section discusses select wildlife species or taxa (groups of species) that are known or likely to occur in the Analysis Area and for which federal law or BLM policy and guidance directs management actions, and includes preliminary scoping input from NDOW and USFWS for this EA. See Appendix D for an explanation and current list of Nevada BLM Sensitive species in the District.

Freshwater emergent wetlands: USFWS mapping identifies extensive areas on several parcels as freshwater emergent wetlands. Such desert wetlands are rare and provide water and crucial habitat to many wildlife taxa, often including rare fish, aquatic invertebrates, and amphibians (discussed below) that have adapted to the conditions in their particular environment, isolated from similar species by the surrounding desert. Proposed lease parcels with freshwater wetlands include parcels 2, 3, 4, 5, 6, 26, 32, 33, 50, 77, 95, 101, and 102.

Fish and aquatic invertebrates generally occupy limited, isolated habitats in Nevada. BLM, NDOW and USFWS biologists identified the following species of conservation concern that are known to, or may, occupy habitat in or near proposed parcels. Some parcels may be located near these sensitive species' known ranges or known habitats. Thus, some parcels may contain as yet unidentified potential habitat.

- **Lahontan cutthroat trout** (*Onchorynchus clarkia henshawi*) are potentially found in Shoshone and Santa Fe Creek within parcels 3 and 4.
- **Hot Creek Valley tui chub** (*Siphaletes bicolor ssp. 5*), a BLM Sensitive species, occurs near proposed parcel 50 in Cane and Twin Springs.
- **Fish Creek Spring tui chub** (*Siphaletes bicolor euchila*) occurs south of proposed parcel 109 on private property, and is a Nevada State protected species.
- **Railroad valley springfish** (*Crenichthys nevadae*) populations nearest proposed lease parcels are located about two miles south of proposed parcel 151, in North Spring. The spring is on private lands owned by NDOW. Several other populations occur on BLM managed lands within the Railroad Valley Wildlife Management Area but are not on or near proposed parcels.
- **Springsnails** (*Pyrgulopsis* spp.) are restricted to habitat in and near the sources of freshwater springs. A number of springsnails have been designated as BLM Sensitive species (Appendix B); more surveys are needed to document these species' occurrence, habitat, and population structure. Currently-known general locations on BLM lands include Railroad Valley, with five

endemic springsnails: Duckwater pyrg (*P. aloba*), Southern Duckwater pyrg (*P. anatine*), Duckwater Warm Spring pyrg (*P. villacampae*) and Big Warm Spring pyrg (*P. papillata*), which are listed as BLM Sensitive; and Lockes pyrg (*Pyrgulopsis lockensis*). These species were previously petitioned for listing under the ESA, but listing was determined not warranted due to a lack of information. USFWS initially reported to BLM that the Analysis Area may provide habitat for seven springsnail species that are currently petitioned for listing as threatened or endangered, but on further review concluded that the known ranges of these seven species apparently occur well outside the Analysis Area, while the five species known to occur in Railroad Valley occur relatively near (within five miles of) proposed lease parcels.

Amphibians: One of three recently-identified species of toad in Nevada's Great Basin is found in small, isolated wet habitats in the Analysis Area: **Railroad Valley toad** in Railroad Valley. According to NDOW the current range of this species is severely restricted, suggesting its populations are especially vulnerable to environmental changes. The Analysis Area is within the range of three BLM Sensitive amphibians: **western toad**, **Columbia spotted frog** and **northern leopard frog**. All of these amphibians are dependent on the water sources that are found within their areas of distribution and any negative impacts to these water sources would be detrimental to their populations.

Big Game: The general Analysis Area provides habitat for bighorn sheep (*Ovis canadensis* ssp., Figures 8 and 9 in Appendix K); pronghorn (*Antilocapra americana*, Figures 10 and 11); mule deer (*Odocoileus hemionus*, Figures 12-15). Bighorn sheep, a BLM Sensitive species, rely on proximity to rocky cliffs to escape predators; one proposed parcel intersects crucial lambing and summer habitat. No crucial pronghorn winter habitat intersects proposed parcels, but pronghorn are widely distributed across the Analysis Area; fawning can occur anywhere within their distribution depending on yearly habitat conditions, including playas when forage, water or cover is available. Mule deer use a variety of vegetation types and habitats seasonally for forage, thermal cover and escape cover; riparian areas, meadows and aspen stands are important fawn-rearing areas. Mule deer winter range and migration corridors intersect many parcels. These are listed along with the applicable TL stipulation or lease notice in Appendix B, using 2014 NDOW spatial data in BLM's corporate data layers as directed by NVSO.

Other mammal species of management concern include several BLM Sensitive species (Appendix D) which may be found in habitats that are widespread in the Analysis Area.

- **Pygmy rabbits** (*Brachylagus idahoensis*) typically require stands of tall, dense sagebrush, in areas with deep, loose soils for their burrows; sagebrush is the primary food and may comprise up to 99% of their winter diet, and shrub cover provides essential protection during dispersal.
- **Dark and pale kangaroo mouse** (*Microdipodops megacephalus* ssp., *Microdipodops pallidus*) are found in shadscale scrub, sagebrush scrub, and alkali sink plant communities; the former prefer loose sand and gravel, while the latter are nearly restricted to fine sands.
- **Bats**, many of which are BLM Sensitive species, inhabit or use many niches including caves, abandoned mines, cliffs, springs, riparian, aspen, pinyon-juniper, subalpine coniferous forest and desert shrub. Bats frequently forage in riparian areas; perennial stream corridors provide important bat habitat. Several proposed parcels are known to include bat roosts.

Greater Sage-Grouse, a BLM Sensitive species, occur in Eureka, Lander and northern portions of Nye County on the District, in foothills, plains and mountain slopes where sagebrush and meadows are in close proximity. Areas used often vary by season (breeding, nesting, early and late brood rearing, and

wintering), but may be year-round in some areas. The Analysis Area includes several parcels having PHMA, GHMA and/or OHMA habitat mapped under the GRSG Plan Amendment, as described under Regulatory Framework above; see Figures 16 and 17 and Appendix B for the intersection of proposed parcels with sage-grouse habitats. Available data indicate that nesting, brooding, summer, and winter habitat may occur not only in PHMA and GHMA but also in many areas of OHMA.

Migratory Birds: A wide variety of bird species protected by the MBTA are found throughout all habitat types in the Analysis Area; see Appendix C for a discussion of major avian communities. Riparian vegetation associated with perennial streams, seeps and springs is particularly important for a diverse migratory bird community. Playas, if consistently flooded during the breeding season, may provide breeding habitat for BLM Sensitive western snowy plover (*Charadrius nivosus nivosus*); and even if only occasionally flooded, would then provide feeding and stopover habitat for migrating shorebirds and waterfowl. Potential western snowy plover habitat includes playas and associated springs and wetlands in Railroad Valley. Nesting habitat for BLM Sensitive long-billed curlew is also found in Railroad Valley.

Raptors: Several raptor species are widespread in the District. Golden eagles, prairie falcon, ferruginous hawk and burrowing owl are among the BLM Sensitive raptor species known to forage in the Analysis Area on a year-round or seasonal basis. All native North American birds of prey are strictly protected. Mountain ranges in or adjacent to the Analysis Area include important raptor habitats. Pancake Range has the highest density of cliff nesting raptors in central Nevada. Proposed lease parcels 23, 50, 54, 67 all have golden eagle nests.

Environmental Consequences of Proposed Action

Offering, selling, and issuing federal oil and gas leases would not produce any direct impacts to wildlife resources. However, there may be indirect impacts from future ground disturbing activities on any leased parcels. At this time the specific acres and types of habitat that would be disrupted cannot be determined, as the BLM would not receive any applications for exploration or development until after the lease sale. At that time additional site-specific mitigation measures and BMPs would be included in the proposal or attached as COAs for each proposed activity, which would be analyzed under project-specific NEPA analysis including consultation with NDOW and USFWS as needed. BLM Nevada Standard Stipulations, attached to all parcels (Appendix B), alert prospective lessees that the parcel “may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species” and summarizes steps that may be required to address them. The Standard Stipulations also outline requirements to protect migratory birds under the MBTA.

To reduce potential impacts to wildlife from future exploration or development, stipulations are attached to specific parcels as listed in Appendix B, providing direction that must be followed in the specified habitat. Parcels that have crucial bighorn sheep or mule deer seasonal habitats as identified by NDOW’s 2014 data would be addressed by timing limitation (TL) stipulations or lease notices, restricting use during the critical seasons to protect populations from disturbance (Appendix B; maps, Appendix K). When any proposal for exploration or development is approved, the proponent would be required to plan work so as to comply with TL stipulations. If, due to unanticipated delays, operations are ongoing when a restricted season begins, the authorized officer would confer with the proponent and a BLM or NDOW wildlife biologist familiar with the area and decide if and how operations may proceed.

Parcels with Greater Sage-grouse habitats have the appropriate Fluid Minerals stipulations applied as per the GRSG Plan Amendment (BLM 2015; see Appendix B of this EA). At the lease sale stage, BLM cannot apply stipulations beyond those specified by the GRSG Plan Amendment; but if parcels are leased, effects would be considered at the time of any future project proposal, potentially including additional mitigation measures as needed.

The Water Resources stipulation would be attached to parts of ten parcels which include aquatic and riparian/wetland habitats, along with playas and 100-year floodplains; it requires additional environmental review, engineering controls, and mitigation measures within 500 feet of perennial waters, springs, wells, and wetland/riparian areas. It would ensure protection from most impacts, including indirect impacts such as run-off, erosion, sedimentation, or accidental contamination that could extend into the protected area from a greater distance. It also applies to playas, extending protection to snowy plover habitat and to seasonal feeding and stopover habitat for migrating shorebirds and waterfowl. It would help protect important raptor foraging areas in wet habitats.

The Water Resources stipulation would protect any aquatic habitat on the parcels, benefitting any aquatic invertebrates and amphibians of conservation concern whose presence is cannot be confirmed due to incomplete survey data. Stipulations cannot be attached to a parcel to protect resources that are off-parcel; however, concerns about potential effects to aquatic and amphibious species off-parcel could be addressed by the additional project-specific analysis that would be conducted at the time of any exploration or development proposal, including consultation with NDOW and USFWS as needed.

In other habitats, generally mobile animals would avoid and move away from the project-associated noise and activities; some mortality could occur among small animals unable or less likely to move away; and there would be some loss of habitat. Based on the RFD scenario, oil and gas exploration and production activities would continue to be minimal with an expectation of no more than 25 wells being drilled District-wide, disturbing a total of approximately 65-100 acres over the next ten years. If all disturbance were to occur on lease parcels to be offered under the current Proposed Action, a 100-acre total disturbed area would represent 0.02% of that area. These activities are temporary in nature and most wildlife would likely eventually move back into the area after successful reclamation.

Artificial lighting from drilling rigs and other structures can have potential adverse impacts to wildlife such as insectivorous bats and insects. Guidelines for lighting intensity, orientation, etc. would be recommended at the time of any project proposal to avoid, minimize, and mitigate such impacts.

Based on the available resource protection measures in place, potential future exploration or development on leased parcels should not have any long-term or substantial impacts to wildlife resources.

3.2.9 Wild Horses and Burros

Affected Environment

Portions of 61 proposed parcels overlap wild horse Herd Management Areas (HMAs). Figure 6 in Appendix H displays the HMAs and parcels. Parcels overlap two HMAs administered by the Mount Lewis Field Office and three HMAs administered by the Tonopah Field Office. One parcel extends over the District Boundary into the Ely District and a wild horse HMA administered by that office, indicated with an asterisk below

Table 5. Acreage and population data for Herd Management Area with proposed lease parcels.

| HMA | BLM HMA Acres | AML | Estimated Population ¹ | Number of Proposed Lease Sale Parcels in HMAs | Proposed Lease Sale Parcel Acres in HMAs |
|-------------------|---------------|-------------|-----------------------------------|---|--|
| Fish Creek | 230,675 | 170 | 640 | 10 | 19,836 |
| Hickison (burros) | 57,634 | 16-45 | 256 ² | 3 | 4,379 |
| Pancake* | 853,025 | 493 | 2,160 ³ | 1 | 344 |
| Reveille | 105,494 | 138 | 130 | 2 | 1,229 |
| Sand Springs West | 157,436 | 49 | 333 | 40 | 63,349 |
| Stone Cabin | 403,736 | 364 | 782 | 5 | 2,447 |
| Total | 1,808,000 | 1,230-1,259 | 4,301 | 61 | 91,584 |

1. 2018 post-foaling population estimates where not indicated otherwise.

2. Population for both the USFS and BLM portions of the Hickison Burro Complex.

3. Pre-foaling populations.

* HMA administered by BLM Ely District Office.

Fish Creek HMA

The Fish Creek HMA is south of Eureka in Eureka County, Nevada, mostly south of U.S. Highway 50. The small portion north of U.S. Highway 50 is managed with the Roberts Mountain HMA. The HMA is comprised of mid-elevation mountains, pinyon-juniper woodlands and valleys that support winterfat and sagebrush communities. Elevations reach 9,500 feet on Prospect Peak in the north portion of the HMA and 10,100 feet on Ninemile Peak in the south; valleys average 6,200 feet. Water sources are scattered and limited, consisting of small mountain springs and developed water sources with pipelines and troughs, or wells. Wild horses are well scattered throughout the summer months, using both lower and higher elevations, with lower elevations used predominantly during winter. The Fish Creek HMA is adjacent to the Sevenmile and Pancake HMAs; movement between the HMAs is known to occur.

Proposed parcels in this HMA are located in an area that is heavily utilized by wild horses, in the vicinity of Browns Canyon, McCullough Butte, Dry Lake and Spring Valley. Wild horses use this area throughout the summer months and may also use it during mild winters. Several of the parcels have slopes in excess of 30%, and several small springs exist in the vicinity of McCullough Butte.

Hickison HMA

The Hickison HMA, about 12 miles east of the town of Austin in Lander County, is administered together with the 52,570-acre U.S. Forest Service Hickison Wild Burro Territory (WBT) which adjoins it to the east; both are managed for wild burros. The U.S. Highway 50 right-of-way fence separates the northern and southern parts of the Hickison HMA; approximately 19,000 acres of BLM-managed land in the northern portion of the HMA is unavailable to wild burro use. There are no wild horses known to inhabit the HMA or WBT south of U.S. Highway 50. Burros use higher elevations in the WBT predominantly in summer and move to lower elevations during the winter months, but are common in the foothills throughout the HMA. Within the HMA, utilization is highest in the northern portion, and near the Spencer Hot Springs. The vegetation communities in the HMA are not highly productive; vegetation is sparse and

water sources are limited. Three proposed parcels are in the central portion of the HMA; this area is moderately utilized by burros. No water sources are known within the parcels.

Pancake HMA

One proposed parcel overlaps the Pancake HMA administered by the Ely District. This HMA is southeast of Eureka, Nevada, just south of U.S. Highway 50, and borders the Battle Mountain District on its west and south. The HMA is very large, and the parcel represents a very small (0.3%) and infrequently used part of the HMA.

Reveille HMA

Parts of two proposed parcels overlap the Reveille HMA, which is approximately 50 miles east of Tonopah in Nye County and includes parts of the Kawich and Reveille Ranges and Reveille Valley. It includes large, flat valley bottoms and steep mountains with elevations ranging from 5,000 feet in the Reveille Valley to over 9,400 feet on Kawich Peak. The area is remote and rugged, with slopes exceeding 30 percent and portions of two Wilderness Study Areas (WSAs) overlapping the HMA. The vegetation consists primarily of salt desert shrub, black sagebrush, and pinyon-juniper woodlands. The lease parcels here overlap what is considered a core use area for horses, although horse sightings are more concentrated west the parcels. The nearest water sources are primarily wells and storage areas.

Sand Springs West HMA

The Sand Springs West HMA begins approximately 65 miles northeast of Tonopah in Nye County and covers Big Sand Springs Valley and part of the Pancake Range, bounded by U.S. Highway 6 in the south and the edge of Railroad Valley to the east. The HMA is 19.6 miles long and 17.9 miles wide at the widest point. Elevations range from 4,800 in the Lockes area to nearly 8,000 feet in the Pancake Range. Predominant shrub species are black sage, Wyoming big sage, basin big sage, budsage, winterfat, saltbushes, and rabbitbrushes. Grass species include Indian ricegrass, bottlebrush squirreltail, needle and thread, galleta, cheatgrass, and Sandberg's bluegrass. Pinyon-juniper woodlands are found in the hills and mountains. Natural water sources in the HMA are nearly nonexistent, and water developments that are range improvements (wells, troughs, etc.) may only be available when livestock are present. Sand Springs West horses are known to travel back and forth into the Pancake HMA in search of water, as well as outside the HMA between Highway 6 and the eastern HMA boundary. Slopes exceed 30% in seven of the proposed lease parcels that overlap this HMA.

Stone Cabin HMA

The Stone Cabin HMA, approximately 30 miles east of Tonopah in Nye County, is bisected by U.S. Highway 6 and its associated right-of-way fences which were installed in 2009, making movement of horses between the two halves of the HMA no longer possible. The Monitor Range forms the western boundary while the Hot Creek and Kawich ranges form the eastern boundary, and it includes parts of the Kawich and Rawhide Wilderness Study Areas. Elevations range from 5,300 to 9,400 feet. Dominant vegetation communities are composed of basin big sagebrush, Wyoming big sagebrush, black sagebrush, white sage, shadscale, fourwing saltbrush, Indian ricegrass, galleta grass, and rabbitbrush. Some pinyon-juniper woodlands are found at the upper elevations. The proposed lease parcels here overlap a core horse use area, although horse sightings are more concentrated to the west of the parcels in the foothills and valley. The nearest water sources to this area are wells and a small spring approximately 1.3 miles west of the nearest parcel boundary. Slopes within these parcels exceed 30 percent.

Environmental Consequences of Proposed Action

The sale of parcels and issuance of oil and gas leases is strictly an administrative action. The act of offering, selling, and issuing federal oil and gas leases would not have direct impacts to wild horses. On-the-ground impacts would not occur until a lessee applies for and receives approval to conduct exploration. The BLM cannot determine at the leasing stage whether a proposed parcel would actually be leased, or whether the lease would be explored or developed. Consequently, the BLM cannot determine exactly where on a lease a well may be drilled or what technology may be used, so the impacts listed below are derived from historical information and what might be proposed in the near future. Impacts of any future proposed exploration or development would be analyzed under additional project-specific environmental analysis to assess potential impacts to wild horses and their habitat.

Oil and gas exploration or development in the Battle Mountain District is minimal in HMAs. The RFD scenario (Appendix G) based on recent trends predicts that within the entire District, approximately 25 wells would be drilled and 65-100 acres of associated surface disturbance could be expected over the next ten years. However, trends in exploration or development could change and could result in increased activity, which may or may not occur within HMAs or in areas that could affect wild horses. Any potential effects would be addressed in project-specific analyses at the time of any proposal.

Activities may include exploration wells, production infrastructures, road construction, and gravel pit expansion. These actions would remove vegetation, potentially increasing wind and water erosion; cause soil compaction; and remove and crush vegetation. See the Soils (3.2.2), Vegetation (3.2.5) and Water (3.2.4) sections of this EA for further discussion of potential impacts to these resources which constitute the habitat used by wild horses.

The existing Shoshone Eureka and Tonopah RMPs do not include analysis of the impacts of oil and gas leasing to wild horses, or stipulations specific to those impacts. Refer to the Lease Notice – Wild Horse and Burro (#NV-B-05-A-LN) in Appendix B.

The primary indirect (potential future) impacts to wild horses could include influence to herd distribution and movement patterns throughout the HMA and disturbance to the forage or water resources.

Impacts could include displacement of horses due to increased human activity. These impacts would likely be short term and would consist of animals moving out of the area or changing movement patterns to avoid possible noise disturbance and human presence. Increased traffic could increase risk of injury or death from vehicle collisions. The degree of disturbance would be proportional to the levels of exploration/development and increased activity in the area. These impacts would be analyzed in appropriate NEPA processes if exploration or development proposals are received for any leased parcels. At that time site-specific mitigation measures would be attached as COAs for each proposed activity and would identify BMPs to minimize or prevent vehicle related issues.

Wild horses that commonly use a particular area that is developed for oil or gas production would be pressured to move from that portion of the HMA, thus changing their movement and use patterns. Any activity that occurs near a water source such as a spring, stream or seep, or that causes a water source to be eliminated or contaminated, could have impacts to wild horse distribution and use patterns and affect the overall water availability in the area. The magnitude of this change in movement would depend on the

location, duration and extent of any future exploration or development. The Water Resources (Appendix B) would apply to any potential activity in the vicinity of water resources. Fifteen parcels within the HMAs are known to involve water resources.

Forty-nine of the proposed parcels in the HMAs include land with slopes exceeding 30%. The stipulation applied to all parcels with slopes greater than 30% (Appendix B) would help to maintain site stability and reduce the risk of negative impacts to habitat used by wild horses.

Exploration could result in localized and small scale vegetation disturbance or forage habitat fragmentation due to seismic testing, road construction, overland travel and drill pad construction.

Mitigation measures and best management practices (BMPs) would be developed in the course of site-specific or project-specific NEPA analysis. However, the following general measures would be taken if a parcel is developed:

- Avoid or minimize blocking access to water sources.
- Bury pipelines to avoid hindering animal movement patterns.
- Posted speed limits (and reasonable speeds where no limits are posted) should be followed by motorists to avoid colliding with wild horses crossing roads.
- Should a water source become unavailable due to exploration or development, the authorized officer may require alternate water sources be developed or made available to wild horses, wildlife and livestock.

3.2.10 Grazing Management

Affected Environment

Livestock production is a major industry within the Battle Mountain District. The Range Program permits and manages public land grazing on 91 allotments for 88 permittees and approximately 366,946 Animal Unit Months (AUMs). An AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. Most grazing allotments are comprised of both public and private lands; however, the majority of the allotments are dominated by public lands. Grazing permits are issued to qualified individuals or entities, and specify livestock numbers, season of use, kind of livestock and number of AUMs allowed for use. Other terms and conditions may be added to grazing permits for the orderly management of the permit and/or the livestock within the allotment(s). Each allotment may have one or multiple permittees. Range improvement projects on the allotments may include fences, cattle guards, pipelines, seedings, vegetation manipulation projects, troughs and wells.

Twelve grazing allotments include all or portions of the parcels proposed for leasing (Figures 20 and 21 in Appendix K). Table 6 shows the allotments within the Project Area, the public acres within the allotment, the number of acres of offered lease parcels within each allotment, the number of authorizations (permittees) within each allotment, the kind of livestock authorized, and active and suspended AUMs. Near BLM District boundaries, grazing may be managed by the adjacent District.

Table 6. Grazing allotments with proposed lease parcels for June 2019 lease sale.

| Allotment Name | Allotment Public Acres | Approximate Lease Parcel Acres | Number of Authorizations | Kind | Permitted AUMs | Suspended AUMs |
|-------------------|------------------------|--------------------------------|--------------------------|--------------|----------------|----------------|
| Arambel | 46,969 | 15,505 | 1 | Sheep | 2,554 | 1,205 |
| Butterfield | 122,080 | 2,974 | 1 | Cattle | 4,776 | 0 |
| Crater Black Rock | 97,859 | 10,235 | 1 | Cattle | 4,637 | 0 |
| Duckwater | 80,7662 | 272 | 9 | Cattle/Sheep | 20,098 | 25,390 |
| Fish Creek Ranch | 287,984 | 5,340 | 3 | Cattle/Sheep | 36,815 | 32,000 |
| Hot Creek | 154,483 | 9,700 | 2 | Cattle | 6,363 | 0 |
| Kingston | 79,920 | 12,289 | 2 | Cattle | 2,720 | 0 |
| Lucky C | 114,327 | 1,058 | 1 | Cattle | 3,054 | 888 |
| Reveille | 657,520 | 108,108 | 1 | Cattle | 25,730 | 0 |
| Sand Springs | 203,868 | 94,102 | 2 | Cattle/Sheep | 7,843 | 0 |
| Stone Cabin | 389,499 | 2,234 | 2 | Cattle | 13,963 | 1,582 |
| Wildcat Canyon | 64,976 | 2,121 | 1 | Cattle | 2,677 | 0 |

Environmental Consequences of Proposed Action

Potential future actions on leased parcels under the RFD scenario would decrease the public land acreage available for livestock grazing and available forage on 65-100 acres, potentially temporarily decreasing the active AUMs in the affected allotment(s). Currently, available forage is allocated on public land at the allotment scale within the Battle Mountain District. According to 43 CFR 4110.4-2 (a)(1), where there is a decrease in public land acreage available for livestock grazing within an allotment, grazing permits may be modified as appropriate to reflect the changed area of use. The established stocking rates (AUMs/Acre) will potentially be used to temporarily reduce the appropriate amount of AUMs within allotments based on the amount of acres impacted by future actions on leased parcels under the RFD scenario. However, these impacts are expected to be minor when compared to the total acreage of the grazing allotment(s) that may be affected; and would be temporary in nature, because the majority of the disturbance (roads and pads) would be reclaimed. Impacts to rangeland resources from these activities would be analyzed under an additional project-specific EA when an action is proposed and specifics are known, such as location, well depth, water consumption needs, and area of disturbance. Through this process, project-specific mitigation measures and BMPs would be attached as COAs for each proposed activity. Any potential impacts to existing range improvements would also be identified and mitigated via the project-specific analysis for any future exploration or development project on leased parcels.

3.2.11 Cultural Resources

Affected Environment

Cultural resources include prehistoric and historic-period resources such as buildings, sites, structures, objects, and districts. Prehistoric cultural resources are associated with the human occupation and use of Nevada before long-term European occupation. Such resources include but are not limited to Native American camp sites, rock art, and trails—some dating to over 12,000 years old. Historic-period cultural

resources include both the archaeological- and built-environment, such as buildings and structures, archaeological sites, and historic districts.

Parcels are located primarily in areas of little prior cultural resource survey (Figures 1-3). Although limited cultural resource surveys have been completed within the proposed parcels (less than 10% of the total parcel acreage has been surveyed at the Class III level) all are likely to contain areas of moderate and/or high sensitivity for cultural resources.

Environmental Consequences of Proposed Action

The act of selling oil and gas leases in itself does not have the potential to impact cultural resources, as lease sales do not authorize exploration, development, or production that could directly or indirectly affect the environment; however, once issued, a lease bestows upon its owner the “right to use so much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold” (43 CFR§ 3101.1-2) subject to specific nondiscretionary statutes and lease stipulations (Appendix B).

Conservatively, based on historic information and anticipated activity, over the next ten years, approximately 65-100 acres of surface disturbance associated with potential oil and gas exploration and production activities could be expected to occur in the Battle Mountain district. Cultural resources located within the proposed parcels would be subject to direct and indirect effects from oil and gas exploration and development activities (e.g. ground disturbance and facilities construction). As such, identification and evaluation of these resources on a case-by-case basis for compliance with Section 106 of the National Historic Preservation Act (NHPA) would be required prior to project implementation or ground disturbing activities.

The Standard Lease Notice, NV-B-00-A-LN, would be attached to all leases within District to help minimize any potential effects on cultural resources located within the proposed parcels. This Lease Notice informs the lessee that their lease may contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders. It also informs the lessee that the BLM will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., State Historic Preservation Officer [SHPO] and tribal consultation) under applicable requirements of the NHPA and other authorities. The BLM may also require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

3.2.12 Native American Cultural Concerns

Affected Environment

The Analysis Area lies within the traditional territory of the Western Shoshone Tribes. Sites and resources considered sacred or necessary to the continuation of tribal traditions include, but are not limited to: prehistoric and historic village sites, pine nut gathering locations, sites of ceremony and prayer, archaeological sites, burial locations, “rock art” sites, medicinal/edible plant gathering locations, areas associated with creation stories, or any other tribally designated Traditional Cultural Property.

Tribal ethnographic resources are associated with the cultural practices, beliefs, and traditional history of a community. In general, ethnographic resources include places in oral histories or traditional places, such as particular rock formations, the geothermal water sources, or a rock cairn; large areas, such as landscapes and views; sacred sites and places used for religious practices; social or traditional gathering areas, such as racing grounds; natural resources, such as plant materials or clay deposits used for arts, crafts, or ceremonies; and places and natural resources traditionally used for non-ceremonial uses, such as trails or camping locations. Future Native American consultations in the area may reveal such sites, activities, or resources.

The NEPA process does not require a separate analysis of impacts to religion, spirituality, or sacredness. References to such beliefs or practices convey only the terminology used by participants involved in current and historic ethnographic studies and tribal consultation and coordination, and does not reflect any BLM evaluation, conclusion, or determination that something is or is not religious, sacred, or spiritual.

Tribal Consultation and Information Sharing: The BLM Battle Mountain District, Mount Lewis and Tonopah Field Offices have an ongoing invitation for consultation and information sharing with the tribes. Consultation and communication with these tribal/band governments have included letters, phone calls, e-mails, and visits with individual tribal/band Environmental Coordinators or other representatives. Consultation and information sharing will continue throughout the life of the project. The majority of lands in the Analysis Area have not been analyzed for ethnographic resources or Native American cultural concerns. The BLM contacted the Battle Mountain Band of Western Shoshone; the Duckwater Shoshone Tribe, the South Fork Band; the Te-Moak Tribe of Western Shoshone; and the Yomba Shoshone Tribe to identify areas of concern, mitigation measures, operating procedures or alternatives that may eliminate or reduce impacts to any existing tribal resources.

Environmental Consequences of Proposed Action

Although the act of issuing oil and gas leases does not directly authorize exploration, development, or production, or any other related ground-disturbing activities, the potential exists for future such activities on leased parcels to impact Native American spiritual, cultural, or traditional sites. Such effects can be difficult to effectively mitigate; however, impacts can be minimized and/or mitigated when affected Tribes provide input and actively and fully participate in the decision making process. The standard stipulation (Appendix B) attached to all parcels states that BLM will not approve any ground-disturbing activities until it conducts its tribal consultation obligations, and may require modification to exploration or development proposals or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated. If projects are proposed on any leased parcel in the future, each would be analyzed under project-specific NEPA analysis. At that time the BLM would consult with the tribes and site-specific mitigation measures and BMPs would be attached as COAs.

3.2.13 Recreation

Affected Environment

The proposed lease parcels are all within dispersed recreation areas subject to public use. Dispersed recreation activities include off-highway vehicle (OHV) use, driving for pleasure, camping, mountain biking, sightseeing, rock collecting, photography, hunting, fishing, recreational shooting, trail running,

Environmental Consequences of Proposed Action

Potential indirect (future) impacts could occur from activities on leased parcels. During the exploration phase, survey and drilling crews are likely to use available access roads and trails that are also used for dispersed recreation and access to recreation opportunities. Increased truck traffic during construction of access roads and well pads could affect recreation due to increased noise and dust levels and could cause temporary delays or closures on access roads. Construction sites are likely to limit public access, slightly decreasing access to the area for recreation and possibly displacing recreational users. Survey and exploration activities are likely to minimally impact recreation, if at all, due to the short duration, small crew size and temporary nature of the surveys and well drilling, along with the dispersed nature of recreation activities in these areas.

The production stage may include operation and maintenance of the constructed facilities. These activities require a small number of employees who would use access roads in the area but are not likely to limit recreational use of these roads. Oil and gas production facilities are likely to have limited public access; this could slightly decrease access to the area for recreation and possibly displace recreational users. However, improved access to the general area for recreation may be available because of the maintained access road to the production facility. If parcels were developed in the future, mitigation measures and BMPs would be developed and attached as COAs for each proposed activity, through additional project- and site-specific NEPA analysis.

3.2.14 Visual Resources

Affected Environment

BLM Manual Series 8400 outlines the visual resource management (VRM) program. The BLM assigns VRM classes to public lands through the land use planning process, with management direction for each class. Attempts are made to mitigate visual contrasts from surface-disturbing activities regardless of the VRM class. VRM classes are based in part on a Visual Resources Inventory (VRI) which rates existing scenic values. The Tonopah RMP established VRM classes; the older Shoshone-Eureka RMP (Mt. Lewis Field Office) did not. Although there is a current VRI (Figure 22, Appendix K), no decision has been signed regarding visual resources at this time. The Battle Mountain District will establish VRM classes for the Mt. Lewis Field Office area as part of its upcoming RMP revision process. In the interim, visual resources will be managed with best management practices for multiple use.

Thirteen proposed lease parcels (24-29, 36-37, 51, 55, 57-59) substantially intersect lands designated as VRM Class II, plus a small area of parcel 38. All other proposed lease parcels in the Tonopah Field Office area are in VRM Class IV (Figure 23 in Appendix K). Management direction for these classes, as stated in Tonopah RMP Determinations (p. 6), is as follows:

- Class II Areas: Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. A contrast may be seen but should not attract attention.
- Class IV Areas: Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements (form, line, color, texture) inherent in the characteristic landscape.

If and when a project is proposed, effects to visual resources, and measures to minimize them, would be considered as part of the additional project- and site-specific environmental analysis. Effects are assessed in terms of how conspicuous they would be from key observation points, such as roads or scenic overlooks. Structures in the foreground distance zone (0-1/2 mile) often create a contrast that exceeds the VRM class, even when designed to harmonize and blend with the characteristic landscape. Approval by the Area Manager is required on a case-by-case basis to determine whether the structure(s) meet the acceptable VRM class standards and, if not, whether they add acceptable visual variety to the landscape.

Dark skies are also taken into consideration as a visual resource. Central Nevada, including the Analysis Area, generally offers outstanding night sky viewing opportunities with frequent clear weather and many areas of little or no light pollution.

Environmental Consequences of Proposed Action

Potential indirect (future) impacts that could occur on leased parcels may include, but are not limited to, contrast of line, shape, color, or texture due to roads, drill pads, drill rigs, tank batteries, temporary and long-term facilities and pump jacks; and impacts of nighttime lighting to dark skies. If parcels were developed in the future, site-specific visual resource mitigation measures and BMPs would be developed and attached as COAs for each proposed activity, which would be developed through additional project- and site-specific NEPA analysis. Potential methods to reduce impacts include, but are not limited to:

- designing lighting to reduce the impacts to night skies
- screening any stationary lights and light plants
- directing lighting 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
- hooding and shielding lighting fixtures as appropriate
- using topographic features to visually screen facilities
- locating drill sites where they will be least conspicuous (BLM has the discretion to move proposed drill site locations up to 200 meters within the lease boundary)
- reducing the size or changing the configuration of drill pads
- using low profile tanks
- matching colors (approved by BLM VRM specialist) of facilities and equipment to blend in with the surroundings
- planning road alignment to minimize visual contrast
- required reclamation, which may include re-contouring drill pads; reclaiming roads; re-seeding drill sites and roads; and removing equipment and facilities

These methods, along with any others identified via NEPA analysis at the APD stage, generally have the potential to minimize impacts to visual resources on public lands to the greatest extent practicable.

3.2.15 Wilderness Characteristics

Affected Environment

The Battle Mountain District has recently completed an inventory for lands with wilderness characteristics, defined by the Wilderness Act of 1964 as land that “(1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least

five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” Section 201 of the Federal Land Management Policy Act (FLPMA) requires the BLM to maintain, on a continuing basis, an inventory of all public lands and their resources and other values, which includes wilderness characteristics. It also provides that the preparation and maintenance of the inventory shall not, of itself, change or prevent change of the management or use of public lands. It does not address or affect policy related to Congressionally-designated Wilderness or existing Wilderness Study Areas. The Tonopah and Shoshone-Eureka RMPs do not address lands with wilderness characteristics. They will be addressed in the upcoming Battle Mountain District RMP. In the interim, the District will manage lands with wilderness characteristics for multiple use.

In accordance with BLM Manual 6310, an inventory identifies any unit of land with at least 5,000 roadless acres or otherwise meeting criterion (3), then determines if that unit meets criteria (1) and (2). Lands meeting all three of these criteria are considered to have wilderness characteristics. There are 25 inventory units in the Analysis Area that were found to have wilderness characteristics. Of the 123 proposed lease parcels, 117 proposed parcels intersect one or more of those 25 units. A list of units with wilderness characteristics and parcels intersecting each is found in Appendix H; maps are Figures 24 and 25, Appendix K,).

Environmental Consequences

Future oil and gas exploration and production projects on any leased parcels that intersect inventory units having wilderness characteristics could potentially affect those characteristics for the duration of the project, and such effects would be considered as part of a project-specific NEPA analysis. While BLM policy and the District’s RMPs do not currently require managing lands so as to maintain wilderness characteristics, standard practices under several other policies would be applied that would tend to reduce these effects, as described below.

If new access roads were not restored to pre-disturbance conditions after a project, they could potentially reduce the size of a roadless area to less than 5,000 acres, in which case the inventory unit would no longer be considered to have wilderness characteristics unless it otherwise meets criterion (3). However, roads would generally be required to be reclaimed and revegetated to pre-disturbance conditions when the project is completed (see Section 3.1.1).

Geophysical exploration could temporarily affect opportunities for solitude, via the presence for a few hours or days of personnel and equipment, and in some cases noise and vibration that may be sensed at a distance. Exploration drilling could affect opportunities for solitude or for primitive and unconfined recreation for the duration of the project, via traffic, noise, dust levels, displacing recreationists and/or limiting access, as described in the Recreation section above. Potential effects discussed in the Visual Resources section above – due to such factors as roads, drill pads, drill rigs, tank batteries, temporary facilities, and impacts of nighttime lighting to dark skies – would affect the appearance of naturalness, and would be minimized to some extent by policies also discussed in that section. Exploration projects that do not proceed to development and production end with reclamation (Section 3.1.1), which would return the area to a natural-appearing condition, and impacts to solitude and recreation would also cease.

Development and production could produce effects similar to those of exploration drilling but that would be more long-term and could potentially cause an inventory unit to no longer be considered to have wilderness characteristics under criteria (2) and (3) in a subsequent inventory, depending on such factors as the number and placement of wells and long-term facilities in relation to the unit's size, configuration, and topographic and vegetative screening; and the success of measures taken to minimize effects. An inventory unit can have wilderness characteristics even though every acre within the unit may not meet all the criteria. If wells and facilities are "substantially unnoticeable" in the context of the unit as a whole, and the unit overall still "generally appears" natural, the unit could still meet criterion (1). If "outstanding opportunities" to experience solitude *or* primitive and unconfined recreation (not necessarily both) still exist within the unit as a whole, it could still meet criterion (3). BLM Manual 6310 provides further information on how these criteria are applied in the wilderness characteristics inventory process.

When production has ceased, final reclamation would be completed (Section 3.1.1) and all impacts to wilderness characteristics would cease.

3.2.16 Geology and Mineral Resources

Affected Environment

This section discusses extractive mineral uses that may exist in the Analysis Area and be potentially affected by the Proposed Action, with a brief overview of regional geology as background. The Basin and Range province is comprised of north-south trending mountain ranges separated by broad valleys, created through extension of the earth's crust where portions of the crust were faulted and either down thrown (creating basins), or uplifted, creating mountains. The resulting separation and crustal thinning brought magma heat sources close to the surface, leading to volcanic activity, superheated fluid, associated intrusive and igneous activity, and maturation of hydrocarbon sources. This geologic setting has been instrumental in the location of and potential for numerous economic metallic mineral deposits in the Analysis Area, as well as development of economic geothermal resources.

Nevada is seismically active, with numerous earthquakes each year; most are small and the epicenters can be several miles below the ground surface. It is unlikely that any of Nevada's oil wells would be impacted from minor earthquakes (< 5.5 magnitude) that are often felt but only cause minor damage.

Locatable Minerals historically or currently mined within the Analysis Area include metallic minerals (i.e., gold, silver copper, mercury, zinc, molybdenum, manganese, uranium, and tungsten and industrial minerals (i.e., limestone, barite, gypsum, diatomaceous earth, sulfur, and fluorspar). Oil and gas interests may potentially overlap with those of mineral exploration; and mining claims, mining notices, or plans of operation may overlap the parcels, so that coordination with the claimant may be necessary.

Mineral Material Sale of common minerals encompasses petrified wood and common varieties of sand, stone, gravel, pumice, pumicite, cinder, and clay. Less common are sales of topsoil and specialty sand, gravel, or decorative rock. Saleable mineral sites with a priority for use are located along State, County, and BLM managed roads. These types of saleable minerals are distributed throughout the Battle Mountain District and overlap with oil and gas lease parcels should be expected.

Leasable Minerals are those that may be extracted from leases on public lands and are subdivided into solid and fluid leasable mineral groups. Solid minerals include coal, sodium, sulfur, potassium and

phosphate (and under certain conditions, sand, gravel and locatable minerals). Fluid minerals include oil, gas, and geothermal resources.

