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

Environmental Assessment

DOI-BLM-NV-B020-2017-0002-EA

June 2017 Competitive Oil and Gas Lease Sale

PREPARING OFFICE

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

Environmental Assessment

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Table of Contents

List of Tables

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 development of mineral resources 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. The NVSO publishes a Notice of Competitive Lease Sale annually that lists lease parcels to be offered at the auction at least 90 days before it is held. The BLM bases its decision as to which parcels to offer for a competitive lease sale on current resource and land use information and the management framework developed in the appropriate district or field office Resource Management Plans (RMPs).

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

- if they are in areas open to leasing, according to the applicable approved RMP;
- if new information has become available which might change any analysis conducted during the planning process;
- if appropriate consultations have been conducted;
- what appropriate stipulations from the RMP should be included;
- whether, based on new information, parcels or parts of parcels should be deferred from leasing pending either development of new stipulations or closure to leasing in an updated RMP; 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 to the parcels. Those parcels and stipulations 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 lease stipulations applicable to each parcel. Occasionally, additional information obtained after publishing the Notice of Competitive Lease Sale may result in deferral of certain parcels prior to the day of the lease sale. (Here and throughout this EA the term "parcels" refers to "parcels or parts of parcels," as stipulations and deferrals are applied to the smallest appropriate part of a parcel, down to 40-acre quarter-quarter section or lot.)

This EA documents the review and environmental analysis of the 106 parcels on the preliminary list nominated for the June 2017 Competitive Oil and Gas Lease Sale that are administered by Battle Mountain District Office, which consists of the Tonopah and Mt. Lewis Field Offices; plus one previously-leased parcel proposed for reinstatement (Figures 1-5, parcel maps; Appendix A, legal land

descriptions). The EA verifies conformance with the approved Land Use Plan (see Section 1.3), provides the rationale for any lease stipulations applied to specific parcels, and identifies parcels proposed for deferral.

An assessment of potential environmental impacts was conducted by an interdisciplinary team (ID Team) of resource specialists. The ID Team considered historical data and personal knowledge of the areas involved, conducted field inspections, and reviewed existing databases and file information to assess potential effects and to determine the appropriate stipulations and lease notices to attach to specific parcels, and whether parcels should be deferred from leasing. The ID Team analyzed three alternatives, further described in Chapter 2:

- **Proposed Action:** All preliminary lease parcels (parcels on the preliminary list provided by NVSO for analysis) would be included in the June 2017 Notice of Competitive Lease Sale.
- **Partial Deferral Alternative Action:** All preliminary lease parcels not proposed for deferrals would be included in the June 2017 Notice of Competitive Lease Sale (Figures 2-5).
- **No Leasing Alternative Action:** No parcels would be offered for lease sale in June 2017. This alternative is included as a basis for assessing and comparing potential impacts.

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 Application for Permit to Drill (APD) 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 detail in Chapter 3. In summary, 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. For the purpose of this analysis, we assume that over the next 10 years:

- **Proposed Action:** Oil and gas exploration and production would disturb 65-100 acres within the Battle Mountain District, potentially including any of the nominated June 2017 lease parcels.
- **Partial Deferral Alternative:** Oil and gas exploration and production would disturb 65-100 acres within the Battle Mountain District, potentially including any of the nominated June 2017 lease parcels not proposed for deferral.
- **No Leasing Alternative:** Oil and gas exploration and production would occur elsewhere in the Battle Mountain 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 stipulations specified for each lease parcel (Appendix B). The main difference in effects between the Proposed Action and Partial Deferral Alternative is that the latter would have less potential for effects to the resources targeted for protection by the deferrals, pending RMP revisions that would include the necessary protective measures; and/or lease purchasers would be directed away from investing in areas where development would likely be restricted due to known overriding resource concerns. For detailed analyses of the alternatives, see Chapters 3 and 4.

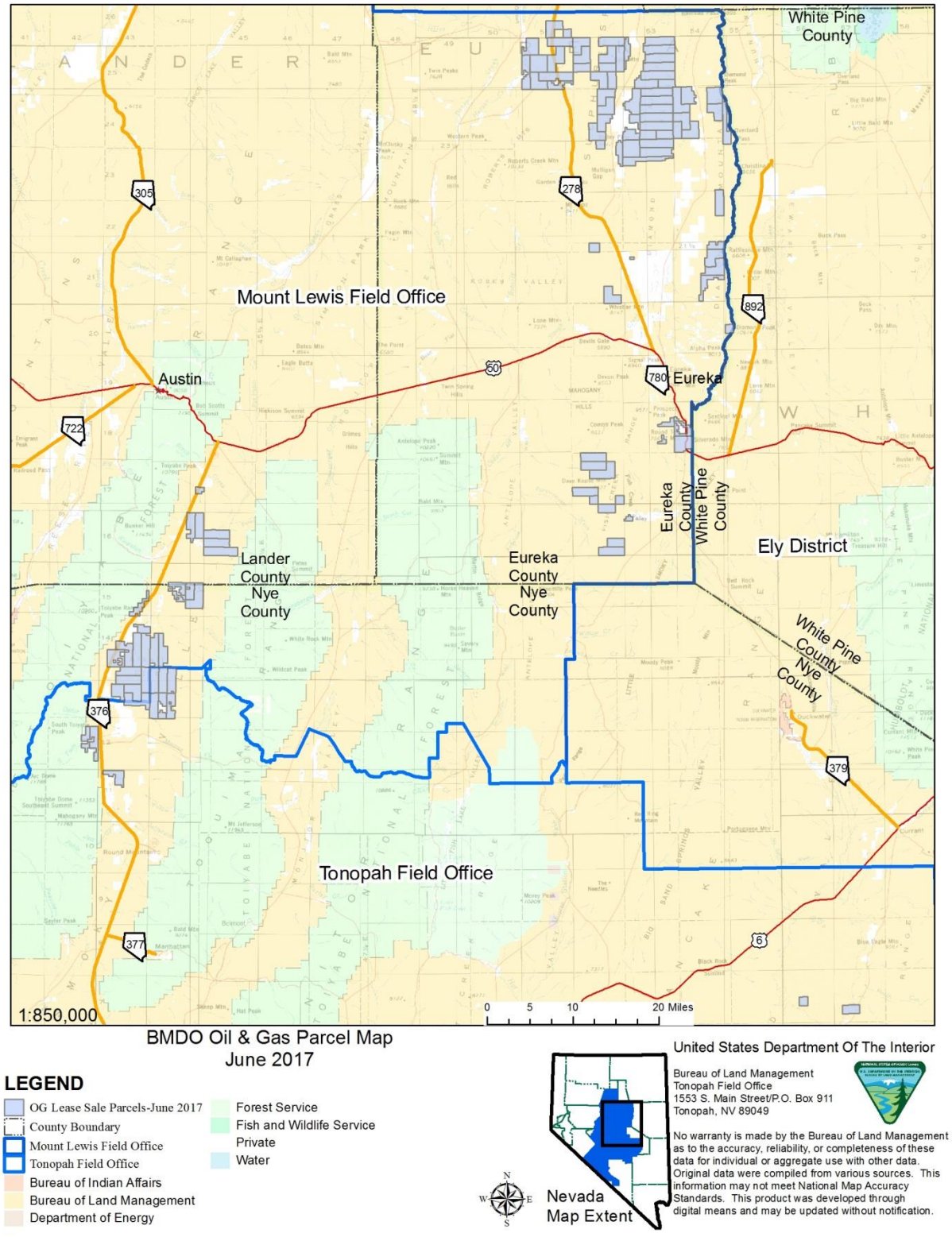

Figure 1. Overview: June 2017 Oil and Gas Lease Sale proposed lease parcels (Proposed Action).

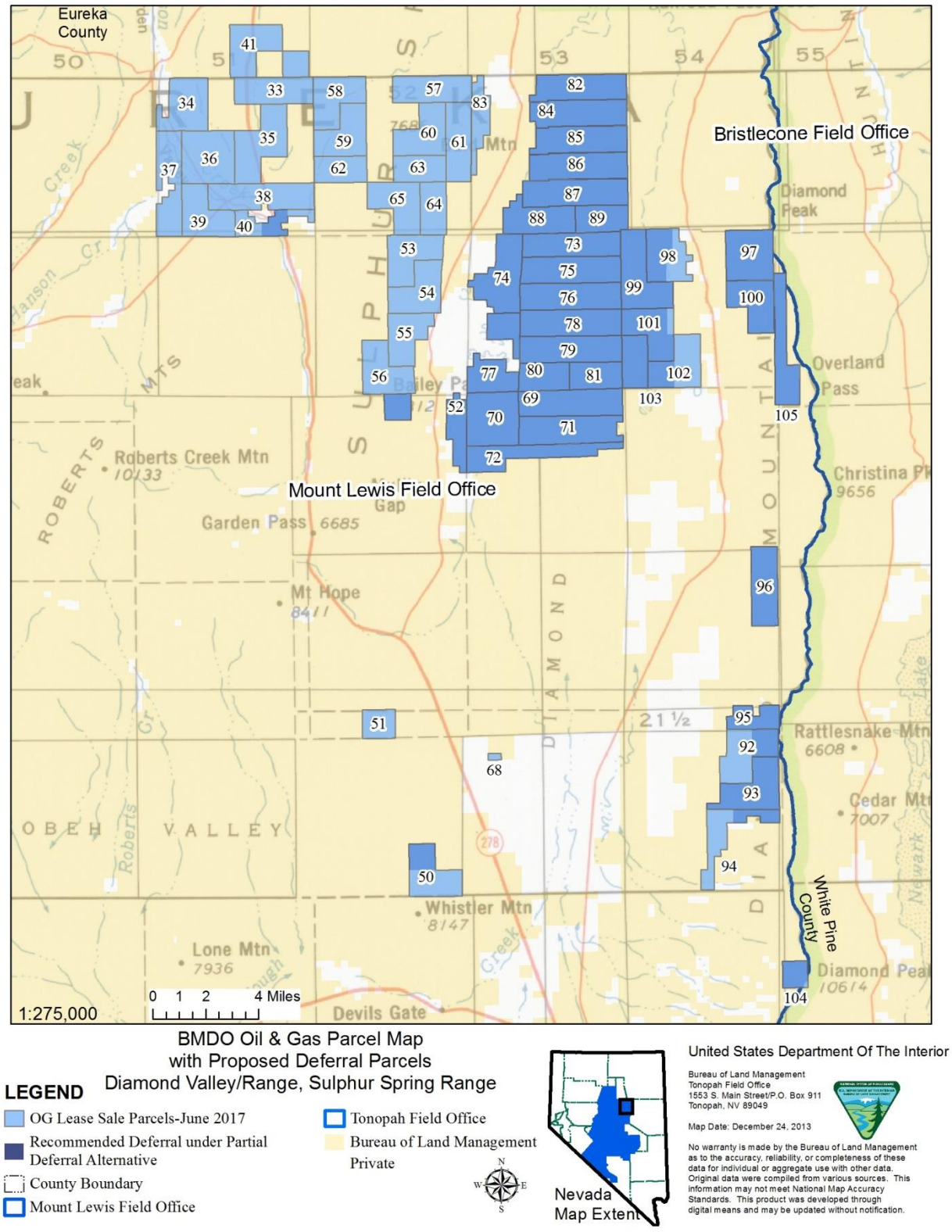

Figure 2. Proposed lease parcels: Diamond Valley/Range, Sulphur Spring Range, Garden Valley. Parcels proposed for deferral under Partial Deferral Alternative: dark blue.

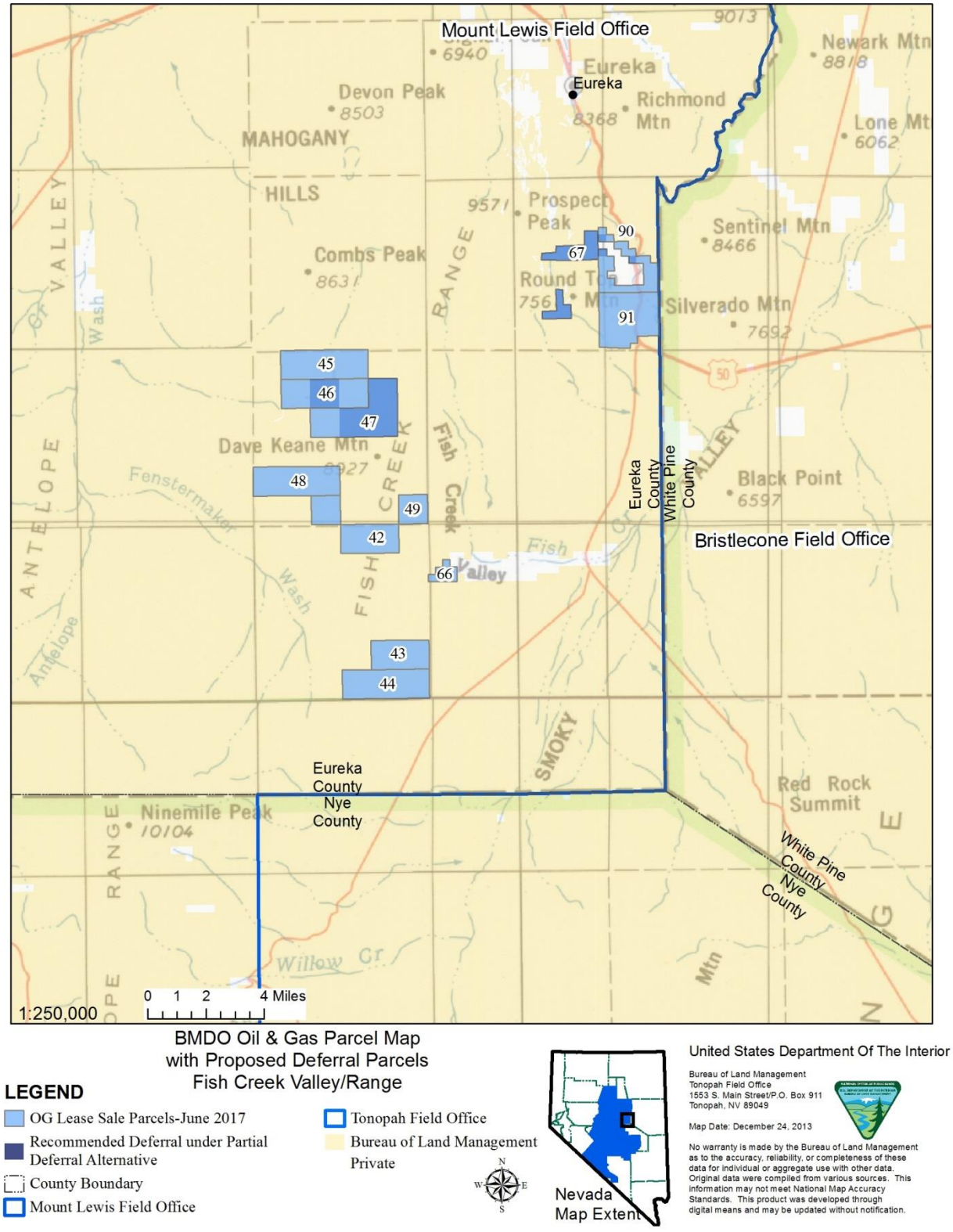

Figure 3. Proposed lease parcels: Fish Creek Valley/Range. Parcels proposed for deferral under Partial Deferral Alternative: dark blue.

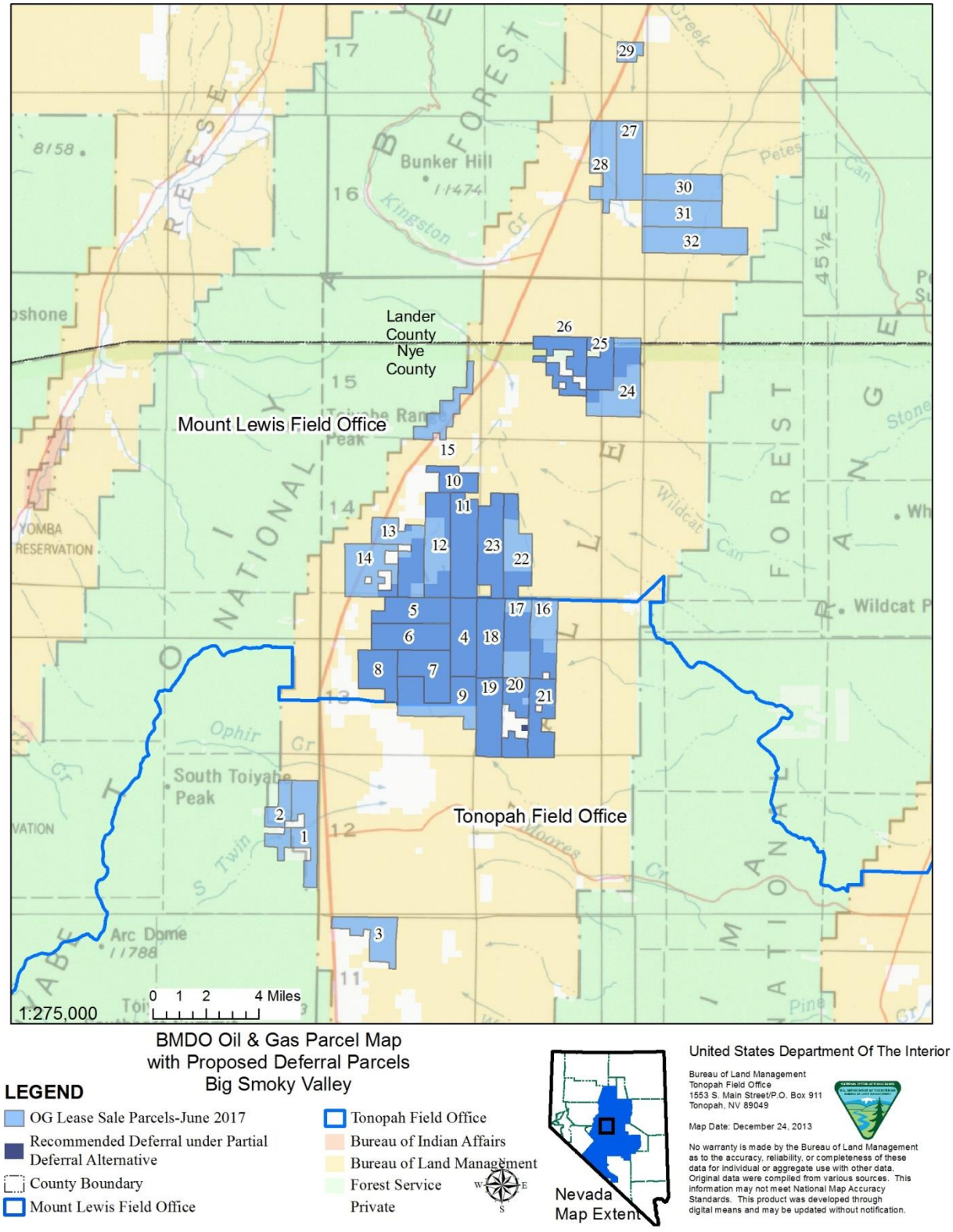

Figure 4. Proposed lease parcels: Big Smoky Valley. Parcels proposed for deferral under Partial Deferral Alternative: dark blue.

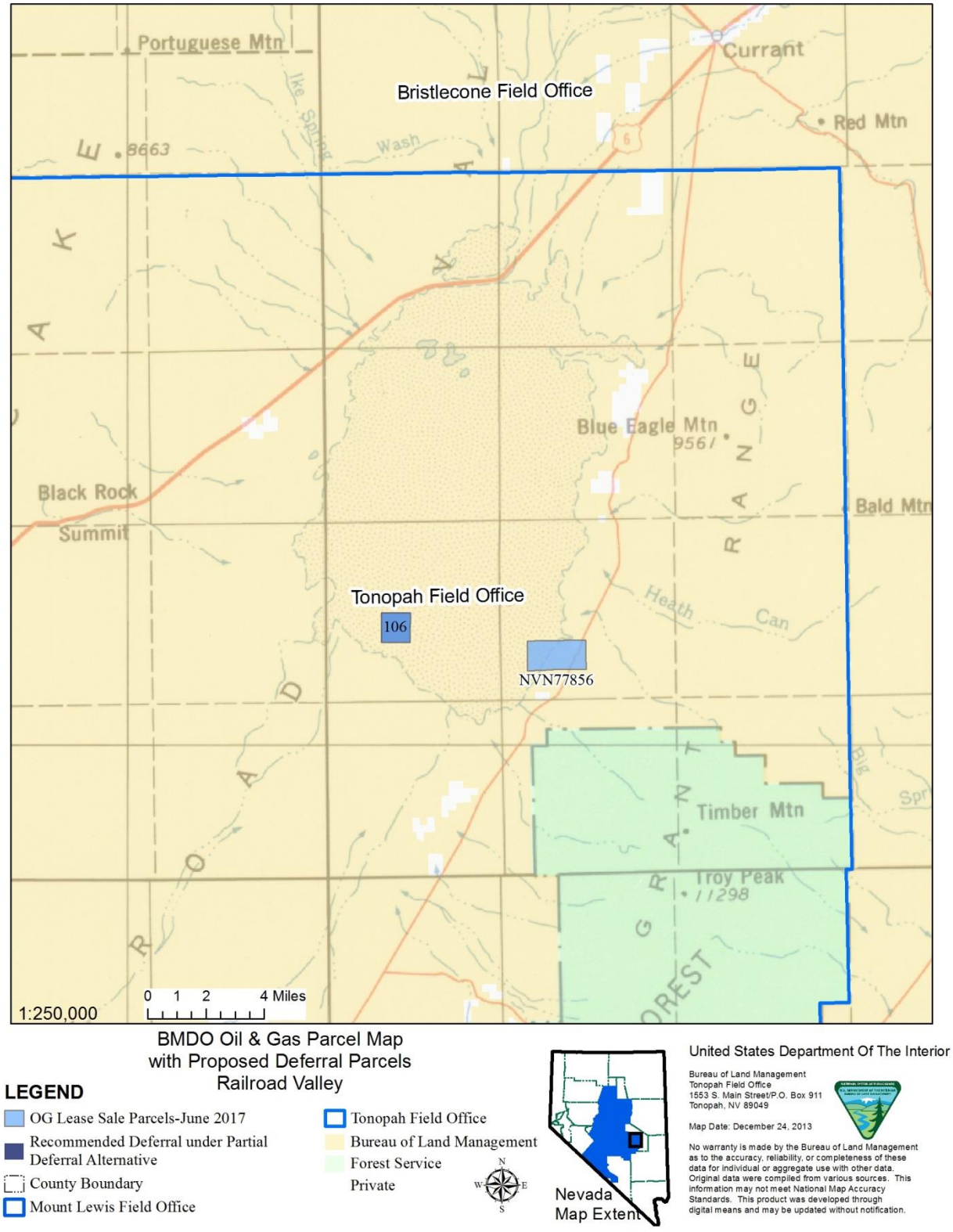

Figure 5. Proposed lease parcels and reinstatement parcel: Railroad Valley. Parcels proposed for deferral under Partial Deferral Alternative: dark blue.

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. 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. Oil and gas leasing is recognized as an acceptable use of the public lands under FLPMA. 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 oil and gas leasing provides for the 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 areas that have been nominated for lease if leasing is in conformance with the applicable BLM land use plan, in this case the Tonopah RMP (Tonopah Field Office), approved in 1997, or the Shoshone Eureka RMP (Mt. Lewis Field Office), approved in 1986. The oil and gas parcels addressed in this EA cannot be considered for leasing without supplemental analysis of new information and changes in environmental conditions since these RMPs were approved, such as increased growth, locations of special status species, identification of traditional cultural properties, and recognition of other sensitive resources that were not addressed in the RMPs.