Oil and Gas parcels on public lands have been available within District for several decades. The main producing oil fields are located within Railroad Valley and Pine Valley; however, exploration for oil and gas could be expected in Diamond Valley, Garden Valley, Big Smoky Valley, Ione Valley, Fish Creek Valley, Antelope Valley, and Big Sand Springs Valley. Oil and gas in Railroad Valley occurs mainly in Miocene and younger age basins formed during the Basin and Range Orogeny. Hydrocarbon traps are stratigraphic and structural in nature. Most oil and gas is trapped in the fractured, Oligocene age volcanic rocks and is believed to be sourced from deeper Cretaceous and early Tertiary marine sediments. Pine Valley oil production comes primarily from Oligocene and Miocene sedimentary and volcanoclastic sedimentary rocks, but rocks as old as the Devonian Telegraph Canyon Formation host oil in the vicinity of the Analysis Area. Natural gas is not produced in commercial quantities in Nevada.

Generally drill sites are chosen following geophysical exploration of subsurface conditions, followed by exploration drilling or drilling of wildcat wells. Additional drilling occurs when initial exploration has shown the presence of a resource, and placement of new wells is used to further define the extent of that resource. Production occurs if the oil can be transported and sold at a profit. The existing oil field in Railroad Valley uses regional temporary storage facilities and later transport to a refinery for processing.

At the end of 2018, there are 153 authorized oil and gas leases in BMD, totaling greater than 315,000 acres. Since 1907, roughly 770 oil and gas wells had been drilled in the State of Nevada, though there are just 96 active wells at the time of this EA. Total oil production from 1954 to 2017 is 53.36 million barrels of oil. Oil production in 2013-2017 averaged 299,578 barrels of oil per year (source: Nevada Division of Minerals).

Shale Oil contains significant crude oil and may be used as a source of petroleum. The potential within the Analysis Area is low in the short term and probably low to moderate in the long term. Shale oil production typically requires a very large resource, access to energy, and access to large volumes of water. The Chainman Formation (Mississippian), Vinini Formation (Ordovician), Woodruff Formation (Devonian), Sheep Pass Formation (Eocene), and the Elko Formation (Eocene-Oligocene) are potential sources of shale oil (Anna et al. 2007) within the Analysis Area. The Sheep Pass Formation hosts some oil in the Railroad Valley area. The Elko Formation may occur within the Battle Mountain District in the lower stratigraphy of Pine Valley, but the bulk of the Elko Formation is northeast of the District.

Geothermal – All land within the Battle Mountain District is open to geothermal leasing and development with the exception of specific closures such as Wilderness Areas, Wilderness Study Areas, community watersheds, critical wildlife habitat areas, and military reservations; 20 percent of the land within the District is potentially valuable for geothermal resources, located mainly in Esmeralda and Lander counties. The 2008 *Geothermal Programmatic Environmental Impact Statement for Geothermal Leasing in the Western U.S.* expedites processing geothermal lease applications.

Environmental Consequences of Proposed Action

If any parcels are leased and developed, design features, project- and site-specific mitigation measures, and BMPs would be attached as COAs for each proposed activity, which would be developed through additional site-specific NEPA analysis. The included stipulations (Appendix B) offer an advantage to

prospective lessees in that they identify important natural resource issues associated with particular parcels – water resources, steep slopes, and deer and pronghorn seasonal habitats – in advance, along with measures to protect them. This would reduce some of the uncertainty of waiting for site- and project-specific NEPA analysis to identify resources of concern and define appropriate conditions of approval.

The potential that oil and gas interests may overlap with other solid or fluid mineral exploration exists. The majority of acres that may be used for oil and gas exploration and production are usually reclaimed within 5 years and 25 years, respectively. In most instances, oil and gas exploration is a short-term endeavor (2-10 months) and hence would not appreciably affect mineral exploration and development. Agreements between oil and gas and mineral operators could help to mitigate those acres that would be used for oil and gas production on a more long-term basis. Any potential impacts to existing mineral estate would be identified and mitigated via the project-specific analysis for any future exploration or development project on leased parcels.

Oil and gas exploration and development activities could require up to 2.5 acres in gravel pit expansion. This small acreage would not greatly increase the size or number of gravel pits, nor would it burden the communities that use gravel.

3.2.17 Land Use Authorizations

Affected Environment

All of the proposed lease parcels are on public lands with federally controlled surface and subsurface mineral estate. Many would require a right-of-way (ROW) to access them. Some proposed parcels include pre-existing land use authorizations such as grants, leases, permits and withdrawals; and new ones may be authorized prior to any proposals for exploration by an oil and gas lessee. In these instances, the holder of land use authorization would have a valid existing right to the authorized use of public lands within the lease. Table 7 provides a summary of the existing land use authorizations in the proposed lease parcels. See Appendix I for a table listing authorizations by case file number and including affected lease parcels.

Table 7. Summary of land use authorizations in proposed lease parcels.

| ROW holder | Types of land use authorizations |
|--|---|
| BLM/Other | Range Improvements; range fence, cattle guard, windmill, spring, corrals, rangeland treatment areas, troughs, windmills, pipelines, reservoir; Lunar Crater Back Country Byway road |
| Nevada Department of Transportation (NDOT) | Highways; mineral material sites |
| US Forest Service | Access roads |
| Nevada Bell | Telephone line/fiber optic line – aerial and buried |
| Sierra Pacific Power Company dba NV Energy | Transmission line/Distribution Line |
| RO Livestock | Ditches & Canals Pre-FLPMA “claimed” |
| Charles & Hazel Gomes | Distribution line and access road |
| Kingston Village Baptist Church | Sign |
| Wine Glass Inc. Gillman Springs Homeowners | Water pipeline |
| Lander County | Access road, Kingston Transfer Station |
| Town of Kingston | Access road, airport lease, water pipeline |

| ROW holder | Types of land use authorizations |
|-------------------------|---|
| Young Bros | Irrigation facilities |
| USGS | Monitoring wells |
| United States Air Force | Access road, withdrawal – Halligan Mesa |
| Makoil | Access road |

Environmental Consequences of Proposed Action

Future activity on leased parcels could impact existing ROWs. FLPMA requires that prior existing rights must be recognized. Any conflicts would be mitigated through agreements between relevant operators. If parcels were developed in the future, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity. Applications for new ROWs may be required for roads for oil and gas exploration and production activities. These off-lease ROWs would be non-exclusive where possible, that is, could be used by the general public for other purposes such as access to public lands.

3.2.18 Socioeconomic Values

Affected Environment

The proposed lease parcels are located within three rural counties in central Nevada: Eureka County (10 parcels), Lander County (9 parcels) and Nye County (104 parcels). As of the 2016 U.S. census these three counties together had a mean average population density of 1.9 persons per square mile (Table 8).

Table 8. Population density by county.

| County | Area, mile ² | Population, 2010 census | Population density per mile ² |
|-------------------|-------------------------|-------------------------|--|
| Eureka | 4,180 | 1,730 | 0.4 |
| Nye | 18,199 | 43,198 | 2.4 |
| Lander | 5,519 | 5,907 | 1.1 |
| 3 Counties | $\Sigma=27,898$ | $\Sigma=50,835$ | $\bar{x} = 1.8$ |
| (Nevada) | (110,572) | (2,839,172) | (25.7) |

Primary activities that contribute to the economic base of central Nevada are minerals extraction (especially gold) and energy production, including renewable energy; agriculture (especially cattle and sheep ranching and alfalfa hay farming); and recreation. Small towns and unincorporated communities nearest the Analysis Area and most likely to experience economic effects of any future exploration, development or production on leased parcels include Tonopah, Battle Mountain, Round Mountain, Hadley, Austin, Kingston, and Eureka.

Executive Order 12898 required federal agencies to promote environmental justice by determining, and addressing as needed, whether the agency's programs, policies, and activities have a disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. When considered at a scale of county sub-regions surrounding the Analysis Area, while there are no known communities with disproportionate representation of any minority race or ethnicity as compared to the state of Nevada overall, the region does have a large low-income population as compared to the state overall; however, it would not be disproportionately affected. See Appendix J.

Environmental Consequences of Proposed Action

The only direct impact of issuing new oil and gas leases on socioeconomic values within the Analysis Area would be generation of revenue from the lease sale, as the State of Nevada retains 49 percent of the proceeds. Revenues generated from both competitive and non-competitive oil and gas lease sales in the state of Nevada for fiscal year 2018 totaled \$3.1 million; statewide revenues from 2014 to 2018 totaled \$23.9 million (ONRR, 2018). Subsequent oil and gas exploration, development and production could affect the local economy in terms of additional jobs, income and tax revenues. Oil and gas companies typically provide in-house scientists and technicians for most pre-drilling exploration work. Subsequent oil and gas exploration and development activities could include road and drill pad construction, which could be contracted to local contractors. Wells would typically be drilled over a period of time and not at the same time. The crews, ranging from 20 to 30 people, would spend a portion of their salary (approximately \$200-\$250 per person per day) in local communities for the duration of the project (four to eight weeks).

During development and production phases, the potential for local socioeconomic impacts could increase. More long-term roads and drill pads could be constructed, along with associated support facilities. Typically, most of this work is supplied by local contractors. Local businesses may realize increased revenue from the purchase of supplies, meals, rooms, etc. Local trucking and delivery companies may also benefit economically by transporting supplies, building materials and oil products. Oil production from federal lands is subject to a 12.5 percent royalty payment to the federal government. Half of that amount is provided to the state government, which then provides a portion to the counties.

These positive indirect impacts to socioeconomics would likely be minor, given the RFD scenario (Appendix G); however, bonus bids (the amount paid at time of auction), annual rent fees (for 10 years regardless of activity on a leased parcel), and royalties (if and when production occurs) may provide substantial income to county governments for schools and other expenditures. The potential for adverse effects to the human environment, including human health hazards, is considered to be low (see effects analyses for air quality, section 3.2.1; water quality and quantity, 3.2.4; hazardous and solid waste, 3.2.18). The Proposed Action would not induce substantial growth or concentration of population, displace a large number of people, cause a substantial reduction in employment, reduce wage and salary earnings, cause a substantial net increase in county expenditures, or create a substantial demand for public services.

For any future proposed project on any parcel that is leased, additional site-specific, project-specific analysis would be required, including a thorough examination of socioeconomics and environmental justice. The required NEPA analysis would address all aspects of exploration, development and production, including connected actions such as transportation of any oil or gas produced.

3.2.19 Waste, Hazardous and Solid

Affected Environment

The majority of the proposed lease parcels are in rural areas and not adjacent to any schools or populated centers. However, there are several ranches and ranching/mining communities within close proximity.

Environmental Consequences of the Proposed Action

Oil and gas activities including exploration drilling, extraction, production facilities, pipeline transport, and tanker loading, unloading and transport, have the potential to affect the environment through production of waste fluids, emissions and site impacts resulting from field development and related infrastructure. Oil spills, produced waters, drill fluids/cuttings, and hazardous materials could be encountered at a facility or drill pad. Under any alternative, all appropriate statutes, regulations and policies (see Section 1.4) and Gold Book standards, guidelines and BMPs would be applied.

The RFD scenario (Appendix G) predicts that approximately 25 exploration wells would be drilled in the District in the next 10 years, and few if any would continue into development and production phases. Examples of indirect (future) environmental impacts from hazardous materials, hazardous waste, and solid waste which might be encountered during each phase are provided below. However, most of these incidental impacts, if not all, can be avoided or lessened through proper inspection and maintenance.

Exploration: Impacts could include drilling fluid or hydrocarbon spills, leakage from improperly constructed reserve pits or wastewater collection systems, improperly handled brine backflow water from drilling that may or may not have used HF technology, and accumulations of solid waste, which could impact water quality or contaminate soils. Hydrocarbon spills could consist of hydraulic fluid, gasoline, diesel, oil, or grease from vehicles, generators, and exploration drill rigs. Backflow water from exploration drilling can be extremely saline; improper disposal could raise the pH of existing surface waters to unacceptable levels. Accumulations of nonhazardous solid waste could include trash, drill cuttings or mud, wastewater, bentonite and cement generated during drilling operations.

Development: Impacts could be the same as in the exploration phase; however, the quantities of hazardous materials, hazardous waste, or solid waste used and generated could be greater. Accidental releases from reserve pits or waste water collection systems could include hazardous water treatment chemicals such as chlorine. Also, stormwater runoff could contain elevated quantities of heavy metals and volatile organic compounds. When fracked water comes back to the surface as backflow, it can contain high levels of salts, introduced chemical additives, and various chemicals and compounds that occur naturally within the earth. Backflow spills have been known to kill off all vegetation and render the soil unusable. Nonhazardous solid waste such as drill cuttings or mud could be generated at this stage.

Production: Routine plant operations could involve leaks or spills of substances such as hydraulic fluid, gasoline, diesel, oil, paint, antifreeze, cleaning solvents, transformer insulating fluid, and grease. These discharges could result in impacts to water, soil, air, and wildlife. Stormwater runoff containing heavy metals and VOCs could be problematic. Nonhazardous solid waste could also be generated.

Final Abandonment: The operator would identify, remove, and properly dispose all hazardous materials, hazardous waste, and solid waste. Spills could occur during removal.

When the RFD scenario is considered, impacts would generally be negligible because the substances involved would be properly handled, stored, and disposed of in accordance with applicable federal, state and local regulations. Proper management of these substances would ensure that no soil, ground water, or surface water contamination would occur with any adverse effect on wildlife, worker health and safety, or surrounding communities. Additional project- and site-specific environmental analysis of any future

exploration, development and/or production would allow inclusion of updated mitigation measures, BMPs, and COAs; and performance standards would be defined at that time.

Impacts of any hazardous waste spills in areas with water resources would be potentially substantial and difficult to mitigate. The CSU Water Resources stipulation would require avoiding impacts within 500 feet of surface waters and riparian areas; and impacts to floodplains and playas. Application of this stipulation would not only prevent surface disturbance within the defined areas but would also prevent indirect impacts including accidental contamination.

Chapter 4. Cumulative Effects

The Interdisciplinary Team analyzed cumulative effects to the Analysis Area and the surroundings. Cumulative impacts are those effects on resources within an area or region caused by a combination of past, present and reasonable foreseeable future actions (RFFAs). These impacts may be individually minor but added together over time may become significant (40 CFR 1508.7).

4.1. Methods and Assumptions

To be cumulative, effects must overlap in both time and place. As with the effects analysis in Chapter 3, it is unknown if, when, or where exploration or development projects would be proposed; nor is it known what types or extent of projects would be proposed; therefore this analysis considers general possible effects of future uses of the lease parcels. A more specific cumulative effects analysis would be part of the NEPA process for any project proposed.

4.1.1 Alternatives Considered

The ID Team considered cumulative effects of the Proposed Action and No Leasing Alternative (Section 2.1) on all resources. For all resources, the difference between these and the No Leasing Alternative is simply that cumulative effects would occur on other leased parcels. The No Leasing Alternative is not discussed separately in Section 4.2.

4.1.2 Cumulative effects study area, timeframe, and RFD

The cumulative effects study area (CESA) for this EA encompasses the entire BLM Battle Mountain District in central Nevada (see map inset, Figure 1). The analysis uses the same 10-year timeframe and reasonably foreseeable development (RFD) scenario as is described in detail in Section 2.4.

4.1.3 Reasonably Foreseeable Future Actions (RFFAs)

Along with oil and gas exploration, development and production as described under the RFD scenario (Section 2.4), based on recent and current activities the following future actions could occur concurrently in the District during the next 10 years:

- geothermal exploration and development
- mineral exploration and mining
- gravel pit development and production
- wind power construction
- communication site construction
- road building
- powerline construction
- livestock grazing
- fence construction
- off-highway vehicle use
- non-motorized recreation such as hunting, mountain biking, geo-caching
- withdrawal of water for irrigation (agriculture) and mining
- wild horse gathers
- noxious weed treatment
- fire suppression and rehabilitation
- construction of wildlife habitat improvement projects

4.2 Cumulative Effects Analysis

4.2.1 Cumulative Effects to Air Quality, Climate Change, Greenhouse Gases

Drilling 25 wells would produce between 16,275 tons and 78,900 tons of greenhouse gas emissions in CO₂e (Erbes 2013). Contributions from production and combustion of oil produced from the wells would be between 0 and 215,000 tons per year CO₂e. Thus under the high production/emission RFD scenario total annual GHG emissions of 293,900 tpy CO₂e would constitute 0.0019 percent of total worldwide contribution of CH₄ which is 730,832,399 tons per year (15,347,480,381 tpy CO₂e). The incremental increase in these impacts is small when compared to the level of impacts that already exist in the sub-basins as described above in section 3.2.1. Given that oil and gas production worldwide is largely demand driven, these cumulative impacts would be expected to continue to occur under either of the alternatives.

4.2.2 Cumulative Effects to Soils and Vegetation

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mine development, grazing management, wild fires, fire rehabilitation and range improvement projects. Creating new roads, constructing drill pads and developing wells and mines removes available vegetation and increases the susceptibility of soil to wind and water erosion, soil compaction and invasion by invasive species, and disturbs microbiotic crusts and top soil. However, the cumulative impacts of oil and gas exploration and development on soils are generally expected to be minimal due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs. Wetlands and riparian soils and vegetation would be protected by the Water Resources stipulation, and steep slopes by the Slopes >30% stipulation.

4.2.3 Cumulative Effects to Paleontological Resources

Several ongoing and potential actions in the area, such as mining, mineral and geothermal exploration, off-highway vehicle use, and livestock grazing, have the potential to cumulatively impact paleontological resources. The geographic scope or extent of cumulative impacts for paleontological resources is generally the geographic formation in question. None of the proposed parcels have been surveyed to determine the boundaries and geographic extent of fossil resources or any paleontological localities. Parcels identified as having low potential for containing significant paleontological resources would not be subject to cumulative effects; however, BMPs and COAs would apply in the event a significant paleontological resource were encountered as a result of any ground-disturbing oil and gas exploration or development activities. Parcels identified as having moderate to high potential for containing significant paleontological resources may require a field determination to map locations of any vertebrate fossils or any scientifically significant fossils; once mapped, the geographic and temporal scope for paleontological resources can be defined, followed by an analysis to determine what, if any, impacts there would be to paleontological resources resulting from past, present, or reasonably foreseeable actions in the CESA. It is expected that the proposed action may contribute to cumulative impacts through the reasonably foreseeable role of oil and gas exploration and development; however, with implementation of appropriate mitigation, BMPs, and the COAs, impacts may be avoided.

4.2.4 Cumulative Effects to Water Resources, Forestry and Woodland Products

The Water Resources CSU stipulation would provide adequate protection (Section 3.2.18), so the Proposed Action would not contribute to a risk of cumulative impacts to these resources. As any

exploration and development efforts on leased parcels would be focused outside and away from riparian vegetation, there would be little potential for the Proposed Action to contribute to cumulative effects to cottonwood and willow. For woodland products, even if it is assumed that all 100 acres of estimated potential future disturbance occurs within timbered landscapes, the contribution to cumulative effects would still be negligible as this represents less than 0.02% of the more than 500,000 acres of pinyon and juniper woodlands within the Mt. Lewis Field Office alone.

4.2.5 Cumulative Effects to Noxious Weeds and Invasive Species

Potential exploration and development resulting from leasing the parcels would increase surface-disturbing activities that remove vegetation, compact soil, increase erosion and sediment yield, may result in fragmented native plant communities and increase competition from noxious weeds, invasive and non-native species. The disturbance associated with potential oil and gas exploration and production would add to the disturbances from mining exploration, mine development, grazing management, wild fires, fire rehabilitation and range improvement projects; disturbed areas would be more susceptible to invasion by invasive species, as described in Section 4.2.5. However, the cumulative impacts of oil and gas exploration and development are expected to be minimal in most areas due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs. Due to the Water Resources CSU stipulation the Proposed Action would not be expected to contribute substantially to cumulative effects to noxious weeds and invasive species in riparian and wetlands vegetation communities.

4.2.6 Cumulative Effects to Wildlife Resources

Cumulative impacts from oil and gas exploration and production activities would add to the impacts of other past and present actions and RDDFs that impact habitat or displace wildlife. In upland habitats, the cumulative impact to wildlife and associated wildlife resources from oil and gas exploration and production activities would generally be expected to be short-term and minimal due to the relatively small area of disturbance in the RFD scenario timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs. Greater sage-grouse seasonal habitats are addressed by stipulations (Appendix B). The Proposed Action would not contribute substantially to cumulative effects to aquatic, wetland and riparian habitats, due to the Water Resources stipulation. Mule deer, pronghorn and bighorn sheep are protected by TL stipulations applied to their crucial seasonal habitats, and the TL lease notice applied to mule deer movement corridors.

4.2.7 Cumulative Effects to Wild Horses

Past, present and reasonably foreseeable projects that have had and could continue to have impacts to wild horses in the assessment area include mining; power line construction; gravel pit expansion; road building; fencing; fuels reduction projects; wild horse gathers; and noxious weed treatments. These activities involve isolated and usually limited soil and vegetation disturbance or loss, but cumulative impacts could include increased fragmentation of wild horse habitat and cumulative increases in vegetation and soil disturbances, which result in incremental losses in the quality and quantity of habitat available to wild horses, as well as increase risks for erosion and noxious weed invasion. These activities can also impact wild horse distribution and seasonal movement throughout and between HMAs. Each activity could result in incremental restrictions to free roaming behavior of wild horses and over time may influence habitat use patterns, genetic interchange and use of water sources. According to the RFD scenario it is unlikely that large areas of disturbance would occur within the parcels offered for lease.

Exploration and production proposals would be subject to further project-specific analysis, and mitigation measures, COAs and concurrent reclamation applied to avoid or reduce impacts. The Water Resources and Slopes >30% stipulations would help to decrease the habitat fragmentation or changes to distribution and movement patterns that could result from loss of water sources and forage; impacts to herd health and genetic interchange would be reduced as a result of fewer effects on distribution. For these reasons, the Proposed Action's contribution to cumulative effects are anticipated to be minimal.

4.2.8 Cumulative Effects to Grazing Management

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining activities and off-highway vehicle use. Creating new roads, constructing drill pads and developing wells and mines removes available forage, which could impact ranching operations. However, based on the RFD scenario, the cumulative impacts of the proposed action on rangeland resources are expected to be minimal due to the relatively small area of disturbance (65-100 acres), concurrent reclamation and site-specific mitigation.

4.2.9 Cumulative Effects to Cultural Resources

The Proposed Action does not authorize any ground disturbance and therefore has no direct effect to cultural resources; however, the reasonably foreseeable role of oil and gas exploration and development could cumulatively result in adverse effects to cultural resources. Several ongoing and potential actions in the area, such as mining, mineral and geothermal exploration, off-highway vehicle use, and livestock grazing, have the potential to cumulatively impact cultural resources. The majority of parcels nominated for the 2019 Oil & Gas Lease Sale have not been inventoried for cultural resources; therefore, the types of resources that may be present in any particular area within parcels are unknown. A CESA cannot be defined for cultural resources until the presence of such resources is known. A Class III cultural resources inventory would be required prior to development within parcels. Once an inventory is completed, the geographic and temporal scope for analysis would be defined, followed by an analysis to determine what, if any, impacts there would be to cultural resources resulting from past, present, or reasonably-foreseeable actions within the CESA. Appropriate mitigation, BMPs, and COAs would be implemented to resolve any adverse effects to historic properties.

4.2.10 Cumulative Effects to Native American Cultural Concerns

Fluid mineral leasing and exploration may affect sites and associated activities of a cultural, traditional and spiritual nature. Potential residual effects of any surface occupancy that results from oil and gas leasing may be cumulative with other past and present actions and RFFAs. Presently, impacts to many cultural, traditional, spiritual sites and associated activities have been avoided through Native American consultation efforts. In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P. L.94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L.101-601) and Executive Order 13007, the BLM must also provide affected tribes an opportunity to comment and consult on proposed actions. BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/spiritual sites, activities, and resources. Only the potential impacts to tribal resources were analyzed in this EA because it evaluates the leasing of oil and gas parcels, not specific areas of proposed surface disturbance. If, as a result of leasing, a ground disturbing plan to explore or develop is submitted to BLM, all applicable laws, regulations, directives, SOPs, and stipulations and limitations would apply. BLM would work with the operator to

mitigate effects to traditional/ cultural or religious sites on activities associated with any surface occupancy that results from oil and gas leasing. Consequently, the BLM must take steps to identify locations having traditional/cultural or religious values to Native Americans and ensure that its actions do not unduly or unnecessarily burden the pursuit of traditional religion or traditional values. If specific concerns are identified, a thorough cumulative effects analysis would be part of the additional project-specific, site-specific NEPA analysis conducted at that time.

4.2.11 Cumulative Effects to Recreation, Visual Resources, and Wilderness Characteristics

Past and present actions and RFFAs with the greatest potential to affect recreation include geothermal exploration and development, mineral exploration and mining, gravel pit development and production, wind power construction, communication site construction, and road building. Given that many outdoor recreation activities are dependent upon a high quality visual/aesthetic environment, such developments, including fluid mineral development, have the potential to cumulatively lower the quality of recreational experiences in the Analysis Area. A reduction in opportunity for primitive and unconfined recreation would affect wilderness characteristics. These developments could also affect wilderness characteristics by reducing the appearance of naturalness, opportunities for solitude, and the extent of roadless area. However, given the RFD scenario for fluid minerals, other existing and foreseeable developments, any mitigation measures developed during additional site-specific analysis, and required reclamation (recontouring and revegetation) of any abandoned projects, it is not anticipated that the quality of recreational experiences or the extent of wilderness characteristics would be substantially reduced overall.

Increased commercial development could slightly increase the area's population, which would create an increase in numbers of recreationists. Examples would be visits to WSAs, hunting and OHV use. This could affect wilderness characteristics by reducing opportunity for solitude.

The cumulative impacts to visual resources remain low to moderate due to the likelihood of large distances between actions and limited surface disturbance. Most of the future activities would be on valley floors. Visual resources are mitigated on a case-by-case basis and many of the activities would be temporary, with visual contrasts essentially eliminated when reclamation (recontouring and revegetation) is completed, also eliminating impacts to the appearance of naturalness.

4.2.12 Cumulative Effects to Geology and Minerals, Land Use Authorizations

There is little appreciable potential for exploration or development resulting from the Proposed Action to have substantial cumulative impacts, combined with past and present actions and RFFAs, to geology and minerals or land use authorizations. Based on the RFD scenario, only a small percentage of acres of constructed roads associated with exploration/development would potentially remain after 10 years. The likelihood of other resources being present at the same location is minor, although not impossible, and methods are in place to co-develop resources. Since fluid and solid minerals are non-renewable resources, the combined effects of producing either or both would result in mineral depletion. However, considering the RFD scenario and that site-specific mitigation measures would be required for exploration and development, the Proposed Action's contribution to cumulative impacts would not be substantial.

4.2.13 Cumulative Effects to Socioeconomic Values

As described in Section 3.2.17, it is expected that the socioeconomic effects of the Proposed Action would be minor and beneficial. The same would be expected for cumulative effects. Specific information regarding the timing, duration, and level of employment is not available for other RFFAs that may occur within the CESA, precluding a comprehensive analysis of potential cumulative socioeconomic impacts. Additional project-specific analysis would be required for any future exploration or development project, including socioeconomics and environmental justice effects.

4.2.14 Cumulative Effects to Waste, Hazardous and Solid

Other major activities potentially generating hazardous and solid waste include mining, mineral, geothermal, and existing oil and gas exploration, development and production projects. Given the small acreage of oil and gas activity disturbance identified in the RFD (65-100 acres), as well as any mitigation developed during additional site-specific analysis for oil and gas exploration and development, the contribution to cumulative impacts would be negligible. Also, federal and state governments specifically regulate each project to ensure that there are no releases of hazardous materials, hazardous waste or solid waste into the environment. As discussed in Section 3.2.18, a slight risk of accidental spillage exists, and the consequences of any spill would be greater in wetlands, springs/seeps, riparian areas, floodplains and seasonally flooded playas. The CSU Water Resources stipulation would generally prevent direct or indirect contamination of these areas.

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List of Preparers

Table 9. List of BLM resource specialists participating in this EA.

| Resources | Specialists |
|--|--|
| Cultural Resources and Paleontology | Jonah Blustain |
| Native American Cultural Concerns | Vicki Lankford |
| Land Use Authorizations | Wendy Seley, Jennifer Wohlgemuth |
| Recreation, Visual Resources, Wilderness Characteristics | David Hullum |
| Geology and Minerals | Melissa Jennings, Scott Distel |
| Waste, Hazardous and Solid | Richard Singer, Earl Numinen |
| Soils, Vegetation, Rangeland Resources | Daltrey Balmer, Sam Ault, Robert Burdick |
| Noxious Weeds, Invasive Non-native Species; Forestry | Anna O'Brien |
| Air Quality, Climate Change, Greenhouse Gases | Frederick Cooper Kaminer |
| Water Resources | Justin Ferris, Ben Kennedy |
| Wildlife Resources and Special Status Species | Brandon Crosby, Elin Pierce |
| Wild Horses and Burros | Shawna Richardson, Beth Freniere |
| Socioeconomic Values | Julie Suhr-Pierce |
| NEPA compliance | Joy Fatooh, Melissa Jennings |

Appendix A: List of Nominated Parcels

| | |
|---|---|
| <p>NV-19-06-001 2130.000 Acres T.0150N, R.0440E, 21 MDM, NV Sec. 005 LOTS 1-3,5-8; 005 S2; 006 LOTS 2-12; 006 E2SW,SE; 008 ALL; Lander County Battle Mountain DO</p> | <p>NV-19-06-006 2150.260 Acres T.0160N, R.0440E, 21 MDM, NV Sec. 029 E2NE,N2NW,SWNW,SESW,SE; 030 LOTS 3-8; 030 NE,E2SW,W2SE,NESE; 031 LOTS 1; 031 NENW; 032 E2,E2NW,NESW; 033 ALL; Lander County Battle Mountain DO OHMA, GHMA MAT SITE CC23332</p> |
| <p>NV-19-06-002 1197.460 Acres T.0150N, R.0440E, 21 MDM, NV Sec. 007 LOTS 1-4; 007 E2W2,E2; 018 LOTS 1-2,4; 018 E2W2,E2; Lander County Battle Mountain DO</p> | <p>NV-19-06-007 1868.340 Acres T.0160N, R.0450E, 21 MDM, NV Sec. 001 LOTS 3-6; 001 S2N2,S2; 002 LOTS 5-11; 002 S2NE,SENW,E2SW,SE; 003 LOTS 1-4; 003 S2N2,S2; Lander County Battle Mountain DO</p> |
| <p>NV-19-06-003 2204.680 Acres T.0160N, R.0440E, 21 MDM, NV Sec. 003 LOTS 1-4; 003 S2N2, S2; 010 E2NE,SWNW,S2; 015 ALL; 016 LOTS 1-4; 016 NE,N2S2; Lander County Battle Mountain DO OHMA, GHMA MAT SITE N82349 COMM SITE N18351</p> | <p>NV-19-06-008 1278.090 Acres T.0160N, R.0450E, 21 MDM, NV Sec. 011 LOTS 1-7; 011 S2NE,SENW,E2SW,SE; 012 PROT ALL; Lander County Battle Mountain DO</p> |
| <p>NV-19-06-004 2282.590 Acres T.0160N, R.0440E, 21 MDM, NV Sec. 017 LOTS 1-6; 017 W2NE,N2SW,NWSE; 019 SE; 020 LOTS 1-4; 020 NWNE,S2NE,S2; 021 S2N2;S2; 028 ALL; Lander County Battle Mountain DO OHMA, GHMA</p> | <p>NV-19-06-009 1232.290 Acres T.0160N, R.0450E, 21 MDM, NV Sec. 015 LOTS 1-4; 015 E2,E2W2; 022 LOTS 1-4; 022 E2W2,E2; Lander County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-005 120.000 Acres T.0160N, R.0440E, 21 MDM, NV Sec. 024 W2NW,NWSW; Lander County Battle Mountain DO SPLIT ESTATE 27/71/0122 YOUNG BROTHERS</p> | <p>NV-19-06-010 2337.000 Acres T.0040N, R.0492E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT ALL; 003 PROT ALL; 010 PROT ALL; 011 PROT ALL; Nye County Battle Mountain DO</p> |

| | |
|------------------------------|----------------|
| NV-19-06-011 | 2129.000 Acres |
| T.0040N, R.0492E, 21 MDM, NV | |
| Sec. 012 | PROT ALL; |
| 013 | PROT ALL; |
| 014 | PROT ALL; |
| 015 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-012 | 2130.000 Acres |
| T.0040N, R.0492E, 21 MDM, NV | |
| Sec. 022 | PROT ALL; |
| 023 | PROT ALL; |
| 024 | PROT ALL; |
| 025 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| COMM SITES | |
| NV-19-06-013 | 2343.000 Acres |
| T.0040N, R.0492E, 21 MDM, NV | |
| Sec. 026 | PROT ALL; |
| 027 | PROT ALL; |
| 034 | PROT ALL; |
| 035 | PROT ALL; |
| 036 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-014 | 1167.000 Acres |
| T.0050N, R.0492E, 21 MDM, NV | |
| Sec. 034 | PROT ALL; |
| 035 | PROT S2N2,S2; |
| 036 | PROT S2N2,S2; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-015 | 1942.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 003 | PROT ALL; |
| 004 | PROT ALL; |
| 005 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-016 | 1921.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 006 | PROT ALL; |
| 007 | PROT ALL; |
| 008 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| NV-19-06-017 | 2560.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 009 | PROT ALL; |
| 010 | PROT ALL; |
| 015 | PROT ALL; |
| 016 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-018 | 2550.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 017 | PROT ALL; |
| 018 | PROT ALL; |
| 019 | PROT ALL; |
| 020 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-019 | 2560.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 021 | PROT ALL; |
| 022 | PROT ALL; |
| 023 | PROT ALL; |
| 024 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-020 | 2545.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 025 | PROT ALL; |
| 026 | PROT ALL; |
| 035 | PROT ALL; |
| 036 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-021 | 2521.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 027 | PROT ALL; |
| 028 | PROT ALL; |
| 033 | PROT ALL; |
| 034 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-022 | 2509.000 Acres |
| T.0030N, R.0500E, 21 MDM, NV | |
| Sec. 029 | PROT ALL; |
| 030 | PROT ALL; |
| 031 | PROT ALL; |
| 032 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |

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| <p>NV-19-06-023 1247.000 Acres T.0032N, R.0500E, 21 MDM, NV Sec. 031 PROT ALL; 032 PROT ALL; 033 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-029 1268.000 Acres T.0032N, R.0510E, 21 MDM, NV Sec. 034 PROT ALL; 035 PROT ALL; 036 PROT ALL;</p> <p>Nye County Battle Mountain DO</p> |
| <p>NV-19-06-024 2560.000 Acres T.0030N, R.0510E, 21 MDM, NV Sec. 001 PROT ALL; 011 PROT ALL; 012 PROT ALL; 013 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-030 1918.780 Acres T.0070N, R.0510E, 21 MDM, NV Sec. 001 LOTS 1-4; 001 S2N2,S2; 012 ALL; 013 ALL;</p> <p>Nye County Battle Mountain DO</p> |
| <p>NV-19-06-025 2560.000 Acres T.0030N, R.0510E, 21 MDM, NV Sec. 014 PROT ALL; 021 PROT ALL; 022 PROT ALL; 023 PROT ALL;</p> <p>Nye County Battle Mountain DO</p> | <p>NV-19-06-031 1440.000 Acres T.0070N, R.0510E, 21 MDM, NV Sec. 024 ALL; 025 N2,SW,N2SE,SWSE; 036 N2NW,SWNW,W2SW;</p> <p>Nye County Battle Mountain DO</p> |
| <p>NV-19-06-026 2534.000 Acres T.0030N, R.0510E, 21 MDM, NV Sec. 019 PROT ALL; 020 PROT ALL; 029 PROT ALL; 030 PROT ALL;</p> <p>Nye County Battle Mountain DO</p> | <p>NV-19-06-032 1040.000 Acres T.0110N, R.0510E, 21 MDM, NV Sec. 025 PROT S2SW,SE; 026 PROT W2,SE; 027 PROT S2;</p> <p>Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-027 2560.000 Acres T.0030N, R.0510E, 21 MDM, NV Sec. 024 PROT ALL; 025 PROT ALL; 026 PROT ALL; 036 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-033 1920.000 Acres T.0110N, R.0510E, 21 MDM, NV Sec. 034 PROT ALL; 035 PROT ALL; 036 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-028 2560.000 Acres T.0030N, R.0510E, 21 MDM, NV Sec. 027 PROT ALL; 028 PROT ALL; 034 PROT ALL; 035 PROT ALL;</p> <p>Nye County Battle Mountain DO</p> | <p>NV-19-06-036 2264.000 Acres T.0030N, R.0512E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT ALL; 003 PROT ALL; 010 PROT ALL; 011 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> |

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| <p>NV-19-06-037 2258.000 Acres T.0030N, R.0512E, 21 MDM, NV Sec. 012 PROT ALL; 013 PROT ALL; 014 PROT ALL; 015 PROT ALL; 022 PROT ALL; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-042 2478.000 Acres T.0030N, R.0520E, 21 MDM, NV Sec. 009 PROT ALL; 010 PROT ALL; 011 ALL; 012 ALL; Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-038 2560.000 Acres T.0030N, R.0512E, 21 MDM, NV Sec. 023 PROT ALL; 024 PROT ALL; 025 PROT ALL; 026 PROT ALL; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-043 1858.000 Acres T.0030N, R.0520E, 21 MDM, NV Sec. 013 ALL; 014 ALL; 015 PROT ALL; Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-039 1611.000 Acres T.0030N, R.0512E, 21 MDM, NV Sec. 027 PROT ALL; 034 PROT ALL; 035 PROT ALL; 036 PROT ALL; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-044 1917.000 Acres T.0030N, R.0520E, 21 MDM, NV Sec. 016 PROT ALL; 017 PROT ALL; 018 PROT ALL; Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-040 2021.825 Acres T.0030N, R.0520E, 21 MDM, NV Sec. 001 LOTS 1-3; 001 S2N2,S2; 002 SE; 003 PROT SWSW; 004 PROT SWNE,NW,S2; 005 PROT ALL; Nye County Battle Mountain DO</p> | <p>NV-19-06-045 2515.000 Acres T.0030N, R.0520E, 21 MDM, NV Sec. 019 PROT ALL; 020 PROT ALL; 021 PROT ALL; 022 PROT ALL; Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-041 1946.000 Acres T.0030N, R.0520E, 21 MDM, NV Sec. 006 PROT ALL; 007 PROT ALL; 008 PROT ALL; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-046 1937.840 Acres T.0030N, R.0520E, 21 MDM, NV Sec. 023 LOTS 1-8; 023 N2; 024 ALL; 025 ALL; Nye County Battle Mountain DO OHMA</p> |

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| NV-19-06-047 | 2537.000 Acres |
| T.0030N, R.0520E, 21 MDM, NV | |
| Sec. 026 | ALL; |
| 027 | PROT ALL; |
| 028 | PROT ALL; |
| 029 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-048 | 2559.000 Acres |
| T.0030N, R.0520E, 21 MDM, NV | |
| Sec. 030 | PROT ALL; |
| 031 | PROT ALL; |
| 032 | PROT ALL; |
| 033 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA,GHMA | |
| NV-19-06-049 | 1917.000 Acres |
| T.0030N, R.0520E, 21 MDM, NV | |
| Sec. 034 | PROT ALL; |
| 035 | ALL; |
| 036 | ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-050 | 2210.500 Acres |
| T.0040N, R.0520E, 21 MDM, NV | |
| Sec. 019 | LOTS 2-4; |
| 019 | NENE.SENW,E2SW; |
| 030 | LOTS 1-4; |
| 030 | W2NE,E2NW,E2SW,SE; |
| 031 | LOTS 1-7; |
| 031 | NE,E2NW,NESW,N2SE; |
| 032 | LOTS 1-4; |
| 032 | SWNW,NW,N2S2; |
| 033 | LOTS 1; |
| 036 | LOTS 3,6,7; |
| Nye County | |
| Battle Mountain DO | |
| MAT SITE NEV44324 | |
| NV-19-06-051 | 1600.000 Acres |
| T.0060N, R.0520E, 21 MDM, NV | |
| Sec. 001 | PROT N2,N2SW,SESW,SE; |
| 002 | PROT N2,SW,N2SE; |
| 003 | PROT E2,N2NW,SENW; |
| Nye County | |
| Battle Mountain DO | |

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| NV-19-06-052 | 2560.000 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 001 | PROT ALL; |
| 002 | PROT ALL; |
| 011 | PROT ALL; |
| 012 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-053 | 2560.000 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 003 | PROT ALL; |
| 004 | PROT ALL; |
| 009 | PROT ALL; |
| 010 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-054 | 2325.000 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 005 | PROT |
| E2E2,W2W2,SESW,SWSE; | |
| 006 | PROT ALL; |
| 007 | PROT ALL; |
| 008 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-055 | 2360.000 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 013 | PROT ALL; |
| 014 | PROT ALL; |
| 015 | PROT ALL; |
| 016 | PROT E2,N2NW,SENW; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-056 | 1335.625 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 017 | PROT N2NE, |
| SWNE,NW,NWSW; | |
| 018 | PROT ALL; |
| 019 | PROT NW,W2SW; |
| 030 | NWNW,S2NW; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-057 | 1920.000 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 022 | PROT ALL; |
| 023 | PROT ALL; |
| 024 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |

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| NV-19-06-058 | 1920.000 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 025 | PROT ALL; |
| 026 | PROT ALL; |
| 027 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-059 | 1765.250 Acres |
| T.0070N, R.0520E, 21 MDM, NV | |
| Sec. 034 | PROT NE,E2W2,SE; |
| 035 | PROT ALL; |
| 036 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-060 | 2043.000 Acres |
| T.0080N, R.0520E, 21 MDM, NV | |
| Sec. 003 | PROT ALL; |
| 004 | PROT ALL; |
| 009 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-061 | 2560.000 Acres |
| T.0080N, R.0520E, 21 MDM, NV | |
| Sec. 010 | PROT ALL; |
| 011 | PROT ALL; |
| 014 | PROT ALL; |
| 015 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-062 | 2560.000 Acres |
| T.0080N, R.0520E, 21 MDM, NV | |
| Sec. 016 | PROT ALL; |
| 017 | PROT ALL; |
| 019 | PROT ALL; |
| 020 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-063 | 2560.000 Acres |
| T.0080N, R.0520E, 21 MDM, NV | |
| Sec. 021 | PROT ALL; |
| 022 | PROT ALL; |
| 023 | PROT ALL; |
| 026 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |

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| NV-19-06-064 | 2560.000 Acres |
| T.0080N, R.0520E, 21 MDM, NV | |
| Sec. 027 | PROT ALL; |
| 028 | PROT ALL; |
| 033 | PROT ALL; |
| 034 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-065 | 2388.000 Acres |
| T.0080N, R.0520E, 21 MDM, NV | |
| Sec. 029 | PROT ALL; |
| 030 | PROT ALL; |
| 031 | PROT ALL; |
| 032 | PROT N2,W2SW,E2SE; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-066 | 1280.000 Acres |
| T.0080N, R.0520E, 21 MDM, NV | |
| Sec. 035 | PROT ALL; |
| 036 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-067 | 2558.000 Acres |
| T.0090N, R.0520E, 21 MDM, NV | |
| Sec. 001 | PROT ALL; |
| 002 | PROT ALL; |
| 011 | PROT ALL; |
| 012 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA, GHMA | |
| NV-19-06-068 | 2560.000 Acres |
| T.0090N, R.0520E, 21 MDM, NV | |
| Sec. 003 | PROT ALL; |
| 004 | PROT ALL; |
| 009 | PROT ALL; |
| 010 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| <p>NV-19-06-069 2522.000 Acres T.0090N, R.0520E, 21 MDM, NV Sec. 005 PROT ALL; 006 PROT ALL; 007 PROT ALL; 008 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA, GHMA, PHMA</p> | <p>NV-19-06-074 1874.120 Acres T.0100N, R.0520E, 21 MDM, NV Sec. 018 LOTS 1-4; 018 E2,E2W2; 019 LOTS 1-4; 019 E2,E2W2; 020 ALL;</p> <p>Nye County Battle Mountain DO OHMA, GHMA</p> |
| <p>NV-19-06-070 2560.000 Acres T.0090N, R.0520E, 21 MDM, NV Sec. 013 PROT ALL; 014 PROT ALL; 023 PROT ALL; 024 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA, GHMA</p> | <p>NV-19-06-075 2560.000 Acres T.0100N, R.0520E, 21 MDM, NV Sec. 021 ALL; 022 ALL; 027 ALL; 028 ALL;</p> <p>Nye County Battle Mountain DO</p> |
| <p>NV-19-06-071 2560.000 Acres T.0090N, R.0520E, 21 MDM, NV Sec. 015 PROT ALL; 016 PROT ALL; 021 PROT ALL; 022 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-076 2560.000 Acres T.0100N, R.0520E, 21 MDM, NV Sec. 023 ALL; 024 ALL; 025 ALL; 026 ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-072 2522.000 Acres T.0090N, R.0520E, 21 MDM, NV Sec. 017 PROT ALL; 018 PROT ALL; 019 PROT ALL; 020 PROT ALL;</p> <p>Nye County Battle Mountain DO OHMA, GHMA</p> | <p>NV-19-06-077 2521.600 Acres T.0100N, R.0520E, 21 MDM, NV Sec. 029 ALL; 030 LOTS 1-4; 030 E2,E2W2; 031 LOTS 1-4; 031 E2,E2W2; 032 ALL;</p> <p>Nye County Battle Mountain DO OHMA, GHMA, PHMA</p> |
| <p>NV-19-06-073 2560.000 Acres T.0090N, R.0520E, 21 MDM, NV Sec. 027 PROT ALL; 028 PROT ALL; 033 PROT ALL; 034 PROT ALL;</p> <p>Nye County Battle Mountain DO</p> | <p>NV-19-06-078 2560.000 Acres T.0100N, R.0520E, 21 MDM, NV Sec. 033 ALL; 034 ALL; 035 ALL; 036 ALL;</p> <p>Nye County Battle Mountain DO OHMA</p> |

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| <p>NV-19-06-079 2241.190 Acres T.0110N, R.0520E, 21 MDM, NV Sec. 001 LOTS 1-4; 001 S2N2,S2; 002 LOTS 1-4; 002 S2N2,S2; 003 LOTS 1,2; 003 S2NE,SENE,S2; 009 E2NE,SWNE,S2; Nye County Battle Mountain DO</p> | <p>NV-19-06-084 1952.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 008 PROT ALL; 017 PROT ALL; 018 PROT ALL; Eureka County Battle Mountain DO</p> |
| <p>NV-19-06-080 2560.000 Acres T.0110N, R.0520E, 21 MDM, NV Sec. 010 ALL; 011 ALL; 012 ALL; 013 ALL; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-085 2560.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 009 PROT ALL; 010 PROT ALL; 015 PROT ALL; 016 PROT ALL; Eureka County Battle Mountain DO OHMA, GHMA</p> |
| <p>NV-19-06-081 2040.000 Acres T.0110N, R.0520E, 21 MDM, NV Sec. 014 ALL; 015 ALL; 016 ALL; 017 SENE,E2SE; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-086 2560.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 011 PROT ALL; 012 PROT ALL; 013 PROT ALL; 014 PROT ALL; Eureka County Battle Mountain DO OHMA, GHMA</p> |
| <p>NV-19-06-082 2560.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT ALL; 003 PROT ALL; 004 PROT ALL; Eureka County Battle Mountain DO OHMA, GHMA</p> | <p>NV-19-06-087 1987.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 019 PROT ALL; 020 PROT ALL; 030 PROT ALL; Eureka County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-083 1981.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 005 PROT ALL; 006 PROT ALL; 007 PROT ALL; Eureka County Battle Mountain DO</p> | <p>NV-19-06-088 2560.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 021 PROT ALL; 022 PROT ALL; 028 PROT ALL; 029 PROT ALL; Eureka County Battle Mountain DO OHMA, GHMA</p> |
| | <p>NV-19-06-089 1920.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 023 PROT ALL; 024 PROT ALL; 025 PROT ALL; Eureka County Battle Mountain DO OHMA, GHMA</p> |

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| <p>NV-19-06-090 1280.000 Acres T.0180N, R.0520E, 21 MDM, NV Sec. 026 PROT ALL; 027 PROT ALL; Eureka County Battle Mountain DO OHMA</p> | <p>NV-19-06-095 344.000 Acres T.0100N, R.0530E, 21 MDM, NV Sec. 009 PROT ALL; 010 PROT ALL; 011 PROT ALL; 012 PROT ALL; Nye County Ely DO Battle Mountain DO OHMA</p> |
| <p>NV-19-06-091 2560.000 Acres T.0090N, R.0530E, 21 MDM, NV Sec. 022 PROT ALL; 023 PROT ALL; 026 PROT ALL; 027 PROT ALL; Nye County Battle Mountain DO OHMA, GHMA</p> | <p>NV-19-06-096 1920.000 Acres T.0100N, R.0530E, 21 MDM, NV Sec. 019 PROT ALL; 030 PROT ALL; 031 PROT ALL; Nye County Battle Mountain DO OHMA</p> |
| <p>NV-19-06-092 2418.000 Acres T.0090N, R.0530E, 21 MDM, NV Sec. 024 PROT ALL; 025 PROT ALL; 036 PROT ALL; Nye County Battle Mountain DO OHMA, GHMA</p> | <p>NV-19-06-101 2551.000 Acres T.0110N, R.0530E, 21 MDM, NV Sec. 004 PROT ALL; 005 PROT ALL; 006 PROT ALL; 007 PROT ALL; Nye County Battle Mountain DO</p> |
| <p>NV-19-06-093 1280.000 Acres T.0090N, R.0530E, 21 MDM, NV Sec. 034 PROT ALL; 035 PROT ALL; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-102 2560.000 Acres T.0110N, R.0530E, 21 MDM, NV Sec. 008 PROT ALL; 009 PROT ALL; 016 PROT ALL; 017 PROT ALL; Nye County Battle Mountain DO</p> |
| <p>NV-19-06-094 2082.000 Acres T.0100N, R.0530E, 21 MDM, NV Sec. 007 PROT ALL; 008 PROT ALL; 017 PROT ALL; 018 PROT ALL; 020 PROT ALL; Nye County Battle Mountain DO OHMA</p> | <p>NV-19-06-104 2555.000 Acres T.0110N, R.0530E, 21 MDM, NV Sec. 018 PROT ALL; 019 PROT ALL; 020 PROT ALL; 021 PROT ALL; Nye County Battle Mountain DO</p> |

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| NV-19-06-107 | 2560.000 Acres |
| T.0110N, R.0530E, 21 MDM, NV | |
| Sec. 028 | PROT ALL; |
| 029 | PROT ALL; |
| 032 | PROT ALL; |
| 033 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| NV-19-06-109 | 2560.000 Acres |
| T.0170N, R.0530E, 21 MDM, NV | |
| Sec. 028 | ALL; |
| 029 | ALL; |
| 032 | ALL; |
| 033 | ALL; |
| Eureka County | |
| Battle Mountain DO | |
| OHMA, GHMA | |

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| NV-19-06-110 | 2058.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 001 | PROT ALL; |
| 002 | PROT ALL; |
| 003 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| NV-19-06-111 | 1966.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 004 | PROT ALL; |
| 009 | PROT ALL; |
| 010 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| NV-19-06-112 | 1976.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 005 | PROT ALL; |
| 006 | PROT ALL; |
| 007 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| NV-19-06-113 | 1903.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 008 | PROT ALL; |
| 017 | PROT ALL; |
| 018 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| NV-19-06-114 | 2560.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 011 | PROT ALL; |
| 012 | PROT ALL; |
| 013 | PROT ALL; |
| 014 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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| NV-19-06-115 | 2560.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 015 | PROT ALL; |
| 016 | PROT ALL; |
| 021 | PROT ALL; |
| 022 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

| | |
|------------------------------|----------------|
| NV-19-06-116 | 2529.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 019 | PROT ALL; |
| 020 | PROT ALL; |
| 029 | PROT ALL; |
| 030 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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|------------------------------|----------------|
| NV-19-06-117 | 2560.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 023 | PROT ALL; |
| 024 | PROT ALL; |
| 025 | PROT ALL; |
| 026 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

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|------------------------------|----------------|
| NV-19-06-118 | 2560.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 027 | PROT ALL; |
| 034 | PROT ALL; |
| 035 | PROT ALL; |
| 036 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-119 | 2546.000 Acres |
| T.0090N, R.0540E, 21 MDM, NV | |
| Sec. 028 | PROT ALL; |
| 031 | PROT ALL; |
| 032 | PROT ALL; |
| 033 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-141 | 2016.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 003 | PROT ALL; |
| 001 | PROT ALL; |
| 002 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-142 | 1995.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 004 | PROT ALL; |
| 005 | PROT ALL; |
| 006 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-143 | 2555.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 007 | PROT ALL; |
| 008 | PROT ALL; |
| 017 | PROT ALL; |
| 018 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |

| | |
|------------------------------|----------------|
| NV-19-06-144 | 2560.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 009 | PROT ALL; |
| 010 | PROT ALL; |
| 015 | PROT ALL; |
| 016 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-145 | 1945.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 011 | PROT ALL; |
| 012 | PROT ALL; |
| 013 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-146 | 1928.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 014 | PROT ALL; |
| 023 | PROT ALL; |
| 024 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-147 | 2558.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 019 | PROT ALL; |
| 020 | PROT ALL; |
| 029 | PROT ALL; |
| 030 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-148 | 2560.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 021 | PROT ALL; |
| 022 | PROT ALL; |
| 027 | PROT ALL; |
| 028 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-149 | 1928.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 025 | PROT ALL; |
| 026 | PROT ALL; |
| 036 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |

| | |
|------------------------------|--------------------|
| NV-19-06-150 | 1965.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 031 | PROT ALL; |
| 032 | PROT ALL; |
| 033 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-151 | 1293.000 Acres |
| T.0090N, R.0550E, 21 MDM, NV | |
| Sec. 034 | PROT ALL; |
| 035 | PROT ALL; |
| Nye County | |
| Battle Mountain DO | |
| OHMA | |
| NV-19-06-182 | 2540.490 Acres |
| T.0090N, R.0560E, 21 MDM, NV | |
| Sec. 005 | LOTS 1-4; |
| 005 | S2N2,S2; |
| 006 | LOTS 1-7; |
| 006 | S2NE,SENW,E2SW,SE; |
| 007 | LOTS 1-4; |
| 007 | E2,E2W2; |
| 008 | ALL; |
| Nye County | |
| Battle Mountain DO | |

| | |
|--|-------------------------------|
| NV-19-06-183 | 2540.660 Acres |
| T.0090N, R.0560E, 21 MDM, NV | |
| Sec. 017 | ALL; |
| 018 | LOTS 1-4; |
| 018 | E2,E2W2; |
| 019 | LOTS 1-4; |
| 019 | E2,E2W2; |
| 020 | ALL; |
| Nye County | |
| Battle Mountain DO | |
| NV-19-06-184 | 791.940 Acres |
| T.0090N, R.0560E, 21 MDM, NV | |
| Sec. 030 | LOTS 1-4; |
| 030 | NE,E2W2; |
| 032 | S2NE, N2NW, SWNW, SESW, N2SE; |
| Nye County | |
| Battle Mountain DO | |
| Number of Parcels - 123 | |
| Total Acreage - 264,075.53 | |
| Border Parcels - 1 | |
| TFO - 103 + 1 (Overlap) | |
| BMDO - 19 | |
| Any portion of the listed lands may be deleted upon determination that such lands are not available for leasing. | |

Appendix B: Stipulations and Lease Notices

BLM Nevada Standard Stipulations (NV-B-00-A-LN)

These stipulations and notices apply to all parcels, all lands; and represent standard Best Management Practices for ensuring compliance with extant Federal Laws and resource protection.

T&E, Sensitive and Special Status Species

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. §1531 et seq., including completion of any required procedure for conference or consultation.

Migratory Birds

The Operator is responsible for compliance with provisions of the Migratory Bird Treaty Act by implementing measures to prevent take of migratory birds. Operators should be aware that any ground clearing or other disturbance (such as creating cross-country access to sites, drilling, and/or construction) during the migratory bird (including raptors) nesting season (March 1 -July 31) risks a violation of the Migratory Bird Treaty Act. Disturbance to nesting migratory birds should be avoided by conducting surface disturbing activities outside the migratory bird nesting season.

If surface disturbing activities must be implemented during the nesting season, a preconstruction survey for nesting migratory birds should be performed by a qualified wildlife biologist, during the breeding season (if work is not completed within a specified time frame, then additional surveys may be needed). If active nests are found, an appropriately-sized no surface disturbance buffer determined in coordination with the BLM biologist should be placed on the active nest until the nesting attempt has been completed.

If no active nests are found, construction activities must occur within the survey validity time frame specified in the conditions of approval.

Cultural Resources and Tribal Consultation

This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders. The BLM will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., State Historic Preservation Officer (SHPO) and tribal consultation) under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

Fossils

This area has low to moderate potential for vertebrate paleontological resources, unless noted to have higher potential in a separate stipulation. This area may contain vertebrate paleontological resources. Inventory and/or on-site monitoring during disturbance or spot checking may be required of the operator. In the event that previously undiscovered paleontological resources are discovered in the performance of any surface disturbing activities, the item(s) or condition(s) will be left intact and immediately brought to the attention of the authorized officer of the BLM. Operations within 250 feet of any such discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operations.

Water

The Operator is responsible for compliance with provisions of the Clean Water Act, Safe Drinking Water Act, and applicable State laws and regulations regarding protection of state water resources. Operators should contact Nevada Division of Water Resources and Nevada Division of Environmental Protection regarding necessary permits and compliance measures for any construction or other activities.

Mining Claims

This parcel may contain existing mining claims and/or mill sites located under the 1872 Mining Law. To the extent it does, the oil and gas lessee must conduct its operations, so far as reasonably practicable, to avoid damage to any known deposit of any mineral for which any mining claim on this parcel is located, and should not endanger or unreasonably or materially interfere with the mining claimant's operations, including any existing surface or underground improvements, workings, or facilities which may have been made for the purpose of mining operations. The provisions of the Multiple Mineral Development Act (30 U.S.C. 521 et seq.) shall apply on the leased lands.

Fire

The following precautionary measures should be taken to prevent wildland fires. In the event your operations should start a fire, you could be held liable for all suppression costs.

- All vehicles should carry fire extinguishers and a minimum of 10 gallons of water.
- Adequate fire-fighting equipment i.e. shovel, pulaski, extinguisher(s) and a minimum 10 gallons of water should be kept at the drill site(s).
- Vehicle catalytic converters should be inspected often and cleaned of all brush and grass debris.
- When conducting welding operations, they should be conducted in an area free from or mostly free from vegetation. A minimum of 10 gallons water and a shovel should be on hand to extinguish any fires created from the sparks. Extra personnel should be at the welding site to watch for fires created by welding sparks.
- Report wildland fires immediately to the BLM Central Nevada Interagency Dispatch Center (CNIDC) at (775) 623-3444. Helpful information to reported is location (latitude and longitude if possible), what's burning, time started, who/what is near the fire and direction of fire spread.

When conducting operations during the months of May through September, the operator must contact the BLM Battle Mountain District Office, Division of Fire and Aviation at (775) 635-4000 to find out about any fire restrictions in place for the area of operation and to advise this office of approximate beginning and ending dates for your activities.

**Mule Deer Seasonal Habitat
(#NV-B-02-A-TL)**

Stipulation: Timing Limitation (TL) - No surface activity within Mule Deer winter range from January 15 through May 15. The boundaries of the stipulated area may be modified if the Authorized Officer, in consultation with Nevada Department of Wildlife, determines that portions of the area no longer contain the winter mule deer habitat or that the proposed action would not affect the species and habitat. The dates for the timing restriction may also be modified by the Authorized Officer if new information indicates the dates are not valid for the leasehold. Any modification authorized by this stipulation is subject to 43 C.F.R. 3101.1-4, including provisions requiring public review for issues of major public concern, or substantial modifications.

| Parcel # | Legal Land Description |
|---|---|
| NV-19-06-003 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 016 LOT 2; |
| NV-19-06-004 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 017 LOTS 1-6; 017 W2NE, N2SW, NWSE; 019 SE; 020 LOTS 1-4; 020 W2NE, SW; |
| NV-19-06-006 | T. 0160N, R. 044E, 21 MDM, NV Sec. 029 N2NW, SWNW; 030 LOTS 3-8; 030 E2SW, NE, W2SE, NESE; 031 LOTS 1; 031 NENW; |
| NV-19-06-010 THROUGH NV-19-06-012 | ALL LANDS; |
| NV-19-06-013 | T.0040N, R.049.5E, 21 MDM, NV Sec. 026 PROT ALL; 027 PROT ALL; 035 PROT E2, NENW, SESW; 036 PROT ALL; |
| NV-19-06-014 | ALL LANDS; |
| NV-19-06-015 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 003 PROT SWSW; 004 PROT ALL; 005 PROT ALL; |
| NV-19-06-016 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 006 PROT E2, E2W2; 007 PROT E2, E2NW; 008 PROT ALL; |
| NV-19-06-017 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 009 PROT ALL; 010 PROT W2NW; |

| Parcel # | Legal Land Description |
|--------------|--|
| | 016 PROT NW, W2SW, W2NE; |
| NV-19-06-018 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 017 PROT N2, SE, N2SW; 018 PROT NWE, E2NE; |
| NV-19-06-032 | ALL LANDS; |
| NV-19-06-033 | ALL LANDS; |
| NV-19-06-067 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 001 PROT W2, W2E2; 002 PROT ALL; 011 PROT ALL; 012 S2, NW, W2NE; |
| NV-19-06-068 | ALL LANDS; |
| NV-19-06-069 | ALL LANDS; |
| NV-19-06-070 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 013 PROT ALL; 014 PROT ALL; 023 PROT ALL; 024 PROT NW, NWSW, NWNE; |
| NV-19-06-071 | ALL LANDS; |
| NV-19-06-072 | ALL LANDS; |
| NV-19-06-073 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 027 PROT N2, SW, N2SE, SWSE; 028 PROT ALL; 033 PROT N2; 034 PROT NWNW; |
| NV-19-06-074 | ALL LANDS; |
| NV-19-06-075 | ALL LANDS; |
| NV-19-06-076 | T. 0100N, R. 0520E, 21 MDM, NV Sec. 024 W2W2, E2SW; 023 ALL; 025 W2, W2E2; 026 ALL; |
| NV-19-06-077 | ALL LANDS; |
| NV-19-06-078 | T. 0100N, R. 052E, 21 MDM, NV Sec. 033 ALL; 034 ALL; 035 ALL; 036 W2; |
| NV-19-06-081 | T. 0110N, R. 0520E, 21 MDM, NV Sec. 016 S2S2; 017 SESE; |

| Parcel # | Legal Land Description |
|---|---|
| NV-19-06-082 THROUGH NV-19-06-090 | ALL LANDS; |
| NV-19-06-109 | T. 0170N, R. 0530E, 21 MDM, NV Sec. 029 W2W2, E2NW; 032 W2W2; |

**Lease Notice – Mule Deer Migration Corridors
(#NV-B-02-B-LN)**

The lease area may now or hereafter contain Mule Deer migration corridors recommended as suitable for protection by Nevada Department of Wildlife (NDOW). Surface-disturbing activities within NDOW defined Mule Deer migration corridors may be restricted from November 1 through April 30 in order to protect mule deer migration corridors necessary to maintaining the critical life stages of Mule Deer wildlife populations. After April 30, no additional protection measures should be required until the following season. The area and/or the timing of restrictions for the migration corridor may be modified if consultation with NDOW determines that portions of the area no longer contain the mule deer migration corridors or that the proposed action would not affect the species and habitat.

| Parcel # | Legal Land Description |
|---|--|
| NV-19-06-007 | T. 0160N, R. 0450E, 21 MDM, NV Sec.001 E2E2; |
| NV-19-06-008 | T. 0160N, R. 0450E, 21 MDM, NV Sec. 012 PROT NENE; |
| NV-19-06-010 THROUGH NV-19-06-018 | ALL LANDS; |
| NV-19-06-019 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 021 PROT ALL; 022 PROT ALL; 023 PROT ALL; 024 PROT W2; |
| NV-19-06-020 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 025 PROT NWNW; 026 PROT N2; |
| NV-19-06-021 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 027 PROT N2; 028 PROT N2, N2S2; |
| NV-19-06-022 | T. 0030N, R. 0500E, 21 MDM, NV Sec. 029 PROT N2, N2SE, SW; 030 PROT ALL; 031 PROT NWNW; |
| NV-19-06-032 | T. 0110N, R. 0510E, 21 MDM, NV Sec. 025 PROT S2SW; 026 PROT W2,SE; 027 PROT S2; |
| NV-19-06-033 | T. 0110N, R. 0510E, 21 MDM, NV Sec. 034 PROT ALL; 035 PROT ALL; 036 PROT W2; |
| NV-19-06-067 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT ALL; 011 PROT NENE; |

| Parcel # | Legal Land Description |
|---|--|
| | 012 PROT N2N2; |
| NV-19-06-068 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 003 PROT ALL; 004 PROT N2, N2SE, NESW; |
| NV-19-06-069 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 005 PROT NENE; |
| NV-19-06-074 | T. 0100N, R. 0520E, 21 MDM, NV Sec. 018 LOTS 1-2; 018 E2NW, NE, SE, E2SW; 019 NE, E2SE, NWSE; 020 ALL; |
| NV-19-06-075 | ALL LANDS |
| NV-19-06-076 | ALL LANDS |
| NV-19-06-077 | T. 0100N, R. 052E, 21 MDM, NV Sec. 029 ALL; 030 E2NE; 032 E2NW, NE, E2SE, NWSE; |
| NV-19-06-078 THROUGH NV-19-06-081 | ALL LANDS; |
| NV-19-06-094 | T.0100N, R. 0530E, 21 MDM, NV Sec. 018 PROT W2; |
| NV-19-06-096 | T.0100N, R. 0530E, 21 MDM, NV Sec. 019 PROT W2, SWSE; 030 PROT W2, W2SE; 031 PROT W2, E2SE; |
| NV-19-06-101 | T. 0110N, R. 0530E, 21 MDM, NV Sec. 006 PROT W2W2; 007 PROT W2W2, SESW |
| NV-19-06-104 | T. 0110N, R. 0530E, 21 MDM, NV Sec. 018 PROT W2; 019 PROT W2, E2SE; |
| NV-19-06-109 | ALL LANDS |

**Desert Bighorn Sheep Lambing and Summer Habitat
(#NV-B-04-D-TL)**

Stipulation: Timing Limitation – No surface activity would be allowed within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.

Objective: To protect desert bighorn sheep from disturbances during lambing and the crucial hot summer months to maintain existing populations.

Exception: The Authorized Officer may grant an exception if an environmental review determines that the action, as proposed or otherwise restricted, does not adversely affect the Desert Bighorn Sheep and its habitat. An exception may also be granted if the proponent, BLM, and other affected interests negotiate mitigation that would satisfactorily offset the anticipated impacts to Desert Bighorn Sheep and its habitat. An exception may be granted for actions designed to enhance the long-term utility and availability of the habitat.

Modification: The boundaries of the stipulated area may be modified if the Authorized Officer, in consultation with Nevada Department of Wildlife, determines that portions of the area no longer contain Desert Bighorn Sheep habitat or that the proposed action will not affect the species and habitat. The dates for the timing restriction may also be modified by the Authorized Officer if new information indicates the dates are not valid for the leasehold. Any modification authorized by this stipulation is subject to 43 C.F.R. 3101.1-4, including provisions requiring public review for issues or major public concern, or substantial modifications.

Waiver: The restriction may be waived by the Authorized Officer, in consultation with Nevada Department of Wildlife, if determined that the described lands do not contain suitable Desert Bighorn Sheep habitat, or are otherwise incapable of serving the requirements of the species and therefore no longer warrant consideration as a component necessary for their protection. Any waiver authorized by this stipulation is subject to 43 C.F.R. 3101-4, including provisions requiring public review for issues of major public concern, or substantial waivers.

| Parcel # | Legal Land Description |
|--------------|--|
| NV-19-06-056 | T. 0070N, R. 0530E, 21 MDM, NV (See Tonopah RMP) Sec. 030 NWNW, S2NW; |

**Lease Notice – Wild Horse and Burro
(#NV-B-05-A-LN)**

Wild horse or burro herds are known to use some or all of the proposed lease area. If proposed fluid mineral activities are to occur in a Herd Management Area (HMA) or a Herd Area (HA) the BLM Authorized Officer may identify mitigation measures necessary for reducing adverse impacts to wild horses and/or burros. These measures would be designed so as to not hinder the wild and free-roaming behavior of the horses and burros and may include, but are not limited to, providing alternative water sources for horses of equal quality and quantity as well as fencing to prevent access to project area.

Additional specific measures to protect horses and burros may be developed during review of proposals.

| Parcel # | Legal Land Description |
|---|---|
| NV-19-06-007 THROUGH NV-19-06-009 | ALL LANDS; |
| NV-19-06-013 | T.0040N, R.0492E, 21 MDM, NV Sec. 027 S2; 034 ALL; 035 W2NW, SENW, SW, W2SE, SESE; |
| NV-19-06-015 | T.0030N, R.0500E, 21 MDM, NV Sec. 005 W2; |
| NV-19-06-016 | T.0030N, R.0500E, 21 MDM, NV Sec. 006 ALL; 007 NW, NE, W2SW, NESW, NWSE; 008 W2NW, NENW; |
| NV-19-06-018 | T.0030N, R.0500E, 21 MDM, NV Sec. 018 NWNW, W2SW; 019 NW, E2SW, SWSW; |
| NV-19-06-022 | T.0030N, R.0500E, 21 MDM, NV Sec. 030 NW, SW, W2NE, W2SE, SESE; 031 ALL; 032 W2SW, SESW; |
| NV-19-06-023 | T.0032N, R.0500E, 21 MDM, NV Sec. 031 ALL; 032 W2; |
| NV-19-06-052 | T.0070N, R.0520E, 21 MDM, NV Sec. 001 ALL; 002 ALL; 011 NW, NE, N2SW; 012 N2NW, NWNE, E2NE; |
| NV-19-06-053 | T.0070N, R.0520E, 21 MDM, NV Sec. 003 ALL; 004 ALL; 009 ALL; 010 ALL |
| NV-19-06-054 | T.0070N, R.0520E, 21 MDM, NV Sec. 005 PROT E2NW, NE, SE, E2SW; 008 PROT E2NW, NE, SE; |
| NV-19-06-055 | T.0070N, R.0520E, 21 MDM, NV |

| Parcel # | Legal Land Description |
|--------------|---|
| | Sec. 015 PROT NWNW; 016 PROT NW, W2NE, NENE; |
| NV-19-06-056 | T.0070N, R.0520E, 21 MDM, NV Sec. 017 PROT NWNE, E2NE, NESE; |
| NV-19-06-060 | T.0080N, R.0520E, 21 MDM, NV Sec. 003 PROT ALL; 004 PROT SESE; 009 PROT E2NE, SWNE, SE, SESW; |
| NV-19-06-061 | T.0080N, R.0520E, 21 MDM, NV Sec. 010 PROT ALL; 011 PROT ALL; 014 PROT ALL; 015 PROT ALL; |
| NV-19-06-062 | T.0080N, R.0520E, 21 MDM, NV Sec. 016 PROT ALL; 017 PROT S2SE; 020 PROT E2NE, SE; |
| NV-19-06-063 | T.0080N, R.0520E, 21 MDM, NV Sec. 021 PROT ALL; 022 PROT ALL; 023 PROT ALL; 026 PROT ALL; |
| NV-19-06-064 | T.0080N, R.0520E, 21 MDM, NV Sec. 027 PROT ALL; 028 PROT ALL; 033 PROT ALL; 034 PROT ALL; |
| NV-19-06-065 | T.0080N, R.0520E, 21 MDM, NV Sec. 029 PROT E2NE, SE, SESW; 032 PROT E2NW, E2SW, NE, SE; |
| NV-19-06-066 | T.0080N, R.0520E, 21 MDM, NV Sec. 035 PROT ALL; 036 PROT ALL; |
| NV-19-06-067 | T.0090N, R.0520E, 21 MDM, NV Sec. 001 PROT E2, E2NW, E2SW; 011 PROT SESW, SE; 012 PROT E2NW, SESW, E2; |
| NV-19-06-070 | T.0090N, R.0520E, 21 MDM, NV Sec. 014 PROT NENW, SENW, E2, SW; 013 PROT E2NW, SWNW, NE, SE, SW; 023 PROT ALL; 024 PROT ALL; |
| NV-19-06-071 | T.0090N, R.0520E, 21 MDM, NV Sec. 015 PROT E2SE; 022 PROT NENE; |
| NV-19-06-073 | T.0090N, R.0520E, 21 MDM, NV Sec. 027 PROT SESE; 034 PROT E2NE, SE, SESW; |
| NV-19-06-082 | ALL LANDS |

| Parcel # | Legal Land Description |
|-------------------------|--|
| THROUGH NV-19-06-090 | |
| NV-19-06-091 | T.0090N, R.0530E, 21 MDM, NV Sec. 022 PROT ALL; 023 PROT ALL; 026 PROT ALL; 027 PROT ALL; |
| NV-19-06-092 | T.0090N, R.0530E, 21 MDM, NV Sec. 024 PROT ALL; 025 PROT ALL; 036 PROT ALL; |
| NV-19-06-093 | T.0090N, R.0530E, 21 MDM, NV Sec. 034 PROT ALL; 035 PROT ALL; |
| NV-19-06-094 | T.0100N, R.0530E, 21 MDM, NV Sec. 007 PROT ALL; 008 PROT ALL; 017 PROT ALL; 018 PROT ALL; 020 PROT ALL; |
| NV-19-06-095 | T.0100N, R.0530E, 21 MDM, NV Sec. 009 PROT ALL; 010 PROT ALL; 011 PROT ALL; 012 PROT ALL; |
| NV-19-06-096 | T.0100N, R.0530E, 21 MDM, NV Sec. 019 PROT ALL; 030 PROT ALL; 031 PROT ALL; |
| NV-19-06-107 | T.0110N, R.0530E, 21 MDM, NV Sec. 028 PROT S2SW, S2SE; 029 PROT S2SW, S2SE; 032 PROT ALL; 033 PROT ALL; |
| NV-19-06-109 | T.0170N, R.0530E, 21 MDM, NV Sec. 028 PROT NE, N2NW, SENW; 029 PROT N2N2; |
| NV-19-06-110 | T.0090N, R.0540E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT ALL; 003 PROT ALL; |
| NV-19-06-111 | T.0090N, R.0540E, 21 MDM, NV Sec. 004 PROT ALL; 009 PROT ALL; 010 PROT ALL; |
| NV-19-06-112 | T.0090N, R.0540E, 21 MDM, NV Sec. 005 PROT ALL; 006 PROT ALL; 007 PROT ALL; |

| Parcel # | Legal Land Description |
|--------------|--|
| NV-19-06-113 | T.0090N, R.0540E, 21 MDM, NV Sec. 008 PROT ALL; 017 PROT ALL; 018 PROT ALL; |
| NV-19-06-114 | T.0090N, R.0540E, 21 MDM, NV Sec. 011 PROT ALL; 012 PROT ALL; 013 PROT ALL; 014 PROT ALL; |
| NV-19-06-115 | T.0090N, R.0540E, 21 MDM, NV Sec. 015 PROT ALL; 016 PROT ALL; 021 PROT ALL; 022 PROT ALL; |
| NV-19-06-116 | T.0090N, R.0540E, 21 MDM, NV Sec. 019 PROT ALL; 020 PROT ALL; 029 PROT ALL; 030 PROT ALL; |
| NV-19-06-117 | T.0090N, R.0540E, 21 MDM, NV Sec. 023 PROT ALL; 024 PROT ALL; 025 PROT ALL; 0026 PROT ALL; |
| NV-19-06-118 | T.0090N, R.0540E, 21 MDM, NV Sec. 027 PROT ALL; 034 PROT ALL; 035 PROT ALL; 036 PROT ALL; |
| NV-19-06-119 | T.0090N, R.0540E, 21 MDM, NV Sec. 028 PROT ALL; 031 PROT ALL; 032 PROT ALL; 033 PROT ALL; |
| NV-19-06-141 | T.0090N, R.0550E, 21 MDM, NV Sec. 001 PROT NWNW; 002 PROT NW, NE, SW, NWSE; 003 PROT ALL; |
| NV-19-06-142 | T.0090N, R.0550E, 21 MDM, NV Sec. 004 PROT ALL; 005 PROT ALL; 006 PROT ALL; |
| NV-19-06-143 | T.0090N, R.0550E, 21 MDM, NV Sec. 007 PROT ALL; 008 PROT ALL; 017 PROT ALL; 018 PROT ALL; |
| NV-19-06-144 | T.0090N, R.0550E, 21 MDM, NV Sec. 009 PROT ALL; |

| Parcel # | Legal Land Description |
|--------------|---|
| | 010 PROT NW, NE, SW, W2SE; 015 PROT NW, W2SW; 016 PROT ALL; |
| NV-19-06-145 | ALL LANDS |
| NV-19-06-147 | T.0090N, R.0550E, 21 MDM, NV Sec. 019 PROT ALL; 020 PROT ALL; 029 PROT ALL; 030 PROT ALL; |
| NV-19-06-148 | T.0090N, R.0550E, 21 MDM, NV Sec. 021 PROT NW, NE, SW, NWSE; 028 PROT ALL; |
| NV-19-06-150 | T.0090N, R.0550E, 21 MDM, NV Sec. 031 PROT ALL; 032 PROT NW, SW, W2NE, NENE; |

Stipulation – Raptor Nest Sites
(#NV-L-06-B-TL)

Stipulation: Timing Limitation. No surface activity from May 1 through July 15 within 0.5 mile of a raptor nest site which has been active within the past five years.

Objective [Purpose]: To protect raptor nesting activities necessary to maintaining the critical life stages of existing raptor populations.

Exception: The Authorized Officer may grant an exception if an environmental review determines that the action, as proposed or otherwise restricted, does not adversely affect raptor nest sites being protected by the restriction. An exception may also be granted if the proponent, BLM, and other affected interests, in consultation with Nevada Department of Wildlife, negotiate mitigation that would satisfactorily offset the anticipated impacts. An exception may be granted for actions designed to enhance the long-term utility or availability of the habitat.

Modification: The boundaries of the stipulated area may be modified if the authorized officer, in consultation with Nevada Department of Wildlife, determines that portions of the area can be occupied without adversely affecting raptor nesting activity. The dates for the timing restriction may be modified if new information indicates the dates are not valid for the leasehold. Any modification authorized by this stipulation is subject to 43 C.F.R. 3101.1-4, including provisions requiring public review for issues of major public concern, or substantial modifications.

Waiver: The stipulation may be waived if the authorized officer, in consultation with Nevada Department of Wildlife determines that the entire leasehold no longer contains raptor nest sites. Any waiver authorized by this stipulation is subject to 43 C.F.R. 3101.1-4, including provisions requiring public review for issues of major public concern, or substantial waivers.

| Parcel # | Legal Land Description |
|--------------|---|
| NV-19-06-095 | T.0100N, R.0530E, 21 MDM, NV Sec. 012 PROT E2E2; |

Stipulation – Water Resources
(#NV-B-10-B-CSU)

Stipulation: A Controlled Surface Use (CSU) stipulation will be applied to oil and gas leases and land use authorizations to avoid impacts to the following areas: 1) identified 100-year flood plains, and playas; 2) areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas. Surface disturbing activities may require special engineering design, construction and implementation measures, potentially including relocation of operations more than 200 meters to protect water resources.

Objective [Purpose]: To protect landscape features that are sensitive areas for water resource impacts, and maintain proper functioning of water resources.

Exception: The Authorized Officer may grant an exception if an environmental review determines that the action, as proposed or otherwise restricted, does not affect the resource, or could be conditioned so as to not negatively impact the water resources identified. An exception may be granted for actions designed to enhance the long-term utility or availability of the riparian habitat. An exception may also be granted when areas cannot be avoided and when engineering, best management practices, and/or design considerations are implemented to mitigate impacts to water resources.

Modification: The Authorized Officer may modify the size and shape of the restricted area if an environmental analysis indicates the actual suitability of the land for the resource differs from that in the otherwise applicable restriction. Any modification authorized by this stipulation is subject to 43 C.F.R. 3101.1-4, including provisions requiring public review for issues of major public concern, or substantial modifications.