The Battle Mountain District must provide a recommendation to the Nevada BLM State Director regarding whether or not to recommend leasing all or part of the preliminary nominated parcel list, plus one reinstatement, in the upcoming June 2017 Competitive Oil and Gas Lease Sale. If there are known resource conflicts that cannot be addressed using a stipulation from the appropriate RMP, then the Battle Mountain District may recommend that all or part of a parcel be deferred until the known resource conflict is resolved or the RMP is updated with stipulations addressing current known resource concerns. The State Director will decide which parcels will be included in the June 2017 lease sale based on the analysis in this EA.

1.3 Land Use Plan Conformance

The Proposed Action and alternatives are in conformance with the Tonopah RMP and Shoshone Eureka RMP and their associated Record of Decisions and all subsequent applicable amendments.

Tonopah RMP (Tonopah Field Office), approved 1997

The Proposed Action and alternatives are provided for in the following 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 lease parcels are a subset of "[The] total of 5,360,477 acres (88% of the Tonopah Assessment Area)[that] is open to fluid minerals leasing subject to standard terms and conditions" (p.22).

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

The Proposed Action and alternatives are 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 specifically addresses oil and gas leasing and 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."

Greater Sage-Grouse Approved Resource Management Plan Amendment

The Proposed Action and alternatives are in conformance with the 2015 Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (GRSG Plan Amendment), which amends all BLM land use plans in the areas addressed, including the Tonopah and Shoshone-Eureka RMPs. Under the GRSG Plan Amendment, mapped habitat for Greater Sage-grouse (GRSG) is designated as Sagebrush Focal Area (SFA), Priority Habitat Management Area (PHMA), General Habitat Management Area (GHMA), or Other Habitat Management Area (OHMA). The proposed parcels include some areas of PHMA, GHMA and OHMA. The Proposed Action and alternatives conform with the following applicable sections of the GRSG Plan Amendment.

- GRSG Plan Amendment Section 2.2, Management Decisions (MD) for Mineral Resources (MR), Unleased Fluid Minerals include the following MD applicable to oil and gas lease sales in PHMA and GHMA (others apply to SFA, geothermal, etc.):
    - 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 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 and describes conditions under which exceptions, modifications, or waivers may or may not be applied. The stipulations have

been applied to each part of a parcel with GRSG habitat, down to the 40-acre quarter-quarter of a section, using the highest applicable level of protection (e.g. if a quarter-quarter section includes PHMA and GHMA, stipulations for PHMA are applied).

1.4 Relationship to Statutes, Regulations and Policy

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. Federal regulations and policies require the BLM to make public land and resources available based on the principle of multiple use. At the same time, it is BLM policy to conserve special status species and their habitats and ensure that actions authorized by the BLM do not contribute to the need for the species to become listed as threatened or endangered by the United States Fish and Wildlife Service (USFWS).

The BLM must adhere to Section 106 of National Historic Preservation Act (NHPA). 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. All activities will be subject to regulations including, but not limited to: EO 11990 Protection of Wetlands, EO 11988 Protection of Floodplains, the Clean Water Act, the Safe Drinking Water Act, the Onshore Oil and Gas Orders, Wild Free Roaming Horse and Burro Act, Endangered Species Act, Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

The Proposed Action and alternatives are in conformance with the NEPA of 1969 (P.L. 91-190 as amended; 42 USC §4321 et seq.); 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.

1.5 Scoping and Public Involvement

The Battle Mountain District ID Team conducted internal scoping via interdisciplinary discussions and field visits which took place November 7 – December 12, 2016. The ID Team evaluated important natural and cultural resources, resource concerns and land use conflicts and, for each parcel, identified applicable stipulations in the existing RMPs and GRSG Plan Amendment (Section 1.3) and/or other applicable regulatory authority to be pointed out in a Lease Notice (Section 1.4). The ID Team also identified parcels to propose for deferral based on other resource concerns and land use conflicts that could not be resolved via stipulations in the existing RMPs as amended. For each proposed deferral, the ID Team recommended a new stipulation or other measure to address the issue via an upcoming revised RMP. The resulting lease notices and stipulations, and the recommended deferrals pending new stipulations, are provided in Appendices B and C.

Native American Coordination: The Battle Mountain District Native American Coordinator informed the Duckwater Shoshone Tribe, Yomba Shoshone Tribe, the Te-Moak Shoshone Tribe, and the

Descendants of the Big Smoky Valley, of the proposed lease sale parcels via letters sent on November 18, 2016.

The Duckwater Shoshone Tribe, in a letter to the District Manager dated November 30 2016, requested deferral of the same parcels as were deferred from the June 2016 Oil and Gas Lease Sale based on the Tribe's concerns. BLM internal direction allows deferrals for one year based on the need to collect and analyze additional resource information, including ongoing tribal consultation. The same parcels may be proposed for longer-term deferral based on issues that are not addressed by stipulations in the existing RMP, in which case BLM would recommend that lands be deferred until identified issues has been resolved by either amending the RMP and/or by working through the issues (BLM Washington Office Instruction Memorandum 2010-117; BLM Nevada Instruction Memorandum NV-2016-037). The Native American Coordinator met with representatives of the Tribe on December 7, 2016 to further discuss the Tribe's concerns.

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 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 requested NDOW input. NDOW provided written comments via email recommending specific parcels for deferrals, timing stipulations or lease notices to address concerns regarding wildlife, important wildlife habitats, and rare plant communities; and recommending other resource protection measures to be applied at the time of any future exploration or development. NDOW sent information specific to parcels in Big Smoky Valley and Railroad Valley on December 2, 2016, and other locations on December 8, 2016.

Chapter 2. Proposed Action and Alternatives

2.1 Description of the Proposed Action

The Proposed Action is to offer for competitive sale all of the 106 original nominated parcels that the NVSO provided to Battle Mountain District for review. These parcels total approximately 195,732 acres in Diamond Range and Valley, Sulphur Spring Range, Garden Valley, Fish Creek Range and Valley, Big Smoky Valley, and Railroad Valley (Figures 1-5; legal land descriptions, Appendix A). A 1280-acre previously-leased parcel in Railroad Valley is proposed for reinstatement (Appendix A) and is included in this EA except where stated otherwise.

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 (Appendix B). Stipulations are resource-protective restrictions that apply to a parcel as specified in the applicable RMP; notices inform prospective lessees of applicable statutes, regulations and policies (Sections 1.3, 1.4).

If leases are issued and lease operations are proposed in the future, BLM would conduct additional site-specific, project-specific NEPA analysis when an APD or other 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 Partial Deferral Alternative

This alternative would be the same as the Proposed Action except that parcels or parts of parcels would be proposed for deferral pending developing stipulations for an updated RMP that would address resources that are not adequately protected under either or both current RMPs, or otherwise resolving the concerns.

The Tonopah and Shoshone-Eureka RMPs, approved in 1986 and 1997 respectively, are scheduled to be replaced with a single updated RMP for the Battle Mountain District which would allow management to reflect the changing needs of the planning area. The process of developing the updated RMP was begun in 2010 and temporarily suspended while the GRSG Plan Amendment (see Section 1.3) was under development, to ensure that the RMP would be consistent with the extensive management direction it provides. The Battle Mountain District anticipates resuming the RMP update in 2017.

The parcels proposed for deferral, totaling approximately 104,176 acres and comprising approximately 53 percent of the original nominated acreage, would not be offered for competitive sale in 2017. The Partial Deferral Alternative is to offer for competitive sale the remaining 91,556 acres not proposed for deferral. Maps of the parcels that would be deferred and that would remain available for sale under this alternative are provided in Figures 2-5. Appendix C gives legal land descriptions of the deferred parcels, reasons for deferral, further explanation of the deferral process, and text of proposed stipulations for the updated RMP. The reinstatement parcel is not eligible for deferral.

2.3 Description of the No Leasing Alternative

In accordance with BLM NEPA guidelines H-1790-1, Chapter 6, this EA evaluates a No Leasing Alternative Action. This alternative forms a baseline for assessing and comparing the potential impacts of the other two alternatives. Under this alternative, no parcels on the Battle Mountain District would be offered for lease sale in June 2017, and the reinstatement parcel would not be reinstated. Any new oil and gas development would take place on parcels that were leased in other lease sales. There are currently 186 authorized leases totaling 305,005 acres in the Battle Mountain District.

2.4 Oil and Gas Exploration and Development Trends and Projections

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 defines the number of wells and amount of surface disturbance likely to occur (Section 2.4.1), and the assumption that current technologies, methods, and requirements will be applied in the foreseeable future (Section 2.4.2). Because leases expire after 10 years if production is not achieved, a 10-year time period is considered.

2.4.1 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

Nine of the 106 nominated lease sale parcels are located in the Tonopah Field Office (TFO) area, including one that overlaps the boundary with Mt. Lewis Field Office (MLFO). The TFO parcels total approximately 16,401 acres, or 8% of the total nominated acreage; plus the 1280-acre reinstatement parcel.

As part of the 1997 Tonopah RMP, the BLM developed an RFD scenario for oil and gas exploration and development through the year 2014. That 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 prior to 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

The majority of the nominated lease sale parcels are located in the MLFO area: 96 parcels totaling approximately 179,331 acres, or 92% of the total nominated acreage.

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 Assessment 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 Assessment Area was considered to have a lower potential when compared to that of the eastern portion. The eastern portion of the Shoshone-Eureka Assessment 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 Assessment 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.

2.4.2 Types of Activities Anticipated

Despite the low predicted potential of the proposed lease parcels, 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, each of which occurs 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

Geophysical exploration uses physical methods at the surface of the Earth to obtain detailed information about physical properties of the subsurface. A variety of exploration methods are employed, including placing electrodes or geophones in the ground; detonating explosives to create shockwaves; and employing specially constructed off-road vehicles to produce vibrations. Currently, the most commonly used method in eastern Nevada is the seismic vibrator technique (formerly trademarked as Vibroseis), which uses a large vehicle-mounted "thumper" or "shaker" to generate 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

Exploratory 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 for each well, if needed. Total disturbance attributed to drilling an exploration well is usually limited to less than 10 acres for the pad and access road (averaging 3.3 acres in the TFO area; see Section 2.4.1).

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 (Appendix E).

Statistically, in Nevada over 95% of exploration wells have been dry holes, that is, not producing oil or gas in commercially worthwhile amounts.

In-Field Drilling

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 of in-field drilling is the same as that employed for initial exploratory drilling, although new roads and pads may not be required in every instance.

Production

Production only occurs if oil or gas can be transported to a market 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 one or more of the following: 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)

Well stimulation may be used to enhance oil recovery. Several methods of well stimulation are available and 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, to the extent 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 began to be developed experimentally in 1947, was first applied commercially in 1949, and 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 hydraulic fracturing is a more recent method typically used in certain types of "unconventional" geologic formations such as shale oil and shale gas, and is not reasonably foreseeable in the Battle Mountain District.)

Appreciable amounts of water (800,000 – 10,000,000 gallons) can be consumed during HF operations (Appendix E). Much of this water 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 four 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 White Paper (Appendix E) for additional information on HF.

In addition, the State of Nevada has adopted new Hydraulic Fracturing Regulations (NRS 522 & NAC 522; see Appendix F). These regulations are more stringent than federal requirements, and would be applicable to any HF operation proposed in the state.

Well Abandonment

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 of a well 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

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 is conducted following the 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 of the site 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. The revised 2007 Gold Book (4th Edition) can be accessed online at https://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/gold_book.html

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.

Chapter 3. Affected Environment and Environmental Consequences

3.1 Analysis Process Overview

This section provides an overview of the effects analysis process. As explained in Section 2.4, since there is no specific project proposal at the time of a lease sale, likely effects are predicted based on a reasonable future development scenario and current knowledge and technologies. The methods and assumptions, time period, analysis area, and other terms used for this analysis are summarized in sections 3.1.1 to 3.1.5.

The next step is to determine which resources may be affected. The ID Team considers all resources that various supplemental authorities require BLM to address in EAs (Section 3.1.6), and other resources deemed appropriate for evaluation (Section 3.1.7). The ID Team determines whether each resource is not present; is present but clearly would not be affected; or is present and may be affected. If it 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

As described in detail in Chapter 2, Proposed Action and Alternatives, the effects analysis in this chapter compares the potential effects of three alternatives, briefly restated here. This analysis assumes a reasonably foreseeable development (RFD) scenario described in detail in Section 2.4.1, under which 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 over the next ten years; this assumption is applied to the alternatives as follows.

Proposed Action: Offer for competitive lease sale in June 2017 all 106 nominated parcels (approximately 195,732 acres) and reinstate the reinstatement parcel (1280 acres). Stipulations and notices would be attached to lease parcels. If leases are issued and lease operations are proposed in the future, BLM would conduct additional site-specific, project-specific NEPA analysis and Gold Book standards, guidelines and BMPs would be applied. Over the next 10 years, a total anticipated surface disturbance of 65-100 acres could occur on leased parcels in the Battle Mountain District including these 106 parcels.

Partial Deferral Alternative Action: Parcels or parts of parcels totaling approximately 104,176 acres are proposed for deferral pending resolving important resource concerns in these parcels, generally by establishing appropriate stipulations or closures in an updated RMP (Appendix C). Under this alternative these parcels would not be offered for competitive lease sale in 2017, and for the purpose of this analysis it is assumed that they would not be developed, although they could be proposed for lease sale again once resource concerns are resolved. The remaining 91,556 acres would be offered in 2017 as under the Proposed Action. Over the next 10 years, a total anticipated surface disturbance of 65-100 acres could occur on leased parcels in the Battle Mountain District including these 91,556 acres.

No Leasing Alternative Action: No parcels would be offered for lease sale in June 2017. Any new oil and gas development would take place on parcels that were leased in other lease sales. Over the next 10

years, a total anticipated surface disturbance of 65-100 acres would occur elsewhere in the District, on parcels offered in other lease sales.

Types of disturbance that could occur are assumed to be those associated with technologies currently in use in geologically similar areas, as described in Section 2.4.2.

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). There would be no direct impacts from issuing new oil and gas leases because leasing does not directly authorize ground disturbing activities. However, if a lease is sold, the lessee retains certain irrevocable 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. If an APD is received for a leased parcel, additional site-specific, project-specific NEPA analysis would address direct and indirect effects of any action and alternatives proposed at that time.

3.1.3 Time Period Considered

The time period considered in this analysis is ten years, June 2017 to June 2027, because a lease expires within ten years after purchase if not developed. If there is a proposal to develop a lease parcel, the project-specific NEPA analysis would then consider direct and indirect effects for a time frame appropriate to that project.

3.1.4 Analysis Area

The term Analysis Area in this chapter refers to the parts of the BLM Battle Mountain District in which the lease parcels occur, in central Nevada. It includes northeastern parts of the Tonopah Field Office area, in Nye County; and southern and eastern parts of the Mt. Lewis Field Office area, in Eureka and Lander counties (see map, Figure 1).

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 in this document.

A list of abbreviations and acronyms used in this document is included in Appendix G.

3.1.6 Supplemental Authorities Considered

To comply with NEPA, BLM is required to address specific elements of the environment that are subject to requirements specified in statute, regulation or by executive order (BLM 1988, BLM 1997, BLM 2008). These requirements are known as "supplemental authorities." Table 1 outlines these elements.

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 4.2.11
Environmental justice		√		No minority or low-income groups would be disproportionately affected by health or environmental effects of any alternative.
Farmlands, prime or unique	√			There are no Prime or Unique Farmlands, as defined by the Farmland Protection Policy Act, in the Battle Mountain District.
Noxious weeds and invasive, non-native species			√	See Sections 3.2.7 and 4.2.7
Native American cultural concerns			√	See Sections 3.2.12 and 4.2.12
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 4.2.8 for riparian/wetland wildlife habitat
Threatened or endangered species			√	See Sections 3.2.8 and 4.2.8
Migratory birds			√	See Sections 3.2.8 and 4.2.8
Waste, hazardous/solid			√	See Sections 3.2.18 and 4.2.18
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 or near a designated Wilderness or WSA, and no alternative would affect such lands.
Lands with wilderness characteristics	√			2012-2013 inventory data (to be updated at the time of any APD) show no wilderness characteristics in proposed lease parcels.

3.1.7 Other Resources Considered

Other resources that have been considered in this EA are listed in Table 2.

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, site specific analysis.
Forestry and woodland products			√	See Sections 3.2.6 and 4.2.6
Geology and minerals			√	See Sections 3.2.15 and 4.2.15
Land use authorization			√	See Sections 3.2.16 and 4.2.16
Paleontological resources			√	See Sections 3.2.3 and 4.2.3
Rangeland resources			√	See Sections 3.2.10 and 4.2.10
Recreation			√	See Sections 3.2.13 and 4.2.13
Socioeconomic values			√	See Sections 3.2.17 and 4.2.17
Soils			√	See Sections 3.2.2 and 4.2.2
Specially designated areas			√	National Historic Trail; see Recreation sections, 3.2.13 and 4.2.13
Special status species			√	See Sections 3.2.8 and 4.2.8; list, Appendix D
Vegetation			√	See Sections 3.2.5 and 4.2.5
Visual resources			√	See Sections 3.2.14 and 4.2.14
Wild horses and burros			√	See Sections 3.2.9 and 4.2.9
Wildlife			√	See Sections 3.2.8 and 4.2.8

3.2 Environmental Effects of the Alternatives

3.2.1 Air Quality, Climate Change, and Greenhouse Gases

These resources are interrelated and are being combined 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 within Nevada contribute to local and regional air pollution. Urbanization and tourism create emissions that affect air quality over a wide area. Air pollutants generated by motor vehicles include tailpipe emissions and dust from travel over dry, unpaved road surfaces. Strong winds can generate substantial amounts of windblown dust. Air pollution emissions are characterized as point,

area, or mobile. Point sources are large, stationary facilities such as power plants and manufacturing facilities and are accounted for on a facility by facility basis. Area sources are smaller stationary sources and, due to their greater number, are accounted for by classes. Production emissions from an oil and gas well and dust from construction of a well pad would be considered area source emissions. Mobile sources consist of non-stationary sources such as cars and trucks. Mobile emissions are further divided into on-road and off-road sources. Engine exhaust from truck traffic to and from oil and gas locations would be considered on-road mobile emissions. Engine exhaust from drilling operations would be considered off road mobile emissions.

Affected Environment

The Clean Air Act required the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. These NAAQS for criteria pollutants, include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). Exposure to air pollutant concentrations greater than the NAAQS has been shown to have a detrimental impact on human health and the environment. The EPA has delegated regulation of air quality under the federal Clean Air Act to the State of Nevada. Along with the criteria pollutants, the release of hazardous air pollutants (HAPs) is regulated. HAPs are chemicals that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. EPA currently lists 188 identified compounds as hazardous air pollutants, some of which, such as benzene, toluene, and formaldehyde can be emitted from oil and gas development operations. Ambient air quality standards for HAPs do not exist; rather, these emissions are regulated by the source type, or specific industrial sector responsible for the emissions.

Ambient air quality in the affected environment (i.e. compliance with the NAAQS) is demonstrated by monitoring for ground level (i.e. receptor height) atmospheric air pollutant concentrations. In general, the ambient air measurements show that existing air quality in the region is good. 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.

The Battle Mountain District has existing sources of pollution that vary mainly from regional ozone to particulate matter. Regional ozone is typical in the western states as forest fires, transport from shipping lanes, electric power generation and a conglomerate of other sources combine under certain meteorological conditions. Particulate matter is another issue during dust storms or when dust is raised by other activities in this dry region.

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

Worldwide greenhouse gas (GHG) emissions are estimated to be Global Warming Potential (GWP; see Table 3) 15,347,480,381 tons per year (tpy) mainly from CH_4 (International Panel on Climate Change Fourth Assessment Report). The Nevada Department of Mineral website (http://data.nbmg.unr.edu/Public/OilGas/ProductionSummaries) reports there were 50,662,701 barrels of oil produced in Nevada between 1954 and 2009 (the most recent data available); 44 active oil wells in the

state; and one oil refinery. None are identified as gas wells. There is no systematic pipeline system in Nevada to transport gas from the well sites to a major distribution site. Gas produced in Nevada wells is primarily used to power onsite pumping equipment. There are significant uncertainties associated with estimates of Nevada's GHG emissions from this sector. This is compounded by the fact that there are no regulatory requirements to track CO_2 or CH_4 emissions. Therefore, estimates (other than those listed on Table 3) of GHG emissions measurements in Nevada are not possible at this time.

Environmental Consequences

Proposed Action

While the act of leasing the parcels would produce no substantial air quality effects, potential future development of the lease could lead to increases in area and regional emissions. Since it is unknown if the parcels would be developed, or the extent of the development, it is not possible to reasonably quantify potential air quality effects through dispersion modeling or another applicable method at this time. The timing, specific locations, and construction and production equipment specifications and configurations are also unforeseeable at this time. Additional project-specific air effects will be addressed in a subsequent analysis when an APD or other project is proposed. All proposed activities including, but not limited to, exploratory drilling activities would be subject to applicable local, State, and Federal air quality laws and regulations.

The BLM National Operations Center retained the Kleinfelder Team (which consisted of staff from Kleinfelder, Inc. and ENVIRON International Corporation) 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. The emissions inventory was designed to be used by BLM staff, such as NEPA planners, air resource specialists, and natural resource specialists, to evaluate emissions from small oil and gas projects, which for purposes of this inventory would involve approximately five wells or less.

Defining a "representative" oil and gas well for the entire western US was extremely challenging as there are numerous variables, even within a single basin and sub-basin, that can materially affect the emissions. Such variables include oil and gas composition, difficulty drilling the geologic formation, oil and gas production rate, equipment at the well site, emission controls, produced water that may be associated with oil and gas production, among many others. Accordingly, to develop such an inventory, five different well types (three natural gas wells and two oil wells) representative of five different major oil and gas basins in the western US were evaluated. In order to develop the emission inventories, 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. Table 3, below, is taken from this March 2013 report: Erbes, Air Emissions Inventory Estimates for a Representative Oil and Gas Well in the Western United States.

Table 3. Air emissions inventory estimates for representative oil or gas wells in the western U.S.

Well Type	Gas	Gas	Gas	Oil	Oil
Pollutant	Uinta/Piceance (tpy)	Upper Green River (tpy)	San Juan (tpy)	Williston (tpy)	Denver (tpy)
NOx	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_2O	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 round off differences. 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 CO_2, CH_4, and N_2O. Global Warming Potential (GWP) is in terms of short tons of CO_2 equivalent (CO_2e), using a GWP of 1 for CO_2, 21 for CH_4, and 310 for N_2O (Erbes, 2013).

The act of leasing would not result in changes to air quality. However, should the leases be issued, development of those leases could impact air quality conditions. It is not possible to accurately estimate potential air quality impacts from the project by computer modeling, due to the variation in emission control technologies as well as construction, drilling, and production technologies applicable to oil versus gas production and used by various operators, so this discussion remains qualitative.