Waiver: The restriction may be waived by the Authorized Officer pending BLM approval of a site specific study by a qualified hydrologist or engineer that finds the areas proposed for surface occupancy after construction would: 1) pass the 10-year peak flow event without erosion, 2) pass the 25-year peak flow without failed infrastructure, 3) pass the 50-year peak flow event without failure (when surface occupancy is planned for greater than 50 years), 4) not impede 100-year peak flow events, 5) not negatively impact springs or wells, and 6) any wetland impacted could be restored to their original function post occupancy.

| Parcel # | Legal Land Description |
|--------------|---|
| NV-19-06-002 | T.0150N, R.0440E, 21 MDM, NV Sec. 018 LOT 4 |
| NV-19-06-003 | T.0160N, R.0440E, 21 MDM, NV Sec. 003 SWSW; 010 SWNW, NESW, S2SE; 015 SW, NWSE, S2SE; 016 LOTS 1-4; 016 S2S2 |
| NV-19-06-004 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 017 LOT 3; 017 N2SW, NWSE; 019 SE; 020 SESE; 021 N2SW, SENW, S2NE; |
| NV-19-06-005 | T.0160N, R.0440E, 21 MDM, NV Sec. 024 NWNW; |
| NV-19-06-006 | T.0160N, R.0440E, 21 MDM, NV |

| Parcel # | Legal Land Description |
|--------------|---|
| | Sec. 030 LOT 4; 032 SWNE, NESE; 033 SWSW; |
| NV-19-06-026 | T.0030N, R.0510E, 21 MDM, NV Sec. 019 PROT W2E2; 030 PROT W2E2; |
| NV-19-06-032 | T.0110N, R.0510E, 21 MDM, NV Sec. 025 PROT S2SW; |
| NV-19-06-033 | T.0110N, R.0510E, 21 MDM, NV Sec. 036 PROT E2NW, E2SW; |
| NV-19-06-050 | T.0040N, R.0520E, 21 MDM, NV Sec. 019 LOT 2; 019 SENW; |
| NV-19-06-077 | T.0100N, R.0520E, 21 MDM, NV Sec. 030 LOT 2; 030 SENW, SWNE; |
| NV-19-06-095 | T.0100N, R.0530E, 21 MDM, NV Sec. 012 PROT E2E2; |
| NV-19-06-101 | T.0110N, R.0530E, 21 MDM, NV Sec. 004 PROT E2NW, W2SW; |
| NV-19-06-102 | T.0110N, R.0530E, 21 MDM, NV Sec. 008 PROT SENE; 009 PROT NWNW; |

Stipulation – Slopes > 30%
(#NV-B-11-A-CSU)

Stipulation: Controlled Surface Use (CSU) applies to lands with slopes greater than 30 percent. An engineering/reclamation plan must be submitted by the applicant and approved by the BLM Authorized Officer before any surface disturbance can occur. The plan must demonstrate to the Authorized Officer's satisfaction how the operator will meet the following performance standards:

- Soil stability is maintained preventing slope failure and wind or water erosion.
- The site will be stable with no evidence of accelerated erosion features.
- The rate of soil erosion will be controlled to maintain or improve soil quality and sustainability.
- The disturbed soils shall have characteristics that approximate the reference site with regard to quantitative and qualitative soil erosion indicators described in H-7100-1 Soil Inventory, Monitoring, and Management Handbook.
- Sufficient topsoil is maintained for ensuring successful final reclamation.
- Interim reclamation will be completed for producing well locations and long-term roads, including the re-spreading of all salvaged topsoil over the areas of interim reclamation.
- The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation.

Objective [Purpose]: To maintain soil productivity, provide necessary protection to prevent excessive soil erosion on lands with steep slopes, to avoid areas subject to slope failure, mass wasting, piping, or having excessive reclamation problems, and to ensure successful interim and final reclamation.

Exception: An exception may be granted by the Authorized Officer if an environmental analysis of the proposed action identifies that the scale of the operation would not result in any long term decrease in site productivity or increased erosion.

Modification: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area do not include slopes over 30 percent, or the operator can demonstrate in a plan of operations that adverse effects can be minimized. The authorized officer may modify the size and shape of the restricted area subject to the stipulation based upon a Natural Resource Conservation Service (NRCS) soil survey or BLM evaluation. The stipulation and performance standards identified above may also be modified based on negative or positive monitoring results from similar proposed actions on similar sites or increased national or state performance standards. Any modification authorized by this stipulation is subject to 43 C.F.R. 3101.1-4, including provisions requiring public review for issues of major public concern, or substantial modifications.

Waiver: This stipulation can be waived by the authorized officer if it is determined that none of the leasehold includes slopes over 30 percent. Any waiver authorized by this stipulation is subject to 43 C.F.R. 3101.1-4, including provisions requiring public review for issues of major public concern, or substantial waivers.

| Parcel # | Legal Land Description |
|---|------------------------|
| NV-19-06-010 THROUGH NV-19-06-019 | ALL LANDS |
| NV-19-06-021 THROUGH NV-19-06-25 | ALL LANDS |
| NV-19-06-027 THROUGH NV-19-06-029 | ALL LANDS |
| NV-19-06-032 THROUGH NV-19-06-033 | ALL LANDS |
| NV-19-06-036 THROUGH NV-19-06-039 | ALL LANDS |
| NV-19-06-041 THROUGH NV-19-06-050 | ALL LANDS |
| NV-19-06-053 THROUGH NV-19-06-055 | ALL LANDS |
| NV-19-06-057 THROUGH NV-19-06-059 | ALL LANDS |
| NV-19-06-061 THROUGH NV-19-06-065 | ALL LANDS |
| NV-19-06-067 THROUGH NV-19-06-094 | ALL LANDS |
| NV-19-06-102 | ALL LANDS |
| NV-19-06-104 | ALL LANDS |
| NV-19-06-107 | ALL LANDS |
| NV-19-06-110 THROUGH NV-19-06-119 | ALL LANDS |
| NV-19-06-141 THROUGH NV-19-06-145 | ALL LANDS |
| NV-19-06-147 | ALL LANDS |
| NV-19-06-150 | ALL LANDS |

**Lease Notice - NDOT Mineral Pits
(#NV-B-12-A-LN)**

The lessee accepts this lease subject to the right of the State of Nevada to remove road building material from the land embraced in Material Site No. (See below) and agrees that its operations will not interfere with the material operations of the Department of Transportation.

| Parcel # | Legal Land Description |
|--------------|---|
| NV-19-06-006 | T.0160N, R.0440E, 21 MDM, NV Sec. 032 NENW; |
| NV-19-06-043 | T.0030N, R.0520E, 21 MDM, NV Sec. 014 NENE; |
| NV-19-06-050 | T.0040N, R.0520E, 21 MDM, NV Sec. 019 LOT 4; |

**Stipulation – Sage-Grouse Habitat, PHMA
(#NV-B-16-A-NSO)**

Stipulation: No Surface Occupancy. Priority Habitat Management Areas (PHMA) outside of Sagebrush Focal Areas (SFA)-Manage oil and gas resources in Nevada as No Surface Occupancy (NSO), with two exceptions.

Objective [Purpose]: To protect Greater Sage Grouse (GRSG) in PHMA.

Exception: The Authorized Officer may grant an exception to an oil and gas lease NSO

Stipulation only where the proposed action is as one of the following:

(i) Would not have direct, indirect, or cumulative effects on GRSG or its habitat (ii) Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel and would provide a clear net conservation gain to GRSG and its habitat Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal oil and gas lease existing as of the date of ARMPA. Exceptions based on conservation gain must also include such measures as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits would endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding initially would be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding were not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state Wildlife agency head for final resolution. In the event their findings were not unanimous, the exception would not be granted. Approved exceptions would be made publicly available at least quarterly.

Modification: None.

Waiver: None

| Parcel # | Legal Land Description |
|--------------|--|
| NV-19-06-069 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 005 PROT W2SW, SWNW; 006 PROT ALL; 007 PROT N2, SE, E2SW, NWSW; 008 PROT W2; |
| NV-19-06-072 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 017 PROT W2W2, E2NW; 018 PROT E2E2; 019 PROT NENE; |
| NV-19-06-077 | T. 0100N, R. 0520E, 21 MDM, NV Sec. 031 LOTS 2-4; 031 E2SW, SWSE; |

**Stipulation – Sage-Grouse Habitat, GHMA, Near Leks
(#NV-B-16-B-TL)**

Stipulation: Timing Limitation. In General Management Habitat Areas (GHMA) No Surface Activity would be allowed within 4.0 miles of active or pending Greater Sage-Grouse (GRSG) leks from March 1 through May 15.

Objective [Purpose]: To protect GRSG lekking habitat.

Exception: The Authorized Officer may grant an exception where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat. An exception may also be granted if the proponent, the BLM, and the appropriate state agency negotiate mitigation that would provide a clear net conservation gain to GRSG and its habitat.

Modification: The Authorized Officer may modify the size and shape of the restricted area or the period of limitation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat.

Waiver: The Authorized Officer may waive the stipulation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the described lands do not contain GRSG or suitable habitat or are otherwise incapable of serving the requirements of GRSG and therefore no longer warrant consideration as a component necessary for their protection.

| Parcel # | Legal Land Description |
|--------------|---|
| NV-19-06-001 | T. 0150N, R. 0440E, 21 MDM, NV Sec. 006 LOTS 3-6; |
| NV-19-06-003 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 003 LOTS 3-4; 003 SWNW, NWSW; 016 LOTS 1-4; 016 N2SW, W2NE; |
| NV-19-06-004 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 017 LOTS 1-6; 017 W2NE, N2SW, NWSE; 019 SE; 020 LOTS 1-4 020 NWNE, S2NE, SW, NWSE; |
| NV-19-06-006 | T. 0160N, R. 044E, 21 MDM, NV Sec. 029 N2NW, SWNW; 030 LOTS 4-8; 030 NE, E2SW, N2SE, SWSE; 031 LOT 1; 031 NENW; |
| NV-19-06-069 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 007 PROT SWSW; |

| Parcel # | Legal Land Description |
|--------------|---|
| | 005 PROT N2NW, W2NE, NESW; |
| NV-19-06-072 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 018 PROT W2; 019 PROT NW, W2NE, W2SW, NESW; |
| NV-19-06-074 | T. 0100N, R. 052E, 21 MDM, NV Sec. 019 LOT 4; 019 SESW; |
| NV-19-06-077 | T. 0100N, R. 0520E, 21 MDM, NV Sec. 029 SW, SWNW; 030 LOTS 1-4; 030 E2, E2W2; 031 LOTS 1-2; 031 E2NW, NE, N2SE, SESE; 032 W2, W2NE, SWSE; |
| NV-19-06-082 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 001 PROT W2, E2SE, NESE; 002 PROT ALL; 003 PROT NE, E2SE, N2NW; |
| NV-19-06-085 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 010 PROT NENE; 015 PROT E2SE; |
| NV-19-06-086 | T.0180N, R. 0520E, 21 MDM, NV Sec. 011 PROT ALL; 012 PROT W2W2, NENW; 014 PROT SW, NW, W2NE, NENE; |
| NV-19-06-088 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 022 PROT E2NE, SENE; |
| NV-19-06-089 | T.0180N, R. 0520E, 21 MDM, NV Sec. 023 PROT NWNW; |

**Stipulation – Sage-Grouse Habitat, GHMA, Winter
(#NV-B-16-C-TL)**

Stipulation: Timing Limitation. No Surface Occupancy (NSO) would be allowed in Greater Sage-Grouse (GRSG) General Management Habitat Areas (GHMA) winter habitat from November 1 through February 28.

Objective [Purpose]: To protect GRSG winter habitat.

Exception: The Authorized Officer may grant an exception where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat. An exception may also be granted if the proponent, the BLM, and the appropriate state agency negotiate mitigation that would provide a clear net conservation gain to GRSG and its habitat.

Modification: The Authorized Officer may modify the size and shape of the restricted area or the period of limitation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat.

Waiver: The Authorized Officer may wave the stipulation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the described lands do not contain GRSG or suitable habitat or are otherwise incapable of serving the requirements of GRSG and therefore no longer warrant consideration as a component necessary for their protection.

| Parcel # | Legal Land Description |
|--------------|--|
| NV-19-06-001 | T. 0150N, R. 0440E, 21 MDM, NV Sec. 006 LOTS 3-5; |
| NV-19-06-003 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 003 LOT 4; 003 SWNW; 016 LOTS 1-4; 016 N2SW; |
| NV-19-06-004 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 017 LOTS 1-6; 017 W2NE, N2SW, NWSE; 019 SE; 020 LOTS 1-4; 020 W2NE, SW, N2SE, NWSE; |
| NV-19-06-006 | T. 0160N, R. 044E, 21 MDM, NV Sec. 029 NWNW; 030 LOTS 3-8; 030 NE, E2SW, W2SE, NESE; 031 LOT 1; 031 NENW; |
| NV-19-06-033 | T. 0110N, R. 0510E, 21 MDM, NV Sec. 036 PROT S2S2; |
| NV-19-06-069 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 007 PROT SWSW; 005 PROT N2NW, SENW, W2NE, NESW; |
| NV-19-06-072 | T. 0090N, R. 0520E, 21 MDM, NV |

| Parcel # | Legal Land Description |
|--------------|---|
| | Sec. 018 PROT W2; 019 PROT NW, W2NE, W2SW, NESW; |
| NV-19-06-074 | T. 0100N, R. 052E, 21 MDM, NV Sec. 018 LOT 4; 019 LOTS 1-4; 019 E2W2, SE, W2NE, SENE; |
| NV-19-06-077 | T. 0100N, R. 0520E, 21 MDM, NV Sec. 029 W2SW, SWNW; 030 LOTS 1-4; 030 E2,E2W2; 031 LOT 1; 031 E2NW, NE, N2SE, SESE; 032 W2; |
| NV-19-06-082 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 001 PROT W2, E2SE; 002 PROT ALL; 003 PROT NE, E2SE, NENW; |
| NV-19-06-086 | T.0180N, R. 0520E, 21 MDM, NV Sec. 011 PROT N2, SE, E2SW; 012 PROT W2W2; 014 PROT SW, SWNW, E2NW, N2NE, SWNE; |
| NV-19-06-088 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 022 PROT NENE; |
| NV-19-06-089 | T.0180N, R. 0520E, 21 MDM, NV Sec. 023 PROT NWNW; |
| NV-19-06-109 | T. 0170N, R. 0530E, 21 MDM, NV Sec. 029 W2W2, NENW; |

**Stipulation – Sage-Grouse Habitat, GHMA, Early Brood-Rearing
(#NV-B-16-D-TL)**

Stipulation: Timing Limitation. No Surface Occupancy (NSO) would be allowed in Greater Sage-Grouse (GRSG) early brood-rearing habitat from May 15 through June 15.

Objective [Purpose]: To provide seasonal protection to GRSG early brood-rearing habitat in General Management Habitat Areas (GHMA).

Exception: The Authorized Officer may grant an exception where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat. An exception may also be granted if the proponent, the BLM, and the appropriate state agency negotiate mitigation that would provide a clear net conservation gain to GRSG and its habitat.

Modification: The Authorized Officer may modify the size and shape of the restricted area or the period of limitation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat.

Waiver: The Authorized Officer may wave the stipulation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the described lands do not contain GRSG or suitable habitat or are otherwise incapable of serving the requirements of GRSG and therefore no longer warrant consideration as a component necessary for their protection.

| Parcel # | Legal Land Description |
|--------------|--|
| NV-19-06-033 | T. 0110N, R. 0510E, 21 MDM, NV Sec. 036 PROT S2SW; |
| NV-19-06-082 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 001 PROT W2, E2SE; 002 PROT ALL; 003 PROT NE, E2SE, NENW; |
| NV-19-06-086 | T.0180N, R. 0520E, 21 MDM, NV Sec. 011 PROT N2, SE, E2SW; 012 PROT W2W2; 014 PROT SW, SWNW, E2NW, N2NE, SWNE; |
| NV-19-06-088 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 022 PROT NENE; |
| NV-19-06-089 | T.0180N, R. 0520E, 21 MDM, NV Sec. 023 PROT NWNW; |
| NV-19-06-109 | T. 0170N, R. 0530E, 21 MDM, NV Sec. 029 PROT W2W2, NENW; |

**Stipulation – Sage-Grouse Habitat, GHMA, Late Brood-Rearing
(#NV-B-16-E-TL)**

Stipulation: Timing Limitation. No Surface Occupancy (NSO) would be allowed in Greater Sage-Grouse (GRSG) late brood-rearing habitat from June 15 through September 15 in GHMA.

Objective [Purpose]: To provide seasonal protection to GRSG late brood-rearing habitat.

Exception: The Authorized Officer may grant an exception where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat. An exception may also be granted if the proponent, the BLM, and the appropriate state agency negotiate mitigation that would provide a clear net conservation gain to GRSG and its habitat.

Modification: The Authorized Officer may modify the size and shape of the restricted area or the period of limitation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat.

Waiver: The Authorized Officer may wave the stipulation where an environmental review and consultation with the Nevada Department of Wildlife & Sagebrush Ecosystem Technical Team determines that the described lands do not contain GRSG or suitable habitat or are otherwise incapable of serving the requirements of GRSG and therefore no longer warrant consideration as a component necessary for their protection.

| Parcel # | Legal Land Description |
|--------------|--|
| NV-19-06-001 | T. 0150N, R. 0440E, 21 MDM, NV Sec. 006 LOTS 3-5; |
| NV-19-06-003 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 003 LOT 4; 003 SWNW; 016 LOTS 1-4; 016 N2SW; |
| NV-19-06-004 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 017 LOTS 1-6; 017 W2NE, N2SW, NWSE; 019 SE; 020 LOTS 1-4; 020 W2NE, SW, NWSE; |
| NV-19-06-006 | T. 0160N, R. 044E, 21 MDM, NV Sec. 029 NWNW; 030 LOTS 3-8; 030 NE, E2SW, W2SE, NESE; 031 LOT 1; 031 NENW; |
| NV-19-06-033 | T. 0110N, R. 0510E, 21 MDM, NV Sec. 036 PROT S2S2 |
| NV-19-06-069 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 007 PROT SWSW; |

| Parcel # | Legal Land Description |
|--------------|---|
| | 005 PROT N2NW, SENW, W2NE, NESW; |
| NV-19-06-072 | T. 0090N, R. 0520E, 21 MDM, NV Sec. 018 PROT W2; 019 PROT NW, W2NE, W2SW, NESW; |
| NV-19-06-074 | T. 0100N, R. 052E, 21 MDM, NV Sec. 018 LOT 4; 019 LOTS 1-4; 019 E2W2, SE, W2NE, SENE; |
| NV-19-06-077 | T. 0100N, R. 0520E, 21 MDM, NV Sec. 029 W2SW, SWNW; 030 LOTS 1-4; 030 E2,E2W2; 031 LOT 1; 031 E2NW, NE, N2SE, SESE; 032 W2; |
| NV-19-06-082 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 001 PROT W2, E2SE; 002 PROT ALL; 003 PROT NE, E2SE, N2NW; |
| NV-19-06-086 | T.0180N, R. 0520E, 21 MDM, NV Sec. 011 PROT N2, SE, E2SW; 012 PROT W2W2; 014 PROT 014 PROT SW, SWNW, E2NW, N2NE; |
| NV-19-06-088 | T. 0180N, R. 0520E, 21 MDM, NV Sec. 022 PROT NENE; |
| NV-19-06-089 | T.0180N, R. 0520E, 21 MDM, NV Sec. 023 PROT NWNW; |
| NV-19-06-109 | T. 0170N, R. 0530E, 21 MDM, NV Sec. 029 W2W2, NENW; |

Stipulation – Sage-Grouse Habitat, Noise Near Leks
(#NV-B-16-F-CSU)

Stipulation: Control Surface Use (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 miles from active and pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season from March 1 to May 15.

Objective [Purpose]: To protect Greater Sage Grouse (GRSG) lek sites by implementing noise restrictions near leks in General Management Habitat Areas (GHMA).

Exception: None **Modification:** None **Waiver:** None

| Parcel # | # Leks | Legal Land Description | Lek Status 2017 |
|--------------|--------|--|-----------------|
| NV-19-06-004 | 1 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 017 W2NE, NESW, NWSE; | Unknown |

**Stipulation – Sage-Grouse Habitat, GHMA, Lek Buffer Distances
(#NV-B-16-G-CSU)**

Stipulation: Control Surface Use (CSU). In General Management Habitat Areas (GHMA), the BLM will apply lek buffer distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer distances is as follows:

- Linear features (roads) within 3.1 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks
- Tall structures (e.g., communication or transmission towers and transmission lines) within 2 miles of leks
- Low structures (e.g., fences and rangeland structures) within 1.2 miles of leks
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks
- Noise and related disruptive activities, including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.

Objective [Purpose]: To protect GRSG leks.

Exception: Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations and state regulations) may be appropriate for determining activity impacts. The USGS report recognized “that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range.” The USGS report also states that “various protection measures have been developed and implemented... [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands.” All variations in lek buffer distances will require appropriate analysis and disclosure as part of activity authorization.

Modification: None

Waiver: None

| Parcel # | # Leks | Legal Land Description | Lek Status 2017 |
|--------------|--------|--|-----------------|
| NV-19-06-001 | 1 | T.0150N, R. 0440E, 21 MDM, NV Sec. 006 LOTS 3-6; | Unknown |
| NV-19-06-003 | 2 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 003 LOT 3-4; 003 SWNE, NWSW; 016 LOTS 1-4; 016 N2SW, W2NE; | Unknown |
| NV-19-06-004 | 2 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 017 LOTS 1-6; 017 W2NE, N2SW, NWSE; 019 SE; | Unknown |

| Parcel # | # Leks | Legal Land Description | Lek Status 2017 |
|--------------|--------|---|-----------------|
| | | 020 LOTS 1-4; 020 NWNE, S2NE, SW, NWSE; | |
| NV-19-06-006 | 2 | T. 0160N, R. 0440E, 21 MDM, NV Sec. 029 N2NW, SWNW; 030 LOTS 3-8; 030 NE, E2SW, W2SE, NESE; 031 LOT 1; 031 NENW; | Unknown |

Appendix C: Soil Types and Biotic Communities

Soil Types in the Analysis Area

Aridisols are soils that are too dry for the growth of mesophytic plants. The lack of moisture greatly restricts the intensity of weathering processes and limits most soil development processes affecting the uppermost layers of the soils. These soils often accumulate gypsum, salt, calcium carbonate, and other materials that are easily leached from soils in more humid environments. They have properties typical of soils in arid regions and are low in organic matter. Aridisols are mainly found in valley bottoms, but may occur at higher elevations. They do not have water continuously available during the growing season and typically have a water stress period of about 3 months. Aridisols tend to have a finer texture than the other two orders.

Entisols are found on recent landscapes, such as alluvium and disturbed sites. Soil texture tends to be more gravelly and well drained. Entisols are mineral soils that are very young and have not yet developed appreciable accumulations of soluble salts and lime. Soil horizon development is typically minimal. They occur in both the valley bottoms and higher elevations. In the mountains these tend to make up the steeper, more erodible soils, whereas at lower elevation they tend to be found in areas of deposition such as alluvial fans and floodplains. Though these sites are typically xeric, they are not as dry as the Aridisols.

Mollisols are found on dark-colored fertile surface horizons that have been formed under semiarid to sub-humid climate. Moisture availability is typically the highest in this soil type as compared to those previously mentioned. These soils are rich in organic matter and are very fertile due to the available moisture. In the project area, these soils mainly form on mountain slopes, producing healthy grass and forb communities. These soils are older and generally occur on more stable alluvial fans and terraces which have a higher degree of stability due to the increased vegetative structure.

Microbiotic crusts are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria found throughout the Great Basin and Project Area. Cyanobacterial and microfungi filaments weave through the top few millimeters of soil, gluing loose particles together and forming a matrix that stabilizes and protects soil surfaces from erosive forces. Microbiotic crusts retain soil moisture, discourage invasion by annual species, reduce wind and water erosion, fix atmospheric nitrogen and contribute to soil organic matter. These crusts can be impacted by surface disturbing activities. With greater the disturbance, there are greater impacts and more time is required for recovery of these sites. Microbiotic crusts can also be indirectly impacted from increased erosion, whether eroded away or covered by soil from wind or water events. Slight covering by soil does not affect microbiotic crusts (Technical Reference 1730-2, 2001).

Plant Communities in the Analysis Area

Sodic Flats / Flood Plains: This community occurs on floodplains, closed-basin bottomlands adjacent to playas, and alluvial flats. Greasewood is located on slopes that range from 0-2% with an elevation of 4500-5,000 feet and occurs in precipitation zones of 3-5 and 5-8 inches. Vegetation in this type is normally restricted to mounded areas that are surrounded by playa-like depressions or nearly level, usually barren, interspaces. The soil moisture regime is aquic. This plant community is characterized by black greasewood (*Sarcobatus vermiculatus*), Basin wildrye (*Leymus cinereus*), inland saltgrass

(*Distichlis spicata*) and alkali sacaton (*Sporobolus airoides*). Saltgrass may extend into the interspace in some areas. Potential vegetative composition is typically 25% grasses, 5% forbs and 70% shrubs.

Salt Desert Shrub: This vegetative community occurs on alluvial terraces, fans and foothills on all aspects. Salt desert shrubs are located on slopes of 0-30%, with 0-8% slopes the most typical. Salt Desert Shrub occurs at elevations between 4500 and 6000 feet and within precipitation zones of 3-5 and 5-8 inches. The plant community is characterized by shadscale (*Atriplex confertifolia*), bud sagebrush (*Artemisia spinescens*) and some winterfat (*Krascheninnikovia lanata*). Bud sagebrush and winterfat are palatable salt desert shrub species. Bottlebrush squirreltail (*Elymus elymoides*) and Indian ricegrass (*Achnatherum hymenoides*) are key grass species associated with this vegetative community. Alkali meadows are included in this plant community and consist of inland saltgrass and basin wildrye. Potential vegetative composition is typically 10% grasses, 5% forbs and 85% shrubs.

Big Sagebrush: This is the most extensive community within the Analysis Area. It occurs on terraces, alluvial fans and low rolling hills on all exposures. Wyoming sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*) and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) occur on slopes of 2-50 percent with elevations ranging from 4500 to 6000 feet and within the 8-12 inch precipitation zone. This plant community is characterized by Wyoming and Basin big sagebrush, Thurber's needlegrass (*Achnatherum thurberianum*), Indian ricegrass, Basin wildrye, bottlebrush squirreltail and Sandberg's bluegrass (*Poa secunda*). Arrowleaf balsamroot (*Balsamorhiza sagittata*) and Tapertip hawksbeard (*Crepis acuminata*) are important forb species associated with this vegetation type. Potential vegetative composition is typically 50% grasses, 15% forbs and 35% shrubs.

Black Sagebrush: This vegetative community occurs on low arid foothills, mountain side slopes and plateaus. Black sagebrush (*Artemisia nova*) occurs on slopes of 4-50% with elevations ranging from 5000 to 7000 feet and is associated with the 4-8 inch precipitation zone. Soils are often shallow over a calcareous pan, which limits effective water holding capacity and seeding success. Vegetation that characterizes this community consists of black sagebrush, bottlebrush squirreltail and Sandberg's bluegrass. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is characteristic for communities that occur in the higher elevations. Potential vegetative composition is typically 50% grasses, 15% forbs and 35% shrubs.

Low Sagebrush: This vegetative community occurs on mountain side slopes and plateaus. Low sagebrush occurs on slopes of 4-75% with elevations ranging from 5000 to 9000 feet and is associated with the 8-12 inch precipitation zone. Soils are often shallow over a calcareous pan, which limits effective water holding capacity and seeding success. This vegetative community is characterized by low sagebrush (*Artemisia arbuscula*), bottlebrush squirreltail, Sandberg's bluegrass and bluebunch wheatgrass. Potential vegetative composition is typically 50% grasses, 15% forbs and 35% shrubs.

Mountain Brush: This community occurs on upland terraces and inset mountain valleys on all slope aspects. Mountain brush occurs on slopes of 4-50% with elevations ranging from 6000 to 9000 feet. These communities generally occur within the 12+ inch precipitation zone. The vegetative community is characterized by Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass, snowberry (*Symphoricarpos albus*), antelope bitterbrush (*Purshia tridentata*) and serviceberry (*Amelanchier utahensis*). Mountain brome (*Bromus carinatus*), mountain spray (*Holodiscus discolor*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) are other

species associated with this community. Potential vegetative composition is typically 55% grasses, 15% forbs and 30% shrubs.

Pinyon-Juniper Woodlands: This community occurs on upper alluvial fans and in the higher mountainous regions with slopes of 30-50%. Elevations range from 5500 to 9000 feet. This community occurs within the 10-22 inch precipitation zone. Lower elevation (up to 6500 feet) communities are dominated by juniper, mid elevations (6500-7500 feet) by both pinyon and juniper, and high elevations (above 7500 feet) are predominately pinyon pine. These plant communities are characterized by single-leaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*). There are localized ecosystems which support other juniper species such as common juniper (*Juniperus communis*) and Rocky Mountain juniper (*Juniperus scopulorum*). The understory, although sparse, consists of bluebunch wheatgrass, Sandberg's bluegrass, Thurber's needlegrass, basin wildrye and needle-and-thread grass (*Hesperostipa comata*). Juniper and pinyon trees dominate these areas; however, mountain big sagebrush, antelope bitterbrush and curl-leaf mountain mahogany can be found within the community. Heavily wooded areas provide little forage and have a large amount of bare ground. Potential vegetative composition is typically 40% grasses, 15% forbs and 45% shrubs and trees.

Riparian/Wetlands: Wetlands and small riparian communities occur within the project area and are associated with reservoirs, streams, springs and seeps where water is at or near the surface for the majority of the year. Species associated with this community include willow (*Salix* spp.), Kentucky bluegrass (*Poa pratensis*), curly dock (*Rumex crispus*), rabbit's foot grass (*Polypogon monspeliensis*), rushes (*Juncus* spp.) and sedges (*Carex* spp.). Potential vegetative composition is typically 70% grasses and grass-like species, 25% forbs and 5% shrubs.

Winterfat Bottoms: Winterfat communities generally occur in flats of drainage and flood plains. They typically occur in areas where slopes range from 0-2%. The elevation of this community ranges from 4000-6000 feet and within precipitation zones of 5-8 inches. Soils are typically sandy loam. The plant community is characterized and dominated by winterfat. It also includes vegetation such as bud sagebrush, Indian ricegrass and squirreltail. Potential vegetative composition is typically 10% grasses, 5% forbs and 85% shrubs.

Annuals: Although this vegetation type is not considered an ecological type, it is a plant community that accounts for portions of the project area. Areas that have been disturbed may be invaded by invasive annual species, sometimes to the exclusion of native species. Dominant plants are cheatgrass (*Bromus tectorum*) and/or halogeton (*Halogeton glomeratus*). Other plants often present in these areas are Russian thistle (*Salsola tragus*), clasping pepperweed (*Lepidium perfoliatum*), tumble mustard (*Sisymbrium altissimum*) and Russian knapweed (*Centaurea repens*).

Riparian Woodland Species in the Analysis Area

Cottonwoods (*Populus* spp.) are deciduous hardwood poplars belonging to the willow family. They are found naturally in riparian areas along stream banks, on the periphery of springs and ponds, and planted in agricultural areas within the lease area. These native cottonwoods rapidly grow to heights of greater than 80 feet with girths up to five feet, and are relatively short-lived (150 years). They can regenerate both from sprouting and seed. These species can also be propagated by transplanting suckers or small limbs. Currently, the Battle Mountain District protects the trees from any type of harvesting, including deadwood.

Willows (*Salix* spp.) are hardwood members of the Salicaceae family with deciduous foliage and affinities for riparian habitats with high water tables. Ranging in height from ten to 40 feet, there are more individual species of willow than any other hardwood found in the Analysis Area. Like their poplar relatives, they require relatively large, consistent amounts of water to thrive and regenerate. They are not legally harvested in the Battle Mountain District. In the Analysis Area, willows can be found in monotypic communities or associated with other riparian vegetation such as sedge, rush and poplars.

Migratory Bird Communities in the Analysis Area

Species commonly occurring in pinyon-juniper habitats and that are known to occur or have the potential to occur in the Analysis Area include the pinyon jay, western bluebird, Virginia's warbler, black-throated gray warbler and Scott's oriole. Sage thrasher, Brewer's sparrow and sage sparrow are sagebrush obligates, while loggerhead shrike and green-tailed towhee also have potential to occur in the sagebrush habitats. The Analysis Area includes riparian vegetation associated with wetlands, seeps and springs; these features are prominent in numerous proposed lease parcels. Many songbird species are heavily dependent on healthy riparian systems. Seventy-seven bird species have been identified as either riparian obligate or riparian dependent in the western United States (Rich 2002) and these communities are requisite for a diverse migratory bird community. A list of common migratory bird species known to occur in the vicinity of the project, compiled from review of various sources (Audubon, BLM, e-bird, NDOW, NHP, USFWS), includes Western meadowlark, sage sparrow, horned lark, barn swallow, mountain chickadee, Western tanager, spotted towhee, yellow warbler, Western wood peewee, killdeer, loggerhead shrike, eastern kingbird, western bluebird and common raven. The Analysis Area also includes playas, which if consistently flooded during the breeding season may provide breeding habitat for snowy plover, a BLM Nevada Sensitive species; and even if only occasionally flooded, would then provide feeding and stopover habitat for migrating shorebirds and waterfowl.

Wild Horse Habitat Management Areas (HMAs) in the Assessment Area

The Battle Mountain District administers 28 HMAs encompassing approximately 3.6 million acres of public land. Two other HMAs within the district boundary are administered by adjoining Districts. The Battle Mountain District also cooperatively manages several United States Forest Service (USFS) Wild Horse or Burro Territories (WHTs and WBTs). The estimated Battle Mountain District population as of January 1, 2018 is approximately 8,742 wild horses and 982 wild burros.

HMAs are areas identified in Resource Management Plans for long term management of wild horses or burros and are designated "Special Management Areas." Many HMAs encompass mountain ranges and include mountain browse, meadow, mahogany and pinyon and juniper vegetation types interspersed with perennial and ephemeral streams and springs. Wild horses and burros also use sparsely vegetated, rocky terrain and habitat and water sources may be limiting. Winter habitat typically consists of valley bottoms and lower elevations that support Wyoming big sagebrush, winterfat or other salt desert shrub vegetation. See the Vegetation (3.2.5) and Water (3.2.4) sections of this EA for descriptions of these resources which comprise the habitat for wild horses. No burro HMAs are included in the Analysis Area for this EA.

Wild horse and burro populations generally move throughout or between HMAs in response to a number of factors. Wild horse and burro distribution throughout HMAs varies greatly throughout the year and is influenced by forage and water availability, as well as climatic factors such as precipitation and temperature. Demographic factors such as population size and resulting animal density (competition) also

influence herd movement and distribution. Lastly, human presence causes disturbance due to OHV use, roads, mining, exploration, recreation and other uses that occur on the public lands. The Battle Mountain District has identified Core Use Areas within the HMAs which indicates where animals have been observed most consistently since inventory flights began in the 1970s and particularly within the past 20 years. These Core Use Areas can assist management in understanding what areas provide the more preferred habitat for the wild horses, as well as monitor changes in distribution or use patterns over time.

Management of wild horses involves periodic inventory activities, typically completed with helicopter, and on the ground monitoring of habitat, animal health and distribution. Wild horses foal primarily in the spring, with the peak foaling season considered March 1 through June 30. Throughout the Battle Mountain District, populations typically increase by 10-22% annually. Appropriate Management Levels (AMLs) have been established for all HMAs administered by the District. When inventory and other data indicate that the AMLs have been exceeded, gathers are planned to reduce the populations within HMAs to the AML in order to prevent deterioration of the range associated with an overpopulation of wild horses or burros. Fertility control treatments are often administered to help slow population growth rates.

Table 10. Fish Creek HMA proposed lease parcels.

| HMA | Parcel Acreage | Parcel Acreage in HMA |
|------------|----------------|-----------------------|
| Fish Creek | 1981 | All |
| Fish Creek | 1952 | All |
| Fish Creek | 2560 | All |
| Fish Creek | 2560 | All |
| Fish Creek | 1987 | All |
| Fish Creek | 2560 | All |
| Fish Creek | 1920 | All |
| Fish Creek | 1280 | All |
| Fish Creek | 2560 | 476 |

Table 11. Hickison Burro HMA, proposed lease parcels.

| HMA | Parcel Acreage | Parcel Acreage in HMA |
|----------|----------------|-----------------------|
| Hickison | 1868 | All |
| Hickison | 1278 | All |
| Hickison | 1232 | All |

Table 12. Pancake HMA proposed lease parcels.

| HMA | Parcel Acreage | Parcel Acreage in HMA |
|---------|----------------|-----------------------|
| Pancake | 344 | All |

Table 13. Reveille HMA proposed lease parcels.

| HMA | Parcel Acreage | Parcel Acreage in HMA |
|----------|----------------|-----------------------|
| Reveille | 2543 | 213 |
| Reveille | 2537 | 1016 |

Table 14. Sand Springs West HMA proposed lease parcels.

| HMA | Parcel Acreage | Parcel Acreage in HMA |
|-------------------|----------------|-----------------------|
| Sand Springs West | 2558 | 1816 |
| Sand Springs West | 2557 | 2496 |
| Sand Springs West | 2318 | 501 |
| Sand Springs West | 2360 | 195 |
| Sand Springs West | 1341 | 51 |
| Sand Springs West | 2040 | 855 |
| Sand Springs West | 2559 | All |
| Sand Springs West | 2554 | 752 |
| Sand Springs West | 2560 | All |
| Sand Springs West | 2558 | All |
| Sand Springs West | 2382 | 427 |
| Sand Springs West | 1280 | 1280 |
| Sand Springs West | 2556 | 804 |
| Sand Springs West | 2556 | 2230 |
| Sand Springs West | 2554 | 39 |
| Sand Springs West | 2554 | 219 |
| Sand Springs West | 2557 | All |
| Sand Springs West | 2417 | All |
| Sand Springs West | 1279 | All |
| Sand Springs West | 2080 | 2065 |
| Sand Springs West | 1916 | 1893 |
| Sand Springs West | 2557 | 1440 |
| Sand Springs West | 2057 | All |
| Sand Springs West | 1965 | All |
| Sand Springs West | 1974 | All |
| Sand Springs West | 1902 | All |
| Sand Springs West | 2559 | All |
| Sand Springs West | 2559 | All |
| Sand Springs West | 2529 | All |

| HMA | Parcel Acreage | Parcel Acreage in HMA |
|-------------------|----------------|-----------------------|
| Sand Springs West | 2560 | All |
| Sand Springs West | 2561 | All |
| Sand Springs West | 2546 | All |
| Sand Springs West | 2017 | 1057 |
| Sand Springs West | 1993 | All |
| Sand Springs West | 2555 | All |
| Sand Springs West | 2561 | 1893 |
| Sand Springs West | 2558 | 2527 |
| Sand Springs West | 2560 | 454 |
| Sand Springs West | 1965 | 1017 |

Table 15. Stone Cabin HMA, proposed lease parcels.

| HMA | Parcel Acreage | Parcel Acreage in HMA |
|-------------|----------------|-----------------------|
| Stone Cabin | 2538 | 535 |
| Stone Cabin | 1939 | 89 |
| Stone Cabin | 1916 | 1132 |
| Stone Cabin | 2543 | 22 |
| Stone Cabin | 1211 | 456 |

Appendix D: Special Status Species List

All species listed here are Nevada BLM Sensitive Species as designated by the State Director, and are identified on the State Director's list as occurring in the Battle Mountain District, as of October 1 2017. Criteria set forth in the BLM 6840 Manual for designating sensitive species are:

1. Species designated as Bureau sensitive must be native species found on BLM administrated lands for which BLM has the capability to significantly affect the conservation status of the species through management, and either:
 - a. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range, or
 - b. The species depends on ecological refugia or specialized or unique habitats on BLM-administrated lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.
2. All federally designated candidate species, proposed species, and delisted species in the 5 years following their delisting shall be conserved as Bureau sensitive species.

Species listed by U.S. Fish and Wildlife Service under the Endangered Species Act are identified in the first part of the table below (all are also Nevada BLM Sensitive species).

| Battle Mountain District <i>Endangered and Threatened</i> Species List | | |
|---|--|----------------|
| Common Name | Scientific Name | Federal Status |
| Plants (4) | | |
| Spring-loving centaury | <i>Centarium namophilum</i> | Threatened |
| Ash Meadows mousetails | <i>Ivesia kingii</i> var. <i>eremica</i> | Threatened |
| Armagosa niterwort | <i>Nitrophila mohavensis</i> | Endangered |
| Whitebark pine | <i>Pinus albicaulis</i> | Candidate |
| Birds (3) | | |
| Western yellow-billed cuckoo | <i>Coccyzus americanus occidentalis</i> | Threatened |
| Southwestern willow flycatcher | <i>Empidonax trailii extimus</i> | Endangered |
| Ridgway's rail (Yuma clapper rail) | <i>Rallus obsoletus yumanensis</i> | Endangered |
| Reptile (1) | | |
| Desert Tortoise | <i>Gopherus agassizii</i> | Threatened |
| Fish (2) | | |
| Railroad Valley springfish | <i>Crenichthys nevadae</i> | Threatened |
| Lahontan cutthroat trout | <i>Oncorhynchus clarkii henshawi</i> | Threatened |

| Battle Mountain District <i>Special Status</i> Plant Species List (32) | |
|---|---|
| Common Name | Scientific Name |
| Eastwood milkweed | <i>Asclepias eastwoodiana</i> |
| Cima milkvetch | <i>Astragalus cimae</i> var. <i>cimae</i> |
| Tonopah milkvetch | <i>Astragalus pseudiodanthus</i> |
| Toquima milkvetch | <i>Astragalus toquimanus</i> |
| Currant milkvetch | <i>Astragalus uncialis</i> |
| Elko rockcress | <i>Boechera falcifructa</i> |
| Monte Neva paintbrush | <i>Castilleja salsuginosa</i> |
| Tecopa birdbeak | <i>Cordylanthus tecopensis</i> |
| Mojave (Virgin River) thistle | <i>Cirsium mohavense</i> (<i>C. virginense</i>) |
| Goodrich biscuitroot | <i>Cymopterus goodrichii</i> |
| Nevada willowherb | <i>Epilobium nevadense</i> |
| Windloving buckwheat | <i>Eriogonum anemophilum</i> |
| Beatley buckwheat | <i>Eriogonum beatleyae</i> |
| Deeth buckwheat | <i>Eriogonum nutans</i> var. <i>glabratum</i> |
| Tiehm buckwheat | <i>Eriogonum tiehmii</i> |
| Sand cholla | <i>Grusonia pulchella</i> |
| Alkali ivesia | <i>Ivesia kingii</i> var. <i>kingii</i> |
| Lunar Crater buckwheat | <i>Johanneshowellia crateriorum</i> |
| Davis peppergrass | <i>Lepidium davisii</i> |
| Holmgren lupine | <i>Lupinus holmgrenianus</i> |
| Low feverfew | <i>Parthenium ligulatum</i> |
| Pahute Mesa beardtongue | <i>Penstemon pahutensis</i> |
| Lahontan beardtongue | <i>Penstemon palmeri</i> var. <i>macranthus</i> |
| Bashful beardtongue | <i>Penstemon pudicus</i> |
| Tiehm beardtongue | <i>Penstemon tiehmii</i> |
| Clarke phacelia | <i>Phacelia filiae</i> |
| Reese River phacelia | <i>Phacelia glaberrima</i> |
| Williams combleaf | <i>Polycytenium williamsiae</i> |
| Blaine pincushion | <i>Sclerocactus blainei</i> |
| Nye (Tonopah) pincushion | <i>Sclerocactus nyensis</i> |
| Railroad Valley globemallow | <i>Sphaeralcea caespitosa</i> var. <i>williamsiae</i> |
| Lone Mountain goldenheads | <i>Tonestus graniticus</i> |

| Battle Mountain District <i>Special Status</i> Animal Species List | |
|---|--------------------------------------|
| Common Name | Scientific Name |
| BIRDS (26) | |
| Northern goshawk | <i>Accipiter gentilis</i> |
| Golden eagle | <i>Aquila chrysaetos</i> |
| Short-eared owl | <i>Asio flammeus</i> |
| Burrowing owl | <i>Athene cunicularia</i> |
| Ferruginous hawk | <i>Buteo regalis</i> |
| Swainson's hawk | <i>Buteo swainsoni</i> |
| Greater sage-grouse | <i>Centrocercus urophasianus</i> |
| Western snowy plover (not protected Pacific Coast DPS) | <i>Charadrius nivosus nivosus</i> |
| Great Basin willow flycatcher | <i>Empidonax traillii odastus</i> |
| Peregrine falcon | <i>Falco peregrinus</i> |
| Sandhill crane | <i>Antigone canadensis</i> |
| Pinyon jay | <i>Gymnorhinus cyanocephalus</i> |
| Bald eagle | <i>Haliaeetus leucocephalus</i> |
| Least bittern | <i>Ixobrychus exilis</i> |
| Loggerhead shrike | <i>Lanius ludovicianus</i> |
| Black rosy-finch | <i>Leucosticte atrata</i> |
| Gray-crowned rosy-finch | <i>Leucosticte tephrocotis</i> |
| Lewis' woodpecker | <i>Melanerpes lewis</i> |
| Long-billed curlew | <i>Numenius americanus</i> |
| Mountain quail | <i>Oreortyx pictus</i> |
| Sage thrasher | <i>Oreoscoptes montanus</i> |
| Phainopepla | <i>Phainopepla nitens</i> |
| Flammulated owl | <i>Psiloscops flammeolus</i> |
| Brewer's sparrow | <i>Spizella breweri</i> |
| Crissal thrasher | <i>Toxostoma crissale</i> |
| LeConte's thrasher | <i>Toxostoma lecontei</i> |
| FISH (9) | |
| Big Smoky Valley speckled dace | <i>Rhinichthys osculus lariversi</i> |
| Monitor Valley speckled dace | <i>Rhinichthys osculus</i> ssp. 5 |
| Oasis Valley speckled dace | <i>Rhinichthys osculus</i> ssp. 6 |
| Fish Lake Valley tui chub | <i>Siphateles bicolor</i> ssp. 4 |
| Hot Creek Valley tui chub | <i>Siphateles bicolor</i> ssp. 5 |
| Little Fish Lake Valley tui chub | <i>Siphateles bicolor</i> ssp. 6 |
| Railroad Valley tui chub | <i>Siphateles bicolor</i> ssp. 7 |
| Big Smoky Valley tui chub | <i>Siphateles bicolor</i> ssp. 8 |
| Charnock Ranch (Charnock Springs) tui chub | <i>Siphateles bicolor</i> ssp. 10 |
| MAMMALS (31) | |
| Pallid bat | <i>Antrozous pallidus</i> |
| Pygmy rabbit | <i>Brachylagus idahoensis</i> |
| Desert pocket mouse | <i>Chaetodipus penicillatus</i> |
| Townsend's big-eared bat | <i>Corynorhinus townsendii</i> |
| Big brown bat | <i>Eptesicus fuscus</i> |
| Spotted bat | <i>Euderma maculatum</i> |
| Greater western mastiff bat | <i>Eumops perotis</i> |
| Allen's big-eared (lappet-browed) bat | <i>Idionycteris phyllotis</i> |

| Battle Mountain District <i>Special Status</i> Animal Species List | |
|---|--|
| Common Name | Scientific Name |
| Silver-haired bat | <i>Lasionycteris noctivagans</i> |
| Western red bat | <i>Lasiurus blossevillei</i> |
| Hoary bat | <i>Lasiurus cinereus</i> |
| Dark kangaroo mouse (includes Desert Valley and Fletcher) | <i>Microdipodops megacephalus</i> ssp. |
| Pale kangaroo mouse | <i>Microdipodops pallidus</i> |
| Pahranagat Valley montane vole | <i>Microtus montanus fucosus</i> |
| California myotis | <i>Myotis californicus</i> |
| Western small-footed myotis | <i>Myotis ciliolabrum</i> |
| Long-eared myotis | <i>Myotis evotis</i> |
| Little brown bat | <i>Myotis lucifugus</i> |
| Fringed myotis | <i>Myotis thysanodes</i> |
| Cave myotis | <i>Myotis velifer</i> |
| Long-legged myotis | <i>Myotis volans</i> |
| Yuma myotis | <i>Myotis yumanensis</i> |
| Big free-tailed bat | <i>Nyctinomops macrotis</i> |
| Canyon bat (formerly western pipistrelle) | <i>Parastrellus hesperus</i> |
| Bighorn sheep | <i>Ovis canadensis</i> ssp. |
| Merriam's shrew | <i>Sorex merriami</i> |
| American water shrew | <i>Sorex pallustris</i> |
| Brazilian free-tailed bat | <i>Tadarida brasiliensis</i> |
| Botta's pocket gopher | <i>Thomomys bottae</i> |
| Fish Spring pocket gopher | <i>Thomomys bottae abstrusus</i> |
| San Antonio pocket gopher | <i>Thomomys bottae curatus</i> |
| AMPHIBIANS (4) | |
| Western toad | <i>Anaxyrus boreas</i> |
| Amargosa toad | <i>Anaxyrus nelsoni</i> |
| Northern leopard frog | <i>Lithobates pipiens</i> |
| Columbia spotted frog | <i>Rana luteiventris</i> |
| REPTILES (6) | |
| Great Basin collared lizard | <i>Crotaphytus bicinctores</i> |
| Long-nosed leopard lizard | <i>Gambelia wislizenii</i> |
| Pygmy short-horned lizard | <i>Phrynosoma douglassii</i> |
| Greater short-horned lizard | <i>Phrynosoma hernandesi</i> |
| Desert horned lizard | <i>Phrynosoma platyrhinos</i> |
| Western red-tailed skink | <i>Plestiodon [Eumeces] gilberti rubricaudatus</i> |
| MOLLUSCS (9) | |
| California floater | <i>Anodonta californiensis</i> |
| Western ridged mussel | <i>Gonidea angulata</i> |
| Duckwater pyrg | <i>Pyrgulopsis aloba</i> |
| Southern Duckwater pyrg | <i>Pyrgulopsis anatina</i> |
| Large-gland Carico pyrg | <i>Pyrgulopsis basiglans</i> |
| Carinate Duckwater pyrg | <i>Pyrgulopsis carinata</i> |
| Oasis Valley pyrg | <i>Pyrgulopsis micrococcus</i> |
| Ovate Cain Spring pyrg | <i>Pyrgulopsis pictilis</i> |
| Duckwater Warm Springs pyrg | <i>Pyrgulopsis villacampae</i> |
| Ants, Wasps, Bees (2) | |

| Battle Mountain District <i>Special Status</i> Animal Species List | |
|---|---|
| Common Name | Scientific Name |
| Mojave gypsum bee | <i>Andrena balsamorhizae</i> |
| Mojave poppy bee | <i>Perdita meconis</i> |
| True Bugs (1) | |
| Pahranagat naucorid bug | <i>Pelocoris shoshone shoshone</i> |
| Beetles (4) | |
| Crescent Dunes aegialian scarab | <i>Aegialia crescenta</i> |
| Aegialian scarab beetle | <i>Aegialia knighti</i> |
| Crescent Dunes aphodius scarab | <i>Aphodius</i> ssp. 2 |
| Crescent Dunes serican scarab | <i>Serica ammomenisco</i> |
| Butterflies (7) | |
| Big Smoky wood nymph | <i>Cercyonis oetus alkalorum</i> |
| White River wood nymph | <i>Cercyonis pegala pluvialis</i> |
| Monarch butterfly | <i>Danaus plexippus plexippus</i> |
| White Mountains skipper | <i>Hesperia miriamae longaevicola</i> |
| Railroad Valley skipper | <i>Hesperia uncas fulvapalla</i> |
| White River Valley skipper | <i>Hesperia uncas grandiosa</i> |
| Great Basin small blue | <i>Philotiella speciosa septentrionalis</i> |

Appendix E: Hydraulic Fracturing Technology

This discussion on hydraulic fracturing is derived from the Hydraulic Fracturing (BLM 2013) written and developed by the Bureau of Land Management, Wyoming State Office. It has been modified to meet the criteria for the State of Nevada.

I. BACKGROUND

Hydraulic fracturing (HF) is a well stimulation process used to efficiently maximize the extraction of underground resources – groundwater, oil, natural gas, and geothermal energy. The HF process includes the acquisition of water, mixing of chemicals, surface pressure pumps, production zone fracturing, and HF flowback disposal.

In the United States, HF has been used since the 1940's. Early on, the HF process utilized pressures that are of a much smaller magnitude than those used today.

The HF process involves the injection of a fracturing fluid and propping agent into the hydrocarbon bearing formation under sufficient pressure to widen existing fractures and/or create new fractures. This allows the trapped hydrocarbons an avenue to flow to the wellbore. HF has gained interest recently as hydrocarbons trapped in low permeability or “tight” sand and shale formations are now technically and economically recoverable. As a result, oil and gas production has increased significantly in the United States.

Prior to the development of HF in hydrocarbon bearing tight gas and shale formations, domestic production of conventional resources had been declining. In response to this decline, the federal government in the 1970's through 1992, passed tax credits to encourage the development of unconventional resources. It was during this time that the HF process was further advanced to include the high-pressure multi-stage HF operations being conducted today.

Generally, HF can be described as follows:

1. Water, proppant, and chemical additives are pumped at extremely high pressures down the wellbore.
2. The fracturing fluid is pumped through perforated sections of the wellbore and into the surrounding formation, creating fractures in the rock. The proppant holds the fractures open during well production.
3. Company personnel continuously monitor and gauge pressures, fluids and proppants, studying how the proppants reacts when it hits the bottom of the wellbore, slowly increasing the density of proppants to water as HF progresses.
4. This process may be repeated multiple times, in “stages” to reach maximum areas of the formation(s). The wellbore is temporarily plugged between each stage to maintain the highest fluid pressure possible for the drill casing and to get maximum fracturing results in the rock.
5. The plugs are drilled or removed from the wellbore and the well is tested for results.
6. The pressure is reduced and the fracturing fluids are returned up the wellbore for disposal or treatment and re-use, leaving the proppant in place to prop open the fractures and allow the oil/gas to flow.

II. OPERATIONAL ISSUES

Wells that undergo HF may be drilled vertically, horizontally, or directionally and the resultant fractures induced by HF can be vertical, horizontal, or both. Wells in Nevada (NV) may extend to depths greater than 10,000 feet or less than 1,000 feet, and horizontal sections of a well may extend several thousand feet from the production pad on the surface. Prior to initiating HF, a cement bond log and pressure test is required and evaluated to ensure the integrity of the cement and its bond to both the well casing and the rock facies around the annulus within the geologic formation.

The total volume of fracturing fluids is generally 95-99% water. The amount of water needed to fracture a well in NV depends on the geologic basin, the formation, and depth and type of well (vertical, horizontal, directional), and the proposed completion process.

In general, approximately 25,000 to 350,000 gallons may be used to fracture shallow vertical wells in NV, while approximately 800,000 to 10 million gallons may be used to fracture deep horizontal or directionally drilled wells in NV.

Proppant, consisting of synthetic or natural silica sand, may be used in quantities of a few hundred tons for a vertical well to a few thousand tons for a horizontal well.

Drilling muds, drilling fluids, water, proppant, and HF fluids are stored in onsite tanks or lined pits during the drilling and/or completion process. Equipment transport and setup can take several days, and the actual HF and flowback process can occur in a few days up to a few weeks. For oil wells, the flowback fluid from the HF operations is treated in an oil-water separator before it is stored in a lined pit or tank located on the surface. Where gas wells are flowed back using a “green completion process” fluids are run through a multi-phase separator, which are then piped directly to enclosed tanks or to a production unit. Nevada currently does not have any gas production, but this may change, if gas rich formations are discovered.

Gas emissions associated with the HF process, such as methane, carbon dioxide, and volatile organic compounds (VOCs), are captured when the operator utilizes a green completion process. A “green completion process” is where the operator captures gases at the well head immediately after the well is completed. Where a green completion process is not utilized, gas emissions associated with the well may be vented and/or flared until “saleable quality” product is obtained in accordance with federal and state rules and regulations. The total volume of emissions from the equipment used (trucks, engines) will vary based on the pressures needed to fracture the well, and the number of zones to be fractured.

Under either completion process, wastewaters from HF may be disposed in several ways. For example, the flowback fluids may be stored in tanks pending reuse; the resultant waste may be re-injected using a permitted injection well, or the waste may be hauled to a licensed facility for treatment, disposal and/or reuse.

Disposal of the waste stream following establishment of “sale-quality” product, would be handled in accordance with Onshore Order #7 regulations and other state/federal rules and regulations.

Fracturing Fluids

As indicated above, the fluid used in the HF process is approximately 95 to 99 percent water and proppants, and 1-5 percent of special-purpose chemical additives. There is a broad array of chemicals that can be used as additives in a fracture treatment including, but not limited to, hydrochloric acid, anti-bacterial agents, corrosion inhibitors, gelling agents (polymers), surfactants, and scale inhibitors. The 1 to 5 percent of chemical additives translates to a minimum of 15,000 gallons of chemicals for every 1.5 million gallons of water used to fracture a well (Paschke, Dr. Suzanne. USGS, Denver, Colorado. September 2011). Water used in the HF process is generally acquired from surface water or groundwater in the local area. Information on obtaining water and water rights is discussed below.

The Nevada Division of Minerals (NDOM) has regulations that require the reporting of the amount and type of chemicals used in a HF operation in “FracFocus” within 60 days of HF completion for public disclosure. For more information concerning FracFocus and HF, refer to the FracFocus website at www.fracfocus.org and the NDOM website at minerals.state.nv.us.

Re-Fracturing

Re-fracturing of wells (RHF) may be performed after a period of time to restore declining production rates. RHF success can be attributed to enlarging and reorienting existing fractures while restoring conductivity due to proppant degradation and fines plugging. Prior to RHF, the wellbore may be cleaned out. Cleaning out the wellbore may recover over 50% of the initial proppant sand. Once cleaned, the process of RHF is the same as the initial HF. The need for RHF cannot be predicted.

Water Availability and Consumption Estimates

According to the Nevada State Water Plan (March 1999), total statewide water withdrawals for NV are forecasted to increase about 9 percent from 4,041,000 acre-feet (af) in 1995 to 4,391,000 acre-feet in 2020, assuming current levels of conservation. Approximately one-half of these withdrawals are consumptively used. This projected increase in water use is directly attributable to Nevada’s increasing population and related increases in economic endeavors.

The anticipated rise in total statewide water withdrawals primarily reflects expected increases in public supply for municipal and industrial (M&I) water usage to meet the needs of a growing urban population, with expanding commercial and industrial activities. Nevada’s population is projected to reach about 3,047,000 by the year 2020, with about 95 percent of these residents served by public water systems (NDWP, March 1999).

M&I withdrawals currently account for about 13 percent of the water used in NV. About 77 percent of water withdrawals are currently for agricultural use. Annual M&I water use is projected to increase from 525,000 af in 1995 to 1,034,000 af in 2020 (24 percent of total water withdrawals) based upon existing water use patterns and conservation measures. Approximately 6 to 7 percent of statewide water withdrawals occur in the mining industry (NDWP, March 1999).

Interest in obtaining the necessary water supplies for wildlife and environmental needs is increasing. Additionally, the popularity of water-based outdoor recreation continues to grow. It is

anticipated that these trends will continue, resulting in increased water supply demands for wildlife, environmental and recreational purposes.

Currently, surface water supplies are virtually fully appropriated. The increase in total statewide demand, particularly M&I water use, is expected to be met via better demand management (conservation), use of alternative sources (reused water, reclaimed water and gray water), purchases, leases or other transfers from existing water users, and by new groundwater appropriations. Much of the state's unappropriated groundwater is located in basins at a distance from urban centers. Thus, increasing attention will be placed on interbasin and intercounty transfers, and implementation of underutilized water management tools such as water marketing and water banking. Water for instream flow purposes, wildlife protection, environmental purposes and recreation will likely be generated by increased conservation and the acquisition of existing water rights (NDWP, March 1999).

Comparison Figures:

- Olympic-sized swimming pool - **660,430 gallons** of water.
- Typical golf course requires **100,000 to 1,000,000 gallons** of water per week in summer to maintain healthy vegetation.
- Average car wash of fresh water uses **9 to 15 gallons** during any given wash cycle.
- Average household in Southern Nevada uses about **222 gallons** of water per day (**81,000 gallons** per year).

Potential Sources of Water for Hydraulic Fracturing

Quality freshwater is required to drill the surface-casing section of the wellbore per Federal regulations; other sections of the wellbore (intermediate and/or production strings) would be drilled with appropriate quality makeup water as necessary. This is done to protect usable water zones from contamination, to prevent mixing of zones containing different water quality/use classifications, and to minimize total freshwater volumes. With detailed geologic well logging during drilling operations, geologists/mud loggers on location identify the bottoms of these usable water zones, which aids in the proper setting of casing depths. Usable water is defined as having less than 10,000 mg/l of Total Dissolved Solids (TDS). Drinking or potable water is defined as having less than 1,000 mg/l of TDS.

Several sources of water are available for drilling and/or HF in NV. Nevada's water rights system is based on the prior appropriation doctrine; therefore, all use of water, with the exception of domestic wells, requires a permit from the State Engineer (NRS 534.180). Like any other water user, companies that drill or hydraulically fracture oil and gas wells must adhere to NV water laws when obtaining and using specific sources of water.

Below is a discussion of the sources of water that could potentially be used for HF. The decision to use any specific source is dependent on BLM authorization at the APD stage and the ability to obtain water rights. From an operators' standpoint, the decision regarding which water source will be used is primarily driven by the economics associated with procuring a specific water source.

Water transported from outside the state. The operator may transport water from outside the state. As long as the transport and use of the water carries no legal obligation to NV, this is an allowable source of water from a water rights perspective.

Irrigation water leased or purchased from a landowner. The landowner may have rights to surface water, delivered by a ditch or canal that is used to irrigate land. The operator may choose to enter into an agreement with the landowner to purchase or lease a portion of that water. This is allowable, however, in nearly every case, the use of an irrigation water right is likely limited to irrigation uses and cannot be used for well drilling and HF operations. To allow its use for drilling and HF, the owner of the water right and the operator must apply to change the water right through a formal process.

Treated water or raw water leased or purchased from a water provider or municipality. The operator may choose to enter into an agreement with a water provider to purchase or lease water from the water provider's system. Municipalities and other water providers may have a surplus of water in their system before it is treated (raw water) or after treatment that can be used for drilling and HF operations. Such an arrangement would be allowed only if the operator's use were compliant with the water provider's water rights.

Water treated at a waste water treatment plant leased or purchased from a water provider. The operator may choose to enter into an agreement with a water provider to purchase or lease water that has been used by the public and then treated as wastewater. Municipalities and other water providers discharge their treated waste water into the streams where it becomes part of the public resource, ready to be appropriated once again in the priority system. But for many municipalities a portion of the water that is discharged has the character of being "reusable." As a result, it is possible that after having been discharged to the stream, it could be diverted by the operator to be used for drilling and HF operations. Such an arrangement would only be appropriate with the approval of the Nevada Division of Water Resources, State Engineer's Office (NDWR) and would be allowed only if the water provider's water rights include uses for drilling and HF operations.

New diversion of surface water flowing in streams and rivers. New diversion of surface waters in most parts of the state are rare because the surface streams are already fully appropriated, meaning that there is no water available for appropriation. Given the variability of surface water flows in the State, this may not be the most reliable water source even if there is water available for appropriation.

Produced Water. The operator may choose to use water produced in conjunction with oil or gas production at an existing oil or gas well. The water that is produced from an oil or gas well is under the administrative purview of the NDEP, Underground Injection Control Program (UIC) and is either non-tributary, in which case, it is administered independent of the prior appropriation doctrine; or is tributary, in which case, the depletions from its withdrawal must be fully augmented if the depletions occur in an over-appropriated basin. The result in either case is that the produced water is available for consumption for other purposes, not just oil and gas operations. The water must not be encumbered by other needs and the operator must obtain a proper well permit from the NDWR before the water can be used for drilling and HF operations.

Reused or Recycled Drilling Water. Water that is used for drilling of one well may be recovered and reused in the construction of subsequent wells. The BLM encourages reuse and recycling of both the water used in well drilling and the water produced in conjunction with oil or gas production. However, as described above, the operator must obtain the right to use the water for this purpose.

On-Location Water Supply Wells. Operators may apply for, and receive, permission from the NDWR to drill and use a new water supply well. These wells are usually drilled on location to provide an on-demand supply. The proper construction, operation and maintenance, backflow prevention and security of these water supply wells are critical considerations at the time they are proposed to minimize impacts to the well and/or the waters in the well, water right holders and water-dependent resources. Plugging these wells is under the jurisdiction of the NDWR and BLM.

Authorization of any future proposed projects would require full compliance with local, state, and federal regulations and laws that relate to surface and groundwater protection and would be subject to routine inspections by the BLM and the State of Nevada Commission on Mineral Resources, Division of Minerals Memorandum of Understanding dated January 9, 2006, prior to approval.

III. Potential Impacts to Usable Water Zones

Impacts to freshwater supplies can originate from point sources, such as chemical spills, chemical storage tanks (aboveground and underground), industrial sites, landfills, household septic tanks, and mining activities. Impacts to usable waters may also occur through a variety of oil and gas operational sources which may include, but are not limited to, pipeline and well casing failure, and well (gas, oil and/or water) drilling and construction of related facilities. Similarly, improper construction and management of open fluids pits and production facilities could degrade ground water quality through leakage and leaching.

Should hydrocarbons or associated chemicals for oil and gas development, including HF, exceeding US Environmental Protection Agency (EPA)/NDEP standards for minimum concentration levels migrate into potable water supply wells, springs, or usable water systems, it could result in these water sources becoming non-potable and killing off aquatic species. Water wells developed for oil and gas drilling could also result in a drawdown in the quantity of water in nearby residential areas depending upon the geology and volumes of water extracted.

Usable groundwater aquifers are most susceptible to pollution where the aquifer is shallow (within 100 feet of the surface depending on surface geology) or perched, are very permeable, or connected directly to a surface water system, such as through floodplains and/or alluvial valleys or where operations occur in geologic zones which are highly fractured and/or lack a sealing formation between the production zone and the usable water zones. If an impact to usable waters were to occur, a greater number of people could be affected in densely populated areas versus sparsely populated areas characteristic of NV. Pollution could also impact usable waters in remote basins where interbasin transfer projects can pump and transport water through pipelines to urban areas, like Las Vegas and Reno. The BLM is also required to analyze potential impacts to aquatic species from groundwater contamination.

Potential impacts on usable groundwater resources from fluid mineral extraction activities could result from the following scenarios:

1. Contamination of aquifers through the introduction of drilling and/or completion fluids through spills or drilling problems, such as lost circulation zones.
2. Communication of the induced hydraulic fractures with existing fractures potentially allows for HF fluid migration into usable water zones/supplies. The potential for this impact is likely dependent on the local hydraulic gradients where those fluids are dissolved in the water column.
3. Cross-contamination of aquifers/formations may result when fluids from a deeper aquifer/formation migrate into a shallower aquifer/formation due to improperly cemented well casings.
4. Localized depletion of perched aquifer or drawdown of unconfined groundwater aquifer. Progressive contamination of deep confined, shallow confined, and unconfined aquifers if the deep confined aquifers are not completely cased off, and geologically isolated, from deeper oil bearing units. An example of this would be salt water intrusion resulting from sustained drawdown associated with the pumping of groundwater.
5. Casing failure (casing ruptures in low pressure formations, casing corrosion)
6. Communication through old abandoned wells nearby
7. Transportation of fluids to and from site (accidents)
8. Wastewater disposal

The impacts above could occur as a result of the following processes:

Improper casing and cementing.

A well casing design that is not set at the proper depths or a cementing program that does not properly isolate necessary formations could allow oil, gas or HF fluids to contaminate other aquifers/formations. In addition, old well casing and casing cement that has corroded over time can fail allowing contaminants to migrate into the well formation.

Natural fractures, faults, and abandoned wells.

If HF of oil and gas wells result in new fractures connecting with established natural fractures, faults, or improperly plugged dry or abandoned wells, a pathway for gas or contaminants to migrate underground may be created posing a risk to water quality. The potential for this impact is currently unknown but it is generally accepted that the potential decreases with increasing distance between the production zone and usable water zones. This potential again is dependent upon the site specific conditions at the well location.

Fracture growth.

A number of studies and publications report that the risk of induced fractures extending out of the target formation into an aquifer allowing hydrocarbons or other fluids to contaminate the aquifer may depend, in part, on the formation thickness separating the targeted fractured formation and the aquifer. According to a 2012 Bipartisan Policy Center report, the fracturing process itself is unlikely to directly affect freshwater aquifers because in Nevada fracturing typically takes place at a depth of 6,000 to 10,000 feet, while drinking water aquifers are typically less than 1,000 feet deep. However, some areas of Nevada, the deep carbonate aquifer can extend to 6,000 feet below ground surface. Recent studies have shown that induced fractures created during HF growing more than 350 meters vertically is less than 1% (Lacazette and Geiser). If a parcel is sold and

development is proposed in usable water zones, those operations would have to comply with federal and/or state water quality standards or receive a Class II designation from the NDEP.

Fracture growth and the potential for upward fluid migration, through volcanic, sedimentary and other geologic formations depend on site-specific factors such as the following:

1. Physical properties, types, thicknesses, and depths of the targeted formation as well as those of the overlying geologic formations.
2. Presence of existing natural fracture systems and their orientation in the target formation and surrounding formations.
3. Amount and distribution of stress (i.e., in-situ stress), and the stress contrasts between the targeted formation and the surrounding formations.

Hydraulic fracture stimulation designs include the volume of fracturing fluid injected into the formation as well as the fluid injection rate and fluid viscosity; this information is evaluated against the above site specific considerations.

Fluid leak and recovery (flowback) of HF fluids.

Not all fracturing fluids injected into the formation during the HF process are recovered at the surface. Estimates of the fluids recovered range from 15-80% of the volume injected depending on the site (EPA 2010). Fluid movement into smaller fractures or other geologic substructures can be to a point where flowback efforts will not recover all the fluid or that the pressure reduction caused by pumping during subsequent production operations may not be sufficient to recover all the fluid that has leaked into the formation. Fracturing fluids can remain in the formation due to adsorption and chemical reactions, movement out of the capture zone, inadequate mixing, or from fracture collapse. It is noted that the fluid loss due to leakage into small fractures and pores is minimized by the use of cross-linked gels.

Willberg et al. (1998) analyzed HF flowback and described the effect of pumping rates on cleanup efficiency in initially dry, very low permeability (0.001 millidarcy) shale. Some wells in this study were pumped at low flowback rates (less than 3 barrels per minute (bbl/min)). Other wells were pumped more aggressively at greater than 3 bbl/min. Thirty-one percent of the injected HF fluids were recovered when low flowback rates were applied over a 5-day period. Forty-six percent of the fluids were recovered when aggressive flowback rates were applied in other wells over a 2-day period. In both cases, additional fluid recovery (10 percent to 13 percent) was achieved during the subsequent gas production phase, resulting in a total recovery rate of 41 percent to 59 percent of the initial volume of injected HF fluid. Ultimate recovery rate however, is dependent on the permeability of the rocks, fracture configuration, and the surface area of the fracture(s).

The ability of HF chemicals to migrate in an undissolved or dissolved phase into a usable water zone is likely dependent upon the location of the sealing formation (if any), the geology of the sealing formation, hydraulic gradients and production pressures.

HF fluids can remain in the subsurface unrecovered, due to “leak off” into connected fractures and the pores of rocks. Fracturing fluids injected into the primary hydraulically induced fracture can intersect and flow (leak off) into preexisting smaller natural fractures. Some of the fluids lost in

this way may occur very close to the well bore after traveling minimal distances in the hydraulically induced fracture before being diverted into other fractures and pores. Once “mixed” with the native water, local and regional vertical and horizontal gradients may influence where and if these fluids will come in contact with usable water zones, assuming that there is inadequate recovery either through the initial flowback or over the productive life of the well. Faults, folds, joints, etc., could also alter localized flow patterns as discussed below.

The following processes can influence effective recovery of the fracture fluids:

Check-Valve Effect

A check-valve effect occurs when natural and/or newly created fractures open and HF fluid is forced into the fractures when fracturing pressures are high, but the fluids are subsequently prevented from flowing back toward the wellbore as the fractures close when the fracturing pressure is decreased (Warpinski et al., 1988; Palmer et al., 1991a).

A long fracture can be pinched-off at some distance from the wellbore. This reduces the effective fracture length. HF fluids trapped beyond the “pinch point” are unlikely to be recovered during flowback and oil/gas is unlikely to be recovered during production.

In most cases, when the fracturing pressure is reduced, the fracture closes in response to natural subsurface compressive stresses. Because the primary purpose of HF is to increase the effective permeability of the target formation and connect new or widened fractures to the wellbore, a closed fracture is of little use. Therefore, a component of HF is to “prop” the fracture open, so that the enhanced permeability from the pressure-induced fracturing persists even after fracturing pressure is terminated. To this end, operators use a system of fluids and “proppants” to create and preserve a high-permeability fracture-channel from the wellbore deep into the formation.

The check-valve effect takes place in locations beyond the zone where proppants have been placed (or in smaller secondary fractures that have not received any proppant). It is possible that some volume of stimulation fluid cannot be recovered due to its movement into zones that were not completely “propped” open.

Adsorption and Chemical Reactions

Adsorption and chemical reactions can also prevent HF fluids from being recovered. Adsorption is the process by which fluid constituents adhere to a solid surface and are thereby unavailable to flow with groundwater. Adsorption to coal is likely; however, adsorption to other geologic material (e.g., shale, sandstone) is likely to be minimal. Another possible reaction affecting the recovery of fracturing fluid constituents is the neutralization of acids (in the fracturing fluids) by carbonates in the subsurface.

Movement of Fluids outside the Capture Zone

Fracturing fluids injected into the target zone flow into fractures under very high pressure. The hydraulic gradients driving fluid flow away from the wellbore during injection are much greater than the hydraulic gradients pulling fluid flow back toward the wellbore during flowback and production (pumping) of the well. Some portion of the fracturing fluids could be forced along the hydraulically induced fracture to a point beyond the capture zone of the production well. The size

of the capture zone will be affected by the regional groundwater gradients, and by the drawdown caused by producing the well. Site-specific geologic and hydrogeologic characteristics, injection pressure, and production pumping details should provide the information needed to estimate the dimension of the production well capture zone and the extent to which the fracturing fluids might disperse and dilute.

Incomplete Mixing of Fracturing Fluids with Water

Steidl (1993) documented the occurrence of a gelling agent that did not dissolve completely and actually formed clumps at 15 times the injected concentration in an induced fracture. Steidl also directly observed gel hanging in stringy clumps in many other induced fractures. As Willberg et al. (1997) noted, laboratory studies indicate that fingered flow of water past residual gel may impede fluid recovery. Therefore, some fracturing fluid gels appear not to flow with groundwater during production pumping and remain in the subsurface unrecovered. Such gels are unlikely to flow with groundwater during production, but may present a source of gel constituents to flowing groundwater during and after production.

IV. Geologic Hazards (including seismic/landslides)

Nevada is the 3rd most tectonically active state in the union. Since the 1850s there have been 63 earthquakes with a magnitude greater than 5.5, the cutoff for a destructive earthquake. Potential geologic hazards caused by HF include induced seismic activity in addition to the tectonic activity already occurring in the state. Induced seismic activity could indirectly cause a surficial landslide where soils/slopes are susceptible to failure. Landslides involve the mass movement of earth materials down slopes and can include debris flows, soil creep, and slumping of large blocks of material. Any destructive earthquake also has the potential to induce liquefaction in saturated soils.

Earthquakes occur when energy is released due to blocks of the earth's crust moving along areas of weakness or faults. Earthquakes attributable to human activities are called "induced seismic events" or "induced earthquakes." In the past several years induced seismic events related to energy development projects have drawn heightened public attention. Although only a very small fraction of injection and extraction activities at hundreds of thousands of energy development sites in the United States have induced seismicity at levels that are noticeable to the public, seismic events caused by or likely related to energy development have been measured and felt in Alabama, Arkansas, California, Colorado, Illinois, Louisiana, Mississippi, Nebraska, Nevada, New Mexico, Ohio, Oklahoma, and Texas.

A study conducted by the National Academy of Sciences (Induced Seismicity Potential in Energy Technologies, National Academy of Sciences, 2012) studied the issue of induced seismic activity from energy development. As a result of the study, they found that:

1. The process of hydraulic fracturing a well as presently implemented for shale gas recovery does not pose a high risk for inducing felt seismic events; and
2. Injection for disposal of waste water derived from energy technologies into the subsurface does pose some risk for induced seismicity, but very few events have been documented over the past several decades relative to the large number of disposal wells in operation.

However, a more recent study by the U.S. Geological Service has found that at some locations the increase in seismicity coincides with the injection of wastewater in deep disposal wells. Wastewater injection increases the underground pore pressure, which may, in effect, lubricate nearby faults thereby weakening them. If the pore pressure increases enough, the weakened fault will slip, releasing stored tectonic stress in the form of an earthquake. Even faults that have not moved in millions of years can be made to slip and cause an earthquake if conditions underground are appropriate (USGS 2014).

The potential for induced seismicity cannot be made at the leasing stage; as such, it will be evaluated at the APD stage should the parcel be sold/issued, and a development proposal submitted.

V. Spill Response and Reporting

Spill Prevention, Control, and Countermeasure (SPCC) Plans – EPA’s rules include requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires that operators of specific facilities prepare, amend, and implement SPCC Plans. The SPCC rule is part of the Oil Pollution Prevention regulation, which also includes the Facility Response Plan (FRP) rule. Originally published in 1973 under the authority of §311 of the Clean Water Act, the Oil Pollution Prevention regulation sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities. To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires the operator of these facilities to develop and implement SPCC Plans and establishes procedures, methods, and equipment requirements (Subparts A, B, and C). In 1990, the Oil Pollution Act amended the Clean Water Act to require some oil storage facilities to prepare FRPs. On July 1, 1994, EPA finalized the revisions that direct facility owners or operators to prepare and submit plans for responding to a worst-case discharge of oil.

In addition to EPA’s requirements, operators must provide a plan for managing waste materials, and for the safe containment of hazardous materials, per Onshore Order #1 with their APD proposal. All spills and/or undesirable events are managed in accordance with Notice to Lessee (NTL) 3-A for responding to all spills and/or undesirable events related to HF operations.

Certain oil and gas exploration and production wastes occurring at or near wellheads are exempt from the Clean Water Act, such as: drilling fluids, produced water, drill cuttings, well completion, and treatment and stimulations fluids. In general, the exempt status of exploration and production waste depends on how the material was used or generated as waste, not necessarily whether the material is hazardous or toxic.

VI. Public Health and Safety

The intensity, and likelihood, of potential impacts to public health and safety, and to the quality of usable water aquifers is directly related to proximity of the proposed action to domestic and/or community water supplies (wells, reservoirs, lakes, rivers, etc.) and/or agricultural developments. The potential impacts are also dependent on the extent of the production well’s capture zone and well integrity. Nevada’s Standard Lease Stipulations and Lease Notices specify that oil and gas development is generally restricted within 500 feet of riparian habitats and wetlands, perennial

water sources (rivers, springs, water wells, etc.) and/or floodplains. Intensity of impact is likely dependent on the density of development.

VII. Hydraulic Frac Job Data for Nevada

| Operator | Noble Energy | Noble Energy | Noble Energy | Makoil | Grant Canyon |
|----------------------------------|--------------------|-------------------|----------------------|------------------------|---------------|
| Well | Humboldt M2C-M2-21 | Huntington K1L-1V | Humboldt M10C-M10-11 | Portugese Mountain 14A | Blackburn #16 |
| Total Base Water Volume (gal) | 250,057 | 300,537 | 343,919 | 29,949 | 209,600 |
| 2% KCL Water | 88.5614 | 0 | 86.45119 | 0 | 0 |
| Fresh Water | 0 | 88.9968 | 0 | 53.90215 | 85.2039 |
| Water | 1.57645 | 0.61826 | 0.81892 | 0.78169 | 0.53354 |
| 2-bromo-2-nitro-1, 3-propanediol | 0.00202 | 0.00213 | 0.00358 | 0.00129 | 0.00171 |
| Crystalline Silica, quartz | 0.65036 | 8.59936 | 10.49356 | 32.39228 | 14.4277 |
| Ethylene glycol monobutyl ether | 0.02379 | 0.00537 | 0.01688 | 0.09718 | 0.02695 |
| Isopropanol | 0.00311 | 0.00351 | 0.00221 | 0.04926 | 0.00353 |
| Methanol | 0.00311 | 0.00353 | 0.00226 | 0.05782 | 0.00361 |

* Values are based on the percent of the total mass. These are the most common additives in all the jobs.