Prior to authorizing specific proposed projects on the lease parcels, quantitative computer modeling using project specific emission factors and planned development parameters (including specific emission source locations) may be conducted to adequately analyze direct and indirect potential air quality impacts. In conducting subsequent project-specific analysis, BLM will follow the policy and procedures of the National Interagency Memorandum of Understanding (MOU) Regarding Air Quality Analysis and Mitigation for Federal Oil and Gas Decisions through NEPA, and the FLAG 2010 air quality guidance document. Air quality dispersion modeling, which may be required, includes impact analysis for demonstrating compliance with the NAAQS plus analysis of impacts to Air Quality Related Values (i.e. deposition, visibility), particularly as they might affect regional Class 1 areas (National Parks and Wilderness Areas).

Any subsequent exploration or development activity could include soil disturbances resulting from the construction of well pads, access roads, pipelines, power lines, and drilling. Any disturbance is expected to cause increases in fugitive dust and potentially inhalable particulate matter (specifically PM_{10} and $PM_{2.5}$) in the project area and immediate vicinity. Particulate matter, mainly dust, may become airborne

when drill rigs and other vehicles travel on dirt roads to drilling locations. 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 will contribute to potential short and long term increases in the following criteria pollutants: carbon monoxide, ozone (a secondary pollutant, formed photochemically by combining VOC and NOX 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 could also be emitted. Certain pollutants may be significant when evaluating air quality related values (AQRV) for effects on visibility and atmospheric deposition. Significance will depend greatly on the proximity to sensitive receptors, area meteorology, and the background levels of AQRV at any sensitive receptor. Dust control measures, such as applying a layer of gravel over the travel surfaces, watering travel surfaces, and reducing speed along the roadways can be very effective in mitigating dust issues.

Well development includes emissions from earth-moving equipment, vehicle traffic, drilling, and completion activities. NOX, SO_2, and CO would be emitted from vehicle tailpipes. Fugitive dust concentrations would increase with additional vehicle traffic on unpaved roads and from wind erosion in areas of soil disturbance. Drill rig and fracturing engine operations would result mainly in NOX and CO emissions, with lesser amounts of SO_2. These temporary emissions would be short-term during the drilling and completion times.

During well production there are continuous emissions from separators, condensate storage tanks, and daily tailpipe and fugitive dust emissions from operations traffic. During the operational phase of any future well field development, NOX, CO, VOC, and HAP emissions would result from the long-term operation of condensate storage tank vents, and well pad separators. Additionally, road dust (PM10 and $PM_{2.5}$) would be produced by vehicles servicing the wells.

Project emissions of ozone precursors, whether generated by construction and drilling operations, or by production operations, would be dispersed and/or diluted to the extent where any local ozone impacts from the Proposed Action would be indistinguishable from background or cumulative conditions. The primary sources of HAPs are from oil storage tanks and smaller amounts from other production equipment. Small amounts of HAPs are emitted by construction equipment. However, these emissions are estimated to be less than 1 ton per year. Based on the small amount of project-specific emissions, the Proposed Action is not likely to violate, or otherwise contribute to any violation of any applicable air quality standard, and may only contribute a small amount to any projected future potential exceedance of any applicable air quality standards.

The construction, drilling, completion, testing, and production of an oil and gas well could result in various emissions that affect air quality. Construction activities result in emissions of particulate matter. Well drilling activities result in engine exhaust emissions of NOx, CO, and VOC. Completion and testing of the well result in emissions of VOC, NOX, and CO. Ongoing production results in the emission of NOx, CO, VOC, and particulate matter.

During exploration and development, “natural gas” may at times be flared and/or vented from conventional, coal bed methane, 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 located at the site. The development stage may likely include the installation of pipelines for transportation of raw

product. New centralized collection, distribution and/or gas processing facilities may also be necessary. 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 will result in emissions of criteria, HAP and GHG pollutants. The additional emissions could result in an incremental increase in overall emissions of pollutants, in the region depending on any contemporaneous activities occurring at the same time when potential exploration and development occurring on the lease would happen.

The administrative act of leasing all or part of 106 parcels covering 195,732 acres would not result in any direct GHG emissions. However, in regard to future development, the assessment of GHG emissions and climate change is in its formative phase. While it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed tracts available for leasing, some general assumptions can be made: offering the proposed parcels may contribute to drilling new wells.

Although no GHG emissions would result from the Proposed Action, which is administrative in nature, BLM foresees that the primary sources of greenhouse gases associated with oil and gas exploration and production are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

The RFD scenario developed for this lease EA is a maximum of 25 wells drilled within the parcels in the Battle Mountain District. The number of wells that could be drilled in any given area is unknown but potential emissions would be multiplied appropriately. For example, using the information from Erbes (2013), the drilling of 25 wells would produce between 19,775 tons and 92,050 tons of greenhouse gas emissions in terms of short tons of CO_2 equivalent (CO_2e), using a Global Warming Potential (GWP) of 1 for CO_2, 21 for CH_4, and 310 for N_2O,(Erbes, 2013). Total CH_4 contributions would be between 45 tons per year (GWP 3,600 tpy) and 415 tons per year (GWP 8,715 tpy). Total N2O contributions would be between 1 ton per year (GWP 310 tpy) and 15 tons per year (GWP 4,650 tpy). Total CO_2e contributions would be between 16,275 tons per year (GWP 16,275 tpy) and 78,900 tons per year (GWP 78,900 tpy). This compares to the total worldwide contribution of CH_4 which is 730,832,399 tons per year (GWP 15,347,480,381 tpy) or 0.00015 percent of the world wide total CH4 yearly emissions.

Also, nitrous oxide and VOCs are indirect air pollutants that contribute to ozone production and aid in prolonging the life of methane in the atmosphere. With respect to climate change, climate plays a significant role in the production of ozone. Sunlight and high temperatures are a major catalyst in reactions between VOCs and NOx in the production of ozone. With an increase in overall temperature, we can expect to have more hot days and less precipitation that will lead to a higher production of ozone. Activities such as fossil fuel combustion, deforestation, and other changes in land use are resulting in the accumulation of trace GHGs such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), water vapor, and several industrial gases in our atmosphere. An increase in GHG emissions is said to result in an increase in the earth's average surface temperature, primarily by trapping and decreasing the amount of heat energy radiated by the earth back into space. The phenomenon is commonly referred to as global warming. Global warming is expected, in turn, to affect weather patterns, average sea level, ocean acidification, chemical reaction rates, precipitation rates, etc., which is commonly referred to as climate change. The Intergovernmental Panel on Climate Change has predicted that the average global temperature rise between 1990 and 2100 could be as great as 5.8°C (10.4°F), which could have massive deleterious effects on the natural and human environments. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of

fossil carbon sources have caused GHG concentrations to increase measurably, from approximately 280 ppm in 1750 to 396 ppm in 2012 (as of June). The rate of change has also been increasing as more industrialization and population growth is occurring around the globe. This fact is demonstrated by data from the Mauna Loa CO_2 monitor in Hawaii that documents atmospheric concentrations of CO_2 going back to 1960, at which point the average annual CO_2 concentration was recorded at approximately 317 ppm. The record shows that approximately 70% of the increases in atmospheric CO_2 concentration or build up, since pre-industrial times has occurred within the last 50 years.

Climate change information is difficult to quantify. However, the following bullet points summarize potential changes identified by the EPA that are expected to occur at the regional scale, where the Proposed Action and its alternatives are to take place. The EPA identifies this area as part of the South West region (http://www.epa.gov/Region8/climatechange/pdf/ClimateChange101FINAL.pdf). The region described by the EPA is expected to experience warmer temperatures with less snowfall.

- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow would be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs would be drier.
- More frequent, more severe, and possibly longer-lasting droughts are expected to occur.
- Crop and livestock production patters could shift northward; less soil moisture due to increased evaporation may increase irrigation needs. Drier conditions would reduce the range and health of ponderosa and lodgepole pine forests, and increase the susceptibility to fire. Grasslands and rangelands could expand into previously forested areas
- Ecosystems would be stressed and wildlife such as the mountain lion, black bear, and bald eagle could be further stressed.

Other impacts could include:

- Increased particulate matter in the air as drier, less vegetated soils experience wind erosion.
- Shifts in vegetative communities which could threaten plant and wildlife species.
- Changes in the timing and quantity of snowmelt which could affect both aquatic species and agricultural needs. Projected and documented broad-scale changes within ecosystems of the U.S. are summarized in the Climate Change Scientific Investigations Report (USGS 2010). Some key aspects include:
    - Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue.
    - Climate changes include warming temperatures throughout the year and the arrival of spring an average of 10 days to 2 weeks earlier through much of the U.S. compared to 20 years ago. Multiple bird species now migrate north earlier in the year.
    - Fires, insect epidemics, disease pathogens, and invasive weed species have increased and these trends are likely to continue. Changes in timing of precipitation and earlier runoff increase fire risks.
    - Insect epidemics and the amount of damage that they may inflict have also been on the rise. The combination of higher temperatures and dry conditions have increases insect

populations such as pine beetles, which have killed trees on millions of acres in western U.S. and Canada.
- Warmer winters allow beetles to survive the cold season, which would normally limit populations; while concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

It is currently not feasible to predict with certainty 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. When further information on the impacts to climate change is known, such information would be incorporated into the BLM planning and NEPA documents as appropriate.

Partial Deferral Alternative

Because air quality, climate change and greenhouse gas effects occur on a regional to global scale, and this alternative would simply shift the location of any future exploration, development or production activity within the Assessment Area or to other leased parcels in the Battle Mountain District, effects would be the same as for the Proposed Action.

No Leasing Alternative

Under this alternative, any future exploration, development or production activity would occur on other leased parcels in the Battle Mountain District. Effects would be the same as for the Proposed Action.

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 project area creates a wide variety of represented soil types. Soils within the project area 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 of the project area are used to for evaluating land-use potential, potential plant communities and developing reclamation and rehabilitation plans. Three major soil orders dominate project area: Aridisols, Entisols and Mollisols. A brief description of each soil order, including the three dominant in the project area, is provided below.

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 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 gravely 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 win 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).

Environmental Consequences

Proposed Action

Although there would be no direct impacts to soil due to oil and gas leasing because no authorization for surface disturbance would be granted, there could be indirect 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), and reclamation activities. It is reasonably foreseeable that oil and gas exploration and development would occur over the next 10 years within the Assessment Area and 65-100 acres will be disturbed by activities associated with oil and gas exploration and production including 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 disturb microbiotic crusts. Also, removal and crushing of vegetation would occur through exploration and development activities. Considering the amount of disturbance anticipated in the RDF scenario (65-100 acres), the impacts to soils are expected to be comparatively minor when compared to the areas offered for lease (approximately 195,732 acres) and temporary in nature because the majority of the disturbance (roads and pads) would be reclaimed.

However, nine parcels located on the Diamond Mountain Range are in locations with slopes in excess of 45%, and eight parcels have slopes in excess of 60%. These high elevation mountain locations would be more susceptible to erosion, and potential impacts could be concentrated in these locations. Two additional parcels (NV-17-67 and NV-17-90) also have slopes of 45% or greater.

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.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving temporary disturbance to 65-100 acres of soils. Deferred parcels would include the parcels identified above as having steep slopes, which would be especially vulnerable to erosion. The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

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]).

Parcels proposed for the 2017 lease sale are located primarily in the Diamond, Garden, and Big Smoky Valleys (Figures 2 and 4). Other parcels are located in the Diamond, Sulphur Springs, and Fish Creek Ranges (Figures 2 and 3). One smaller parcel is positioned in Railroad Valley (Figure 5). 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. Parcels within Big Smoky Valley have the potential to contain rock units with vertebrate or other significant fossils. The parcel in Railroad Valley has low to moderate potential for significant paleontological resources.

Environmental Consequences

Proposed Action

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. 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.

Lease Notices NV-B-08-A-LN, NV-B-08-B-LN, and NV-B-08-C-LN would be attached to all potentially affected leases within Battle Mountain District to help minimize any potential effects on paleontological resources located within the proposed parcels. The first two Lease Notices inform the lessee(s) that their lease(s) may contain a low to moderate potential for vertebrate fossils and if previously undiscovered paleontological resources are discovered in the performance of any surface disturbing activities, the item(s) or condition(s) would be left intact and immediately brought to the attention of the authorized officer of the BLM. Operations within 250 feet of such discovery would not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee would 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. Lease Notice NV-B-08-C-LN informs the operator that the area has high and very high potential for paleontological resources. This land is underlain by geologic units that have been documented to contain a high occurrence of fossils, which may consist of scientifically significant paleontological resources protected by PL 111-11, Paleontological Resources Preservation Act. A field survey by a qualified paleontologist, and at the lessee's expense, will be required prior to surface-disturbing activities. If significant paleontological resources of scientific or educational importance are discovered, they will require avoidance 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 these 106 parcels would be substantial.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving disturbance to 65-100 acres that may contain paleontological resources. Parcels proposed for deferral for reasons of wetlands and slope include two that have high or very high potential for fossil occurrence, so these deferrals would provide additional protection to paleontological resources in these high-probability areas. The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential overall effects to paleontological resources—and the required avoidance and/or data recovery measures—as those identified for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

3.2.4 Water (Surface and Ground) Quality and Quantity

Regulatory Framework

There are several executive orders and federal laws providing relevant direction to federal agencies regarding potential impacts to water, wetlands and floodplains.

Executive Order 11988 – Floodplain management instructs all federal agencies to avoid development in a floodplain whenever possible.

Executive Order 11990 – Protection of wetlands instructs that "each agency shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands." Specific to the purpose of this analysis, it instructs that "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 current Tonopah and Shoshone-Eureka RMPs do not include stipulations or other appropriate restrictions that could be applied to the use of the parcels.

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."

Affected Environment

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). 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. The average annual precipitation in Tonopah is 4.95 inches and March and April are the wettest months (WRCC 2015b). The average annual precipitation in Battle Mountain is 6.3 inches and April and May are the wettest months (WRCC 2015a).

Water is a fundamental component of ecosystem health, especially in arid regions. Springs, seeps, wetlands and perennial streams form literal oases that support all life and encourage biodiversity.

Wetlands, seeps, and springs play an important role in wildlife habitat and in the food chain for many wildlife taxa, including non-game and game-species. In the Big Smoky Valley Complex and Diamond Valley Complex, there are resident and migrating species that utilize these wetlands. They may use these areas for feeding, breeding, nesting, burrowing, as a migration corridor, and/or as a layover while they are migrating to other areas. There are also aquatic wildlife species, including endemic fish and invertebrates, which rely upon wetlands, seeps, and springs (also see Wildlife Resources, Section 3.2.8).

Watershed Boundary

The proposed lease parcels are located in Hydrographic Region 16, Great Basin. The lease parcels are located within the following sub-watersheds:

- Northern Big Smoky Valley Watershed, HUC# 16060004
- Diamond-Monitor Valleys Watershed, HUC# 16060005
- Little Smoky-Newark Valleys Watershed, HUC# 16060006
- Hot Creek-Railroad Valleys Watershed, HUC# 16060012

Groundwater

Runoff from upland areas of the Assessment Area will commonly infiltrate into pediment deposits as they transition into the low basins. Groundwater is either directed toward the playa 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 is highly variable throughout the Assessment Area, ranging 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, the parcels proposed for lease contain approximately at least 34 springs and seeps, 3.9 miles of perennial streams and 127.9 miles of ephemeral and intermittent streams. These streams may have associated riparian and wetland habitat. National Hydrography Dataset (USGS) features in the Assessment Area include 286 acres of swamps and marsh, 300 acres of lakes and ponds, and 13,044 acres of playa. National Wetlands Inventory features in the Assessment Area include 326 acres of freshwater emergent wetlands, 348 acres of freshwater forested and shrub wetlands and 9,118 acres of lakes. Unsurveyed features most likely exist, and would be determined at the project proposal and review stage.

The Nevada Natural Heritage Program (NNHP) has identified and mapped sensitive lakes and wetland-type habitats. Parcels in Big Smoky Valley are categorized as major wetlands in portions of parcels 10, 12, 13, 19, 20 and 21; and in Diamond Valley, parcel 52. The NNHP has additionally identified portions of parcels (82, 84, 85, 86, 87, 88, 74, 77, 70, 80, 81, 99 and 101) and a few parcels in entirety (73, 75 and 89) as major playas in the Diamond Valley area. The NNHP serves the citizens of Nevada as an "early warning system" providing high-quality information early in planning processes to help minimize costly resource conflicts, and to help prevent species from becoming threatened or endangered.

Recent BLM fieldwork has led to the discovery of unique hydrologic features in the Big Smoky Valley, henceforth referred to as spring mounds. They are believed to have been first identified by Meinzer (1917), and their formation may date back to the end of the Pleistocene, when a series of pluvial lakes transitioned into alkali flats, allowing these spring mounds to form. The spring mounds are an extremely unusual and rare hydrologic feature. The mounds are circular in shape, and while they vary in size, they tend to be five to ten feet taller than the surrounding land surface and 100 to 200 feet in diameter. The surface of the entire mound is wet, with water seeping out to an average depth of one-half to one inch. The water smells of sulfur and bacteria characteristic of acidic environments can be seen at the surface. Grasses grow at the surface, and a variety of insects live within the habitat provided. The most distinctive feature of the spring mounds, however, is that the surface of the mound appears to be composed of bacterial mats. It is not clear if the bacterial mats and vegetation grow on a common soil horizon, or if they vegetation is growing in the bacterial mat itself. It is also not clear if the mat is singular, or perhaps the last in a successive series of bacterial mats. The spring mounds will oscillate up and down when impacted, which implies the upper extent of the mount may be composed of multiple layers of bacterial mat interspersed with spring water.

Floodplains

The Federal Emergency Management Agency designates "Zone A" flood hazard areas. Zone A flood hazard areas are subject to inundation by the 1-percent-annual-chance flood event, and they have been delineated in some of the offered leasing area. There are a total of 17,551 acres of the offered lease parcels identified within Zone A flood hazard areas that would be subject to federal regulation and mitigation. Additional site-specific analysis to identify potential flood plain complications would be required prior to drilling in parcels that meet this designation.

Environmental Consequences

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 does not produce impacts to water quality and surface water. On-the-ground impacts would not occur until a lessee applies for and receives approval to drill on the lease. The BLM cannot determine at the leasing stage whether or not a proposed parcel will actually be sold, or if it is sold and issued, whether or not the lease would be explored or developed. Consequently, the BLM cannot determine exactly where on a lease a well or wells may be drilled or what technology may be used to drill and produce wells, 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 site-specific, project-specific environmental analysis.

Subsequent development of a lease may result in long-and short term alterations to the hydrologic regime depending upon the location and intensity of development. Clearing, grading, and soil stockpiling activities associated with exploration and development actions 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. However, several of the proposed lease parcels – particularly in Big Smoky Valley and northern Diamond Valley – largely or entirely overlay a combination of water bodies, wetlands, perennial or ephemeral streams, floodplains, and/or ephemerally-flooded playas, to the extent that it would be difficult or impossible to avoid impacts to these hydrological features and their associated plant communities and wildlife habitats. Leasing these parcels would risk violation of Executive Orders 11988 and 11990 and/or the Clean Water Act.

Groundwater: All activities would be subject to BMPs, State and Federal Regulations and COAs. Potential impacts to groundwater by the development of 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. All HF operations would be subject to the regulations required by 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. 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).

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 in any application of HF. 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 any contamination of groundwater from any HF or other well stimulation treatment.

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.

For more information on risks to groundwater from HF, refer to Appendix E.

Surface Waters: 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 be readily moved downstream (within closed basins) during heavy storms. Sediment from future development activity may be carried into contained basins and sloughs. This would be especially true in areas with high slopes in excess of 45% such as the nine parcels on the Diamond Mountain range, and parcel NV-17-067 and NV-17-090. In some cases, the parcels in the high elevations of the Diamond Range exceed 60% slopes. These mountainous areas would be more susceptible to erosion and consequent impacts to the perennial and ephemeral creeks, springs, and meadows. All activities would be subject to BMPs, state and federal regulations and COAs. Potential impacts of lease development on surface waters may include changes to water quantity and quality. 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.

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 any perturbation.

The hydrogeology that results in spring discharge is often unique and complex. For the numerous springs, seeps, and spring-fed wetlands within the deferred parcels, there would be a slight risk that drilling would lead to subsurface modification due to the possibility of interfering with groundwater flow in a fault. As any future drilling takes place, geophysical studies may be required which provide a subsurface view of both the strata and the permeability of the strata, in which case the likelihood of penetrating a fault with groundwater flow would be minimized.

However, under the Proposed Action there could be other potential future impacts to the many springs, seeps, spring-fed wetlands and riparian areas within the proposed lease parcels under this alternative. The available mitigation measures and BMPs might not be adequate to fully protect these water resources, and the current Shoshone-Eureka and Tonopah RMPs do not include adequate protective stipulations. 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.

While there remains much to learn about the spring mounds, they clearly possess a geochemistry, geomorphology, and biologic diversity that are utterly unique within the surrounding environment. Based on the unknown value of these features, preservation for the purpose of future study to facilitate proper management is essential. Under the Proposed Action these resources could be damaged beyond repair through indirect impacts of any future oil and gas exploration or development.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action.

All parcels or parts of parcels that are largely or entirely occupied by wetlands, riparian zones, seeps/springs, floodplains and/or playas are proposed for deferral. The majority of the proposed deferrals are due to these features. Generally these hydrologic features co-occur and overlay one another in the Assessment Area, so that most of the proposed deferral parcels include several or all of these features (see Appendix C). One proposed 1139-acres deferral is specifically to protect the spring mounds. Under this alternative, the likelihood of impacts to all of these hydrologic features would be considerably reduced. In deferring these parcels BLM proposes to develop stipulations to protect these features in an updated RMP: No Surface Occupancy for wetlands, floodplains and playas, and Controlled Surface Use for a riparian buffer (Appendix C).

On the remaining 91,556 acres that would be offered for lease sale under this alternative, the potential effects described for the Proposed Action would be unlikely, as these parcels either include no wetland/riparian, seep/spring, floodplain or playa areas, or have ample acreage outside of such areas to allow developing the parcel without impacting hydrologic features, through application of the available BMPs and mitigations at the time of any future proposal for exploration or development.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.5 Vegetation

Affected Environment

Vegetation within the proposed lease area provides forage and cover for wildlife, livestock, wild horses and burros within the project area. It also provides ground cover and root mass to stabilize soils and aids in infiltration of water into the ground. The type of vegetation that grows 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. The following vegetative communities are those identified within the lease parcel area and are discussed in detail below. Notably, several plant species in the Battle Mountain District have been identified as special status species (Appendix D). These occur in several of the vegetation communities described here.

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 (*Spordolus 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 Assessment 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* ssp.) and sedges (*Carex* ssp.). 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*).

Environmental Consequences

Proposed Action

Although there would be no direct impacts to vegetation due to oil and gas leasing because no authorization for surface disturbance would be granted at this time, there could be indirect impacts to vegetation from future projects on any leased parcels, from such activities as seismic studies, exploratory drilling, developing a well for production (with or without using HF), and reclamation activities. It is reasonably foreseeable that oil and gas exploration and development would occur over the next 10 years within the Assessment Area and that 65-100 acres will be disturbed by activities associated with oil and gas exploration and production including exploration wells, production infrastructures, road construction, and gravel pit expansion.

Removal and crushing of vegetation would occur through exploration and development activities. 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 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 RDF scenario (65-100 acres), the impacts to vegetation are expected to be comparatively minor when compared to the areas offered for lease (approximately 195,732 acres) and temporary in nature because the majority of the disturbance (roads and pads) would be reclaimed. Impacts to vegetation from these activities 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. Through this process, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity.