VIII. References

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Appendix F: Definitions, Acronyms and Abbreviations

Definitions

Invasive plant: a plant that is not part of (if exotic) or a minor component of (if native) the original plant community or communities, and has the potential to become a dominate or co-dominate species on the site if future establishment and growth are not actively controlled by management interventions; or a plant that is classified as exotic or noxious under state or federal law. Species that become dominant for only one to several years (e.g. short-term response to drought or wildfire) are not invasive plants.

Noxious weed: a plant designated by federal or state laws as generally possessing one of more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insect of disease; or nonnative, new or not common to the U.S. The BLM Battle Mountain District recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture (NDA) statute, found in Nevada Administrative Code (NAC) 555.010.

Weed: any plant that interferes with management objectives for a given area of land at a given point in time.

Acronyms and Abbreviations

| | |
|-------|--|
| APD | Application for Permit to Drill |
| AQRV | air quality related values |
| BGEPA | Bald and Golden Eagle Protection Act |
| BLM | Bureau of Land Management |
| BMDO | Battle Mountain District Office |
| BMPs | Best Management Practices |
| CESA | Cumulative Effects Study Area |
| CFR | Code of Federal Regulations |
| COAs | Conditions of Approval |
| CSU | Controlled Surface Use |
| DOI | United States Department of the Interior |
| EA | Environmental Assessment |
| EO | Executive Order |
| ESA | Endangered Species Act |
| EPA | Environmental Protection Agency |

| | |
|---------------------|---|
| FLPMA | Federal Land Policy and Management Act of 1976 |
| GHG | greenhouse gas |
| GHMA | General Habitat Management Area |
| GIS | Geographic Information System |
| GRSG | Greater Sage-Grouse |
| GRSG Plan Amendment | 2015 Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment |
| GWP | Global Warming Potential |
| HAPs | hazardous air pollutants |
| HF | hydraulic fracturing |
| HMA | Herd Management Area |
| ID Team | interdisciplinary team |
| IM | Instruction Memorandum |
| LLD | legal land description (township, range, section) |
| MD | Management Decision |
| MLFO | Mt. Lewis Field Office |
| MOU | Memorandum of Understanding |
| MR | Mineral Resources |
| NAAQS | National Ambient Air Quality Standards |
| NAC | Nevada Administrative Code |
| NDOW | Nevada Department of Wildlife |
| NEPA | National Environmental Policy Act |
| NDA | Nevada Department of Agriculture |
| NDWR | Nevada Division of Water Resources |
| NDWQ | Nevada Division of Water Quality |
| NHPA | National Historic Preservation Act |
| NNHP | Nevada Natural Heritage Program |

| | |
|-------|---|
| NSO | No Surface Occupancy |
| NVSO | Nevada State Office |
| OHMA | Other Habitat Management Area |
| PHMA | Priority Habitat Management Area |
| PL | Public Law |
| RFD | reasonably foreseeable development |
| RFFA | reasonably foreseeable future action |
| RMP | Resource Management Plan |
| ROW | Right-of-Way |
| SFA | Sagebrush Focal Area |
| SHPO | Nevada State Historical Preservation Office |
| TFO | Tonopah Field Office |
| TL | Timing Limitation |
| tpy | tons per year |
| U.S. | United States |
| USDA | United States Department of Agriculture |
| USFS | United States Forest Service |
| USFWS | United States Fish and Wildlife Service |
| VRM | Visual Resource Management |

Appendix G: Reasonably Foreseeable Development (RFD) Scenario

Oil production data from the Nevada Division of Minerals show that oil and gas production in the state has fallen off since the early 1990s and has flattened out at around 300,000 barrels per year over the last several years. This section discusses projected exploration and development scenarios used in the past in the Battle Mountain District, and adjustments to those scenarios based on actual activity in recent years. These result in the RFD scenario used in this EA.

Tonopah Field Office: past estimates, actual activity, and adjusted estimates

As part of the 1997 Tonopah RMP, the BLM developed an RFD scenario for oil and gas exploration and development through the next 20 years. This RFD was developed during the land use planning process for the Tonopah RMP in accordance with BLM Handbook H-1624-1, Planning for Fluid Mineral Resources. The RFD projected that 30 wildcat wells (exploratory wells outside of established oil fields) would be drilled for a total disturbance of 296 acres. It also projected a number of additional production wells in established oil fields, and estimated a total future surface disturbance of 131 acres in those oil fields. The 1997 RFD also projected development of two additional oil fields with a total future disturbance of 944 acres. This was a conservative approach, as it was impossible to predict with certainty how resource development would occur in the future.

Compared to the actual amount of activity, the oil and gas RFD for the 1997 Tonopah RMP greatly overestimated the amount of exploration and production activity and associated surface disturbance. From 1997 to 2015 a total of 56 exploration wells were authorized; 22 of these authorizations expired without an exploration well being drilled. A total of five became production wells. The last well was drilled in 2013. No new oil fields have been developed in the TFO since 1997. The average amount of surface disturbance associated with the exploration wells (sumps, road construction, pads, etc.) was approximately 3.3 acres per well, for an overall disturbance of approximately 50 acres.

The interaction of prices, markets, technology, environmental concerns, and viability of the potential oil and gas resource in the Battle Mountain District all play a role in estimating future surface disturbance related to oil and gas exploration and production. Based on past history and considering advancements in drilling and well stimulation techniques, it would be highly speculative to assume that production wells and additional oil fields would be developed within the TFO in areas other than Railroad Valley in the eastern part of the field office area, where the potential is moderate to high and where current well fields exist.

The recent exploration and development history provides a basis for estimating a low development potential for oil and gas disturbance that might indirectly result from the June 2016 Competitive Oil and Gas Lease Sale. Conservatively, based on historic information and anticipated activity, over the next ten years, approximately 20 exploration wells with approximately 50-75 acres of associated surface disturbance could be expected to occur in the TFO, assuming approximately 3.3 acres per well (66 acres) and allowing for a range of variation.

Mount Lewis Field Office: past estimates, actual activity, and adjusted estimates

According to the 2006 EA for Oil and Gas Leasing and the 2008 EA for Oil and Gas Leasing within the Western Portion of the Shoshone-Eureka Analysis Area, the overall potential for oil and gas exploration and development in this area has been previously determined to be low to moderate. The western portion

of the Analysis Area was considered to have a lower potential when compared to that of the eastern portion. The eastern portion of the Shoshone-Eureka Analysis Area was considered to have moderate potential because it is located on a strike between Pine Valley and Railroad Valley, the two major production areas in the State; and the geologic setting is similar to those areas. The RFDs for these EAs estimated a total surface disturbance associated with oil and gas exploration/production of approximately 680 acres for the entire MLFO area, which constitutes 4.5 million acres.

Compared to actual acres of disturbance associated with oil and gas exploration/production within the MLFO during the projected period described below, those RFDs overestimated the amount of surface disturbance. While oil and gas interest has increased over the last 25 years in the MLFO area, very few exploratory wells have been drilled; an average of less than one exploration well was drilled per year between the years of 1980 and 2003. Exploration interest since this time has focused on the eastern portion of the MLFO, specifically in Eureka County, which is consistent with the geologic potential of the area. Since 2003, there have only been four exploration wells authorized in the MLFO. The last of these was drilled in 2013. All four wells have since been plugged. The potential for oil and gas exploration and production in the MLFO can also be considered low. Conservatively, over the next ten years, based on previous and anticipated activity and interest, about 5 exploration wells and 15-25 acres of surface disturbance associated with oil and gas exploration/production activity could be expected to occur in the MLFO, again estimating 3.3 acres disturbance per well (16.5 acres) and allowing for a range of variation.

RFD for Battle Mountain District (Tonopah and Mt. Lewis Field Offices)

Estimates for future surface disturbance for the two field offices comprising the Battle Mountain District can be added for a District-wide RFD. Conservatively, based on historic information and anticipated activity, approximately 25 wells would be drilled and 65-100 acres of surface disturbance associated with potential oil and gas exploration and production activities could be expected to occur in the Battle Mountain District over the next ten years. The surface disturbance estimate used to analyze the alternatives in this EA is based on this RFD scenario.

Appendix H: Proposed lease parcels intersecting inventory units that have wilderness characteristics

Inventory units in the Analysis Area that have wilderness characteristics are listed here, along with the proposed lease parcels that intersect each of those units. Also see Appendix K, Figures 24 and 25.

| Parcel # | Wilderness Characteristics Inventory Unit | Parcel # | Wilderness Characteristics Inventory Unit | Parcel # | Wilderness Characteristics Inventory Unit |
|----------|--|----------|---|----------|---|
| 1 | NV-060-0364 A | 19 | NV-060-120 | 38 | NV-060-132 |
| 2 | NV-060-0364 A | 20 | NV-060-120 | 39 | NV-060-132 |
| 3 | NV-060-335 A NV-060-0374 B | 21 | NV-060-120 | 40 | NV-060-142 A |
| 4 | NV-060-335 A NV-060-0364 A | 22 | NV-060-120 NV-060-130 A | 41 | NV-060-132 |
| 6 | NV-060-0364 A | 23 | NV-060-130 A | 42 | NV-060-132 |
| 7 | NV-060-0374 A NV-060-0374 B | 24 | NV-060-132 | 43 | NV-060-132 |
| 8 | NV-060-0374 A | 25 | NV-060-132 | 44 | NV-060-132 |
| 9 | NV-060-335 A NV-060-0374 A NV-060-0374 B | 26 | NV-060-132 | 45 | NV-060-132 |
| 10 | NV-060-059 B NV-060-069 B | 27 | NV-060-132 | 46 | NV-060-123 B NV-060-132 |
| 11 | NV-060-069 B | 28 | NV-060-132 | 47 | NV-060-123 B NV-060-132 |
| 12 | NV-060-069 B | 29 | NV-060-132 | 48 | NV-060-123 B NV-060-132 |
| 13 | NV-060-069 B NV-060-130 A | 30 | NV-060-171 NV-060-181 B | 49 | NV-060-123 B |
| 14 | NV-060-059 B NV-060-069 B | 31 | NV-060-171 | 50 | NV-060-132 NV-060-142 A |
| 15 | NV-060-130 A | 32 | NV-060-212 | 51 | NV-060-162 B NV-060-172 NV-060-173 |
| 16 | NV-060-130 A | 33 | NV-060-212 | 52 | NV-060-172 NV-060-181 B |
| 17 | NV-060-120 NV-060-130 A | 36 | NV-060-132 | 53 | NV-060-181 B |
| 18 | NV-060-120 NV-060-130 A | 37 | NV-060-132 | 54 | NV-060-181 B |

| Parcel # | Wilderness Characteristics Inventory Unit | Parcel # | Wilderness Characteristics Inventory Unit | Parcel # | Wilderness Characteristics Inventory Unit |
|----------|---|----------|---|----------|---|
| 55 | NV-060-172 NV-060-181 B | 76 | NV-060-192 | 102 | NV-060-212 NV-060-213 |
| 56 | NV-060-162 NV-060-171 NV-060-181 B | 77 | NV-060-192 NV-060-212 | 104 | NV-060-212 NV-060-213 |
| 57 | NV-060-172 | 78 | NV-060-192 | 107 | NV-060-213 |
| 58 | NV-060-172 | 79 | NV-060-212 | 110 | NV-060-155 |
| 59 | NV-060-172 | 80 | NV-060-212 | 111 | NV-060-155 |
| 60 | NV-060-181 B | 81 | NV-060-212 | 112 | NV-060-155 |
| 61 | NV-060-181 B | 82 | NV-060-291 NV-060-293 | 113 | NV-060-155 NV-060-194 |
| 62 | NV-060-181 B | 83 | NV-060-282 NV-060-291 | 114 | NV-060-155 |
| 63 | NV-060-181 B | 84 | NV-060-282 NV-060-291 | 115 | NV-060-155 NV-060-194 |
| 64 | NV-060-181 B | 85 | NV-060-282 NV-060-291 | 116 | NV-060-194 |
| 65 | NV-060-181 B | 86 | NV-060-274 NV-060-291 NV-060-293 | 117 | NV-060-155 NV-060-184 NV-060-194 |
| 66 | NV-060-181 B | 87 | NV-060-282 | 118 | NV-060-184 NV-060-194 |
| 67 | NV-060-192 | 88 | NV-060-282 | 119 | NV-060-194 |
| 68 | NV-060-192 | 89 | NV-060-273 NV-060-274 NV-060-291 | 141 | NV-060-155 |
| 69 | NV-060-192 | 90 | NV-060-273 NV-060-274 NV-060-282 | 142 | NV-060-155 |
| 70 | NV-060-192 | 91 | NV-060-194 | 143 | NV-060-155 NV-060-184 |
| 71 | NV-060-192 | 92 | NV-060-155 NV-060-194 | 144 | NV-060-155 |
| 72 | NV-060-192 | 93 | NV-060-194 | 145 | NV-060-155 |
| 73 | NV-060-192 | 94 | NV-060-213 | 146 | NV-060-155 |
| 74 | NV-060-212 | 101 | NV-060-212 | 147 | NV-060-155 NV-060-184 |
| 75 | NV-060-192 NV-060-212 | | | | |

| Parcel # | Wilderness Characteristics Inventory Unit | Parcel # | Wilderness Characteristics Inventory Unit | Parcel # | Wilderness Characteristics Inventory Unit |
|----------|---|----------|---|----------|---|
| 148 | NV-060-155 NV-060-184 | 151 | NV-060-184 | 183 | NV-060-155 |
| 150 | NV-060-184 | 182 | NV-060-155 | | |

Appendix I: Land Use Authorizations Table

| Parcel # | Legal Lands Description | ROW Case File/ROW Holder Range Improvement Description |
|--------------|---|---|
| NV-19-06-001 | T.0150N, R.0440E, 21 MDM, NV Sec. 005 LOTS 1-3,5-8; 005 S2; 006 LOTS 2-12; 006 E2SW,SE; 008 ALL; | N-05229 USFS, 66 ft wide access road to Big Creek-Kingston Cyn; N-05795 USFS 24 ft wide Bowman Creek Road; N-34387 NV Bell Austin to Kingston Cyn 20-ft wide buried cable; N-39908 NV Bell RM to Kingston Cyn 10-ft wide buried cable; N-46509 SPPCo 25-ft 24.9 kV distribution line; N-50103 25-ft 24.9 kV distribution line-Cirac Mill Extension; |
| NV-19-06-002 | T.0150N, R.0440E, 21 MDM, NV Sec. 007 LOTS 1-4; 007 E2W2,E2; 018 LOTS 1-2,4; 018 E2W2,E2; | See above. N-65994 Gomes - 20-ft wide access road starts in sec. 19 and goes through sec. 18, lot 4 on MTP. However, SRP does not reflect this. |
| NV-19-06-003 | T.0160N, R.0440E, 21 MDM, NV Sec. 003 LOTS 1-4; 003 S2N2, S2; 010 E2NE,SWNW,S2; 015 ALL; 016 LOTS 1-4; 016 NE,N2S2; | NVcc 0 022622 NDOT 400-ft Highway - S. of Darrough Hot Springs to Jct 50 (43.12 miles); NVCC 0 023332 NDOT Mineral Material Site - 40 acres; N-02475 Gillman Springs Homowners-Wine Glass Ranch 20,000 gal storage tank and water pipeline from Globe and Gillman Creeks; N-19750-01 Lander County - Kingston Landfill; N-34387 Nevada Bell 20-ft Austin/Kingston Cyn buried cable; N-46509 Sierra Pacific 15-ft 24.9 kV Kingston Smoky Valley distribution line (39.15 mi); N-52921 Lander County 60-ft access road; N-63200 Nevada Bell fiber optic buried and aerial line 20-ft wide 58.30 miles long Hadley to Austin; N-74545 Town of Kingston Town fence; N-77592 Town of Kingston Airport lease; N-83023 Town of Kingston water pipeline; N-89743 Harry Brown 20-ft water pipeline; Nev 0 064382 Young Bros irrigation facilities. |
| NV-19-06-004 | T.0160N, R.0440E, 21 MDM, NV Sec. 017 LOTS 1-6; 017 W2NE,N2SW,NWSE; 019 SE; 020 LOTS 1-4; 020 NWNNE,S2NE,S2; | See above. |

| Parcel # | Legal Lands Description | ROW Case File/ROW Holder Range Improvement Description |
|--------------|---|---|
| | 021 S2N2,S2; 028 ALL; | |
| NV-19-06-005 | T.0160N, R.0440E, 21 MDM, NV Sec. 024 W2NW,NWSW; | See above. |
| NV-19-06-006 | T.0160N, R.0440E, 21 MDM, NV Sec. 029 E2NE,N2NW,SWNW,SESW,SE; 030 LOTS 3-8; 030 NE,E2SW,W2SE,NESE; 031 LOTS 1; 031 NENW; 032 E2,E2NW,NESW; 033 ALL; | See above (030 for NDOT Pit). |
| NV-19-06-007 | T.0160N, R.0450E, 21 MDM, NV Sec. 001 LOTS 3-6; 001 S2N2,S2; 002 LOTS 5-11; 002 S2NE,SENE,E2SW,SE; 003 LOTS 1-4; 003 S2N2,S2; | N-25341 Sierra Pacific Power Company dba NV Energy, 230 kV transmission line 140 ft wide; N-39525 USGS Monitoring well 300x300 ft. |
| NV-19-06-008 | T.0160N, R.0450E, 21 MDM, NV Sec. 011 LOTS 1-7; 011 S2NE,SENE,E2SW,SE; 012 PROT ALL; | See above. |
| NV-19-06-009 | T.0160N, R.0450E, 21 MDM, NV Sec. 015 LOTS 1-4; 015 E2,E2W2; 022 LOTS 1-4; 022 E2W2,E2; | See above. |
| NV-19-06-012 | T.0040N, R.0492E, 21 MDM, NV Sec. 022 PROT ALL; 023 PROT ALL; 024 PROT ALL; 025 PROT ALL; | Warm Springs Communications Site-N-91800 American Tower; N-01819 DOE; N-02775 CommNet Wireless; N-13250 NV Dept of Info Tech; N-31630E Intermt Pwr LA Wtr & Pwr; N-34923 Nye Cnty Sheriff; N-53778 White Pine Cnty Emerg Mgmt; N-54706 USAF; N- 59021 Nye Cnty Emerg Svc; N-62849 USAF; N-76019 BLM. N-01819 |
| NV-19-06-013 | T.0040N, R.0492E, 21 MDM, NV Sec. 026 PROT ALL; 027 PROT ALL; 034 PROT ALL; 035 PROT ALL; 036 PROT ALL; | N-01819 DOE 10-ft access road to communications site; N-54706 USAF 10-ft access road to communications site. NVCC 020460 NDOT 400 ft US Highway 6/95. |

| Parcel # | Legal Lands Description | ROW Case File/ROW Holder Range Improvement Description |
|--------------|---|--|
| NV-19-06-031 | T.0070N, R.0510E, 21 MDM, NV Sec. 024 ALL; 025 N2,SW,N2SE,SWSE; 036 N2NW,SWNW,W2SW; | NVCC 020741 NDOT 400 ft wide US Highway 6; N-94441 SPPCo 30 ft wide 69.9 kV transmission line |
| NV-19-06-040 | T.0030N, R.0520E, 21 MDM, NV Sec. 001 LOTS 1-3; 001 S2N2,S2; 002 SE; 003 PROT SWSW; 004 PROT SWNE,NW,S2; 005 PROT ALL; | Range Improvements 0655, 0127 include stock pond and canal or ditch flume in sections 3,10, 11, 13, 14, 24, and 25. Stock ponds in NE of section 24 and SE of section 25. Sec. 2, NE contains 2 USGS monitoring wells, N-40024 and N-40025. Sec. 2, SW contains corral range improvement #128. Nev 044326 NDOT 400-ft wide Highway 375 passes through secs. 3,11,13,14,24, 25, and 36. |
| NV-19-06-043 | T.0030N, R.0520E, 21 MDM, NV Sec. 013 ALL; 014 ALL; 015 PROT ALL; | Nev 044325 NDOT 40 acre mineral material pit in sec. 14, NENE. |
| NV-19-06-048 | T.0030N, R.0520E, 21 MDM, NV Sec. 030 PROT ALL; 031 PROT ALL; 032 PROT ALL; 033 PROT ALL; | Sec. 32 range improvements 209 consist of trough, spring, corral, and line shack. |
| NV-19-06-049 | T.0030N, R.0520E, 21 MDM, NV Sec. 034 PROT ALL; 035 ALL; 036 ALL; | See above (040 for NDOT ROW). |
| NV-19-06-050 | T.0040N, R.0520E, 21 MDM, NV Sec. 019 LOTS 2-4; 019 NENE.SENW,E2SW; 030 LOTS 1-4; 030 W2NE,E2NW,E2SW,SE; 031 LOTS 1-7; 031 NE,E2NW,NESW,N2SE; 032 LOTS 1-4; 032 SWNW,NW,N2S2; 033 LOTS 1; 036 LOTS 3,6,7; | NDOT 40 acre mineral material pit, Nev 044324, Sec. 19, Lot 4. State Route 375, Nev 044326 NDOT 400 ft wide highway sec. 19 SW; Sec. 30 NENE. |
| NV-19-06-051 | T.0060N, R.0520E, 21 MDM, NV Sec. 001 PROT N2,N2SW,SESW,SE; 002 PROT N2,SW,N2SE; 003 PROT E2,N2NW,SENW; | N-62144 BLM 50-ft road in section 1 and 12 aka Lunar Crater Backcountry Byway.N-01574, S2 of sec. 12 segregation/classification - open to mineral leasing and mineral material sales. |
| NV-19-06-052 | T.0070N, R.0520E, 21 MDM, NV Sec. 001 PROT ALL; | Nev 05524 NDOT 400 ft US Highway 6; NVCC 019923 - NDOT 400 ft US Highway 6 - |

| Parcel # | Legal Lands Description | ROW Case File/ROW Holder Range Improvement Description |
|--------------|---|--|
| | 002 PROT ALL; 011 PROT ALL; 012 PROT ALL; | Secs. 10-12; N-94441 SPPCo 30 ft wide 69 kV transmission line. |
| NV-19-06-053 | T.0070N, R.0520E, 21 MDM, NV Sec. 003 PROT ALL; 004 PROT ALL; 009 PROT ALL; 010 PROT ALL; | NVCC 019923 - NDOT 400 ft US Highway 6; N-94441 SPPCo 30 ft wide 69 kV transmission line. |
| NV-19-06-054 | T.0070N, R.0520E, 21 MDM, NV Sec. 005 PROT E2E2,W2W2,SESW,SWSE; 006 PROT ALL; 007 PROT ALL; 008 PROT ALL; | PLO 7630-6591 Halligan Mesa Comm Site area consists of 200 acres. Open to mineral leasing; withdrawn from surface entry and mining. N-04134 SPPCo distribution line 25-ft wide; N-42984 USAF access road 50-ft wide; N-35951 USAF access road 200-ft wide. |
| NV-19-06-055 | T.0070N, R.0520E, 21 MDM, NV Sec. 013 PROT ALL; 014 PROT ALL; 015 PROT ALL; 016 PROT E2,N2NW,SESW; | N-94441 SPPCO 30-ft wide distribution line; NVCC 019923 NDOT 400-ft wide US Highway 6. |
| NV-19-06-056 | T.0070N, R.0520E, 21 MDM, NV Sec. 017 PROT N2NE,SWNE,NW,NWSW; 018 PROT ALL; 019 PROT NW,W2SW; 030 NWNW,S2NW; | N-42984 USAF access road 50-ft wide; N-35951 USAF access road 200-ft wide. NVCC 020741 NDOT 400 ft Highway 6, sec. 19. |
| NV-19-06-065 | T.0080N, R.0520E, 21 MDM, NV Sec. 029 PROT ALL; 030 PROT ALL; 031 PROT ALL; 032 PROT N2,W2SW,E2SE; | Sec. 32 contains USAF PLO 7630. However, the legal description does not include the PLO area. Be aware the area is not totally fenced to show exact boundaries of the withdrawal area. |
| NV-19-06-076 | T.0100N, R.0520E, 21 MDM, NV Sec. 023 ALL; 024 ALL; 025 ALL; 026 ALL; | Section 24, range improvements R-0502 water pipeline; N-0185 trough and rainwater catchment. |
| NV-19-06-101 | T.0110N, R.0530E, 21 MDM, NV Sec. 004 PROT ALL; 005 PROT ALL; 006 PROT ALL; 007 PROT ALL; | Range improvement fence 4652 on North section line of 4-6 and cattle guard 4653 section line of 6. |
| NV-19-06-102 | T.0110N, R.0530E, 21 MDM, NV Sec. 008 PROT ALL; 009 PROT ALL; | Range improvement fence 4652 on East section line of 9,16,21,28, and 33. Cattle guard in section 28, east section line. |

| Parcel # | Legal Lands Description | ROW Case File/ROW Holder Range Improvement Description |
|--------------|--|---|
| | 016 PROT ALL; 017 PROT ALL; | |
| NV-19-06-107 | T.0110N, R.0530E, 21 MDM, NV Sec. 028 PROT ALL; 029 PROT ALL; 032 PROT ALL; 033 PROT ALL; | See above parcel 102 description. |
| NV-19-06-111 | T.0090N, R.0540E, 21 MDM, NV Sec. 004 PROT ALL; 009 PROT ALL; 010 PROT ALL; | Range improvement fence 4652 north section line secs. 4-6. |
| NV-19-06-112 | T.0090N, R.0540E, 21 MDM, NV Sec. 005 PROT ALL; 006 PROT ALL; 007 PROT ALL; | Range improvement fence 4652 north section line secs. 4-6. Range improvement fence 4906 E2 of sec. 6. |
| NV-19-06-113 | T.0090N, R.0540E, 21 MDM, NV Sec. 008 PROT ALL; 017 PROT ALL; 018 PROT ALL; | Section 18, SESE corner contains a range improvement water well 3551. |
| NV-19-06-149 | T.0090N, R.0550E, 21 MDM, NV Sec. 025 PROT ALL; 026 PROT ALL; 036 PROT ALL; | Range improvement fence 4569 covers E2 and SESW sec. 36. |
| NV-19-06-182 | T.0090N, R.0560E, 21 MDM, NV Sec. 005 LOTS 1-4; 005 S2N2,S2; 006 LOTS 1-7; 006 S2NE,SENE,E2SW,SE; 007 LOTS 1-4; 007 E2,E2W2; 008 ALL; | Range improvement fence 4569 in secs.8,17,18,19,30, and 31. |
| NV-19-06-183 | T.0090N, R.0560E, 21 MDM, NV Sec. 017 ALL; 018 LOTS 1-4; 018 E2,E2W2; 019 LOTS 1-4; 019 E2,E2W2; 020 ALL; | Range improvement fence 4569 in secs.8,17,18,19,30, and 31. Sec. 20 contains N-40192, USGS monitoring well. |

Appendix J: Environmental Justice Analysis

Battle Mountain District June 2019 Oil and Gas Lease Sale Environmental Justice Analysis

Julie A Suhr Pierce, PhD
Great Basin Socioeconomic Specialist

A low income EJ population is present. The percentage of the population classified as low income in each of the blockgroups¹ analyzed is more than 10 percentage points higher than that of the State of Nevada as a whole. While there is a high percentage of minorities living within three of the blockgroups analyzed, the percentages, as compared to that of the State of Nevada, are lower than the reference population. A minority EJ population, therefore, is not present for the purposes of this analysis.

| Population | Low Income | Minority |
|----------------------------|------------|----------|
| Blockgroup ID 320239601001 | 24% | 37% |
| Blockgroup ID 320239601002 | 25% | 29% |
| Blockgroup ID 320150003003 | 40% | 30% |
| Blockgroup ID 320110001002 | 36% | 7% |
| State of Nevada | 11.4% | 48% |

Data sources:

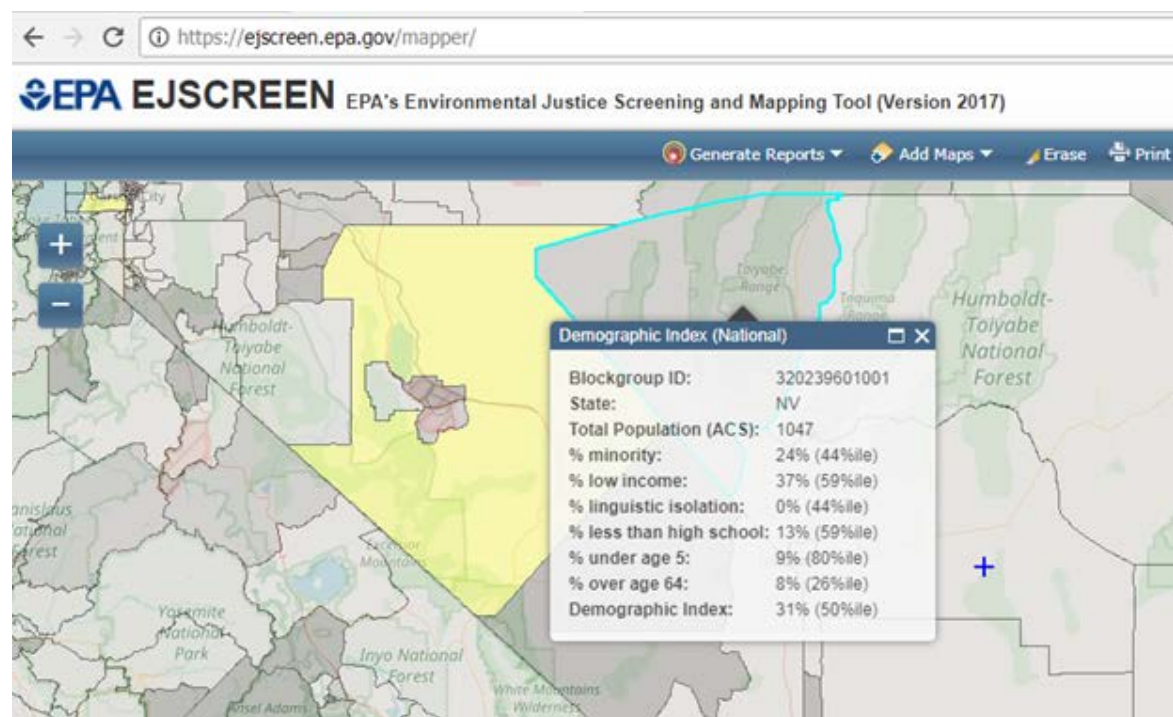
- EPA EJScreen: ejscreen.epa.gov/mapper/ (accessed December 2017)
- Headwaters Economics EPS: <https://headwaterseconomics.org/tools/economic-profile-system/#measures-report-section> (accessed December 2017)

It is not anticipated that there would be any disproportionate impacts on the existing EJ populations within the project area.

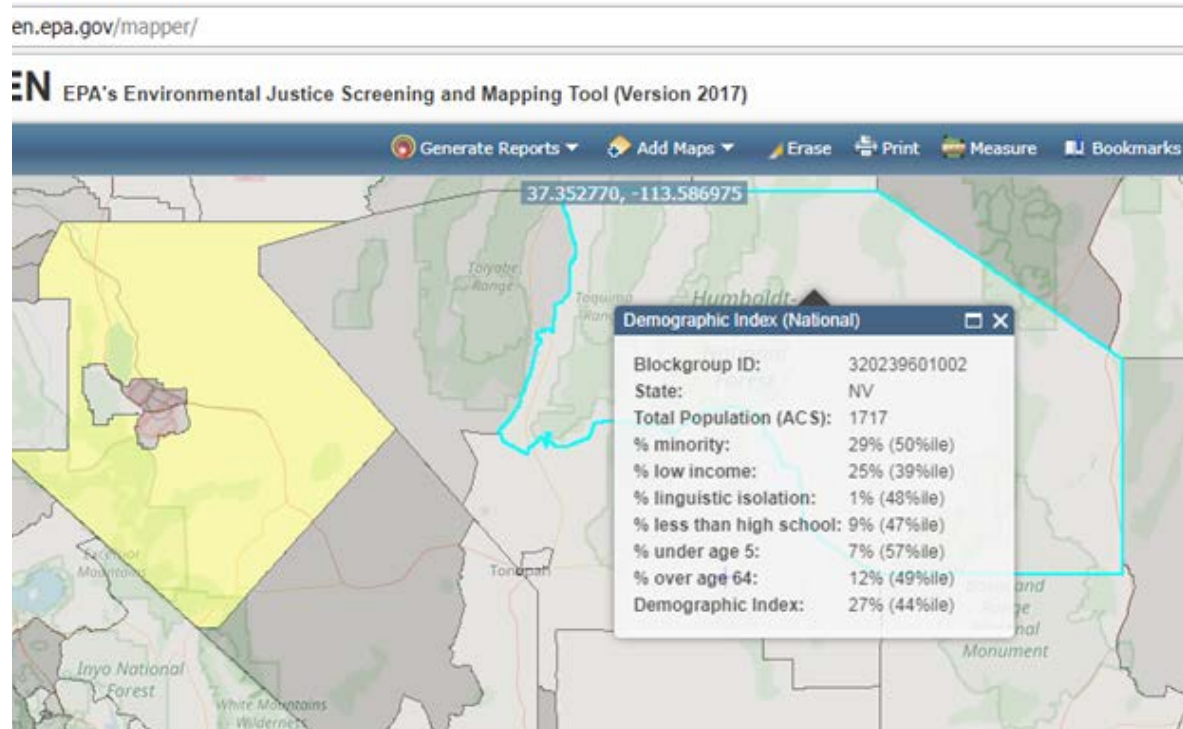
Assessment: Present, not affected.

¹ A block group is an area defined by the U.S. Census Bureau that usually has 600-3000 people living in it. The U.S. is divided into more than 200,000 block groups.

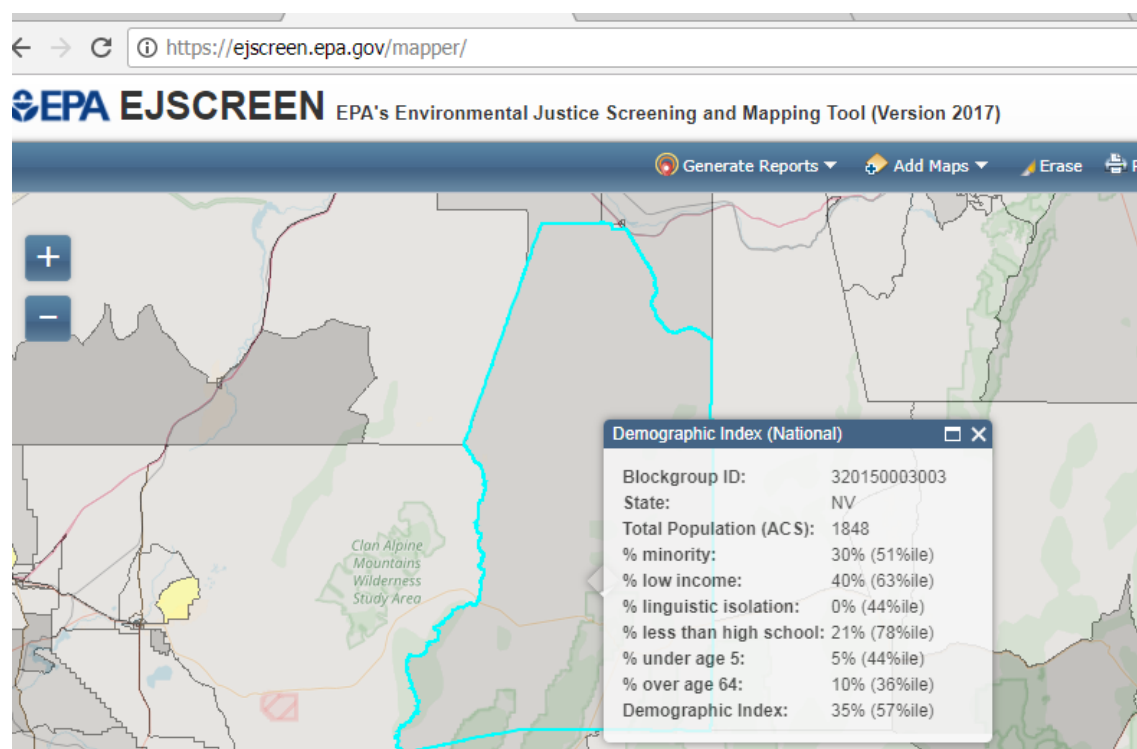
Blockgroup ID 320239601001



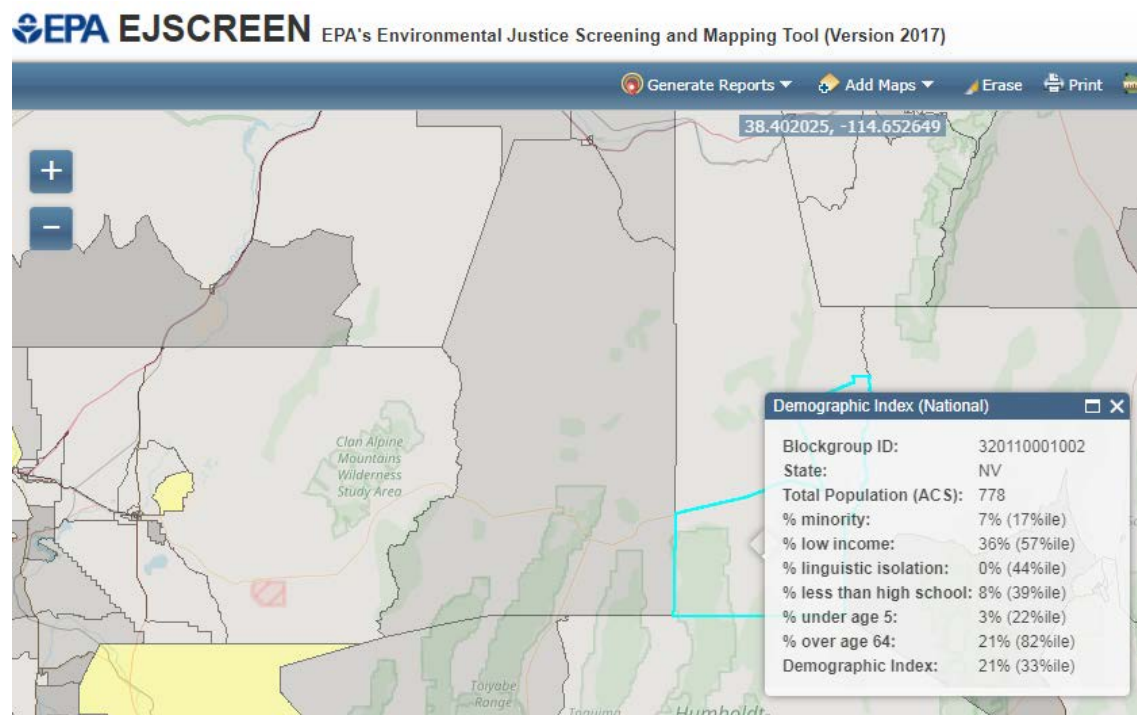
Blockgroup ID 320239601002



Blockgroup ID 320150003003



Blockgroup ID 320110001002



Appendix K: Maps of Proposed Lease Parcels and Associated Resources

For ease of reference, this appendix contains all maps showing proposed lease parcels together with various associated resources as described in the EA. See the project's National NEPA Register website for higher resolution maps.