Based on the RFD, impacts to most vegetation communities from exploration/development are expected to be relatively minor, short term, and localized. In addition, site-specific mitigation measures, BMPs, and COAs would be implemented to reduce impacts. However, oil and gas development could have unknown effects on 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 are 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.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving temporary disturbance to 65-100 acres of vegetation. Parcels with extensive areas of riparian-wetland vegetation community would not be offered for lease sale. The remaining 91,556 acres

that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.6 Forestry and Woodland Products

Affected Environment

The Assessment 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. As such there are no forestry or woodland concerns with the parcels in question, other than the potential for riparian associated species such as cottonwood and willows. Several seeps, springs, and drainages can be found within parcel boundaries, with the potential for impacts to riparian woodland species.

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 Assessment 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 Assessment Area, willows can be found in monotypic communities or associated with other riparian vegetation such as sedge, rush and poplars.

Environmental Consequences

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 Assessment Area and 65-100 acres will be disturbed by activities associated with oil and gas exploration and production including exploration wells, production infrastructures, road construction, and gravel pit expansion. These actions would remove vegetation, potentially increasing wind and water erosion, and have negative impacts on riparian vegetation including cottonwoods and willows. Oil and gas exploration may use off-road vehicles and equipment, which could include four-wheel drive trucks and larger, heavier wheeled vehicles. Damage to woodland species such as cottonwood and willow could result from the contact of such equipment with individual plants. Based on the history of oil and gas exploration in the Battle Mountain District, it is likely that the majority of exploration and development efforts would be

focused on the lower elevation alluvial fans and playas. 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 additional site-specific NEPA analysis.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action. Because most of the areas with potential for cottonwoods and willows – wetlands, seeps and springs – would be deferred, the likelihood of impacts to these species would be minimized. The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.7 Noxious Weeds and Invasive, Non-Native Species

Affected Environment

The BLM defines noxious weeds and invasive plants and weeds with different, interrelated definitions. Noxious weed are 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. Weeds are any plants that interfere with management objectives for a given area of land at a given point in time. Invasive plants are plants that are not part of (if exotic) or a minor component of (if native) the original plant community or communities, and have the potential to become a dominate or co-dominate species on the site if their future establishment and growth are not actively controlled by management interventions; or plants that are 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.

The Federal Noxious Weed Act of 1974 (as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990) authorizes cooperation among federal and state agencies in the control of weeds. 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. Currently the list contains 47 noxious weed species. When considering whether to add a species to the list, the NDA makes a recommendation after consulting with outside experts and a panel comprising Nevada Weed Action Committee members. Per NAC 555.005, if a species is found probable to be "detrimental or destructive and difficult to control or eradicate," the NDA, with approval of the Board of Agriculture, designates the species as a noxious weed. The species is then added to the noxious weed list in NAC 555.010. Upon listing, the NDA will also assign a rating of A, B, or C to the species. The rating reflects the NDA view of the statewide importance of the noxious weed, the likelihood that eradication or control efforts would be successful, and the present distribution of noxious weeds within the state.

The BLM's policy relating to the management and coordination of noxious weeds and invasive plant 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. While, unlike roadways, these waterways are not always heavily disturbed, the fact of 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 anther 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 Assessment Area.

Invasive exotic species also include animals. Several invasive exotic animals can be found in Nevada and the surrounding states, such as *Dreissena polymorpha* (zebra mussel), *Lithobates catesbeianus* (bullfrog) and *Apis mellifera scutellata* (Africanized honeybee). However, there are no records of these or other invasive exotic animal species in or near the Assessment Area.

Environmental Consequences

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.

However, it is reasonably foreseeable that oil and gas exploration and development would occur within the next 10 years on leased parcels. Impacts from these activities would be considered under additional project- and site-specific NEPA analysis.

Based on historic information and anticipated activity, within the next 10 years, approximately 65-100 acres of surface disturbance associated with potential oil and gas exploration and development could be expected, including activities such as road construction and maintenance, vehicles traveling on transportation corridors, and construction of well pads, production facilities and staging areas. These subsequent activities will increase the potential for new and expanded infestations of noxious weeds and invasive and non-native species. 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 may be especially susceptible to new infestations or spread of weeds, as weeds readily establish and spread along waterways and in wet 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.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving movement of humans and equipment and disturbance to 65-100 acres of soils and vegetation, increasing the likelihood of introduction and spread of weeds.

Parcels with extensive seeps, springs, and wetland-riparian areas would not be offered for lease sale. Weeds are particularly likely to become established in such areas, as described above; deferring these parcels would protect them from the impacts described for the Proposed Action.

Several parcels within Big Smoky Valley that are proposed for deferral (parcels 27, 28, 30, 31, 32, and possibly parts of 24 and 25) fall within a 1000-plus acre infestation of *Tamarix ramosissima* (salt cedar) and *Elaeagnus angustifolia* (Russian olive). If these parcels are deferred, this would greatly reduce the risk of spreading these plants within the parcels and from these parcels to other areas.

The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.8 Wildlife Resources

Regulatory Framework

BLM Special Status Species

The Assessment Area may contain one or more Battle Mountain District special status species (SSS) plants, animals or their habitat. The SSS list for the District includes the following taxa: 27 plants, 30 mammals, 18 birds, 11 insects, 7 mollusks, 9 fish, 5 amphibians and 4 reptiles (see Appendix D for the complete list).

BLM SSS are defined as those plant and animal species for which population viability is a concern, as evidenced by:

- significant current or predicted downward trend in population numbers or density, or
- a significant current or predicted downward trend in habitat capability that would reduce the species' existing distribution.

Each state maintains a list of BLM Sensitive species, and manages those species' habitats so as to promote their continuing viability; Appendix D lists Nevada BLM Sensitive species that are found in the Battle Mountain District. SSS also include federally listed species under the Endangered Species Act (ESA; i.e., threatened, endangered or candidate; see section below). These SSS animals are protected under provisions of the ESA or under BLM Manual 6840, Special Status Species Management. BLM has species-specific recommendations to avoid or modify activities that are likely to disturb SSS or severely degrade critical habitat. In many cases, the BLM requires that surveys are conducted for SSS species. BLM would not approve any ground-disturbing activity that may negatively affect federally listed species or critical habitat, until it completes its obligations under applicable requirements of the ESA as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

The Greater Sage-Grouse is a Nevada BLM Sensitive species. All RMPs for BLM lands supporting Greater Sage-Grouse habitat in Nevada and California were amended in 2015 by the Nevada and California Greater Sage-Grouse Land Use Plan Amendment (GRSG Plan Amendment), which designates sage-grouse habitat as Priority Habitat Management Area (PHMA), General Habitat Management Area (GHMA) or Other Habitat Management Area (OHMA) and provides management direction specific to each, along with direction for seasonal resource allocation usage throughout the year near sage-grouse breeding habitat (leks, nesting, early-brooding areas), late-brooding, summer, and winter habitats. Appendix G of the GRSG Plan Amendment Record of Decision provides stipulations to attach to oil and gas lease parcels in PHMA and GHMA, and near leks; see Appendix B of this EA.

Endangered Species Act (ESA)

In accordance with Section 7 of the ESA, federal agencies must "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." The purpose of the ESA is to provide a means for conserving the ecosystems upon which threatened and endangered species depend and to provide a program for protecting these species. The ESA defines an endangered species as a species that is in danger of extinction throughout all or a major portion of its range. A threatened species is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a major portion of its range. This Act also addresses species that have been proposed for listing as either threatened or endangered, but for which a final determination has not been made. These "candidate" species are those for which the US Fish and Wildlife Service (USFWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other, higher priority listing activities. Critical habitat is a specific area or type of area that is considered to be essential for the survival of a species, as designated by the USFWS under the ESA. Within the Battle Mountain District, there are six listed as threatened, endangered, proposed, or candidate species by the USFWS (Appendix D).

BLM and Nevada Department of Wildlife (NDOW) Memorandum of Understanding (MOU)

Wildlife and fish resources and their habitat on public lands are managed cooperatively by the BLM and NDOW under a MOU as established in 1971. The MOU describes the BLM's commitment to manage wildlife and fisheries resource habitat and the NDOW's role in managing populations. The BLM meets its obligations by managing public lands to protect and enhance food, shelter and breeding areas for wild

animals. The NDOW assures healthy wildlife numbers through a variety of management tools including wildlife and fisheries stocking programs, hunting and fishing regulations, land purchases for wildlife management, cooperative enhancement projects and other activities.

NDOW Programs

NDOW is the state agency responsible for the restoration and management of fish and wildlife resources within the state. The NDOW administers state wildlife management and protection programs as set forth in NRS Chapter 501, Wildlife Administration and Enforcement and NAC Chapter 503, Hunting, Fishing and Trapping; Miscellaneous Protective Measures. NRS 501.110 defines the various categories of wildlife in Nevada, including protected categories. NAC 503.010-503.080, 503.110 and 503.140 lists the wildlife species currently placed in the state's various legal categories, including protected species, game species and pest species.

Migratory Bird Treaty Act and Migratory Bird Conservation Act

Migratory birds, with the exception of native resident game birds, are protected under the provisions of the Migratory Bird Treaty Act (MBTA) of 1918. Under this act, nests with eggs or the young of migratory birds may not be harmed, nor may any migratory birds be killed. Measures to prevent bird mortality must be incorporated into the design of a given project. To comply with the MBTA, it is recommended that any land clearing or other surface disturbance associated with proposed actions within the project area be timed to avoid potential disturbance of breeding birds or their nests and young. Disturbance of breeding birds or destruction of nests with eggs or young is a violation of the MBTA. The BLM recommends that land clearing be conducted outside the avian breeding season. For most birds, the breeding season is considered to be from March 1 – July 31 (but see guidelines for Raptors and Eagles below). If land clearing is not feasible outside of the breeding season, the BLM recommends that a qualified biologist survey the area prior to land clearing. These surveys are only good for 14 days. If activity is not completed before that window is finished then another survey may be needed. If nests are located, or if other evidence of nesting (i.e., mated pairs, territorial defense, carrying nesting material, transporting of food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided until young fledge or the nest is no longer occupied.

Guidance for raptors differs from migratory songbirds in that 1) the nesting season is extended (March 1-July 31) and 2) the survey area is larger (surveys will be conducted in the project area in addition to a 1 mile buffer surrounding the proposed surface disturbance). This survey buffer may be reduced or enlarged based on topography and the presence of other physical barriers.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668) applies primarily to taking, hunting and trading activities that involve any bald or golden eagle. The act 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.” Golden eagles are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, both of which prohibit take.

The USFWS has guidance for proposed projects that have the potential to impact eagles or their habitat. Generally, the steps in these guidelines include 1) surveying for nests within an appropriate radius of the project, 2) developing an eagle conservation plan (ECP) in cases where eagles and/or their nests are likely to be impacted, 3) determining if the project has the potential to disturb breeding behavior and 4) determining if the proponents need to apply for a permit to authorize unintentional take. Surveys for golden eagle nests would be designed in coordination with Battle Mountain District biologists to target the most probable locations near the parcels.

Other Regulations

The Sikes Act is federal legislation that authorizes the U.S. Department of Interior to plan, develop, maintain and coordinate programs with state agencies for the conservation and rehabilitation of wildlife, fish and game on public lands. The Fish and Wildlife Conservation Act of 1980 encourages federal agencies to conserve and promote the conservation of non-game fish and wildlife species and their habitats.

Affected Environment

The Battle Mountain District provides habitat for approximately 73 mammals, 231 birds, 24 reptiles, 7 amphibians, 19 fish species and numerous invertebrate species (many of which have yet to be inventoried or identified to species). Several of these wildlife species are likely to occupy the Assessment Area, including migratory birds, golden eagles and other raptors, greater sage-grouse, bats, pronghorn antelope, mule deer and several fish species. In particular, parcels that contain or are adjacent to riparian areas (e.g., streams, springs, seeps and wet meadows) are likely to support a higher density of wildlife species including endemic fish listed by NDOW as state sensitive species. Other important wildlife habitat types within the sale parcels include big sagebrush (mountain and Wyoming big sagebrush), low sagebrush, pinyon-juniper woodlands, aspen woodlands and salt desert scrub vegetation.

The parcels also include seasonally flooded playas. Throughout the Great Basin region there are a number of rare species that occur nowhere else but in the inhospitable environment of seasonally flooded playas, such as fairy shrimp which regenerate via tiny, undetectable cysts that can remain in a dry lake bed for years until conditions are optimum for hatching. Far from major rivers or lakes, playas are often the only water available to wildlife in the desert; pronghorn and other animals may gather there to drink.

The following sections briefly discuss select wildlife species or taxa (groups of species) that are likely to occur in the Assessment Area and for which federal law or BLM policy and guidance directs management actions.

Big Game: The Assessment Area provides habitat for big game species such as pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*). The central portion of the Big Smoky Valley Complex is a corridor for mule deer. The western edge of the complex borders desert bighorn sheep habitat. Pronghorn antelope and mule deer are indigenous to western North America, found nowhere else in the world. Parcels #001 and #002 overlap some crucial mule deer winter habitat.

Pronghorn (sometimes called pronghorn antelope) are found primarily in the valleys between mountain ranges in northern and central Nevada. Pronghorn prefer gentle rolling to flat, wide-open topography. Low sagebrush and northern desert shrubs are the preferred vegetation types. Areas such as these with

low understory allow pronghorn to see great distances and to move quickly to avoid predators. Over 150 different species of grasses, forbs and browse plants are eaten by pronghorn, allowing them to occupy a variety of habitat types. Succulent plants and sprouts are preferred. Some of the main components of pronghorn diet in many locations include sagebrush, antelope bitterbrush, saltbrush, rabbitbrush, cheatgrass, Indian rice grass, crested wheat grass, lambsquarter and shadscale.

Mule deer use a variety of vegetation types and habitats seasonally within the Assessment Area in their pursuit of forage, thermal cover and escape cover for seasonal needs. Vegetation important for mule deer as food and/or cover includes serviceberry, snowberry, mountain mahogany, sagebrush, aspen, cottonwood, willows, chokecherry, wild roses, pinyon pine, juniper, *eriogonum* spp., arrowleaf balsamroot, penstemon, *phlox* spp., sorrel, hawksbeard, lupine and numerous forbs. Riparian vegetation along streams, meadow areas and aspen stands are important fawn-rearing areas.

Pygmy rabbits: Pygmy rabbits (*Brachylagus idahoensis*) are North America's smallest rabbits and the only ones that construct their own burrows. These burrows usually occur in stands of tall, dense sagebrush in areas with deep, loose soils. Big sagebrush is the primary food and may comprise up to 99 percent of food taken in winter and 51 percent in the summer. Wheatgrass and bluegrass are highly preferred foods in the summer. Cheatgrass invasion is detrimental to pygmy rabbits. Shrub cover is necessary for protection during dispersal and cheatgrass monocultures may provide a barrier to dispersal. Pygmy rabbits have SSS status.

Bats: Bats inhabit or utilize many niches across Nevada, including the Battle Mountain District. These include caves, abandoned mines, cliffs, springs, riparian, aspen, pinyon-juniper, subalpine coniferous forest and desert shrub habitats. Bats frequently forage in riparian areas and some of the most important bat habitat exists along perennial stream corridors. Bats are efficient insectivores and also serve a vital role in plant pollination. There are 16 species of bats listed as SSS in the Battle Mountain District.

Fish: Nineteen different fish species live within the Battle Mountain District, nine of which are on the SSS list. Four SSS fish are known to occupy habitat in four of the 106 parcels offered for leasing: parcel #14, Pleasant Valley tui chub; #20 and #21, Big Smoky Valley speckled dace and Charnock Ranch tui chub; #106, Railroad valley tui chub. All four are BLM Sensitive species.

Migratory Birds: A wide variety of bird species protected by the MBTA are found throughout all habitat types within the Assessment Area. These include raptors (i.e., hawks, eagles and owls) and many songbirds. Major avian communities within the Battle Mountain District occur in sagebrush, salt shrub, pinyon-juniper, montane, riparian and aspen habitats. Species commonly occurring in pinyon-juniper habitats and that are known to occur or have the potential to occur in the Assessment 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 Assessment 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 Assessment Area also includes extensive 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. The western snowy plover has previous occurrence records near Big Smoky Valley. Snowy Plover habitat also exists in Diamond Valley in the vicinity of the playa, and the many springs and wetlands located there.

Eagles: Golden eagles are widespread year-round residents across the Battle Mountain District. Golden eagles typically nest on large cliffs and forage on small mammals such as jackrabbits, cottontails and ground squirrels in open shrub, grassland and forested habitats. Bald eagles do not nest in the Battle Mountain District, but they do occur during the winter near relatively large, open bodies of water.

Other raptors: There are known raptor nests on Parcels #043 and #044. The exact species are not known. Eagles, ospreys, hawks, falcons, kites, owls, vultures and all other native North American birds of prey are strictly protected, including a prohibition against the taking or possession of their parts such as feathers or talons; exceptions for individuals require permits from the U.S. Fish and Wildlife Service.

Greater Sage-Grouse: Greater Sage-Grouse occurs within sagebrush habitat in Eureka, Lander and northern portions of Nye County on the Battle Mountain District. Greater Sage-Grouse are known to occur in foothills, plains and mountain slopes where sagebrush and meadows are in close proximity, and variously use these habitats for breeding, nesting, early and late brood rearing, and wintering. Areas used often vary by season, but may be year-round in some areas. The Assessment Area includes several parcels having PHMA, GHMA and OHMA habitat mapped under the GRSG Plan Amendment, as described under Regulatory Framework above. Review of the available data indicates that nesting, brooding, summer, and winter habitat occurs not only in PHMA and GHMA, but also in many areas of OHMA.

***Amphibians*:** There are at least three sensitive species with known occurrences in the Antelope and Big Smoky Valley: Western toad (*Anaxyrus borea*), Chorus frog (*Pseudacris triseriata*), and Great Basin spadefoot *(Spea intermontana*). These frogs remain close to vital ephemeral aquatic habitats since they provide excellent mating, breeding, and hibernation grounds.

Environmental Consequences

Proposed Action

Since 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 produce any direct impacts to wildlife resources. However, there may be indirect impacts to wildlife resources from future ground disturbing activities related to oil and gas exploration and development on any leased parcels. At this time the specific acres that would be disturbed and the 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.

If parcels were leased and developed in the future, 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 their own additional site-specific NEPA analysis with consultation with NDOW and USFWS. In addition, to reduce potential impacts to wildlife, stipulations or lease notices are attached to parcels as listed in Appendix B:

- Greater Sage-grouse (stipulations for parcels with PHMA or GHMA or near leks)
- Mule Deer Winter Range (stipulation for parcels having the habitat)
- Other Special Status Species (lease notice, all parcels)
- Threatened, Endangered and SSS (lease notice, all parcels)
- Migratory Birds (lease notice, all parcels)

Stipulations provide RMP direction that must be followed in the specified habitat. Lease notices alert prospective lessees of other laws or regulations that would apply if a given resource or circumstance is encountered.

In general, animals capable of doing so would avoid and move away from the associated noise and activities; some mortality could occur among animals unable to move away; and there would be some loss of habitat. Based on the Battle Mountain District's 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 disturbing a total of approximately 65-100 acres over the next ten years. A 100-acre total disturbed area would represent 0.05% of the 197,012 acres which make up the 106 lease parcels to be offered under the Proposed Action (195,732 acres), plus the reinstatement parcel (1280 acres). These activities are temporary in nature and wildlife would move back into the area after successful reclamation.

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

However, several parcels are largely or entirely composed of wetland-riparian areas and playas that many wildlife species depend on. Oil and gas development could cause disproportionate and, in some cases, potentially irreversible habitat loss to these dependent species even with stipulated protection measures and BMPs.

Wildlife riparian habitat is directly correlated with the surface water hydrology consequences (Section 3.2.4). As described in that section, impacts could include:

- disproportionate effects of any surface disturbance, due to the habitat's value to wildlife;
- road building redirecting water flows;
- contaminants from accidental spillage spreading throughout the system;
- human activity affecting turbidity and dissolved oxygen content.

Additional impacts of concern to wildlife would be noise and human activity displacing animals or otherwise disrupting their behavior. This, too, would be a disproportionate impact in wetland and riparian areas which are far more rare in this arid region, support higher densities and greater diversity of wildlife, and are more crucial to many species of management concern, as compared to upland areas.

Sensitive species within Big Smoky Valley include western toad, chorus frog, and Great Basin spadefoot. These frogs remain close to vital ephemeral aquatic habitats since they provide excellent mating, breeding, and hibernation grounds. Seeps and springs found in Big Smoky Valley provide essential habitat for these species and impacts to these water sources could impact local population levels of these frogs.

Distribution of water is probably the most limiting factor for pronghorn and mule deer. Adverse effects to these important springs and wetland areas could influence populations of pronghorn and mule deer.

Western snowy plover food consists of immature and adult forms of aquatic and terrestrial invertebrates. Changes in water quantity and quality could impact invertebrate populations, thus reducing food sources for plovers. Many migratory bird species are also 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. Riparian under-story, mid-story, and canopy cover are requisite for a diverse migratory bird community. Woody components of riparian systems, such as willows and cottonwoods, are important habitat features and can be affected by changes in the water table.

Greater sage-grouse do not require open water for day-to-day survival if succulent vegetation is available; they use free water if it is available, however. Their distribution is seasonally limited by water in some areas. In summer, greater sage-grouse in desert regions often occur only near streams and springs, which also provide important brood rearing habitat.

Besides redirecting surface water, building access roads within wetland areas and playas could degrade the habitat for some aquatic species in other ways. Access roads can cause fragmentation of habitat, introduction of invasive species into highly diverse wetland and riparian areas, and increased erosional processes due to removal of vegetation. This could impact nutrient levels, temperature, and pH levels of aquatic habitat; and could indirectly impact food sources for wildlife due to changes in vegetation. If certain thresholds of degradation are crossed within fragile wetland habitats, mitigation would require great input to achieve pre-disturbance conditions of wildlife habitat.

Habitat loss, degradation, and fragmentation are widely accepted causes contributing to raptor population declines worldwide. Availability of nest sites and food are considered limiting factors for raptor populations. Raptors compensate for the loss of foraging and nesting habitat by abandoning established territories and/or attempting to utilize less productive or already occupied territories. A number of raptor species use riparian or wetland vegetation in this region, including the bald eagle, Swainson's hawk, and northern harrier. The decline of cottonwoods and willows in the arid West has been associated with hydrological alterations that deplete surface and ground water (USFWS 2008).

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these areas would not be subject to the general potential effects described for the Proposed Action, involving temporary displacement of animals due to noise and activity, some mortality of animals unable to move, and disturbance to 65-100 acres of vegetation.

Parcels with extensive riparian or wetland areas would not be offered for lease sale; this would greatly reduce the potential for disproportionate and potentially substantial impacts to the many wildlife taxa that concentrate in wetlands and riparian areas, as described for the Proposed Action. Deferral of parcels that include wetlands, floodplains and seasonally flooded playas would reduce the likelihood of impacts to snowy plover habitat, and seasonal feeding and stopover habitat for migrating shorebirds and waterfowl.