Figures in Chapter 1 of the EA:

1. Proposed lease parcels overview, Battle Mountain District, including parcel overlapping Ely District
2. Proposed lease parcels, Mt. Lewis Field Office
3. Proposed lease parcels, Tonopah Field Office

Figures in this appendix:

4. Proposed lease parcels with land status, Mt. Lewis Field Office
5. Proposed lease parcels with land status, Tonopah Field Office
6. Water resources and proposed lease parcels, Mt. Lewis Field Office
7. Water resources and proposed lease parcels, Tonopah Field Office
8. Bighorn sheep habitat and proposed lease parcels, Mt. Lewis Field Office
9. Bighorn sheep habitat and proposed lease parcels, Tonopah Field Office
10. Pronghorn habitat and proposed lease parcels, Mt. Lewis Field Office
11. Pronghorn habitat and proposed lease parcels, Tonopah Field Office
12. Mule deer seasonal habitats and proposed lease parcels, Mt. Lewis Field Office
13. Mule deer seasonal habitats and proposed lease parcels, Tonopah Field Office
14. Mule deer movement corridors and proposed lease parcels, Mt. Lewis Field Office
15. Mule deer movement corridors and proposed lease parcels, Tonopah Field Office
16. Greater Sage-Grouse habitats and proposed lease parcels, Mt. Lewis Field Office
17. Greater Sage-Grouse habitats and proposed lease parcels, Tonopah Field Office
18. Wild horse and burro Herd Management Areas and proposed lease parcels, Mt. Lewis Field Office
19. Wild horse and burro Herd Management Areas and proposed lease parcels, Tonopah Field Office
20. Grazing allotments and proposed lease parcels, Mt. Lewis Field Office
21. Grazing allotments and proposed lease parcels, Tonopah Field Office
22. Visual Resource Inventory and proposed lease parcels, Mt. Lewis Field Office
23. Visual Resource Management and proposed lease parcels, Tonopah Field Office
24. Wilderness characteristics inventory units and proposed lease parcels, Mt. Lewis Field Office
25. Wilderness characteristics inventory units and proposed lease parcels, Tonopah Field Office

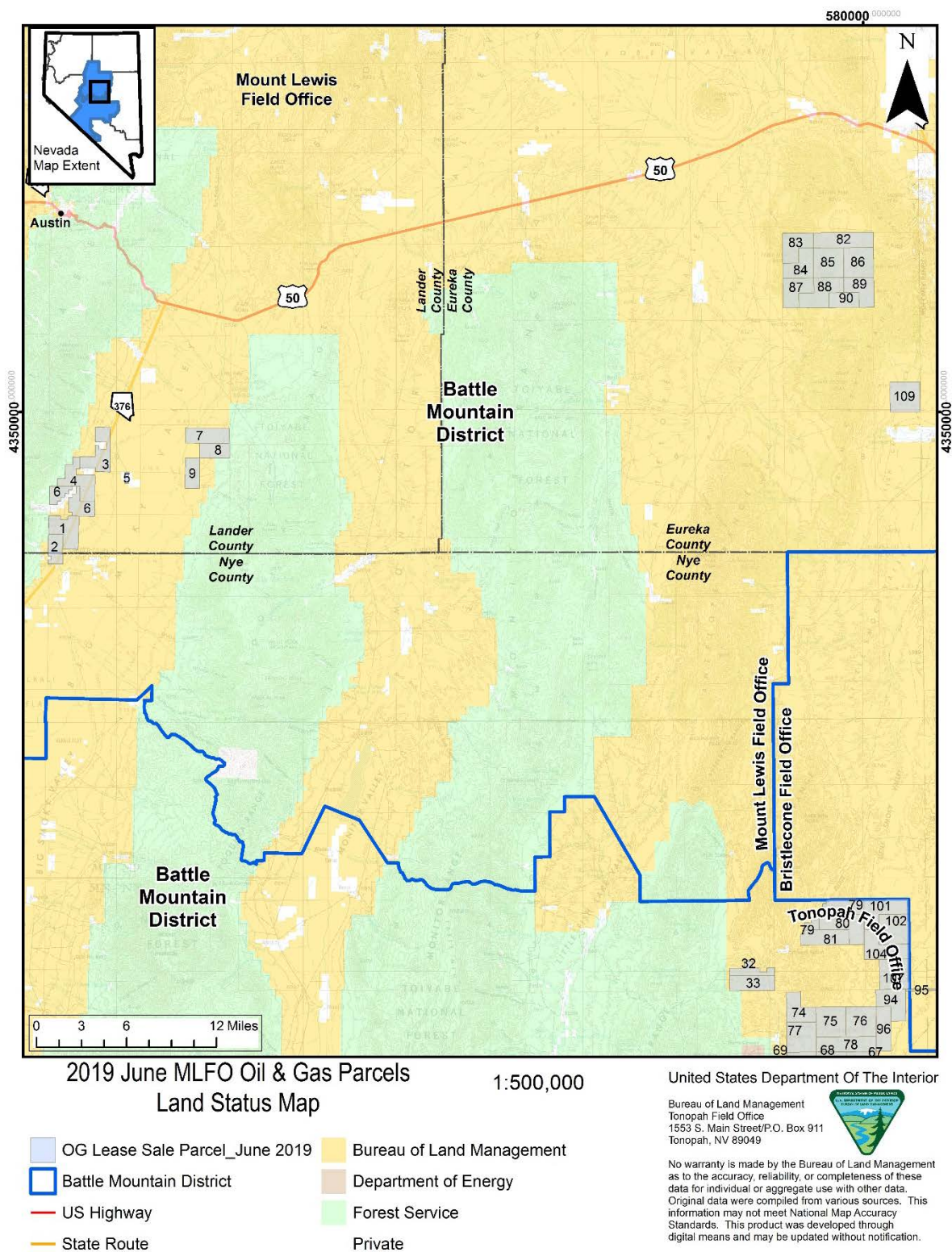


Figure 4. Proposed lease parcels with land status, Mt. Lewis Field Office.

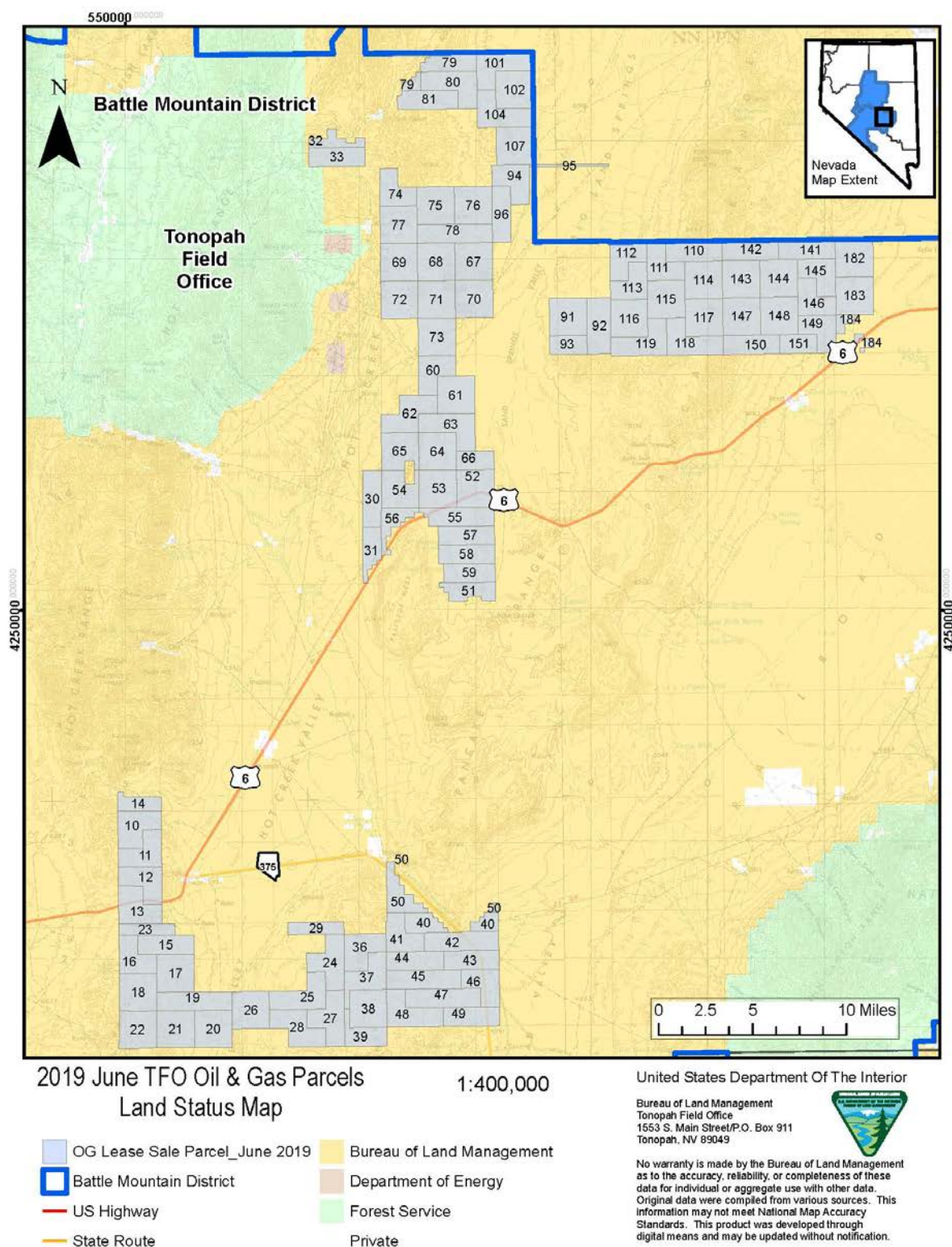


Figure 5. Proposed lease parcels with land status, Tonopah Field Office.

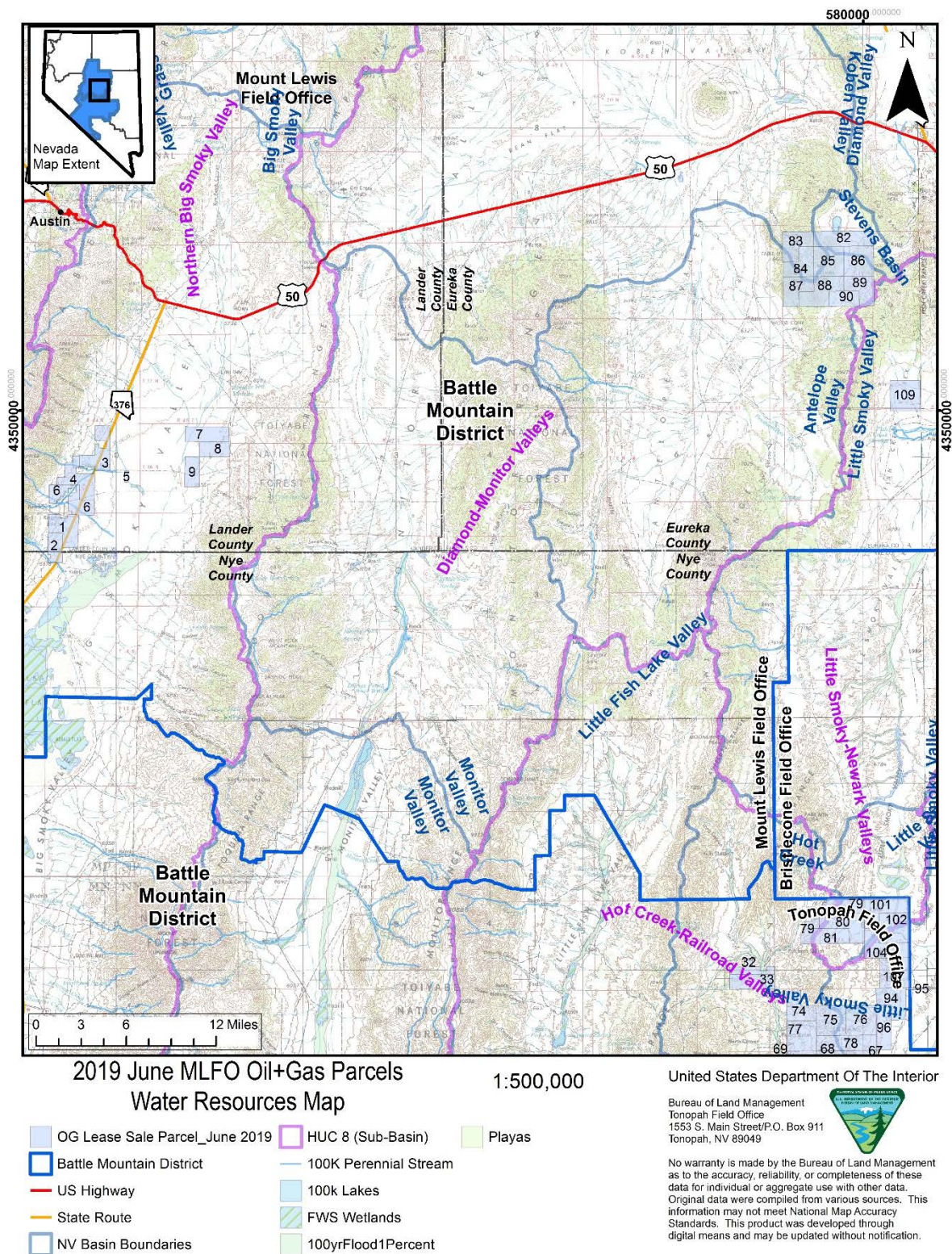


Figure 6. Water resources and proposed lease parcels, Mt. Lewis Field Office.

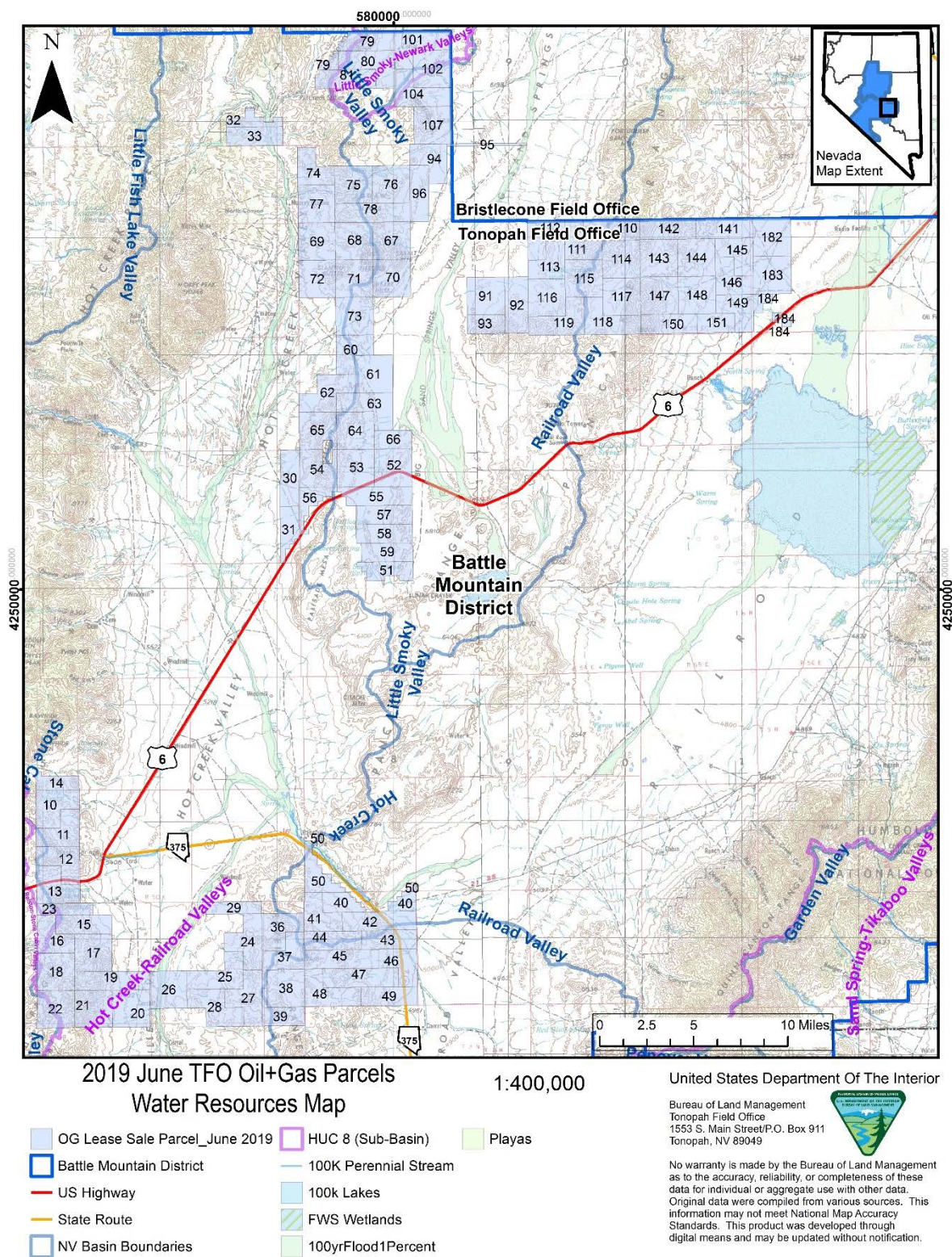


Figure 7. Water resources and proposed lease parcels, Tonopah Field Office.

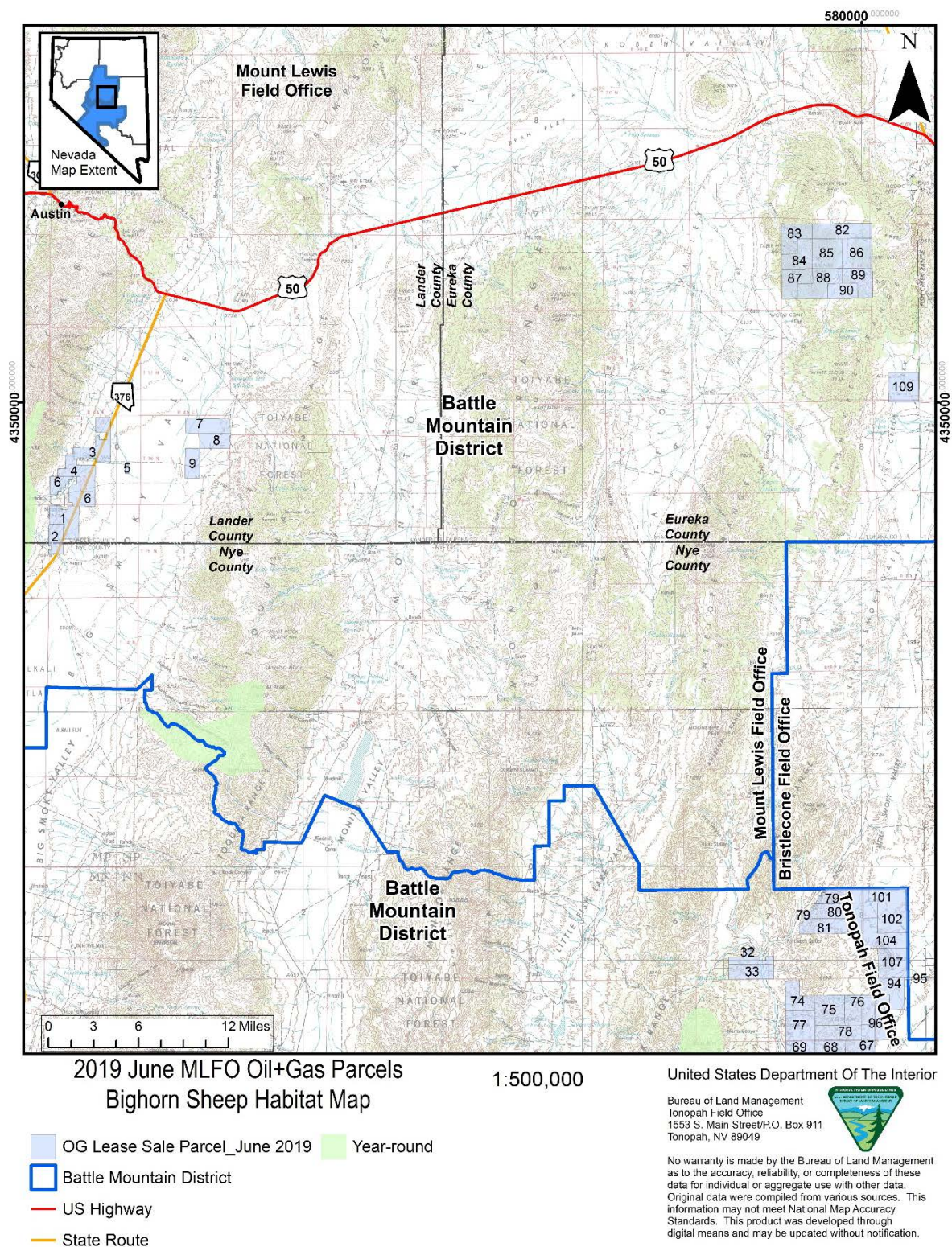


Figure 8. Bighorn sheep habitat and proposed lease parcels, Mt. Lewis Field Office.

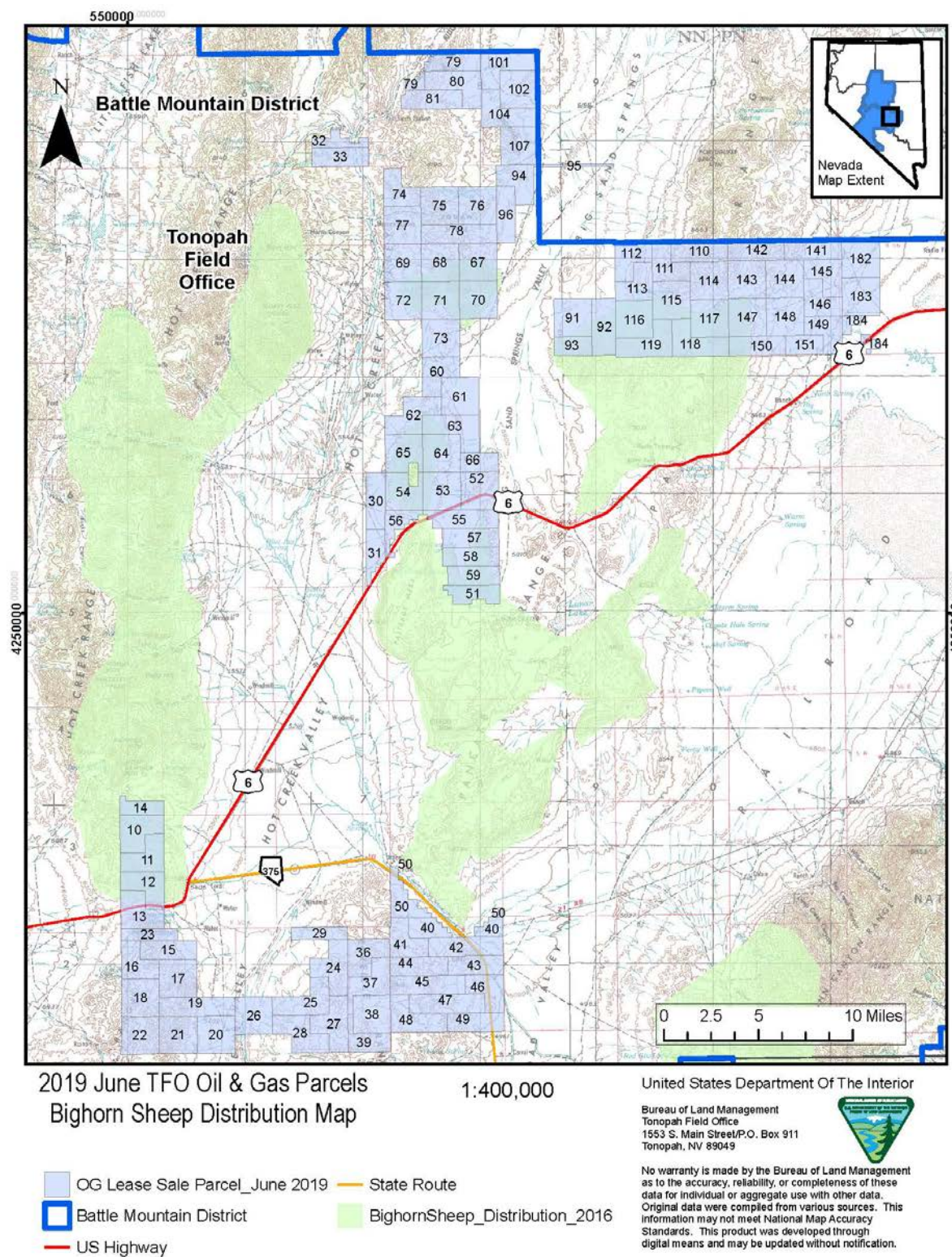


Figure 9. Bighorn sheep habitat and proposed lease parcels, Tonopah Field Office.

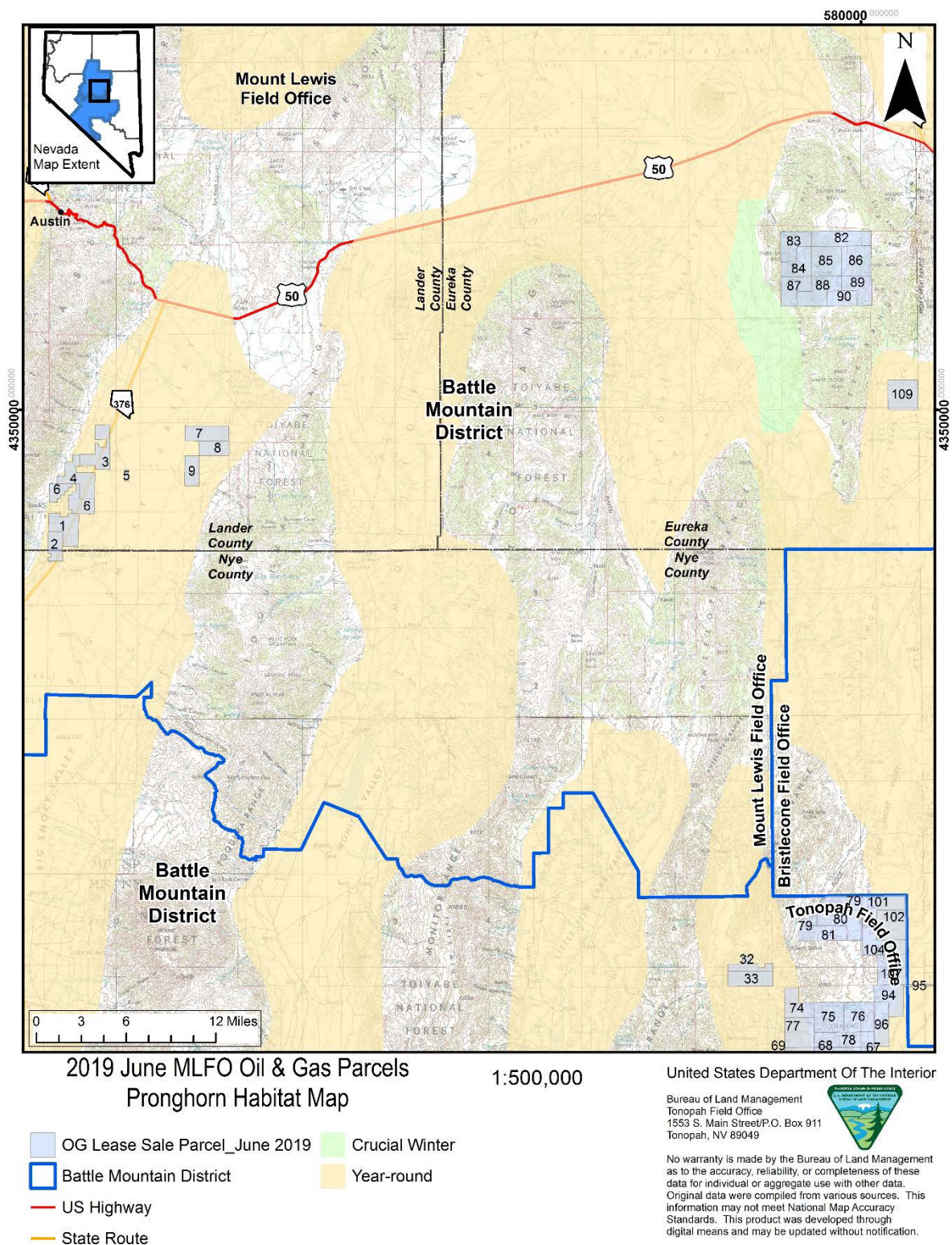


Figure 10. Pronghorn habitat and proposed lease parcels, Mt. Lewis Field Office.

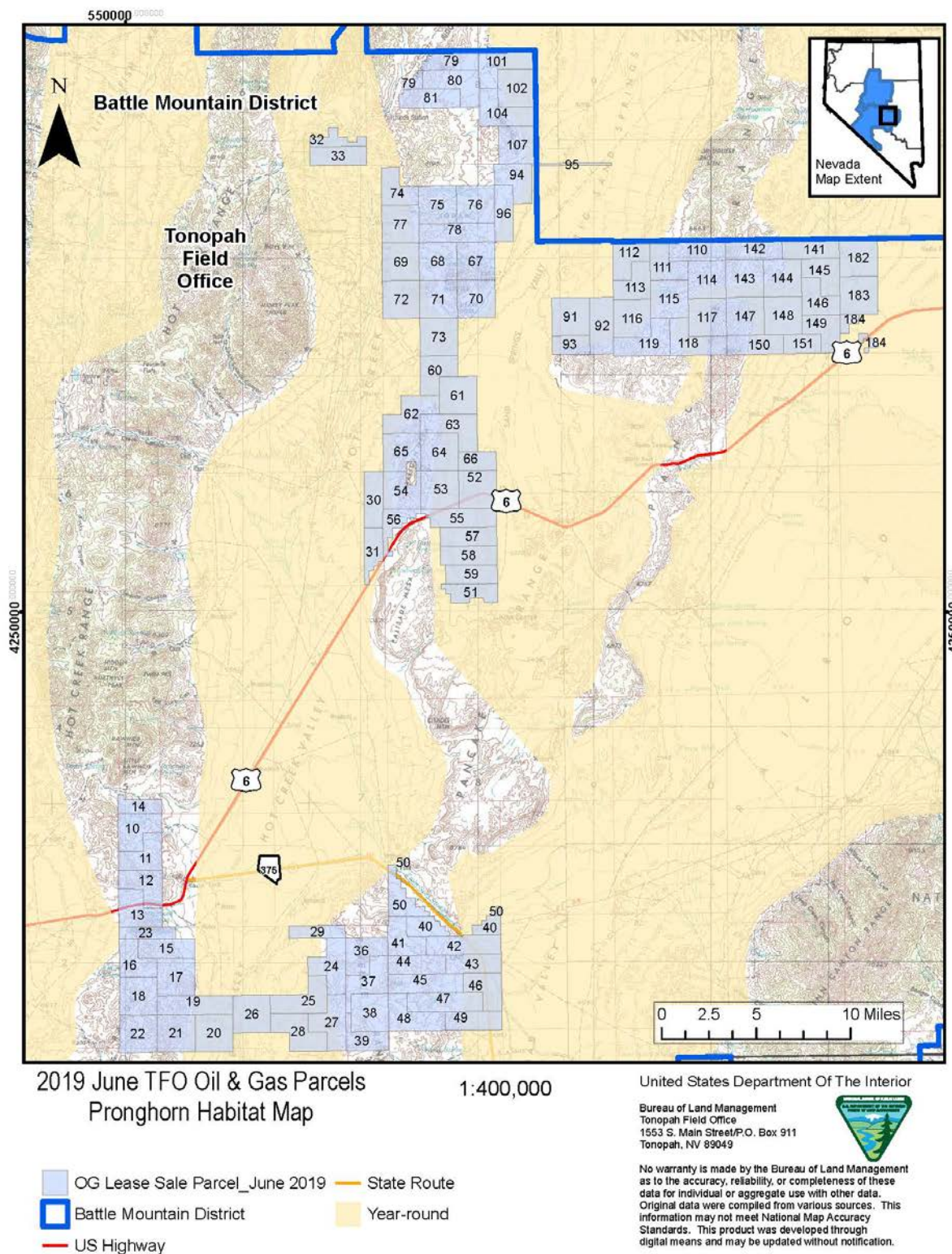


Figure 11. Pronghorn habitat and proposed lease parcels, Tonopah Field Office.

Figure 12. Mule deer seasonal habitats and proposed lease parcels, Mt. Lewis Field Office.

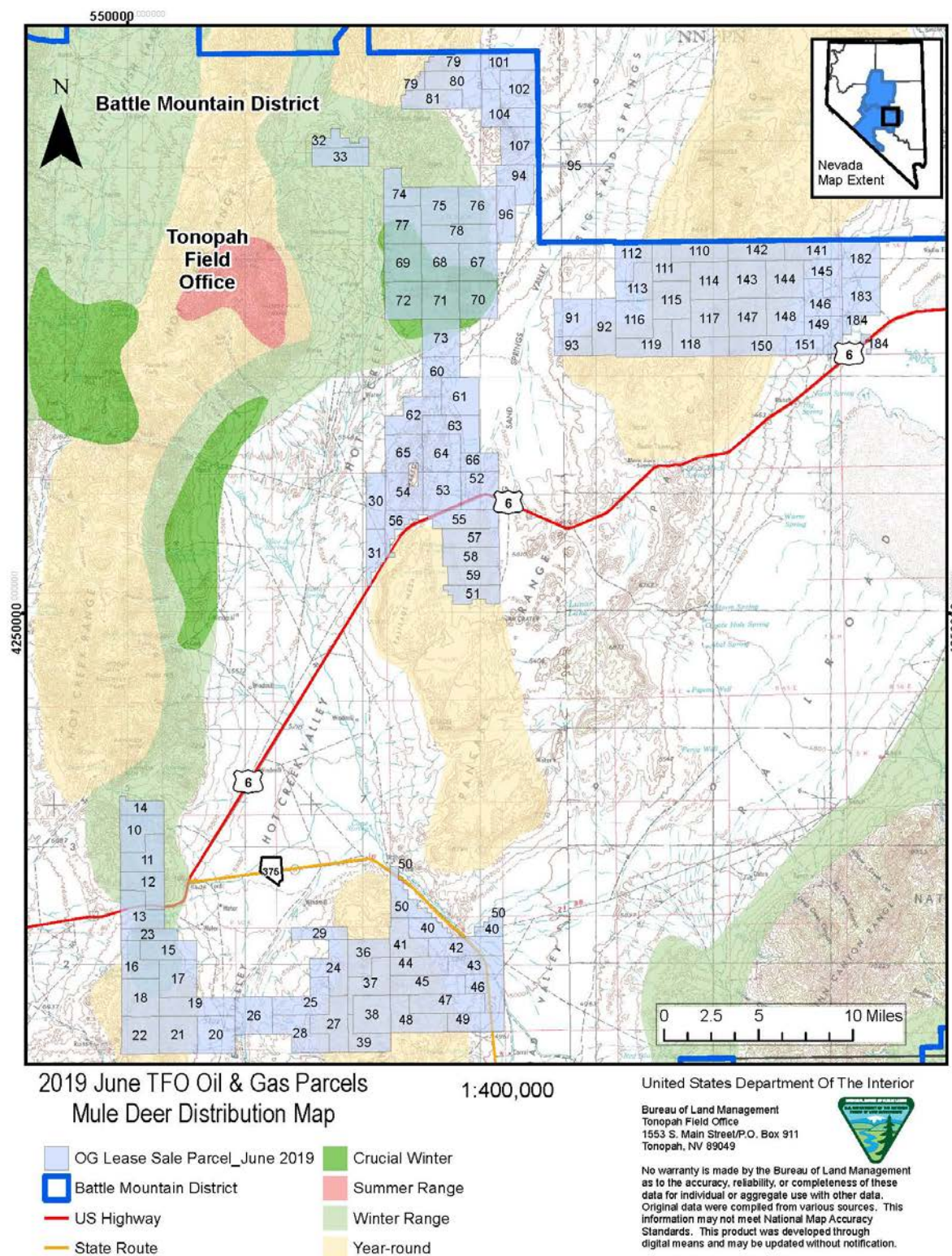


Figure 13. Mule deer seasonal habitats and proposed lease parcels, Tonopah Field Office.

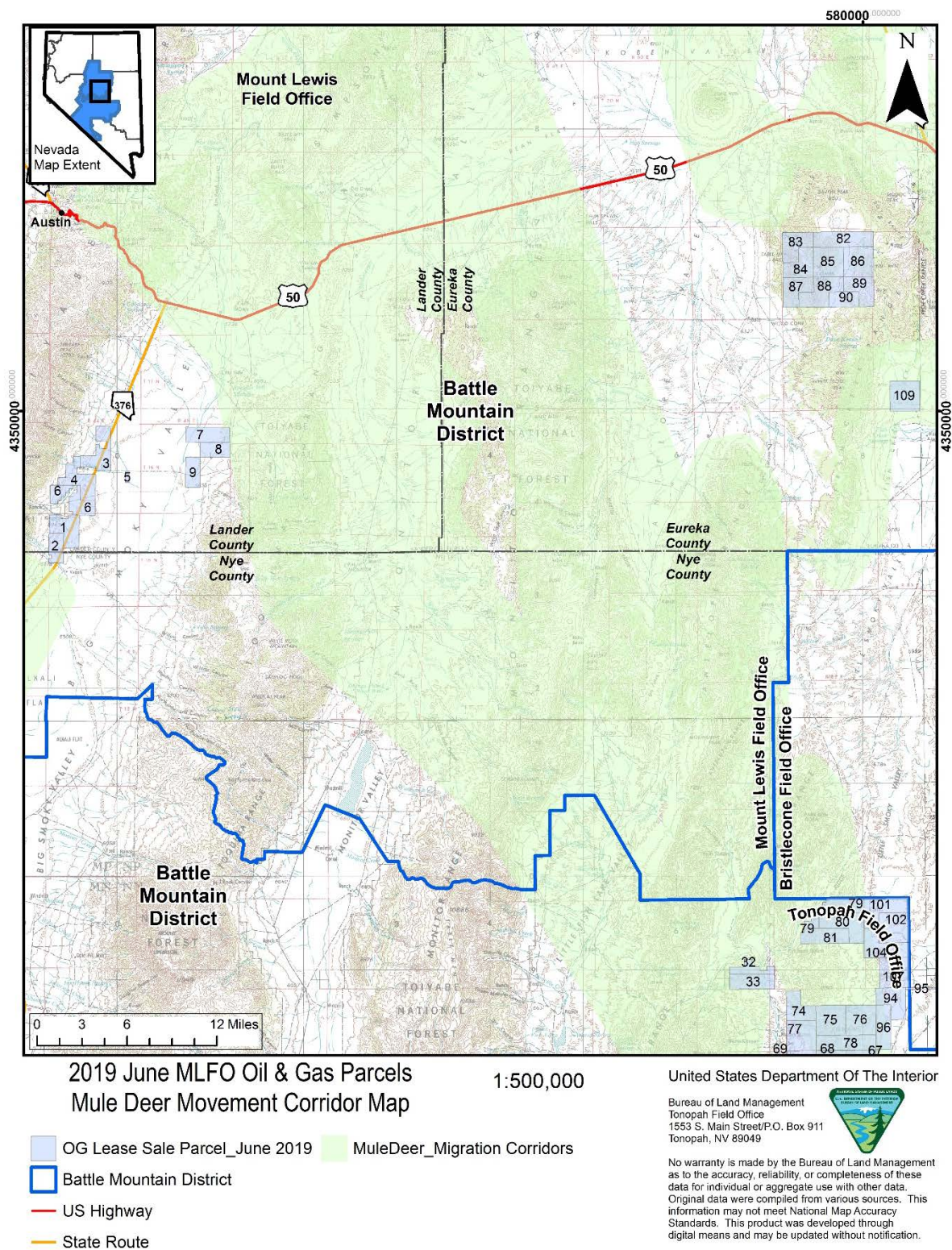


Figure 14. Mule deer movement corridors and proposed lease parcels, Mt. Lewis Field Office.