The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to minor, short-term potential effects to upland habitats, as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.9 Wild Horses and Burros

Regulatory Framework

The BLM is responsible for the protection, management and control of wild horses and burros on public lands in accordance with the Wild Free-Roaming Horse and Burro Act of 1971 as amended (WFRHBA; Public Law 92-195) which states that BLM "shall manage wild free-roaming 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 also mandated to manage wild horses and burros only within those areas where they were found in 1971 when the WFRHBA was passed. Wild horses and burros cannot be relocated somewhere else within the District and new Herd Management Areas (HMAs) cannot be created for them. Nor is BLM allowed to expand the HMAs beyond the 1971 Herd Area boundaries to replace habitat lost.

The Code of Federal Regulations at 43 CFR 4700 provides guidance for management of wild horses and burros, as do numerous handbooks and manuals including the Wild Horses and Burros Management Handbook H-4700-1.

Affected Environment

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, 2017 is approximately 5,841 wild horses and 595 wild burros.

HMAs are areas identified in Land Use Planning 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 streams and springs. Wild horses and burros also use sparsely vegetated, rocky terrain and habitat with limited water. Winter habitat typically consists of valley bottoms and lower elevations that support Wyoming big sagebrush, winterfat or other salt desert shrub vegetation. Wild burros are able to

thrive in more desert type conditions than wild horses. 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 and burros.

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 and burros, as well as monitor changes in distribution or use patterns over time.

Management of wild horses and burros involves periodic inventory activities, typically completed with helicopter, as well as 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. Burro populations may foal year round and may not increase at the same levels as wild horses. 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.

The 2017 lease sale includes proposed parcels located within four HMAs managed for wild horses or burros (Table 4). All are within the Mt. Lewis Field Office area. These four HMAs total 493,752 acres in area, of which 47,734 acres are within proposed 2017 lease sale parcel boundaries. Figure 6 displays the HMAs, all proposed lease parcels under the Proposed Action, and parcels recommended for deferral under the Partial Deferral Alternative.

Table 4. Herd Management Areas with proposed lease parcels.

HMA	BLM HMA Acres	AML	Estimated Population[1]	Proposed Lease Sale Parcel Acres in HMA
Hickison	57,285	16-45	130[2]	3508
Diamond	143,847	151	363	24,375
Whistler Mountain	42,606	14-24	25	2790
Fish Creek	250,069	101-170	476	17,061
Total	**493,752**	**282-390**	**969**	**47,734**

[1]2016 post-foaling population estimates

[2]Estimated population includes USFS Hickison Wild Burro Territory and BLM Hickison HMA

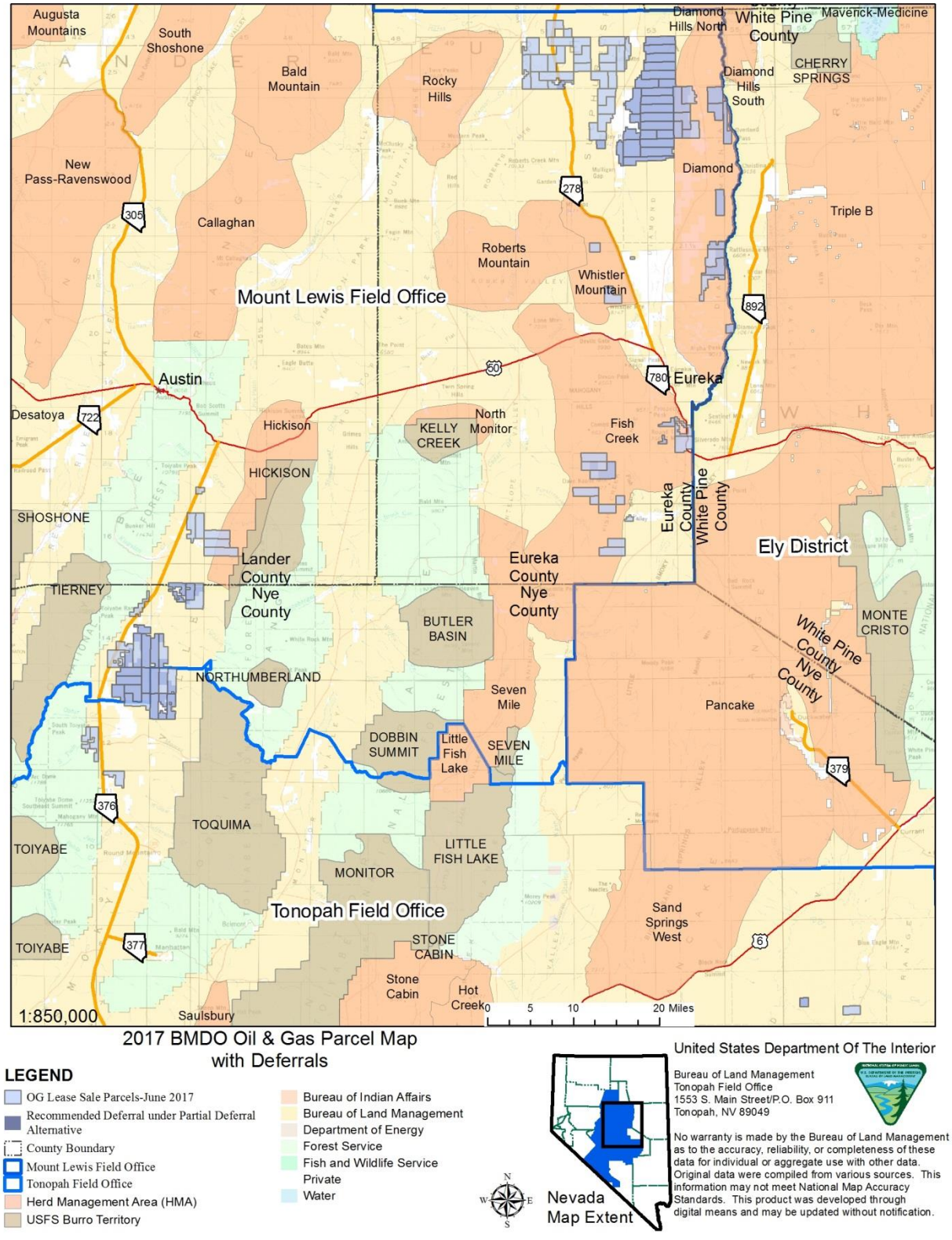

Figure 6. Wild horse and burro Herd Management Areas, with proposed lease parcels (Proposed Action) and recommended deferrals (Partial Deferral Alternative).

Very little oil and gas exploration or development has occurred or is anticipated in the Assessment Area, including the HMAs (see Sections 2.4.1 and 2.4.2). The RFD scenario based on recent trends predicts that within the entire Battle Mountain District, 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 over the next ten years. The anticipated disturbance under the RFD scenario represents a very small fraction of the 3.6 million acres of HMA administered in the District. These activities may or may not occur within HMAs or in areas that could affect wild horses or burros; and any potential effects to wild horses or burros would be addressed in future additional project-specific, site-specific analyses.

Hickison HMA

The Hickison HMA is administered with the adjoining USFS Hickison Wild Burro Territory (WBT). The BLM-managed Hickison HMA includes the Kingston and Simpson Park Allotments. The Hickison HMA/WBT is located approximately 12 miles southeast of the town of Austin in Lander County, covers is approximately 26 miles long and averages about 10 miles wide, and contains 57,285 acres of public lands. The USFS-administered WBT is located east of the HMA, and covers a total of 52,570 acres of public land. The U.S. Highway 50 right-of-way fence separates the northern portion of the Hickison HMA from the southern portion. Approximately 19,000 acres of BLM managed land is in the northern portion and is unavailable to wild burro use. The HMA and WBT are managed for wild burros, and there are no wild horses known to inhabit the HMA or WBT south of U.S. Highway 50. No proposed parcels are in the WBT.

It is believed that burros use higher elevations in the USFS Hickison WBT predominantly in summer and move to lower elevations during the winter months. Inventory flights conducted since 2002 show that approximately 60% of the burro observations were within the WBT, and 40% within the Hickison HMA. Within the HMA, utilization is highest in the northern portion of the HMA, and near the Spencer Hot Springs.

Wild burros are distributed mainly throughout the north eastern portion of the Hickison HMA near the Spencer Hot Springs, the only perennial water source available to wild burros in the BLM managed HMA. The abundance of tracks and trailing seen near the hot springs indicates concentrated use by burros in the area.

The vegetation communities in the Hickison Burro HMA are not highly productive and vegetation is sparse. Due to the limited nature of vegetation, the burros must move throughout the HMA and WBT to locate forage throughout the year.

Portions of three proposed lease parcels are within the Hickison HMA boundaries (Table 5). These parcels are not located within areas known to be heavily utilized by wild burros as derived through long term field monitoring and inventory flights, though burros do move through those portions of the HMA. None of these parcels are proposed for deferral under the Partial Deferral Alternative.

Table 5. Hickison HMA proposed lease parcels.

Parcel Number	Total Acres	Acres within HMA	HMA acres proposed for deferral
NV-17-06-030	1915	792	0
NV-17-06-031	1915	982	0
NV-17-06-032	2541	1733	0
Total Acres	**6371**	**3507**	**0**

Diamond HMA

The Diamond HMA encompasses the west side of the Diamond Mountain Range north of Eureka, Nevada and is managed as a Complex with the Diamond Hills South HMA managed by the Ely District and the Diamond Hills North HMA managed by the Elko District. The Battle Mountain District Diamond HMA is 43 miles long and 7.8 miles wide at the widest point. Elevations exceed 10,000 feet at Diamond Peak. The HMA is comprised of steep canyons that run east and west throughout the west slope of the Diamond Range. The western portion of the HMA is comprised of sagebrush dominated foothills and valley bottoms that support greasewood and salt desert shrub vegetation. The far western portion of the HMA consists of playa. Wild horses generally use the higher elevations in summer months and the lower foothills and valley during winter months.

Wild horses can move throughout the HMA but are restricted to various degrees due to allotment fences and segments of private land. Use by wild horses is concentrated in portions of the HMA as indicated by inventory flight and field data, and is influenced by preferred watering and foraging areas. These areas include the vicinities of Minoletti Creek and Black Point in the southern third of the HMA, Threemile and Telegraph Canyon in the central portion of the HMA, and Judd, Fourmile and Davis Canyon areas in the northern portion of the HMA. Despite the allotment boundary fences, the horses are able to move around the various drift fences, and travel north and south in the highest elevations and along the mountain ridgeline which is not fenced. Many canyons have small springs and streams that are used by wild horses, and relied upon heavily in summer months.

There are 14 proposed lease parcels in the Diamond HMA (Table 6). The parcels are located within wild horse core use areas. Most parcels located in the high elevation areas involve numerous spring sources and steep slopes. A few parcels are also located on the valley floor on the west portion of the HMA and are used less frequently by wild horses. All parcels intersecting this HMA are proposed entirely or in part for deferral under the Partial Deferral Alternative (Table 6), including the spring sources and steep slopes.

Table 6. Diamond HMA proposed lease parcels.

Parcel Number	Total Acres	Acres within HMA	HMA acres proposed for deferral
NV-17-06-92	2099	2099	640
NV-17-06-93	2054	2054	2054
NV-17-06-94	1840	1840	480
NV-17-06-95	1026	1026	1026
NV-17-06-96	1921	1921	1921
NV-17-06-97	2190	2150	2150
NV-17-06-98	1925	1925	1120
NV-17-06-99	2547	2214	2214
NV-17-06-100	1791	1791	1791
NV-17-06-101	1923	1829	1829
NV-17-06-102	1920	1920	640
NV-17-06-103	1291	1133	1133
NV-17-06-104	610	575	575
NV-17-06-105	1958	1958	1958
Total Acres	**25,095**	**24,435**	**19,531**

Fish Creek HMA

The Fish Creek HMA is located 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 portion south of U.S. Highway 50 totals 230,675 acres, and is 36 miles long and 16 miles wide. The HMA is comprised of mid elevation mountains, PJ woodlands and valleys that support winterfat and sagebrush communities. Elevations reach 9500 feet on Prospect Peak in the north portion of the HMA and 10,100 feet on Ninemile Peak in the southern portion of the HMA. Valleys average 6200 feet in elevation. 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 utilizing both lower and higher elevations, with lower elevations being used predominantly during winter months. Distribution of wild horses in the HMA is higher in the foothills and valley bottoms. Higher elevations are predominantly covered with Pinyon and Juniper trees and are not utilized as frequently. There are few fences to impede movement in the HMA. The Fish Creek HMA is adjacent to the Sevenmile HMA and Pancake HMA, and movement between the HMAs is known to occur.

The parcels within the Fish Creek HMA (Table 7) are located in two separate areas. The northern parcels are located in close proximity to U.S. Highway 50 in the northeast portion of the HMA. Wild horses are not known to use the area, and have not been observed in the vicinity during inventory flights since 1980. Wild horses likely avoid the area due to human presence as it is in close proximity to historic mining, the town of Eureka; and the area is frequented by hunters and recreationists.

The remaining parcels are located in the center of the HMA in foothills supporting mixed salt desert shrub vegetation, and mid and higher elevations dominated by Pinyon and Juniper and black and Wyoming big

sagebrush. Several of the parcels are within the core use areas that are used frequently by horses, on a year-round basis. Three small springs exist in one of the parcels. Four of the parcels intersecting this HMA are proposed entirely or in part for deferral under the Partial Deferral Alternative (Table 7), including the springs and parts of the core use areas.

Table 7. Fish Creek HMA proposed lease parcels.

Parcel Number	Total acres	Acres within HMA	HMA acres proposed for deferral
NV-17-06-042	1273	1273	0
NV-17-06-043	1280	1062	0
NV-17-06-044	1920	1691	0
NV-17-06-045	1913	1913	0
NV-17-06-046	1920	1920	640
NV-17-06-047	2560	2560	1920
NV-17-06-048	1913	1913	0
NV-17-06-049	1280	1280	0
NV-17-06-067	982	982	982
NV-17-06-090	1497	840	120
NV-17-06-091	2219	1614	0
Total Acres	**18,757**	**17,048**	**3662**

Whistler Mountain HMA

The Whistler Mountain HMA is located northwest of Eureka, Nevada and is borders the Roberts Mountain HMA. It is managed as a Complex with the Roberts Mountain HMA and the small portion of the Fish Creek HMA north of U.S. Highway 50. It is 16 miles long and 7 miles wide, and totals just 42,606 acres in size. The HMA consists of low mountains covered in Pinyon and Juniper and valleys and foothills that support Wyoming big sagebrush communities. The tallest point is Mt. Hope in the northern portion of the HMA at 8317 feet. Waters are limited to a few small springs. Use of the HMA is seasonal and incidental, as many of the horses rely on habitat in the Roberts Mountain HMA where water is more plentiful.

An allotment fence separates the Whistler Mountain HMA from the Roberts Mountain HMA, but horses are known to go through open gates and breaks in the fence. There is no fence separating the Whistler HMA from the Kobeh Valley Herd Area to the west, and the northern portion of the Fish Creek HMA.

There are two parcels in the HMA (Table 8). Parcel 051 is not within a core use area and not in an area frequented by wild horses. Parcel 050 includes three spring sources that can be used by wild horses, and is considered within core use area. Part of Parcel 050 is proposed for deferral under the Partial Deferral Alternative (Table 7), including the spring sources.

Table 8. Whistler Mountain HMA proposed lease parcels.

Parcel Number	Total Acres	Acres within HMA	HMA acres proposed for deferral
NV-17-06-050	1920	1920	433
NV-17-06-051	870	870	0
Total Acres	**2790**	**2790**	**433**

Environmental Consequences

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 impacts to wild horses or burros. On-the-ground impacts would not occur until a lessee applies for and receives approval to drill on the lease. The BLM cannot determine at the leasing stage whether or not a proposed parcel will actually leased, or whether or not the lease would be explored or developed. Consequently, the BLM cannot determine exactly where on a lease a well or wells may be drilled or what technology may be used to drill and produce wells, 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 site-specific, project-specific environmental analysis to assess the potential impacts to wild horses or burros and their habitat in these areas.

It is reasonably foreseeable that oil and gas exploration and development would occur over the next 10 years within the Assessment Area and 65-100 acres will be disturbed by activities associated with oil and gas exploration and production including 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 and burros.

The existing Shoshone Eureka and Tonopah RMPs do not include analysis of the impacts of oil and gas leasing to wild horses and burros, 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 and burros could include the influence to herd distribution and movement patterns throughout the HMA and disturbance to the forage or water resources.

Mining exploration activities are common throughout the Battle Mountain District, and oil and gas exploration activities would produce similar impacts to wild horses and burros. Impacts from exploration activities (drilling) could include displacement of horses or burros due to increased human activity. These impacts would likely be short term in nature and would consist of animals moving out of the area or changing movement patterns to avoid possible noise disturbance and human presence. The degree of disturbance would be proportional to the levels of exploration/development and increased activity in the area.

Wild horses or burros that commonly utilize a particular area that is subsequently developed for oil or gas production could be pressured to move from that portion of the HMA, thus changing their movement and use patterns. Any exploration or development that occurs near a water sources such as a spring, creek 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.

Increased traffic could increase risk of injury or death from vehicle collisions. Should parcels within the HMA be proposed for exploration or production, additional site- and project-specific NEPA analysis would identify BMPs to minimize or prevent vehicle related issues.

Nine higher elevation parcels in the Diamond Mountain range have slopes that exceed 45% with the majority of those in excess of 60%. These mountain locations are highly susceptible to erosion. Development or exploration in these areas could have impacts to site productivity and forage availability which could be long term. Many of these sites could be difficult to reclaim as shown by failed fire rehabilitation efforts of the past, and predominance of cheatgrass vegetation in many locations.

Should there be exploration implemented in the future as a result of the lease sale, localized and small scale vegetation disturbance or forage habitat fragmentation could occur due to seismic testing, road construction, overland travel and drill pad construction. According to the RDF scenario (Section 2.4.1 and 2.4.2), surface disturbance is likely to constitute 65-100 acres in the next 10 years across the entire Battle Mountain District; this acreage is minimal as compared to the areas offered for lease (approximately 195,732 acres), and the District HMA total of 3.6 million acres. Under the Proposed Action, the area of potential disturbance could include any of the proposed lease parcels. However, if exploration were to occur, or parcels were developed in the future, site-specific mitigation measures would be attached as COAs for each proposed activity, which would be analyzed in additional site-specific NEPA analysis, and would include involvement with the interested public.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action. Of the approximately 47,780 acres of parcels identified within HMAs (Tables 5 – 8), approximately 23,626 acres (49%) would be deferred. Future exploration or development that could influence herd distribution and movement patterns would not occur in the deferred parcels. This would be especially evident in the Diamond HMA, where deferred parcels are within high elevation summer range having water sources. There would be less potential for impacts to the springs that constitute important water sources throughout the Diamond HMA, in three parcels in the Fish Creek HMA, and in parcel 50 of the Whistler Mountain HMA. The remaining 24,154 acres within HMAs that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.10 Rangeland Resources

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. Twenty grazing allotments include all or portions of the parcels proposed for leasing. 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. Various range improvement projects are also located within these allotments and may include fences, cattle guards, troughs, wells, pipelines, seedings, and vegetation manipulation projects.

Table 9 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. Figure 7 displays the allotments, all proposed lease parcels under the Proposed Action, and parcels recommended for deferral under the Partial Deferral Alternative.

Table 9. Grazing allotments with proposed lease parcels.

Allotment Name	Allotment Public Acres	Lease Parcel Acres	Number of Authorizations	Kind	AUMs	Suspended AUMs
Smoky	125,247	16,376	2	Cattle	5,593	226
Nyala	321,274	648	1	Cattle	13,225	6,742
Arambel	46,969	931	1	Sheep	2,554	1205
Black Point	59,804	8,944	1	Cattle / Sheep	6,619	2,307
Diamond Springs	72,271	24,578	1	Cattle	5,287	1,607
Fish Creek Ranch	289,292	16,834	3	Cattle	36,013	32,000
				Sheep	802	0
Flynn/Parman	27,834	11,626	1	Cattle	2,232	833
JD	140,240	9,156	1	Cattle	8,200	0
Kingston	78,810	10,529	2	Cattle	2,720	0
Lucky C	114,327	164	1	Cattle	3,942	888
Millett Ranch	798	0.05	1	Cattle	72	0
Nielson	493	493	1	Cattle	180	64
North Diamond	76,950	44,619	2	Cattle	6,428	2849
Roberts Mountain	163,671	14,379	1	Cattle / Sheep	18,220	8,596
Romano	75,785	3,062	1	Cattle	2,887	0
Ruby Hill	12,267	56	2	Sheep	1,011	0
				Cattle	275	0
Shannon Station	31,487	1,074	1	Cattle	3,211	691
Three Mile	27,335	570	1	Cattle	2,087	1,237
Trail Canyon	24,103	16,247	2	Cattle	1115	534
Wildcat Canyon	64,976	14,988	1	Cattle	2677	0

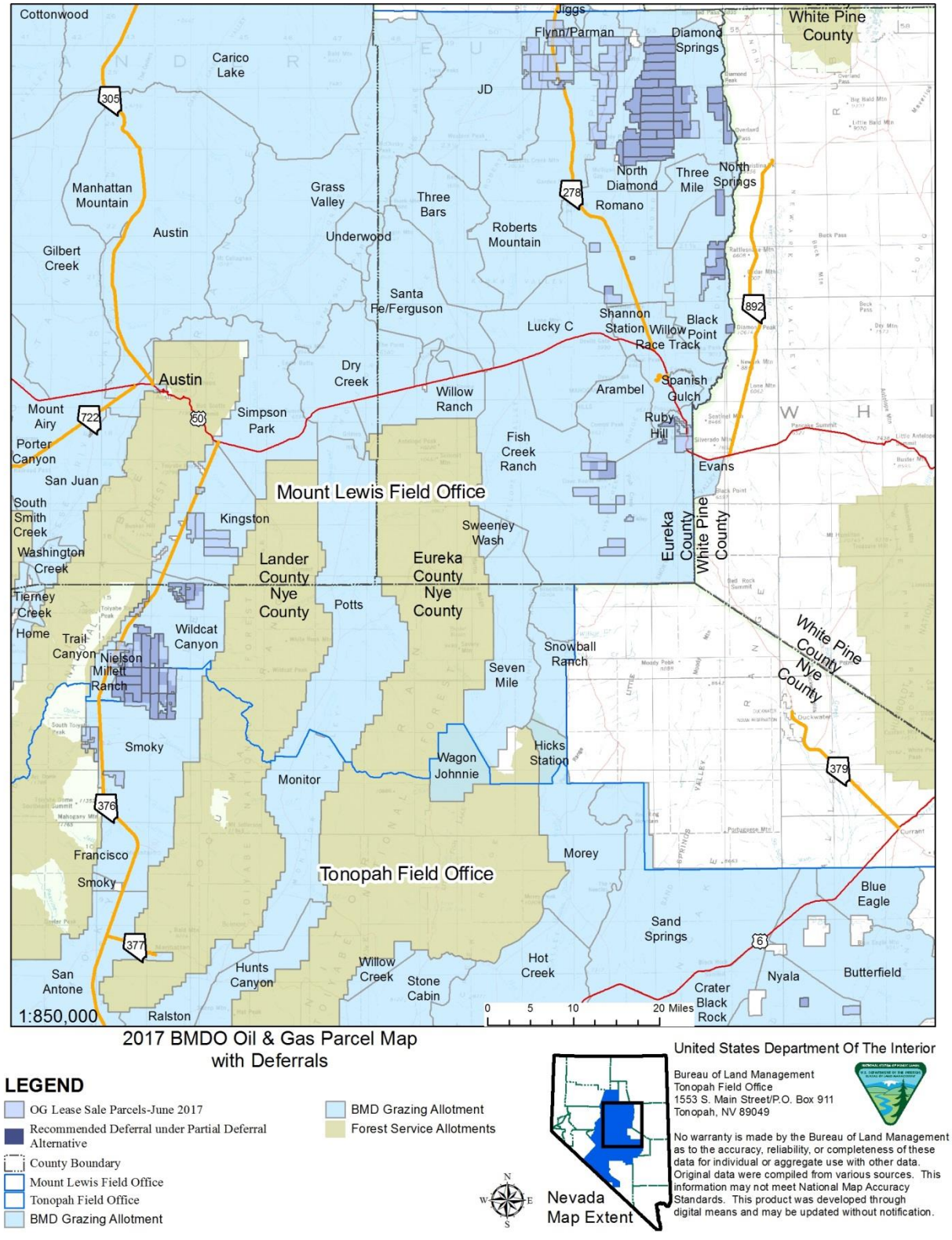

Figure 7. Grazing allotments in the Battle Mountain District, with proposed lease parcels (Proposed Action) and recommended deferrals (Partial Deferral Alternative).

Environmental Consequences

Proposed Action

It is reasonably foreseeable that oil and gas exploration and development would occur over the next 10 years within the Assessment Area, with 65-100 acres disturbed by activities associated with oil and gas exploration and production including exploration wells, production infrastructures, road construction, and gravel pit expansion (see RFD scenario, Section 2.4.1). These actions would remove available forage for livestock on 65-100 acres, potentially decreasing the AUMs in the allotment(s). These impacts to range are expected to be comparatively minor when compared to the acreage offered for lease, 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, site-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.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving temporary disturbance to 65-100 acres of rangeland resources. The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

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 proposed for the 2017 lease sale are located primarily in the Diamond, Garden, and Big Smoky Valleys (Figures 2 and 4). Other parcels are located in the Diamond, Sulphur Springs, and Fish Creek Ranges (Figures 2 and 3). One smaller parcel is positioned in Railroad Valley (Figure 5). Although limited cultural resource surveys have been completed within the proposed parcels, (less than 5% 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.

A segment of the Pony Express Trail traverses Parcel NV-17-06-105. As the trail is on land managed by the Bureau of Land Management, Mount Lewis Field Office, it is classified as an archaeological site. In addition, the Pony Express Trail has been designated a National Historic Trail (NHT) which is administered by the National Park Service, National Trails System (see Section 3.2.13, Recreation).

As an archaeological site, the Pony Express/Overland Trail (Site CrNV-62-482;26EU762/763) falls under the National Historic Preservation Act (Public Law 89-665; 54 U.S.C. 300101 et seq.), specifically Section 106 (see 36 CFR 800, as amended). The section of the route which passes through the proposed leasing parcel was first studied between 1976 and 1982 and has been continuously recorded and documented since. The most recent discussion of the segment's archaeological significance indicates it is eligible to the National Register of Historic Places under Criterion A, as it retains historical integrity of location, setting, feeling, and association to embody its own significance as a part of this important communication system.

Environmental Consequences

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 statues 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.

Lease Notice NV-B-07-A-LN would be attached to all leases within Battle Mountain 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.

Under the Proposed Action, cultural resources located within the proposed parcels would be identified and evaluated on a case-by-case basis, and compliance with Section 106 of the NHPA would be required prior to project implementation or ground disturbing activities. Section 106 compliance activities would include the identification of cultural resources within parcels, evaluation of cultural resources for their eligibility for listing in the NRHP, and resolution of any adverse effects to historic properties (i.e., resources eligible for or listed in the NRHP). Resolution of adverse effects to historic properties, including mitigation, would be conducted in accordance with all applicable authorizes, including the State Protocol Agreement between the Bureau of Land Management and the Nevada State Historic Preservation Officer for Implementing the National Historic Preservation Act (Protocol; revised December 2014). The Protocol also includes certain actions exempt from inventory, such as conducting minerals exploration that conforms to casual use in accordance with 43 CFR §3802.1-2 and 43 CFR §3809.5(1).

Based on the above requirements, it is unlikely that indirect effects to cultural resources from leasing these 106 parcels would be substantial.

An exception to the discussion above is the Pony Express/Overland Trail (Site CrNV-62-482;26EU762/763). Oil and gas development near the trail could result in an adverse effect to the route segment, and the trail as a whole. 36 CFR 800.5(a)(1) defines an adverse effect as any Federal action which "may alter directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion on the National Register [of Historic Places] in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Oil and gas development within the physical footprint of the site—or within its viewshed or auditory sphere—has the potential to adversely impact the site's integrity of setting, setting, and feeling. Existing protections for the resource (e.g. the BLM's discretion to move proposed oil and gas development up to 200 meters; recommendation of design changes, etc.) will not be sufficient to avoid the abovementioned effects.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral. Most of the proposed deferrals are due to sensitive wetlands, seeps and/or springs, floodplains, playas, and steep slopes. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving 65-100 acres of surface disturbance.

Deferred parcels would also include 160 acres of Parcel NV-17-06-105 that are proposed for deferral specifically because that part of the parcel is traversed by the Pony Express/Overland Trail. Under this alternative, this portion of the parcel would be withheld from lease sale pending development of a No Surface Occupancy (NSO) stipulation in the updated RMP. The proposed NSO deferral area would serve to avoid effects to the Pony Express Trail segment as it passes through the proposed lease parcel. Under a future NSO stipulation, the area beneath the parcel would still be available for development; however, ground-disturbing activities would have to be located away from the trail itself. With no surface occupancy directly on the historic route, and development activities moved out of the trail's viewshed, this Pony Express Trail segment's historical and recreational value would be preserved.

The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same overall potential effects—and the required mitigation measures—as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

3.2.12 Native American Cultural Concerns

Affected Environment

The Assessment 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 viewscapes; 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. As a result, 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. This terminology does not reflect any BLM evaluation, conclusion, or determination that something is or is not religious, sacred, or spiritual in nature, but conveys only the information that has been gathered through tribal consultation and coordination and ethnographic study.

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 within the proposed action area have not been analyzed for ethnographic resources or Native American cultural concerns. The BLM contacted the Duckwater Shoshone Tribe, Yomba Shoshone Tribe, the Te-Moak Shoshone Tribe, and the Descendants of the Big Smoky Valley to identify

areas of concern, mitigation measures, operating procedures or alternatives that may eliminate or reduce impacts to any existing tribal resources.

During coordination meetings with the Duckwater Tribe and representatives of the Descendants of the Big Smoky Valley prior to the previous (June 2016) Lease Sale, they identified the whole valley as a significant area regarding the creation of the Shoshone People. Several parcels were identified and deferred from the 2016 lease sale for one year while BLM worked with the Tribes to identify specific areas of concern. For the 2017 lease sale, the Duckwater Shoshone Tribe proposed long-term deferral of the same parcels. Based on further information provided by the Tribes, their main concerns relate to culturally sensitive sites at specific, discrete, but currently-unknown locations within the general area of those parcels. The Tribe also proposed deferrals based on overlap with their grazing allotments.

Environmental Consequences

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 exploration or development on the leased parcels to impact Native American sites of a spiritual, cultural, or traditional nature. Effects to the types of resource uses by traditional activities and current religious practices 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.

Lease Notice NV-B-07-A-LN (Appendix B) would be attached to all parcels at the time of sale, stating 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 proposed activity would be analyzed under its own site-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. This would include avoiding sites of cultural importance in the previously-deferred parcels in Big Smoky Valley when their specific locations become known. Given the importance of the entire valley, the Duckwater tribe, the Yomba tribe and the Descendants of the Big Smoky Valley have requested that they be involved with the development of any of the parcels from the very beginning of the development process. Many of the parcels may require extensive mitigation and very specific COAs (i.e placement of facilities and wells) to avoid adverse effects to these locations. Concerns about effects to grazing allotments would also be addressed at the time of any proposed exploration or development (see Rangeland Resources, Section 3.2.10).

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action.

The parcels that would be deferred under this alternative include parts of 3 of the 8 parcels in Big Smoky Valley that received a one-year deferral from the 2016 lease sale due to Native American concerns. Under this alternative, the parcels would be deferred pending resolution of resource issues related to wetlands, floodplains and playas via new stipulations in an updated RMP. This alternative would provide additional protection to areas with Native American concerns to the extent that they coincide with the deferred parts of the parcels.

The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.13 Recreation

Affected Environment

The proposed lease parcels are not located in any designated recreation areas. The proposed lease parcels are all within dispersed recreation areas subject to public use. Dispersed recreation areas are utilized by many different members of the public. Dispersed recreation activities include off-highway vehicle (OHV) use, driving for pleasure, camping, mountain biking, sightseeing, rock collecting, photography, hunting, trail running, hiking and bird watching.

The section of the Pony Express Trail running through the proposed Parcel 105, discussed in terms of its historical values in Section 3.2.11, Cultural Resources, is also part of the Pony Express National Historic Trail (see P.L. 90-543, as amended, and 16 USC 1244 §5[a][19]). One of the criteria to qualify as a National Historic Trail is "significant potential for public recreational use or historical interest based on historic interpretation and appreciation" 16 USC 1243[b][11][c]). Additionally, according to 16 USC 1246(c) "[r]easonable efforts shall be made to provide sufficient access opportunities to such trails and, to the extent practicable, efforts shall be made to avoid activities incompatible with the purposes for which such trails were established." Recreational uses of the trail may include running, walking, hiking, backpacking, bird watching or horseback riding, typical of a primitive/semi primitive non-motorized setting.

Environmental Consequences

Proposed Action

No direct impacts to recreation on public lands would occur as a result of the oil and gas lease sale. However, there are potential indirect (future) impacts that could occur from associated leasing activities, such as exploration and development. The following are potential environmental impacts on recreation, considering the RFD scenario.

Oil and gas development near the Pony Express National Historic Trail has the potential to both 1) exclude the public from use of the Trail; and 2) represent an incompatible use, counter to the management

direction provided by 16 USC 1246(c) as quoted above. Furthermore, oil and gas development within the Trail itself—or within its viewshed—has the potential to adversely impact the Trail's setting (also see Section 3.2.14, Visual Resources). Existing protections for the resource (e.g. the BLM's discretion to move proposed oil and gas development up to 200 meters, recommendation of design and aesthetic changes, etc.) will not be sufficient to avoid the abovementioned effects.

The following discussion applies to the remainder of the proposed lease 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. The survey activities conducted during the exploration phase 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.

Potential exploration activities may include construction of access roads and well pads. Increased truck traffic during this phase 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 have limited access to the public which could, in turn, slightly decrease access to the area for recreation and possibly displace recreational users.

The production stage may include operation and maintenance of the constructed facilities. These activities require a small number of employees who would utilize access roads in the area but are not likely to limit the recreational use of these roads. Oil and gas production facilities are likely to have limited access to the public which could, in turn, slightly decrease access to the area for recreation and possibly displace recreational users. However, improved access to the 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.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral, mainly due to sensitive wetlands, seeps and/or springs, floodplains, playas and steep slopes. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action.

Deferred parcels would also include 160 acres of Parcel NV-17-06-105 that are proposed for deferral specifically because that part of the parcel is traversed by the Pony Express National Historic Trail. Under this alternative, this portion of the parcel would be withheld from lease sale pending development of a No Surface Occupancy (NSO) stipulation in the updated RMP. The proposed NSO deferral area would serve to avoid effects to the Pony Express Trail segment as it passes through the proposed lease parcel. Under a future NSO stipulation, the area beneath the parcel would still be available for development; however, ground-disturbing activities would have to be located away from the trail itself. With no surface occupancy directly on the historic route, and development activities moved out of the trail's viewshed, this Pony Express Trail segment's historical and recreational value would be preserved.

The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

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 different management direction for each class. Lands are assigned a class ranging from one to four, with VRM Class I maintaining the highest visual values and VRM Class IV maintaining the lowest values. Attempts are made to mitigate visual contrasts from surface-disturbing activities regardless of the VRM class assigned.

None of the Assessment Area falls within VRM Class I. This class provides primarily for natural ecological changes; however, it does not preclude limited management activity. Any contrast created within the characteristic environment must not attract attention. It is applied to wilderness areas, some natural areas, wild portions of designated Wild and Scenic Rivers, and other similar situations where management activities are to be restricted.

Proposed lease parcels are entirely or substantially within the following VRM classes and corresponding management direction:

Class II areas, 3 parcels, 2631 acres (1.34% of Assessment Area)

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 III areas, 34 parcels, 34,080 acres (17.41% of Assessment Area)

Contrasts to the basic elements (form, line, color, texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the changes should remain subordinate to the existing characteristic landscape.

Class IV areas, 69 parcels, 159,021 acres (81.24% of Assessment Area)

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.

In the BLM Ely District, adjacent to the Battle Mountain District, the Pony Express National Historical Trail is designated as VRM II. In the Battle Mountain District the area falls within Class IV designation, although projects with the potential to affect visual values associated with the trail have been held to a higher standard.

When a project is proposed, effects to visual resources, and measures to minimize them, are 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 (0-½ 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 Assessment Area, generally offers outstanding night sky viewing opportunities with frequent clear weather and many areas of little or no light pollution.

Environmental Consequences

Proposed Action

No direct impacts to visual resources on public lands would occur as a result of the oil and gas lease sale. However, there are potential indirect (future) impacts that could occur from associated leasing activities, such as exploration and development. These indirect impacts may include, but are not limited to, contrast of line, shape, color, or texture due to the emplacement of roads, drill pads, drill rigs, tank batteries, temporary and long-term facilities and pump jacks; and impacts of nighttime lighting to dark skies.

The purchase of a parcel does not guarantee that a parcel will be developed for oil and gas resources in the future. Based on the RFD, oil and gas exploration or production activities are expected to disturb a total of 65-100 acres over a 10 year period. The majority of Nevada's leases expire without any development ever occurring on them. However, 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 to visual resources on public lands include, but are not limited to, the following measures:

- 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 of facilities and equipment to blend in with the surroundings
- planning road alignment to minimize visual contrast

At the conclusion of activities related to oil and gas development, reclamation of the drill site would be required. Potential reclamation may include, but is not limited to, re-contouring drill pads; reclaiming

roads; re-seeding drill sites and roads; and removing equipment and facilities related to oil and gas development.

Using these outlined mitigation and reclamation methods, as well as any others identified via NEPA analysis at the APD stage, generally has the potential to minimize impacts to visual resources on public lands to the greatest extent practicable.

Impacts to the viewshed/setting of the Pony Express National Historical Trail segment are of particular concern, as discussed under Section 3.2.13, Recreation, as oil and gas development within the Trail's viewshed has the potential to adversely impact the Trail's setting, counter to the management direction provided by 16 USC 1246(c).

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, and a segment of the Pony Express National Historical Trail. These approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action.

This alternative would reduce the potential for visual impacts to areas managed for higher visual values, because a disproportionate number of parcels proposed for deferral fall entirely or largely into VRM Class II or III. The parcels proposed for deferral include all or substantial parts of 23 of the 34 parcels in VRM Class III areas, and two of the three parcels in VRM Class II areas.

Deferred parcels would include 160 acres of Parcel NV-17-06-105 that are proposed for deferral specifically because that part of the parcel is traversed by the Pony Express National Historic Trail. Under this alternative, this portion of the parcel would be withheld from lease sale pending development of a No Surface Occupancy (NSO) stipulation in the updated RMP. BLM would also propose to include in the updated RMP a VRM Class II designation for the trail throughout the Battle Mountain District.

Under a future NSO stipulation, the area beneath the parcel would still be available for development; however, ground-disturbing activities would have to be located away from the trail itself. With no surface occupancy directly on the historic route, and development activities moved out of the trail's viewshed, this Pony Express Trail segment's historical, recreational, and visual values would be protected. The VRM Class II designation would also acknowledge and protect the trail's visual values.

The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the potential effects described above would occur on other leased parcels in the Battle Mountain District.

3.2.15 Geology and Minerals

Affected Environment

This section discusses other extractive mineral uses that may exist in the Assessment Area and could be affected by oil and gas exploration and development activities, 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, which cover most of Nevada. This unique feature was 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 displacement resulted in tens of thousands of feet of separation and crustal thinning bringing magma heat sources close to the surface, resulting in volcanic activity (lava flows or cinder cones), superheated fluid (geothermal), and maturation of hydrocarbon sources (oil and gas).

The geologic history of central and southern Nevada, including the Assessment Area, is very complex and includes two major cycles of sedimentation (western and eastern facies sources), episodic thrust faulting, mountain-building, and associated intrusive and igneous activity. More recent geologic history includes a period of crustal extension that was accompanied by bimodal (rhyolite-basalt) volcanism, large volume caldera volcanism, and basin and range block-faulting resulting in high-levels of shallow crustal heat flow. The regional and local geologic setting has been instrumental in the location of and potential for numerous economic metallic mineral deposits in the Assessment Area, as well as development of economic geothermal resources.

Oil and gas parcels on public lands have been available within Battle Mountain District for several decades. The main producing fields are located within Railroad 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.

Nevada is a seismically active state that frequently receives numerous earthquakes each year. However, most are small in size 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

Locatable minerals historically or currently mined within the Assessment 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

In addition to locatable minerals, common minerals are sold through mineral material sale. This encompasses petrified wood, 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 include sand, gravel, and rock quarries 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

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 the following: 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

Oil and gas fields in the Battle Mountain District occur in Railroad Valley and Pine Valley, in central Nevada. 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. Natural gas is not produced in commercial quantities in Nevada. Pine Valley oil production comes primarily from Oligocene and Miocene sedimentary and volcaniclastic sedimentary rocks, but rocks as old as the Devonian Telegraph Canyon Formation host oil in the vicinity of the Assessment Area.

Each oil and gas program varies, but 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.

A total of 1248 leases totaling 2.56 million acres have been authorized in Battle Mountain District since 1990. Since 1907, roughly 770 oil and gas wells have been drilled in the State of Nevada. Total oil production from 1954 to 2015 is 52.8 million barrels of oil. Oil production in the past five years (2011-2015) averaged 341,895 barrels of oil per year (source: Nevada Division of Minerals).

Shale Oil

The potential for production of petroleum products from shale oil within the Assessment Area is low in the short-term and probably low to moderate in the long-term. Shale oil contains significant crude oil and may be used as a source of petroleum, which Noble Energy is currently exploring in the northeastern part of Nevada. 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). The Chainman, Vinini, Woodruff, and Sheep Pass Formations all occur within the Assessment 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 exception of specific closures such as Wilderness Areas, Wilderness Study Areas, community watersheds, critical wildlife habitat areas, and military reservations. The Mount Lewis Field Office prepared a "Programmatic Environmental Assessment Geothermal Leasing and Exploration - Shoshone-Eureka Assessment Area" in 2002. The Tonopah Field Office implemented the "Proposed Tonopah RMP and Final Environmental Impact Statement" (1994) and a programmatic Environmental Assessment for geothermal leasing to expedite processing geothermal lease applications. These were supplanted by the Geothermal Programmatic Environmental Impact Statement for Geothermal Leasing in the Western U.S., approved on December 17, 2008 to expedite processing geothermal lease applications.

Approximately 20 percent of the land within the Battle Mountain District is potentially valuable for geothermal resources, located mainly in Esmeralda and Lander counties.

Environmental Consequences

Proposed Action

There would be no direct impact to mineral exploitation, since oil and gas leasing does not authorize exploration and development of oil and gas. 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.

There is one geothermal lease that partially overlaps one proposed oil and gas lease sale parcel. These potential impacts could be mitigated through negotiations between operators.

If any of these parcels are 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.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, floodplains, playas, steep slopes, or historical features. Potential effects, involving temporary disturbance to 65-100 acres of rangeland resources, would be similar to those described for the Proposed Action, except that parcels or parts of parcels comprised of sensitive wetlands and associated wildlife habitat, vegetation, and surface water would be deferred and would not be subject to the potential environmental

consequences described above. The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

3.2.16 Land Use Authorizations

Affected Environment

All of the proposed lease parcels are located on public lands with federally controlled surface and subsurface mineral estate. Many of the offered parcels would require a right-of-way (ROW) in order to access the lease parcels. Some proposed parcels include pre-existing land use authorizations such as grants, leases, permits and withdrawals. Also, grants, leases and permits 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 10 provides a summary of the existing land use authorizations in the proposed lease parcels.

Table 10. Summary of land use authorizations in proposed lease parcels.

ROW Case File	ROW Holder	ROW Description	Affected Lease Parcel
NVCC 022619	Nevada Department of Transportation (NDOT)	Mineral Material Site (Sec 17)	001
N-53344	Truckee River Ranch LLC	RS 2339 D/C Water Pipeline	001, 002
N-88358	Truckee River Ranch LLC	24.9 kV Distribution line	001
R-3529		Range Improvement	001
N-56922	Truckee River Ranch LLC	RS 2339 D/C Water Pipeline	001,002
NVCC 022622	Nevada Department of Transportation (NDOT)	Fed Aid Highway (Sec 17)	003, 013, 014, 015, 028, 029
Nev 065085	Sierra Pacific Power dba NV Energy	12 kV distribution Line	003
N-06971	US Forest Service	ROW – Road Fed Fac	010
NVCC 023331	Nevada Department of Transportation (NDOT)	Mineral Material Site (Sec 17)	013
N-39908	Nevada Bell	Telephone Line – Round Mountain/Kingston	013, 014, 015
N-46509	Sierra Pacific Power dba NV Energy	24.9 kV distribution line	013, 014, 015, 028, 029
N-48678	Sierra Pacific Power dba NV Energy	24.9 kV distribution line	013, 014
N-62358	Ted Melsheimer	Mcleod Creek Pipeline	013, 014, 015
N-63200	Nevada Bell	Smoky Valley Telephone Line	013, 014, 015, 029
N-91092	Arizona Nevada Tower Corp	Kingston Communications Site	013, 014

ROW Case File	ROW Holder	ROW Description	Affected Lease Parcel
N-48809	Sierra Pacific Power dba NV Energy	24.9 kV distribution line	015
NVCC 023330	Nevada Department of Transportation (NDOT)	Mineral Material Site (Sec 17)	015
Nev 064382	Young Brothers	ROW – Irrigation Ditch	027, 028
N-34387	Nevada Bell	Austin/Kingston Canyon telephone line	028, 029
N-51091	Ralph Young	Pending ROW - Road	028
N-51784	Ralph Young	Pending ROW – RS 2339 Pre-FLPMA ditch	027, 028, 031, 032
N-01962	Nevada Department of Transportation (NDOT)	Mineral Material Site (Sec 17)	033
N-42324	Wells Rural Electric	14.4 kV distribution line	033, 035, 038, 041
N-58497	Nevada Bell	Buried fiber optic line	033, 035, 038, 040, 041
N-63162	Sierra Pacific Power dba NV Energy	Falcon - Gonder Fiber Optic Line	035, 036, 038, 040, 041
Nev 001473	Nevada Department of Transportation (NDOT)	Mineral Material Site (Sec 17)	038
Nev 001471	Nevada Department of Transportation (NDOT)	Fed Aid Highway (Sec 17)	038, 040
N-53379	Mobil Oil Corp	40-ft wide Fuel Pipeline	033, 041
N-91500	American Vanadium US, Inc.	Monitoring Station sec. 36	044
N-05638	Mt Wheeler Power Inc.	24.9 kV distribution line	052, 054, 088
N-07318	Nevada Bell	Telephone Line	052, 054
N-74974	Nevada Bell	20-ft wide Telephone Line	052, 054, 088
N-87407	Eureka Moly LLC	Well ROW and accompanying roadways	052
N-53976	Mobil Oil Corp	ROW Road – 40 ft wide	058
N-56120	Nevada Bell	Buried phone cable	084
		Range Improvement Fence	084
Nev 042805	Nevada Department of Transportation (NDOT)	Mineral Material Site (Sec 17)	090, 091
NVCC 018079	Nevada Department of Transportation (NDOT)	Roadway for access to materials site	090, 091
NVCC 018164	Nevada Department of Transportation (NDOT)	Fed Aid Highway (Sec. 32)	091
NVCC 023185	SBC/NV Bell	Buried phone cable	090
N-00248	Nevada Bell	Telephone Line (Pre-FLPMA)	091
N-66394	AT&T	Fiber optic line	090, 091
N-76179	Sierra Pacific Power dba NV Energy	Fiber optic line	090, 091

ROW Case File	ROW Holder	ROW Description	Affected Lease Parcel
Nev 050485	Nevada Department of Transportation (NDOT)	Fed Aid Highway (Secs. 7, 17, 20, 29, 31 and 32)	090, 091

Environmental Consequences

Proposed Action

Leasing creates a valid existing right, which could conflict with other existing or future land use authorizations. These conflicts would be mitigated through agreements between relevant operators.