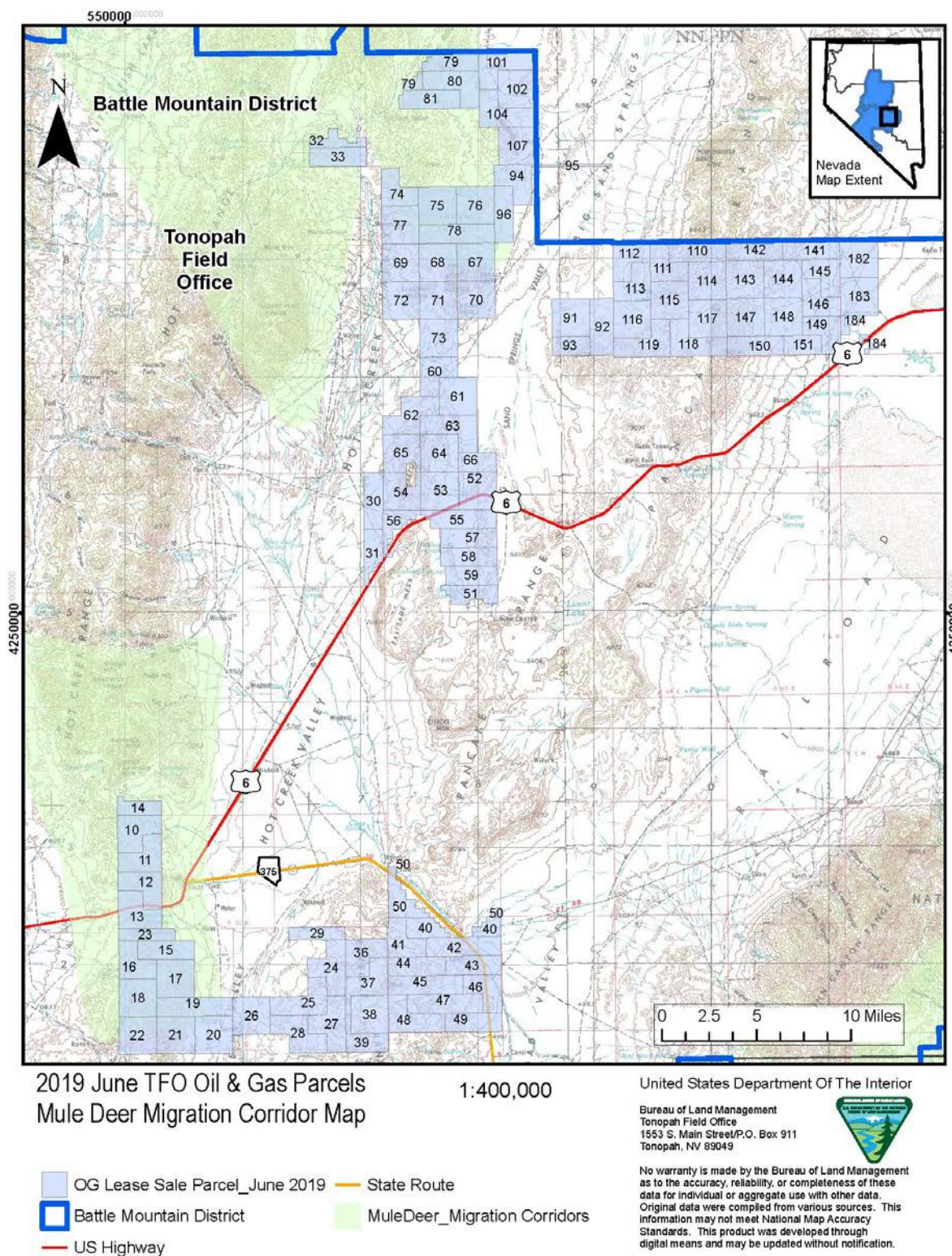


Figure 15. Mule deer movement corridors and proposed lease parcels, Tonopah Field Office.

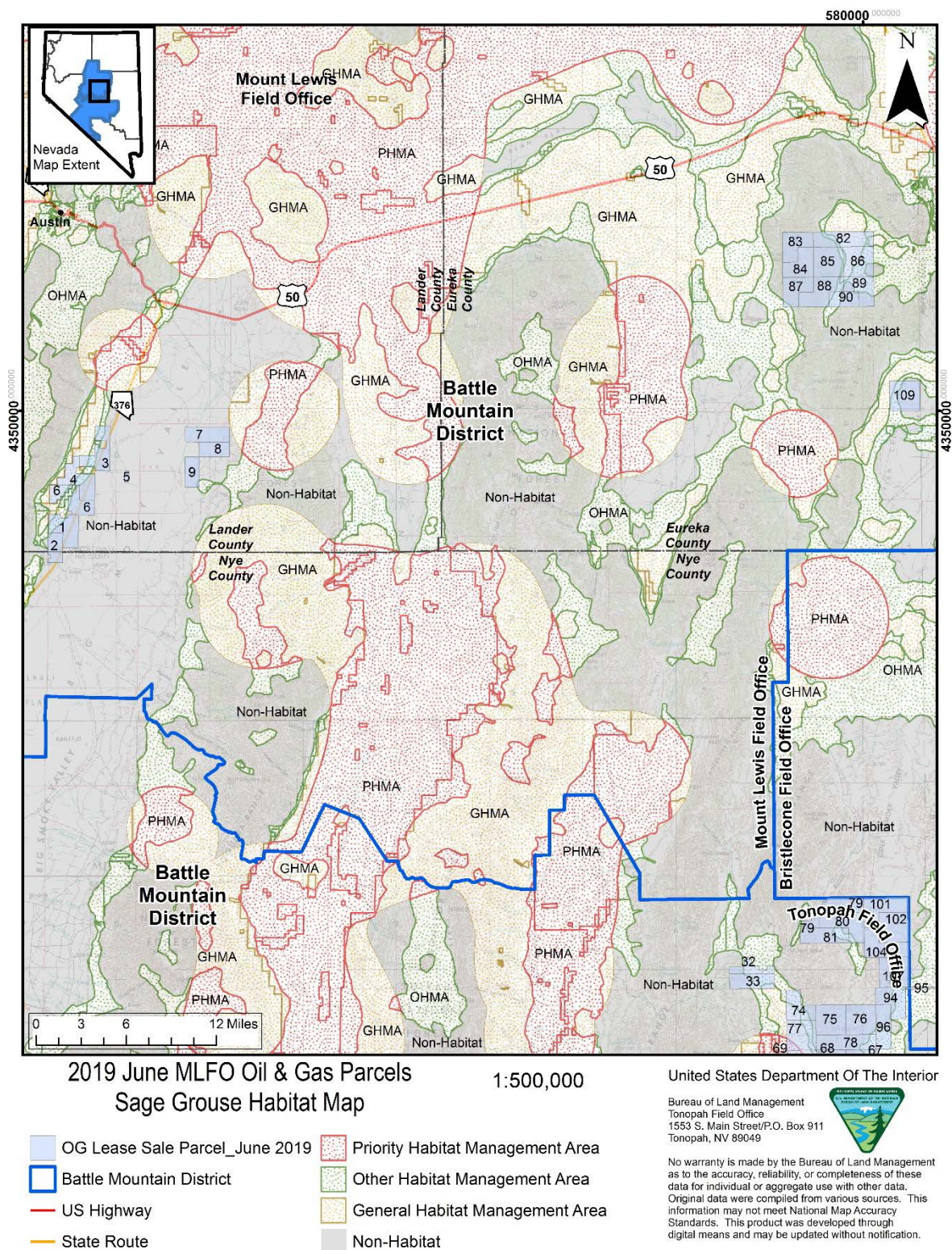


Figure 16. Greater Sage-Grouse habitats and proposed lease parcels, Mt. Lewis Field Office.

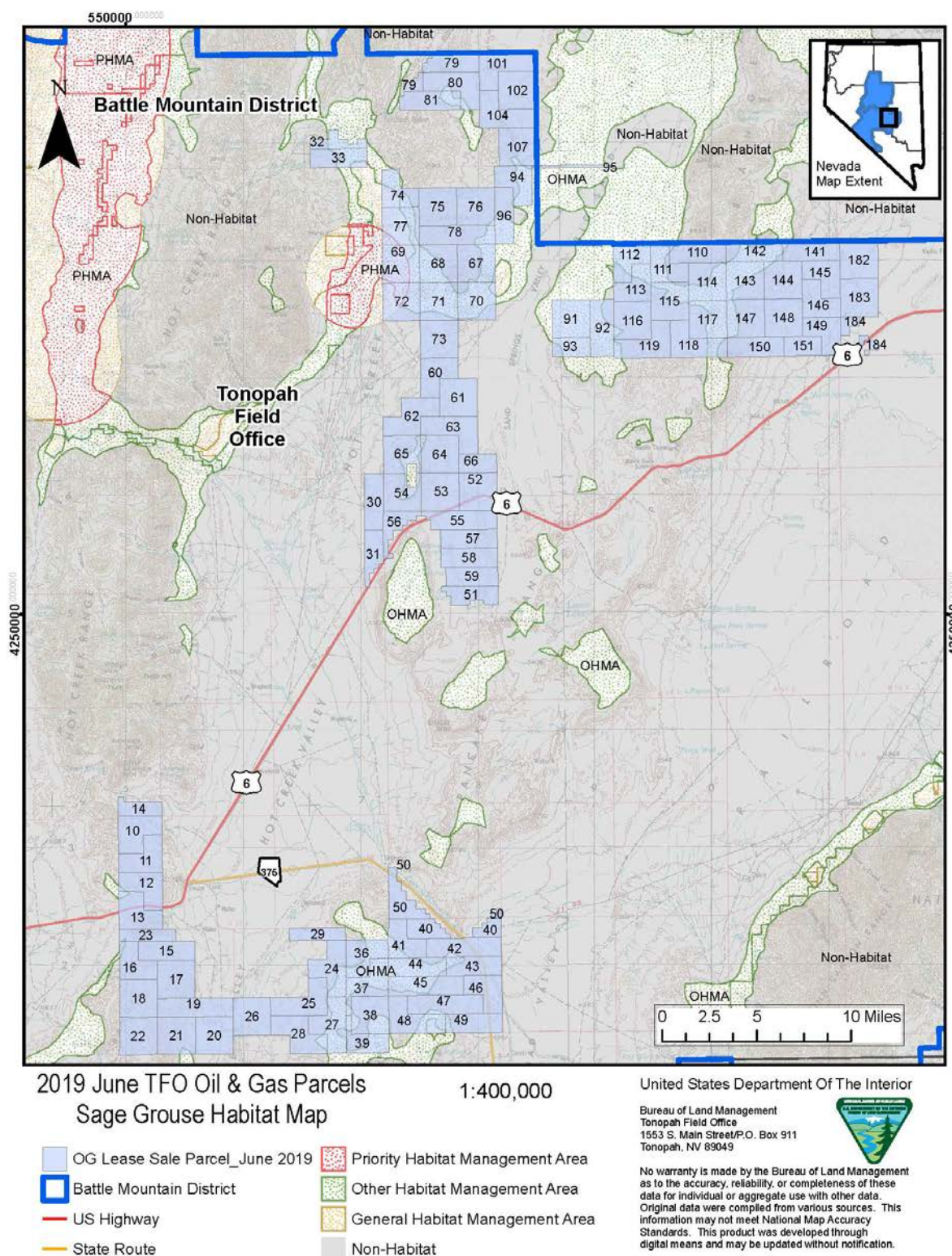


Figure 17. Greater Sage-Grouse habitats and proposed lease parcels, Tonopah Field Office.

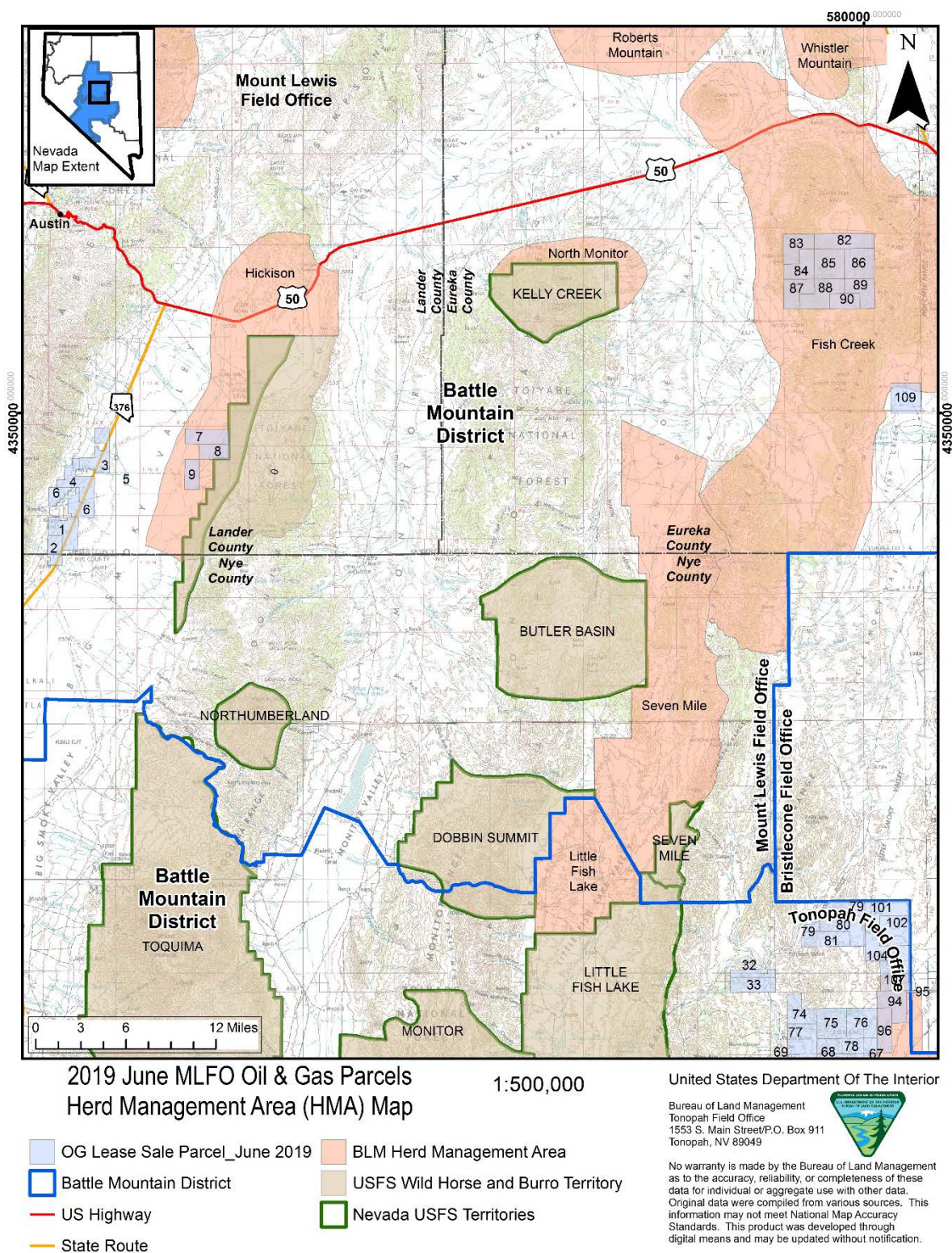


Figure 18. Wild horse and burro Herd Management Areas and proposed lease parcels, Mt. Lewis Field Office.

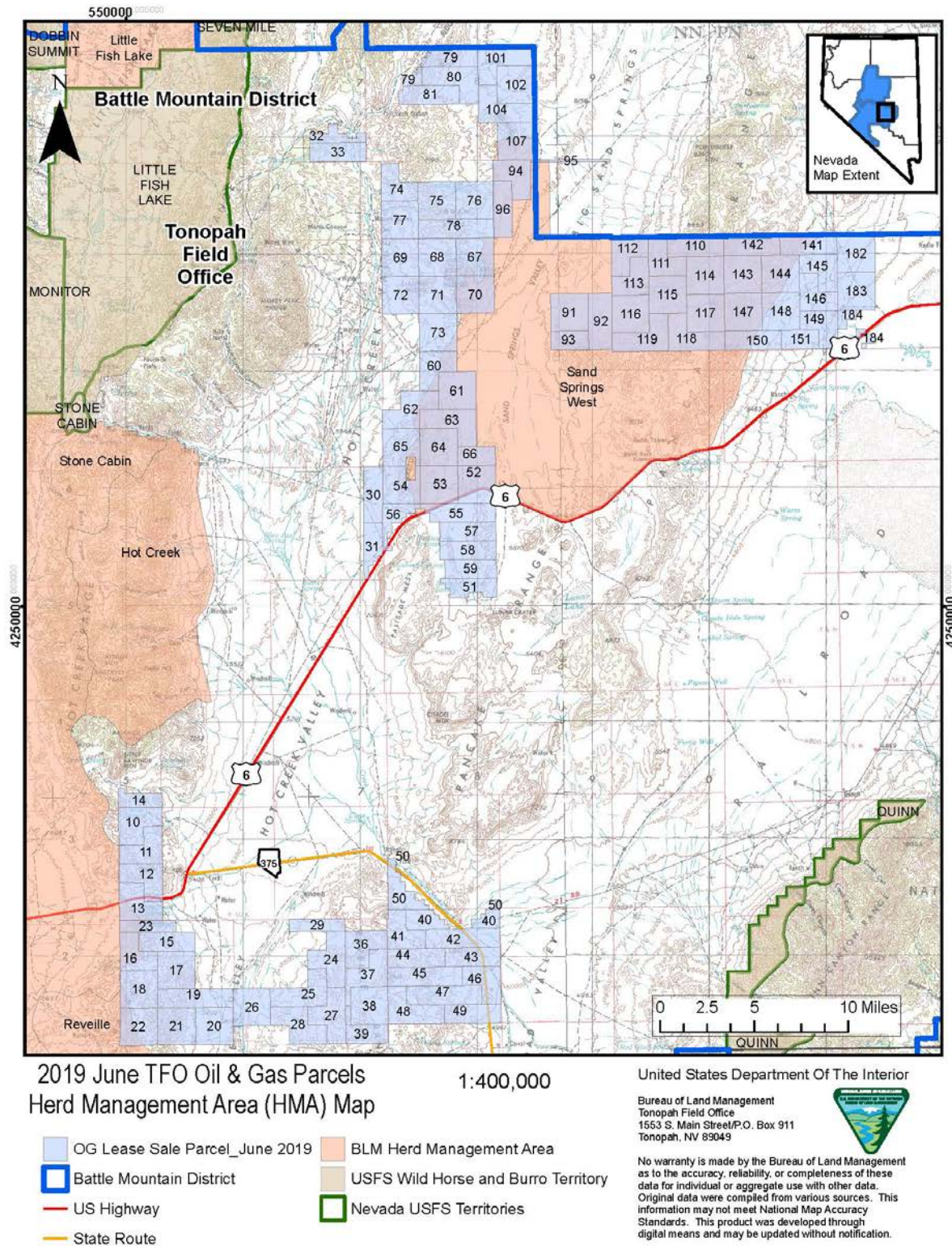


Figure 19. Wild horse and burro Herd Management Areas and proposed lease parcels, Tonopah Field Office.

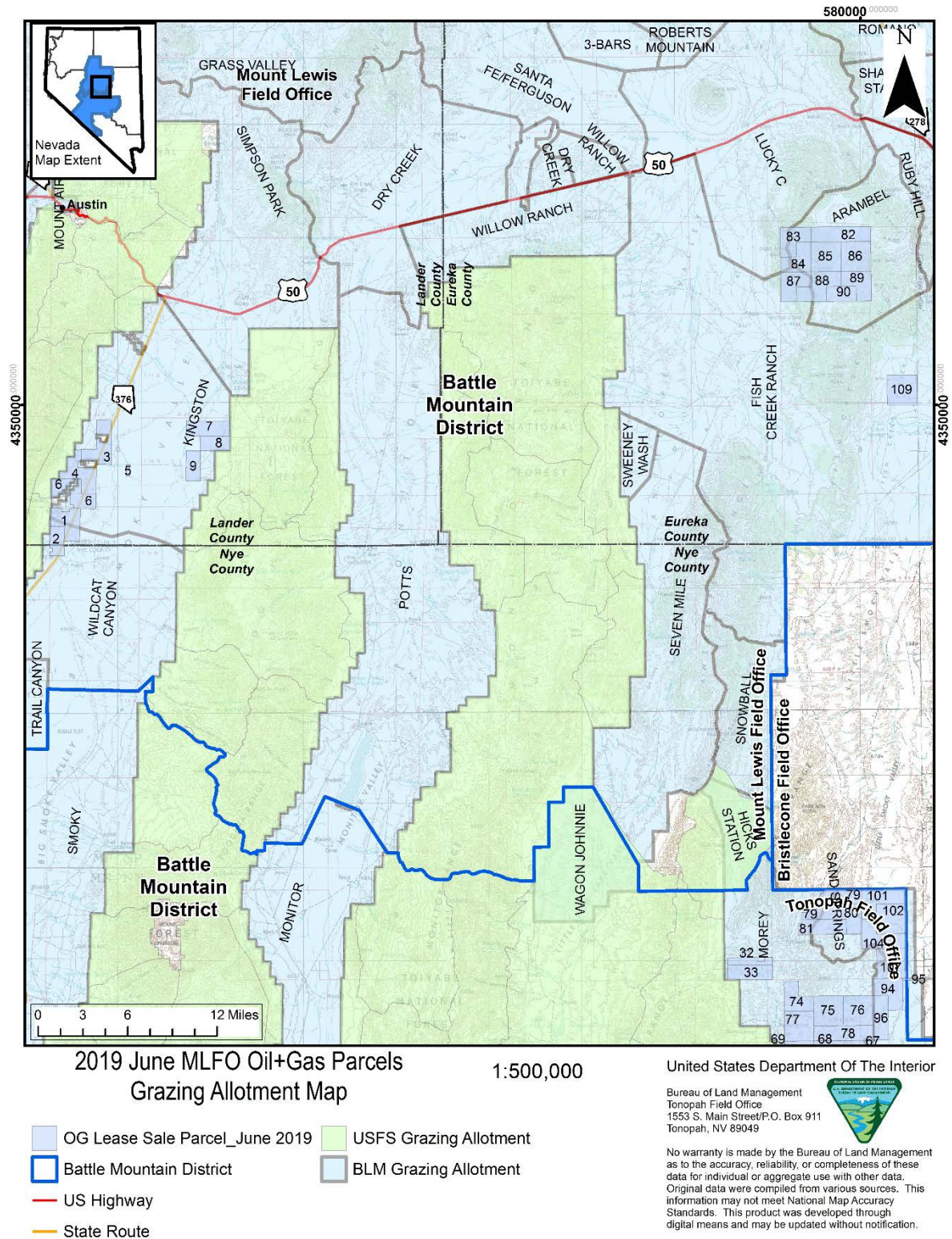


Figure 20. Grazing allotments and proposed lease parcels, Mt. Lewis Field Office.

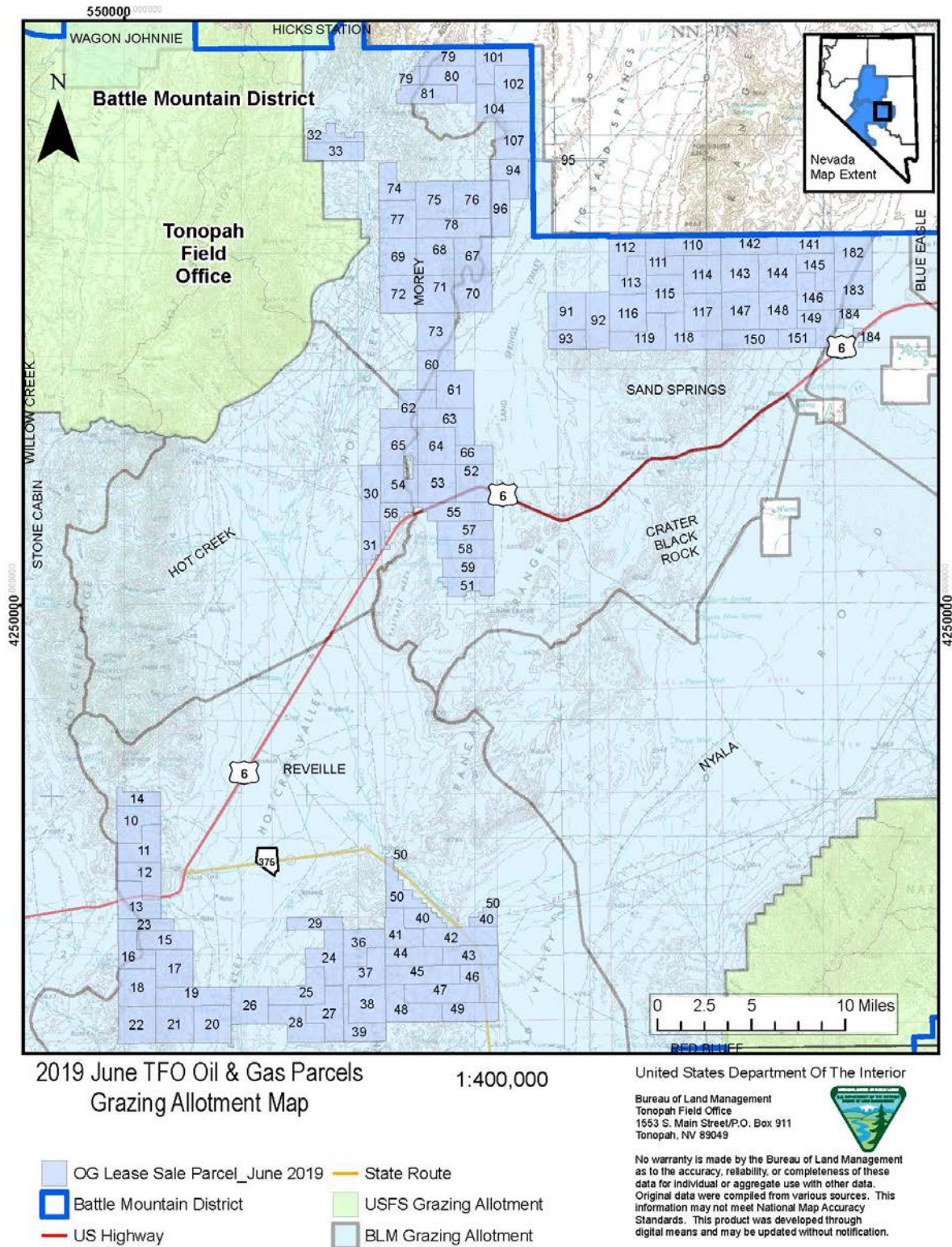


Figure 21. Grazing allotments and proposed lease parcels, Tonopah Field Office.

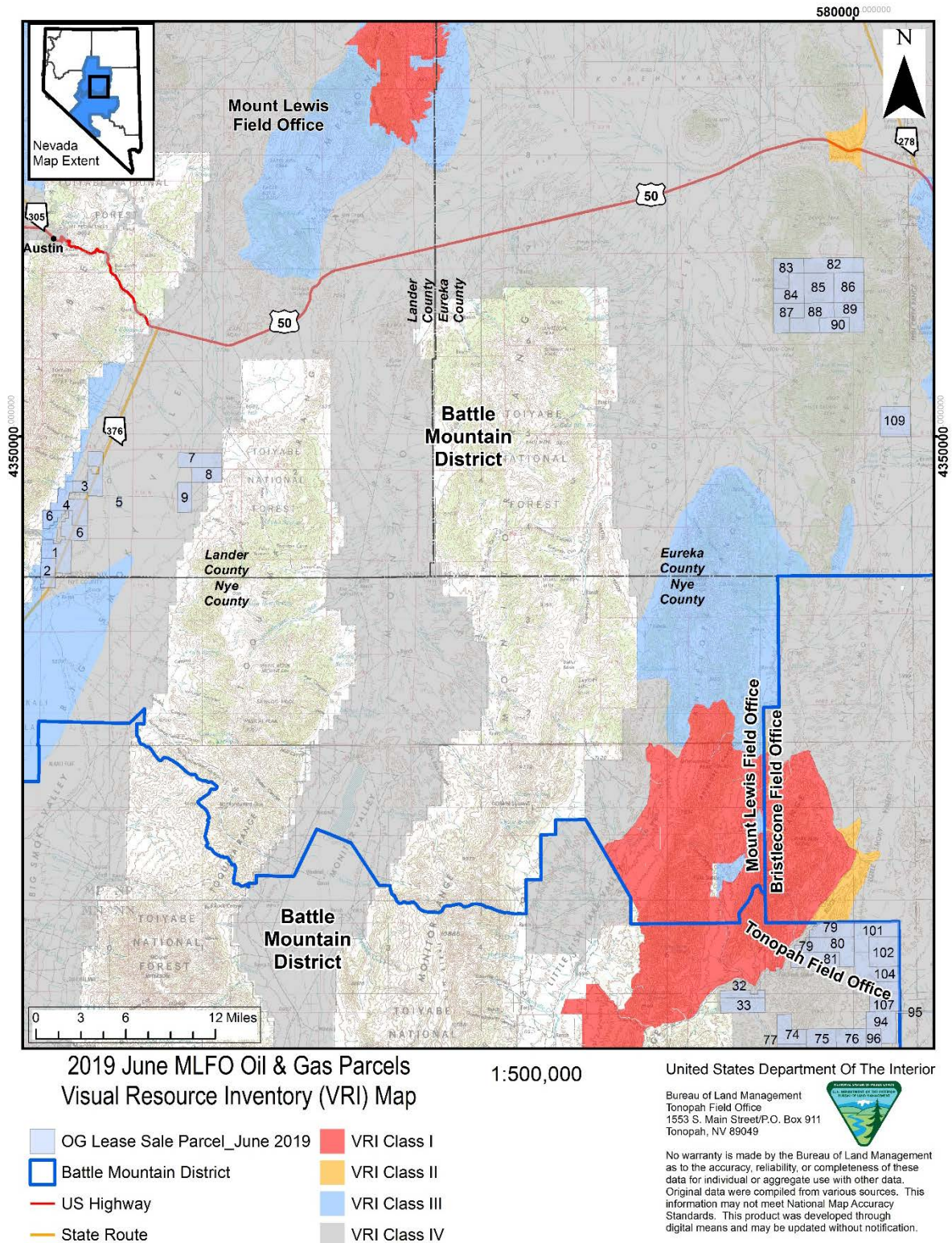


Figure 22. Visual Resource Inventory and proposed lease parcels, Mt. Lewis Field Office.

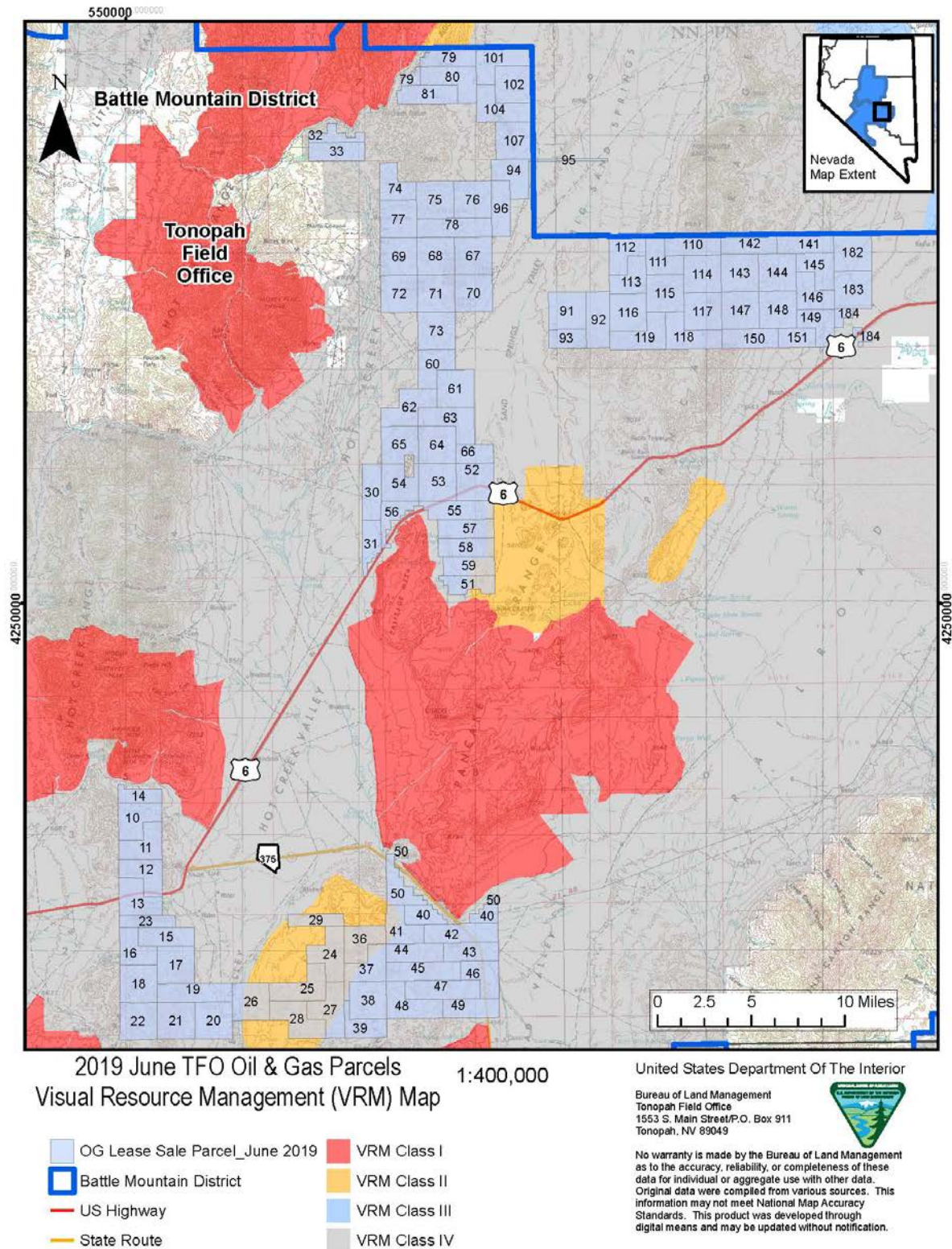


Figure 23. Visual Resource Management and proposed lease parcels, Tonopah Field Office

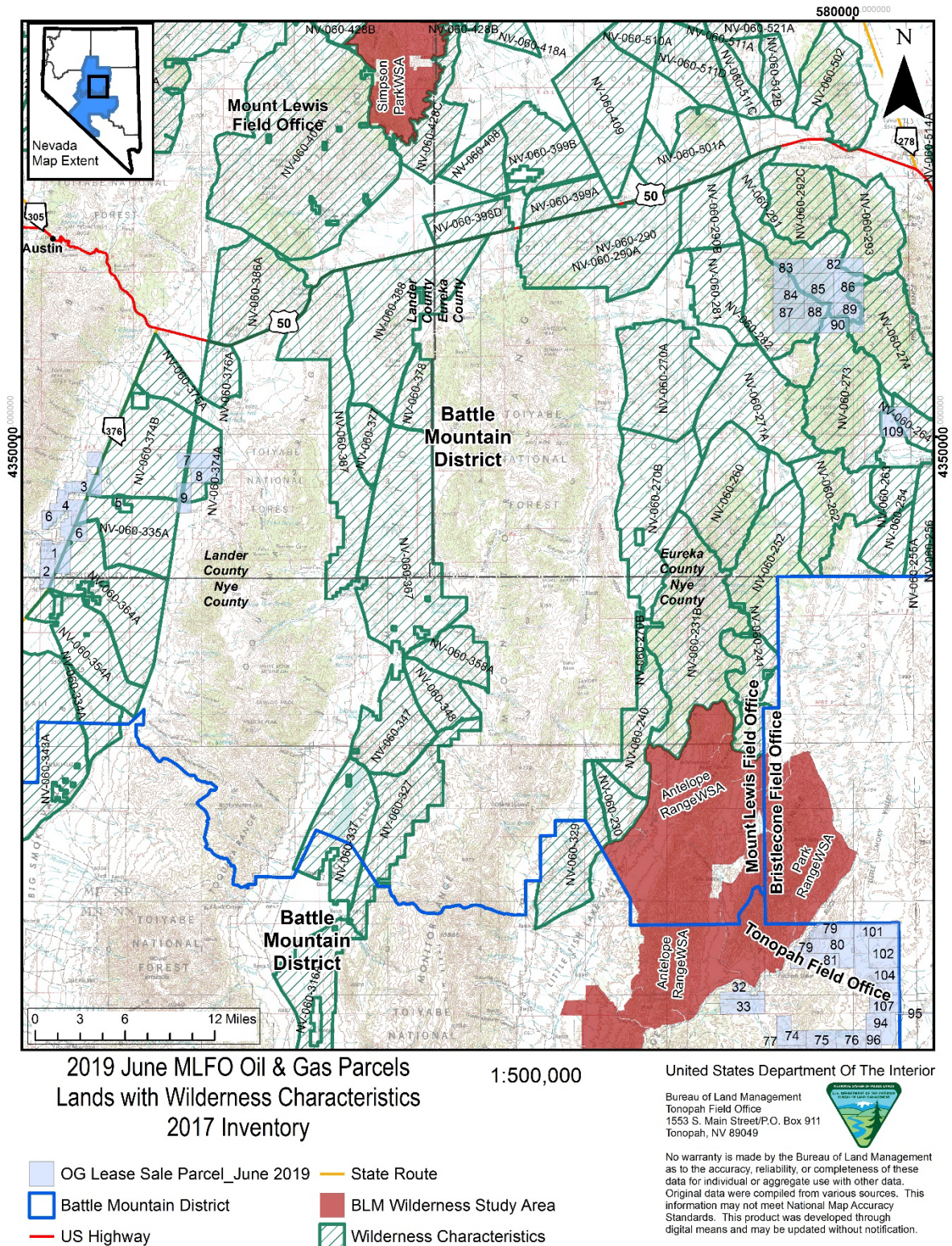


Figure 24. Wilderness characteristics inventory units and proposed lease parcels, Mt. Lewis Field Office.

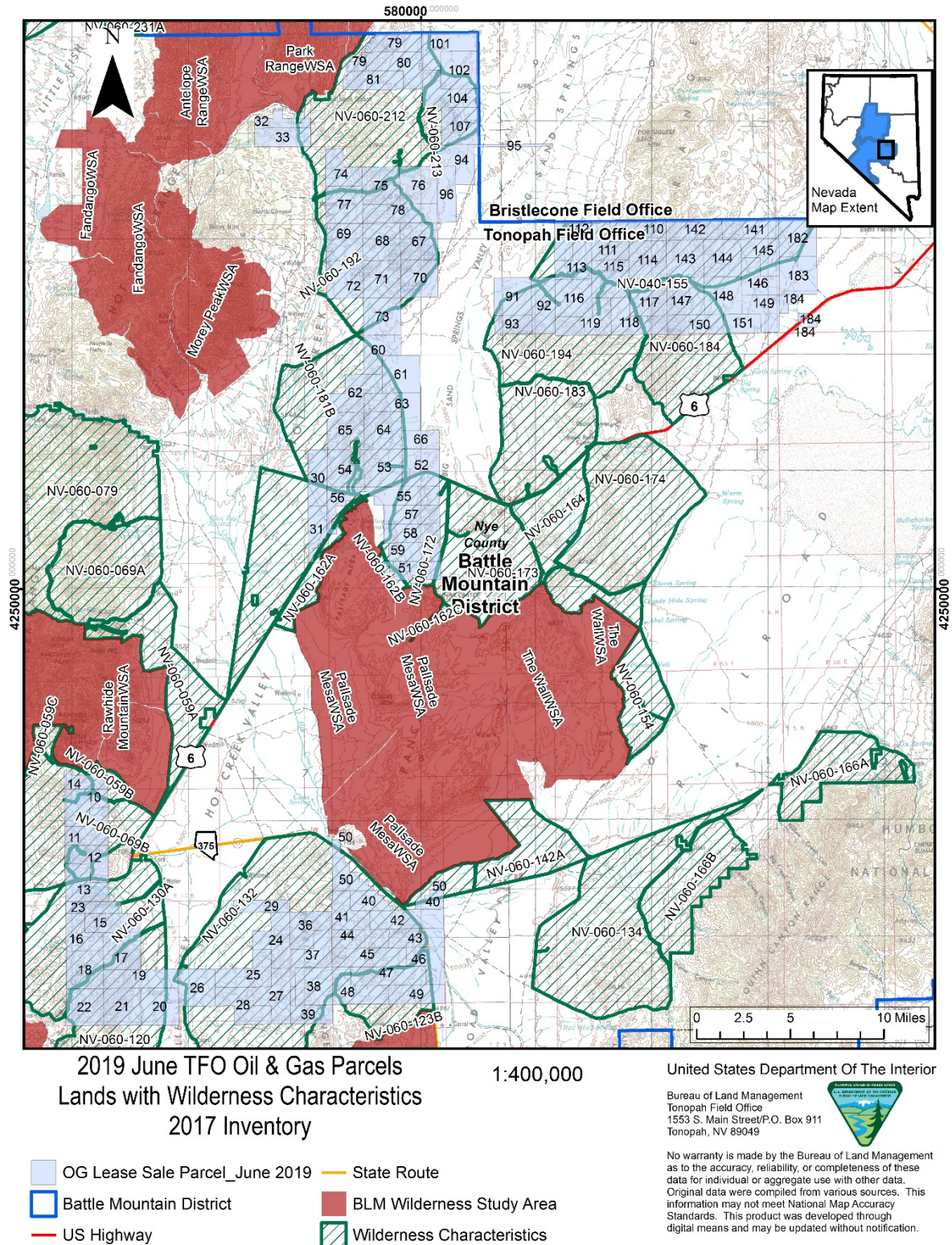


Figure 25. Wilderness characteristics inventory units and proposed lease parcels, Tonopah Field Office.