FLPMA requires that prior existing rights must be recognized. If parcels were developed in the future, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity. Impacts to existing ROWs may occur as a result of disturbance activities associated with potential exploration and development activities.

Applications for 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, they can be used by the general public for other purposes such as access to public lands.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, and any ROWs and other land use authorizations on those parcels would not be affected. The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the same potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

3.2.17 Socioeconomic Values

Affected Environment

The proposed lease parcels are located within three rural counties in central Nevada: Eureka County (73 parcels), Nye County (27 parcels) and Lander County (6 parcels).

Nevada's rural counties are very sparsely populated, with the vast majority of the state's population concentrated in the cities of Las Vegas and Reno. While Las Vegas' rapid growth has been the driving force behind a sharp increase in the state's population density, the rural counties have undergone little change. As of the 2010 U.S. census the three counties intersected by the Assessment Area had an average

population density of 1.9 persons per square mile. Nye County was the most densely populated at 2.4 persons per square mile; Eureka County, the most sparsely populated, had two square miles for every person (Table 11).

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.

The average median income of the three counties intersected by the Assessment Area is higher than that of the state as a whole, and the percent in poverty is lower (Table 11). However, Nye County has a lower median income than the statewide average, and a higher poverty rate than the statewide 14.9% or the national 13.5% poverty rate.

Table 11. Population density and income data by county.

County (State)	Area in square miles	Population, 2010 census	Population density per square mile	Median household income[1]	Percent population in poverty[1]
Eureka	4180	1987	0.5	$65,459	9.5%
Nye	18,199	43,946	2.4	$43,819	17.5%
Lander	5519	5775	1.0	$76,713	10.8%
3 Counties	Σ=27,898	Σ=51,708	$\bar{x}$ = 1.9	$\bar{x}$ = $61,997	$\bar{x}$ = 12.6%
(Nevada)	(110,567)	(2,700,551)	(244.2)	($52,544)	(14.9%)

[1]SAIPE 2015. Small Area Income and Poverty Estimates: State and County Estimates for 2015. Last updated December 14, 2016. https://www.census.gov/did/www/saipe/data/statecounty/data/2015.html

Small towns and unincorporated communities nearest the Assessment 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.

Environmental Consequences

Proposed Action

The only direct impact of issuing new oil and gas leases on socioeconomics within the Assessment Area would be the generation of revenue from the sale of the leases, as the State of Nevada retains 49 percent of the proceeds from lease sales. From March 2010 to July 2014 total revenue generated from both competitive and non-competitive oil and gas lease sales on the Battle Mountain District was $2,411,377.

Subsequent oil and gas exploration, development and production could affect the local economy in terms of additional jobs, income and tax revenues. During the exploration phase, oil and gas companies typically provide in-house scientists and technicians to do the majority of this work. After initial surveys have been completed, 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 exploration 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. Fifty percent of that amount is provided to the state government, which then provides a portion back to the counties.

These positive indirect impacts to socioeconomics within the Assessment Area from the Proposed Action would likely be minimal, given the RDF scenario which predicts 25 wells would be built within the Battle Mountain District in the next ten years.

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.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral; the activities predicted by the RDF scenario would occur on other leased parcels within the Assessment Area and/or elsewhere in the Battle Mountain District. Because nearby communities would experience socioeconomic effects, rather than the parcels themselves, the effects would be the same as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017; the activities predicted by the RDF scenario would occur on other leased parcels in the Battle Mountain District. Socioeconomic effects would be the same as described for the Proposed Action, possibly affecting some different communities in the Battle Mountain District.

3.2.18 Waste, Hazardous and Solid

Affected Environment

The majority of the proposed lease parcels are located in rural areas and not adjacent to any schools or populated centers. However, there are several ranches and ranching/mining communities that are within a close proximity of the proposed parcels. Oil and gas development, which can include exploration drilling, extraction, production facilities, pipeline transport, and tanker loading, unloading and transport, has 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.

Environmental Consequences

Proposed Action

The RFD scenario (Section 2.4.1) predicts that approximately 25 exploration wells would be expected to be drilled in the Battle Mountain District in the next 10 years, and few if any of these 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*:* Impacts of the long-term production phase could include spills and leaks from routine plant operations. Substances that could be leaked/spilled include 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 the removal operations. Based on meeting regulatory requirements and implementing BMPs and COAs, adverse impacts from hazardous materials would be minor.

When the RFD for the BMD is considered, impacts to natural resources would generally be negligible because the substances used for these operations (as described in the affected environment) would be properly handled, stored, and disposed of in accordance with applicable federal, state and local regulations. Proper management of these substances in accordance with federal, state and local regulations 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.

An exception would be parcels containing extensive wetlands, springs/seeps, riparian areas, floodplains and seasonally flooded playas. Where water is present, contaminants from any accidental spillage are easily brought into solution and spread throughout the system, as noted in the discussion of water quality in Section 3.2.4. The importance of water and the associated ecosystems to wildlife and to wild horses and burros is discussed in Sections 3.2.8 and 3.2.9. Impacts of any hazardous waste spills in these rare and sensitive areas would be potentially substantial and difficult to mitigate. As in other areas, the proponent would be required to avoid, minimize, rectify, reduce, or compensate the threat.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action. Deferring the wetlands, seeps/springs, riparian areas, floodplains and playas would prevent the potential effects of any accidental hazardous waste spillage.

The remaining 91,556 acres that would be offered for lease sale under this alternative would be subject to the generally negligible potential effects as described for the Proposed Action.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

Chapter 4. Cumulative Effects

The Interdisciplinary Team examined the Proposed Action and alternatives for cumulative effects to the Assessment 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

This analysis considers the potential cumulative effects of leasing all (Proposed Action) or a subset (Partial Deferral Alternative) of the 106 lease parcels nominated for the June 2016 lease sale. To be cumulative, effects must overlap in both time and space. As with the effects analysis in Chapter 3, it is unknown if, when or where exploration and development projects would be proposed, or what type or extent of projects. 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, Partial Deferral Alternative, and No Leasing Alternative (Section 2.1) on all resources. For several resources the potential effects of the first two alternatives are essentially the same, except that those effects could (Proposed Action) or could not (Partial Deferral Alternative) occur on the deferred parcels. In these cases, both are discussed together. 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 RDF

The cumulative effects study area (CESA) for this EA encompasses the entire BLM Battle Mountain District in central Nevada (see map inset, Figures 2-5). The analysis uses the same 10-year timeframe and reasonably foreseeable development (RDF) scenario as is described in detail in Section 2.4: based on activity over the past 10 years we would predict that 25 oil wells would be drilled in the Battle Mountain District in the next 10 years, with surface disturbance totaling 65 to 100 acres.

4.1.3. Reasonably Foreseeable Future Actions (RFFAs)

Along with oil and gas exploration, development and production as described under the RDF scenario (Section 2.4), based on recent and current activities the following future actions could occur concurrently in the Battle Mountain 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

Proposed Action and Partial Deferral Alternative

Drilling of 25 wells would produce between 19,775 tons and 92,050 tons of greenhouse gas emissions in terms of short tons of CO2 equivalent (CO2e), using a Global Warming Potential (GWP) of 1 for CO_2, 21 for CH_4, and 310 for N_2O,(Erbes, 2013). Total CH4 contributions would be between 45 tons per year (GWP 3,600 tpy) and 415 tons per year (GWP 8,715 tpy). Total N2O contributions would be between 1 ton per year (GWP 310 tpy) and 15 tons per year (GWP 4,650 tpy). Total CO2e contributions would be between 16,275 tons per year (GWP 16,275 tpy) and 78,900 tons per year (GWP 78,900 tpy). This compares to the total worldwide contribution of CH4 which is 730,832,399 tons per year (GWP 15,347,480,381 tpy) or 0.00015 percent of the world wide total CH_4 yearly emissions.

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 the Affected Environment section. These cumulative impacts would continue to occur under any of the alternatives.

4.2.2 Cumulative Effects to Soils

Proposed Action

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 erosion and compaction, and disturbs microbiotic crusts. 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 RDF timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs. This alternative would have greater potential to contribute to cumulative effects to soils than the Partial Deferral Alternative, due to inclusion of 19 parcels having slopes of 45% or greater.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving temporary disturbance to 65-100 acres of soils; and would not contribute to a risk of cumulative effects. Parcels with slopes of 45% or greater, which are potentially more vulnerable to erosion depending on soil type, would be deferred under this alternative.

4.2.3 Cumulative Effects to Paleontological Resources

Proposed Action and Partial Deferral Alternative

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 for paleontological resources is generally the geographic formation in question. None of the parcels identified for the 2017 Oil & Gas Lease Sale 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 within 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 to significant paleontological resources may be avoided.

4.2.4 Cumulative Effects to Water (Surface and Ground) Quality, Quantity

Proposed Action

In Section 3.2.18 the risk of accidental spillage are described, and those risks are noted to be increased in the several parcels than contain springs/seeps, riparian areas, floodplains and seasonally-flooded playas. The Proposed Action would not result in any direct incremental increase in cumulative impacts to water resources, but subsequent oil and gas development would likely increase impacts as described in Section 3.2.4. Potential exploration and development would likely result in water diversions, and surface water quality could be affected by development.

Protection of water resources would be accomplished through implementation of best management practices along with specific restrictions that may be applied to individual parcels. COAs may be applied to mitigate any known environmental or resource conflicts that may occur on a given lease parcel. For example, lessees may be required to locate facilities a distance of 400 feet from streams or off of the 100-year floodplain. These restrictions would be implemented on an individual lease basis and would be required as COAs for exploration and/or development.

Partial Deferral Alternative

Under this alternative, approximately 82,260 acres are proposed for deferral due to sensitive springs/seeps, riparian areas, floodplains and seasonally-flooded playas. If deferred these approximately 82,260 acres would not be subject to the potentially substantial effects to these resources of any accidental spillage, as described for the Proposed Action; and would not contribute to a risk of cumulative impacts.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

4.2.5 Cumulative Effects to Vegetation

Proposed Action

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. Creating new roads, constructing drill pads and developing wells removes vegetation used by wildlife, livestock, wild horses and burros for forage and habitat. Disturbed areas would be more susceptible to wind and water erosion, soil compaction and invasion by invasive species. However, the cumulative impacts of oil and gas exploration and development are expected to be 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.

Wetlands and riparian vegetation are especially susceptible to impacts from livestock and wild horse and burro grazing, invasive/non-native weeds, road building, and off-highway vehicle use. If water supply to wetlands or riparian vegetation is affected by the Proposed Action, these vegetation communities would be less resilient to these impacts, and the Proposed Action would have a greater contribution to cumulative effects.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action; and not contribute to a risk of cumulative effects. This alternative would not contribute substantially to cumulative effects to riparian and wetlands vegetation communities, as parcels that include extensive areas of these communities would be deferred.

4.2.6 Cumulative Effects to Forestry and Woodland Products

Proposed Action

A number of past and present actions and RFFAs in the area, such as mining, mineral and geothermal exploration, off-highway vehicle use and livestock grazing, could contribute to cumulative impacts. Based on the RFD scenario, foreseeable impacts could result in the construction of a number of drilling sites, production facilities and transportation corridors. The long-term change in vegetation and associated potential loss of woodland productivity (cottonwood and willow) would not likely result in substantial impacts since the Assessment Area contains no woodlands and only small isolated patches of riparian areas. Based on the RFD and when considering site-specific mitigation measures that would be developed for potential exploration and development, cumulative impacts to forest and woodland resources would be minimal.

Partial Deferral Alternative

Under this alternative, any exploration and development efforts on 2017 Lease Sale parcels would be focused outside and away from riparian vegetation. There would be very little potential for this alternative to contribute to the loss of cottonwood and willow.

4.2.7 Cumulative Effects to Noxious Weeds and Invasive Species

Proposed Action

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. Creating new roads, constructing drill pads and developing wells removes vegetation and disturbed areas would be more susceptible to invasion by invasive species, as described in Section 4.2.5, Cumulative Effects to Vegetation. 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 RDF timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs.

As noted in Section 4.2.5, wetlands are especially susceptible to loss of vegetation due to livestock and wild horse and burro grazing, invasive/non-native weeds, road building, and off-highway vehicle use. If water supply to wetlands or riparian vegetation is affected by the Proposed Action, these vegetation communities would be less resilient to these cumulative impacts and more vulnerable to weed invasion, so that the Proposed Action in turn would have a greater contribution to cumulative effects. Also, locations with surface water are especially vulnerable to weed invasion, as noted in Section 3.2.7; the Proposed Action would have a greater probability of contributing to cumulative effects to noxious weeds and invasive species as compared to the Partial Deferral Alternative.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action; and not contribute to a risk of cumulative effects. This alternative would not contribute substantially to cumulative effects to noxious weeds and invasive species in riparian and wetlands vegetation communities, as parcels that include extensive areas of these communities would be deferred.

4.2.8 Cumulative Effects to Wildlife Resources

Proposed Action

Cumulative impacts to wildlife and associated wildlife resources from oil and gas exploration and production activities can range from short-term, short-duration to potentially permanent extirpation of regionally unique species. Potential disturbances can result in fragmentation and degradation of habitat. Creating new roads, constructing drill pads and developing wells removes vegetation used by wildlife, livestock, wild horses and burros for forage and habitat. Disturbed areas would be more susceptible to wind and water erosion, soil compaction and invasion by invasive species. In addition, potential disturbances from oil and gas exploration and production activities could result in water diversions and impacts to surface water quality and quantity. Water is already a limiting factor for most wildlife, especially known and unknown aquatic invertebrates, in xeric environments. Water provides needed habitat (i.e. ephemeral drainages, springs, seeps) and nutrients for plant growth. The plants and invertebrates, in turn, provide for nourishment for wildlife farther up the food web. As stated in Section 3.2.8, many of these wildlife species are BLM sensitive species.

Species designated as Bureau sensitive must be native species found on BLM administered 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.

In ephemeral drainages, seeps, springs, and wetlands, the cumulative impact to wildlife and associated wildlife resources from oil and gas exploration and production activities could be long-term and long-duration. There is potential for extirpation, even extinction, of aquatic species as has happened in the past.

In upland habitats, the cumulative impact to wildlife and associated wildlife resources from oil and gas exploration and production activities could be short-term and short-duration. For example, seasonal utilization by wildlife such as greater sage-grouse, mule deer, desert bighorn sheep, and migratory birds may be impacted. In general, these are expected to be 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.

In summary, the cumulative impacts to wildlife and associated wildlife resources from oil and gas exploration and production activities can range from short-term, short-duration to long-term long-duration, to potentially permanent extirpation of regionally unique species.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action; and not contribute to a risk of cumulative effects. This alternative would not contribute substantially to cumulative effects to wetland habitats, as parcels or parts of parcels with extensive wetland habitat are proposed for deferral.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

4.2.9 Cumulative Effects to Wild Horses and Burros

Proposed Action

Cumulative impacts to wild horses from oil and gas leasing would consist of the impacts occurring as a result of exploration and production which could occur in lease areas associated with the RFD scenario. However, the cumulative impacts of oil and gas exploration and development are expected to be 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.

As described in Section 3.2.9, potential impacts to wild horses or burros from the oil and gas leasing would not occur until a lessee were to pursue exploration or drilling, at which time additional project-specific, site-specific environmental analysis would be completed. Potential impacts would include influences to movement and use patterns, surface disturbance to soils and vegetation, and potential impacts to springs used by wild horses, as described in Sections 3.2.2, 3.2.4 and 3.2.5. Past, present and reasonably foreseeable projects that have had and could continue to have impacts to wild horses include mining exploration, geothermal exploration, oil and gas exploration, power line construction, fuels reduction projects, wild horse gathers, communication site construction and noxious weed treatments. These activities result in isolated and usually limited soil and vegetation disturbance or loss, and impacts to animal distribution and use patterns.

Cumulative impacts could include increased fragmentation of wild horse habitat and cumulative increases in vegetation and soil disturbances, which result in incremental losses in availability of quality habitat used for wild horses.

Mining activity, oil and gas production, geothermal development, gravel pit expansion, road building, fencing and wild horse or burro gathers, are all activities which can impact wild horse or burro distribution and seasonal movement throughout and between HMAs. Each activity could result in incremental restrictions to free roaming behavior of wild horses and burros and over time may influence habitat use patterns, genetic interchange and use of water sources.

Oil and gas exploration could involve overland travel, road construction, seismic testing and drilling which could cause surface disturbance. Increased vehicle traffic could affect wild horses due to increased noise and dust levels. Over time, the areas of disturbance could cumulatively increase and impact the quality and quantity of habitat available to wild horses, as well as increase risks for erosion and noxious weed invasion.

According to the RFD scenario (Sections 2.4.1 and 2.4.2), it is unlikely that large areas of disturbance would occur within the parcels offered for lease within wild horse and burro HMAs, and therefore the effects are anticipated to be minimal.

Exploration and production activities would be analyzed on a site specific basis. Effects of potential proposed actions to wild horse and burro populations in the HMAs would be analyzed and mitigation measures developed to avoid or reduce impacts, or COAs would be implemented to protect the long term health of wild horses and burros.

This alternative would increase the potential for future disturbance to contribute to cumulative impacts to wild horse habitat on steep slopes and herd distribution and movement patterns in the Diamond HMA, and to springs that constitute important water sources for wild horses in the Diamond, Fish Creek and Whistler Mountain HMAs as described in Section 3.2.9.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. Approximately 23,626 acres proposed for deferral are located within wild horse or burro HMAs. If deferred these acres would not be subject to the potential effects described for the Proposed Action, involving temporary disturbance to 65-100 acres over the next 10 years as described in the RFD scenario. Therefore, this alternative would not contribute to cumulative effects in the deferred areas. Because the parcels of concern would be deferred, this alternative would not increase the potential for future disturbance to contribute to cumulative impacts to wild horse habitat on steep slopes and herd distribution and movement patterns in the Diamond HMA, or to springs that constitute important water sources for wild horses in the Diamond, Fish Creek and Whistler Mountain HMAs as described in Section 3.2.9.

3.2.10 Cumulative Effects to Rangeland Resources

Proposed Action

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mining and off-highway vehicle use. Creating new roads, constructing drill pads and developing wells and mines removes available forage for wildlife, livestock, wild horses and burros. Reductions of available forage could have an impact on 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 developed site-specific mitigation.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects described for the Proposed Action, involving temporary disturbance to 65-100 acres of rangeland resources. Therefore, this alternative would not contribute to cumulative effects in the deferred areas.

4.2.11 Cumulative Effects to Cultural Resources

Proposed Action

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 2017 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.

The 2017 Oil & Gas Lease Sale 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. Appropriate mitigation, BMPs, and COAs would be implemented to resolve any adverse effects to historic properties.

As described in Section 3.2.11, there is a potential for any future oil and gas activity near the Pony Express/Overland Trail, a historic property that qualifies for inclusion on the National Register of Historic Places, to result in an adverse effect to the route segment and to the trail as a whole. Any development within the physical footprint of the site—or within its viewshed or auditory sphere—has the potential to adversely impact the site’s historical integrity of setting, setting, and feeling. Mining activity within the Battle Mountain District located along or adjacent to the Pony Express Trail has the ability to affect the trail’s auditory and/or visual sphere. Currently there are two foreseeable future mining projects abutting the Trail, either permitted or in the permitting and NEPA review process: General Moly's Mount Hope Molybendum Mine and McEwen Mining's Gold Bar Project. These effects acting concurrently along multiple sections of the trail could lead to loss of the aspects of historical integrity listed above, for the life of each mine and until restoration is completed. Such losses would be cumulative with those resulting from oil and gas development under the proposed action. Full loss of historical integrity resulting from direct or cumulative effects could result in Nevada’s section of the Pony Express Trail being delisted from the National Register of Historic Places.

In describing cumulative impacts to the trail as a whole, the Comprehensive Management and Use Plan and Final EIS for the trail (NPS 1999) states (p. 123), "Many areas with significant trail resources have undergone substantial energy development, including oil and gas drilling and pipeline and powerline construction. Continued drilling and construction in these areas could pose adverse cumulative impacts on natural and cultural trail resources. Powerlines, pipelines, and drilling equipment could adversely impact significant trail landscapes, which could also adversely affect the visitor experience." Deferring the potentially-impacted acreage in Parcel 105 would help prevent these impacts to the trail as a whole.

Partial Deferral Alternative

As described in Section 3.2. 11, under this alternative, approximately 104,176 acres are proposed for deferral, including 160 acres of Parcel NV-17-06-105 that are traversed by the Pony Express/Overland Trail and would be withheld from lease sale pending development of a No Surface Occupancy (NSO) stipulation in the updated RMP, minimizing the potential for effects. This alternative would therefore have negligible potential to contribute to cumulative effects.

4.2.12 Cumulative Effects to Native American Cultural Concerns

Proposed Action and Partial Deferral Alternative

Fluid mineral leasing and exploration may affect sites and associated activities of a cultural, traditional and spiritual nature. Presently, impacts to many cultural, traditional, spiritual sites and associated activities have been avoided through Native American consultation efforts. Only the potential impacts to tribal resources were analyzed in this EA because it evaluates the leasing of oil and gas proposed parcels and does not analyze areas of proposed surface disturbance where impacts might be expected. 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. As stated above, 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.

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. If or when site-specific activities are proposed in the future and 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.

4.2.13 Cumulative Effects to Recreation

Proposed Action

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 Assessment 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 (recountouring and revegetation) of any abandoned projects, it is not anticipated that the quality of recreational experiences would be substantially reduced overall.

However, as described in Section 3.2.13, development on or near the Pony Express National Historic Trail has the potential to both exclude the public from use of the Trail, and represent an incompatible use. Currently there are two foreseeable future mining projects abutting the Trail, either permitted or in the permitting and NEPA review process: General Moly's Mount Hope Molybendum Mine and McEwen Mining's Gold Bar Project. Any future development in Parcel 105 resulting from the Proposed Action, and any other developments in the vicinity of the Trail, would potentially contribute to cumulative impacts to the Trail's setting and violate the management direction provided in 16 USC 1246(c) to provide sufficient access to historic trails and avoid activities incompatible with the purposes for which they were established. Such impacts would also contribute to cumulative impacts to the visitor experience along the trail as a whole, as described in Comprehensive Management and Use Plan and Final EIS for the trail (NPS 1999, quoted in Section 4.2.11 of this EA).

Increased commercial development could increase the population of the area, which would in turn create an increase in all recreational activities. Examples of increased activity would be visits to WSAs, hunting and OHV use in the Assessment Area.

Partial Deferral Alternative

As described in Section 3.2. 13, under this alternative approximately 104,176 acres, including 160 acres of Parcel 105 which encompass the Pony Express National Historic Trail and its viewshed, would be deferred from the June 2017 Lease Sale pending development of a No Surface Occupancy (NSO) stipulation in the updated RMP. This would prevent the Proposed Action from contributing to cumulative impacts to the Trail's setting and to public access to the Trail. The NSO stipulation in the updated RMP would also minimize cumulative effects of any other future activities throughout the Trail's traversal of the Battle Mountain District.

4.2.14 Cumulative Effects to Visual Resources

Proposed Action

Past and present actions and RFFAs with the greatest potential to affect visual resources are the same as would most affect recreation by impacting the visual/aesthetic environment: geothermal exploration and

development, mineral exploration and mining, gravel pit development and production, wind power construction, communication site construction, and road building. The cumulative impacts from these activities remain low to moderate for visual resources 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 in nature, with the visual contrasts essentially eliminated when reclamation (recountouring and revegetation) is completed.

Impacts to the viewshed/setting of the Pony Express National Historical Trail segment are of particular concern, as discussed under Section 3.2.13, Recreation, as oil and gas development within the Trail's viewshed has the potential to adversely impact the Trail's setting, counter to the management direction provided by 16 USC 1246(c). Currently there are two foreseeable future mining projects with potential to impact the Trail's setting (see Section 4.2.13).

Partial Deferral Alternative

Under this alternative approximately 104,176 acres, including 160 acres of Parcel 105 which encompass t the Pony Express National Historic Trail and its viewshed, would be deferred from the June 2017 Lease Sale pending development of a No Surface Occupancy stipulation in the updated RMP. This would prevent the Proposed Action from contributing to cumulative impacts to the Trail's visual setting in Parcel 106. A VRM Class II designation for the Trail and its viewshed would also be proposed for the updated RMP; this would ensure high standards of visual resource management in the Trail's viewshed in the future, and reduce cumulative impacts to its visual setting throughout its traversal of the Battle Mountain District.

4.2.15 Cumulative Effects to Geology and Minerals

Proposed Action and Partial Deferral Alternative

There is little appreciable potential for the Proposed Action or Partial Deferral Alternative to have substantial cumulative impacts, combined with past and present actions and RFFAs, to geology and minerals within the Assessment Area. 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 small acreage, when combined with site-specific mitigation measures for exploration and development, cumulative impacts from the Proposed Action or Partial Deferral Alternative would not be substantial.

4.2.16 Cumulative Effects to Land Use Authorizations

Proposed Action and Partial Deferral Alternative

There is little appreciable potential for the Proposed Action or Partial Deferral Alternative to have substantial cumulative impacts , combined with past, present and RFFAs, to other land use authorizations

within the Assessment Area. Based on the RFD scenario, only a small percentage of acres of constructed roads associated with exploration/development would potentially remain after 10 years. This small acreage, when combined with site-specific mitigation measures for exploration and development, indicates that the potential cumulative impacts from the Proposed Action are negligible and would not be substantial.

4.2.17 Cumulative Effects to Socioeconomic Values

Proposed Action and Partial Deferral Alternative

As stated in Section 3.2.17, it is expected that the cumulative and incremental socioeconomic effects of the Proposed Action and Partial Deferral Alternative would be minor and beneficial. The same would be expected for cumulative and incremental socioeconomic 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. For any future project, additional site-specific analysis for exploration and development would be required prior to implementation and a more thorough examination of socioeconomics would be done at that time.

4.2.18 Cumulative Effects to Waste, Hazardous and Solid

Proposed Action

Other major activities potentially generating hazardous and solid waste include mining, mineral, geothermal, and existing oil and gas exploration, development and production projects. When these activities are combined with 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 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. However, as discussed in Section 3.2.18,a of accidental spillage exists, and those risks are increased in the several parcels with extensive wetlands, springs/seeps, riparian areas, floodplains and seasonally flooded playas.

Partial Deferral Alternative

Under this alternative, approximately 104,176 acres are proposed for deferral due to sensitive wetlands, seeps and/or springs, floodplains, playas, steep slopes, or historical features. If deferred these approximately 104,176 acres would not be subject to the potential effects to these resources of any accidental spillage, as described for the Proposed Action; and would not contribute to a risk of cumulative impacts.

No Leasing Alternative

Under this alternative, no parcels would be offered for leasing in 2017 and the impacts described above would occur on other leased parcels in the Battle Mountain District.

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List of Preparers

The following BLM resource specialists were responsible for preparing this EA.

Table 12. List of preparers.

Resources	Specialists
Cultural Resources and Paleontology	Jonah Blustain, Steven Highland
Native American Cultural Concerns	Juan Martinez
Land Use Authorizations	Wendy Seley, Russell Webb
Recreation, Visual Resources, Wilderness Characteristics	Paul Amar
Project Lead; Geology and Minerals	Melissa Jennings
Waste, Hazardous and Solid	Richard Singer
Soils, Vegetation, Rangeland Resources	Daltrey Balmer, Dashell Burnham, Stephanie Herbert, Amanda Holmes, Robert Burdick
Noxious Weeds and Invasive, Non-native Species; Forestry	Anna O'Brien
Air Quality, Climate Change, Greenhouse Gases	Alex Jensen
Water – Surface; wetlands, riparian, floodplains	Justin Ferris
Water – Groundwater	Jim Harris
Wildlife Resources	David Davis
Wild Horses and Burros	Shawna Richardson, Beth Freniere
NEPA compliance; writer/editor; Socioeconomic Values	Joy Fatooh

Appendices

Appendix A: List of Nominated Parcels and Reinstatement Parcel

NV-17-06-001 1876.980 Acres
T.0120N, R.0420E, 21 MDM, NV
Sec. 001 LOTS 5-20;
012 LOTS 1-13;
013 LOTS 1-9,11;
024 LOTS 1,2,7,8;
025 LOTS 1,2,7,8;
Nye County

NV-17-06-002 1201.380 Acres
T.0120N, R.0420E, 21 MDM, NV
Sec. 002 LOTS 5-12;
011 N2,N2SW,NWSE,SESE;
014 N2,W2SE;
Nye County

NV-17-06-003 1644.430 Acres
T.0110N, R.0430E, 21 MDM, NV
Sec. 004 LOTS 5-20;
005 LOTS 5-14;
006 LOTS 8,9,14,15;
009 N2,N2S2,SESE;
Nye County

NV-17-06-004 1898.000 Acres
T.0130N, R.0430E, 21 MDM, NV
Sec. 001 LOTS 1,2;
001 S2NE;
001 PROT W2,SE;
012 PROT ALL;
013 PROT ALL;
Nye County

NV-17-06-005 1725.000 Acres
T.0130N, R.0430E, 21 MDM, NV
Sec. 002 PROT ALL;
003 PROT ALL;
004 PROT NE,S2;
Nye County

NV-17-06-006 1910.000 Acres
T.0130N, R.0430E, 21 MDM, NV
Sec. 009 PROT ALL;
010 ALL;
011 ALL;
Nye County

NV-17-06-007 1920.000 Acres
T.0130N, R.0430E, 21 MDM, NV
Sec. 014 ALL;
015 ALL;
023 ALL;
Nye County

NV-17-06-008 1549.000 Acres
T.0130N, R.0430E, 21 MDM, NV
Sec. 016 PROT ALL;
017 PROT E2;
020 PROT NE;
021 PROT N2,SE;
Nye County

NV-17-06-009 2372.000 Acres
T.0130N, R.0430E, 21 MDM, NV
Sec. 022 PROT ALL;
024 PROT ALL;
025 PROT N2,SE;
026 PROT N2;
027 PROT N2;
Nye County

NV-17-06-010 920.000 Acres
T.0140N, R.0430E, 21 MDM, NV
Sec. 011 E2,N2NW;
012 NWNW,S2N2,S2;
Nye County

NV-17-06-011 2529.000 Acres
T.0140N, R.0430E, 21 MDM, NV
Sec. 013 S2NE;
013 PROT W2,SE;
024 PROT ALL;
025 PROT ALL;
036 SE;
036 PROT N2,SW;
Nye County

NV-17-06-012 2491.000 Acres
T.0140N, R.0430E, 21 MDM, NV
Sec. 014 NW;
014 PROT E2,SW;
023 PROT ALL;
026 PROT ALL;
035 PROT ALL;
Nye County

NV-17-06-013 2203.580 Acres

T.0140N, R.0430E, 21 MDM, NV
Sec. 021 LOTS 1-4;
021 N2,SE;
022 S2NE,SENW,S2;
027 S2NW;
027 PROT E2,SW;
034 SW;
034 PROT N2,SE;
Nye County

NV-17-06-014 2000.000 Acres
T.0140N, R.0430E, 21 MDM, NV
Sec. 028 N2NE,W2,S2SE;
029 ALL;
032 N2NE,SWNE,W2,SE;
033 E2E2,W2W2,SENW,SESW,SWSE;
Nye County

NV-17-06-015 1240.000 Acres
T.0150N, R.0430E, 21 MDM, NV
Sec. 024 W2E2;
025 NWNE,N2NW,SWNW,W2SW;
026 SE;
034 SE;
035 N2,N2SW,SWSW,W2SE;
Nye County

NV-17-06-016 1870.940 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 004 LOTS 1,2,5-12;
004 S2NE,SE;
009 ALL;
016 N2,SW,N2SE,SESE;
Nye County

NV-17-06-017 1926.160 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 005 LOTS 1,2;
005 S2NE;
005 PROT NW,S2;
008 PROT ALL;
017 PROT ALL;
Nye County

NV-17-06-018 1923.000 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 006 LOTS 3-5;
006 SENW;
006 PROT NE,S2;
007 PROT ALL;
018 PROT ALL;
Nye County

NV-17-06-019 1920.360 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 019 PROT ALL;
030 SE;
030 PROT N2,SW;
031 LOTS 3,4;
031 E2,E2SW;
031 PROT NW;
Nye County

NV-17-06-020 1340.810 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 020 N2SE,SWSE;
020 PROT N2,SW;
029 NE,NENW,SESE;
032 LOTS 1-6;
032 NENW,S2NW,SW;
Nye County

NV-17-06-021 1708.620 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 021 ALL;
028 NE,NWNW,S2NW,SW;
033 LOTS 1-12;
033 NE;
Nye County

NV-17-06-022 2066.000 Acres
T.0140N, R.0440E, 21 MDM, NV
Sec. 017 PROT W2;
020 PROT W2,SE;
029 PROT ALL;
032 PROT N2,SW;
Nye County

NV-17-06-023 2190.000 Acres
T.0140N, R.0440E, 21 MDM, NV
Sec. 018 PROT E2,SW;
019 PROT ALL;
030 PROT ALL;
031 PROT N2,SE;
Nye County

NV-17-06-024 2560.000 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 013 ALL;
024 ALL;
025 ALL;
026 ALL;
Nye County

NV-17-06-025 1200.000 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 014 N2,S2SW,SE;
023 ALL;
Nye County

NV-17-06-026 1720.000 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 015 N2,SESW,SE;
016 N2,S2SW,NWSE;
021 NE,E2SE;
022 NE,NENW,N2SW,SESW,SWSE;
027 N2N2;
Nye County

NV-17-06-027 1915.320 Acres
T.0160N, R.0440E, 21 MDM, NV
Sec. 001 LOTS 1-4;
001 S2N2,S2;
012 ALL;
013 LOTS 1-4;
013 W2,SE;

Lander County

NV-17-06-028 1843.900 Acres
T.0160N, R.0440E, 21 MDM, NV
Sec. 002 LOTS 1-4;
002 S2N2,S2;
011 ALL;
014 NE,S2;
023 W2NE;
Lander County

NV-17-06-029 440.000 Acres
T.0170N, R.0440E, 21 MDM, NV
Sec. 024 N2,N2SW,NWSE;
Lander County

NV-17-06-030 1914.900 Acres
T.0160N, R.0450E, 21 MDM, NV
Sec. 016 ALL;
017 ALL;
018 LOTS 1-4;
018 E2,E2W2;
Lander County

NV-17-06-031 1915.380 Acres
T.0160N, R.0450E, 21 MDM, NV

Sec. 019 LOTS 1-4;
019 E2,E2W2;
020 ALL;
021 ALL;
Lander County

NV-17-06-032 2541.020 Acres
T.0160N, R.0450E, 21 MDM, NV
Sec. 027 LOTS 1-4;
027 E2,E2W2;
028 ALL;
029 ALL;
030 LOTS 1-4;
030 E2,E2W2;
Lander County

NV-17-06-033 1934.760 Acres
T.0250N, R.0510E, 21 MDM, NV
Sec. 001 LOTS 1-4;
001 S2N2,S2;
002 LOTS 1-4;
002 S2N2,S2;
003 LOTS 1-4;
003 S2N2,S2;
Eureka County

NV-17-06-034 2149.590 Acres
T.0250N, R.0510E, 21 MDM, NV
Sec. 005 LOTS 1-4;
005 S2N2,S2;
006 LOTS 1,2;
006 S2NE,SE;
007 LOTS 3-8;
007 S2NE,E2SW,SE;
008 ALL;
Eureka County

NV-17-06-035 2560.000 Acres
T.0250N, R.0510E, 21 MDM, NV
Sec. 011 ALL;
014 ALL;
015 ALL;
022 ALL;
Eureka County

NV-17-06-036 2560.000 Acres
T.0250N, R.0510E, 21 MDM, NV
Sec. 016 ALL;
017 ALL;
020 ALL;
021 ALL;
Eureka County

NV-17-06-037 2247.340 Acres
T.0250N, R.0510E, 21 MDM, NV

Sec. 018 LOTS 1-4;
018 E2,E2W2;
019 LOTS 1-4;
019 E2,E2NW,NESW;
030 LOTS 1,4;
030 NENE,S2NE,E2SW,SE;
031 LOTS 1-4;
031 E2,E2W2;
Eureka County

NV-17-06-038 2520.000 Acres
T.0250N, R.0510E, 21 MDM, NV
Sec. 025 ALL;
026 N2,N2SW,SESW,SE;
027 ALL;
028 ALL;
Eureka County

NV-17-06-039 1920.000 Acres
T.0250N, R.0510E, 21 MDM, NV
Sec. 029 ALL;
032 ALL;
033 ALL;
Eureka County

NV-17-06-040 1200.000 Acres
T.0250N, R.0510E, 21 MDM, NV
Sec. 034 SWNE,W2,SE;
035 NE,SENW,SW,W2SE,SESE;
036 N2N2,SENE;
Eureka County

NV-17-06-041 2560.000 Acres
T.0260N, R.0510E, 21 MDM, NV
Sec. 026 ALL;
027 ALL;
034 ALL;
036 ALL;
Eureka County

NV-17-06-042 1273.000 Acres
T.0160N, R.0520E, 21 MDM, NV
Sec. 002 PROT ALL;
003 PROT ALL;
Eureka County

NV-17-06-043 1280.000 Acres
T.0160N, R.0520E, 21 MDM, NV
Sec. 025 PROT ALL;
026 PROT ALL;
Eureka County

NV-17-06-044 1920.000 Acres
T.0160N, R.0520E, 21 MDM, NV
Sec. 034 PROT ALL;
035 PROT ALL;
036 PROT ALL;

Eureka County

NV-17-06-045 1913.000 Acres
T.0170N, R.0520E, 21 MDM, NV
Sec. 003 PROT ALL;
004 PROT ALL;
005 PROT ALL;
Eureka County

NV-17-06-046 1920.000 Acres
T.0170N, R.0520E, 21 MDM, NV
Sec. 008 PROT ALL;
009 PROT ALL;
010 PROT ALL;
Eureka County

NV-17-06-047 2560.000 Acres
T.0170N, R.0520E, 21 MDM, NV
Sec. 011 PROT ALL;
014 PROT ALL;
015 PROT ALL;
016 PROT ALL;
Eureka County

NV-17-06-048 1913.000 Acres
T.0170N, R.0520E, 21 MDM, NV
Sec. 028 PROT ALL;
029 PROT ALL;
030 PROT ALL;
Eureka County

NV-17-06-049 1280.000 Acres
T.0170N, R.0520E, 21 MDM, NV
Sec. 033 PROT ALL;
036 PROT ALL;
Eureka County

NV-17-06-050 1920.000 Acres
T.0210N, R.0520E, 21 MDM, NV
Sec. 026 PROT ALL;
035 PROT ALL;
036 PROT ALL;
Eureka County

NV-17-06-051 870.180 Acres
T.0212N, R.0520E, 21 MDM, NV
Sec. 003 LOTS 4,5,12;
003 W2NW;
004 LOTS 1-12;
004 N2;
Eureka County

NV-17-06-052 1761.350 Acres
T.0230N, R.0520E, 21 MDM, NV
Sec. 001 LOTS 2;
001 S2NE,SENW,E2SW,SE;
003 PROT ALL;

012 NE,E2NW,NESW,SE;
013 LOTS 1,2,8;
013 NE;
Eureka County

NV-17-06-053 1965.000 Acres
T.0240N, R.0520E, 21 MDM, NV
Sec. 002 PROT ALL;
003 PROT ALL;
010 PROT ALL;
Eureka County

NV-17-06-054 1952.000 Acres
T.0240N, R.0520E, 21 MDM, NV
Sec. 011 SE;
011 PROT N2,SW;
014 E2;
014 PROT W2;
015 PROT ALL;
Eureka County

NV-17-06-055 1683.000 Acres
T.0240N, R.0520E, 21 MDM, NV
Sec. 022 PROT ALL;
023 W2NE;
023 PROT W2;
027 PROT ALL;
Eureka County

NV-17-06-056 1966.000 Acres
T.0240N, R.0520E, 21 MDM, NV
Sec. 028 PROT ALL;
033 PROT ALL;
034 SE;
034 PROT N2,SW;
Eureka County

NV-17-06-057 1943.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 001 PROT ALL;
002 PROT ALL;
003 PROT ALL;
Eureka County

NV-17-06-058 1925.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 005 PROT ALL;
006 PROT ALL;
007 PROT ALL;
Eureka County

NV-17-06-059 1920.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 008 PROT ALL;
017 PROT ALL;
018 PROT ALL;
Eureka County

NV-17-06-060 1920.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 011 PROT ALL;
014 PROT ALL;
015 PROT ALL;
Eureka County

NV-17-06-061 1859.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 012 PROT ALL;
013 PROT ALL;
024 PROT ALL;
Eureka County

NV-17-06-062 1280.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 019 PROT ALL;
020 PROT ALL;
Eureka County

NV-17-06-063 1280.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 022 PROT ALL;
023 PROT ALL;
Eureka County

NV-17-06-064 1280.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 026 PROT ALL;
035 PROT ALL;
Eureka County

NV-17-06-065 1920.000 Acres
T.0250N, R.0520E, 21 MDM, NV
Sec. 027 PROT ALL;
028 PROT ALL;
034 PROT ALL;
Eureka County

NV-17-06-066 318.730 Acres
T.0160N, R.0530E, 21 MDM, NV
Sec. 007 LOTS 4;
007 SWNE,E2SW,SE;
Eureka County

NV-17-06-067 982.250 Acres
T.0180N, R.0530E, 21 MDM, NV
Sec. 013 PROT E2,SW;
014 PROT S2SW,SE;
026 PROT W2NE,S2SW,SE;
Eureka County

NV-17-06-068 80.000 Acres
T.0210N, R.0530E, 21 MDM, NV
Sec. 003 S2SW;

Eureka County

NV-17-06-069 2458.300 Acres
T.0230N, R.0530E, 21 MDM, NV
Sec. 001 LOTS 1-4;
001 S2N2,S2;
002 LOTS 1,2;
002 S2NE;
002 PROT W2,SE;
003 PROT ALL;
004 LOTS 3,4;
004 S2NW;
004 PROT E2,SW;
Eureka County

NV-17-06-070 2532.270 Acres
T.0230N, R.0530E, 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;
Eureka County

NV-17-06-071 2551.000 Acres
T.0230N, R.0530E, 21 MDM, NV
Sec. 009 SW;
009 PROT E2,NW;
010 PROT ALL;
011 SE;
011 PROT N2,SW;
012 NENE,W2NE,W2,W2SE,SESE;
Eureka County

NV-17-06-072 2228.480 Acres
T.0230N, R.0530E, 21 MDM, NV
Sec. 013 N2N2;
014 N2;
015 N2;
016 N2;
017 N2,SW;
018 LOTS 1-4;
018 E2,E2W2;
Eureka County

NV-17-06-073 2135.400 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 001 PROT ALL;
002 PROT ALL;
003 PROT ALL;
004 LOTS 3,4;
004 S2NW;
004 PROT E2,SW;
Eureka County

NV-17-06-074 2520.490 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 005 LOTS 1-4;
005 S2N2,S2;
007 LOTS 4;
007 SENE,E2SW,SE;
008 ALL;
017 ALL;
018 NE,E2NW,NESE;
Eureka County

NV-17-06-075 2418.000 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 009 PROT ALL;
010 PROT ALL;
011 PROT ALL;
012 PROT ALL;
Eureka County

NV-17-06-076 2453.000 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 013 PROT ALL;
014 PROT ALL;
015 PROT ALL;
016 PROT ALL;
Eureka County

NV-17-06-077 2365.680 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 019 E2E2;
020 ALL;
029 E2NE,NESE,S2SW;
030 E2SW,S2SE;
031 LOTS 1-4;
031 E2,E2W2;
032 S2NE,NW,S2;
Eureka County

NV-17-06-078 2459.000 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 021 PROT ALL;
022 PROT ALL;
023 PROT ALL;
024 PROT ALL;
Eureka County

NV-17-06-079 2475.000 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 025 PROT ALL;
026 PROT ALL;
027 PROT ALL;
028 PROT ALL;
Eureka County

NV-17-06-080 1290.000 Acres
T.0240N, R.0530E, 21 MDM, NV

Sec. 033 SW;
033 PROT N2,SE;
034 PROT ALL;
Eureka County

NV-17-06-081 1286.000 Acres
T.0240N, R.0530E, 21 MDM, NV
Sec. 035 PROT ALL;
036 SE;
036 PROT N2,SW;
Eureka County

NV-17-06-082 2133.000 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 001 PROT ALL;
002 PROT ALL;
003 PROT ALL;
004 SESW;
004 PROT E2;
Eureka County

NV-17-06-083 1188.470 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 018 NWNE,E2NW,NESW;
019 LOTS 1-3;
006 LOTS 3-7;
006 SENW,E2SW,SWSE;
007 LOTS 1-4;
007 W2E2,E2W2;
018 LOTS 1-4;
Eureka County

NV-17-06-084 2350.000 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 009 E2NW,NESW;
009 PROT E2;
010 PROT ALL;
011 PROT ALL;
012 PROT ALL;
Eureka County

NV-17-06-085 2280.000 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 013 PROT ALL;
014 PROT ALL;
015 PROT ALL;
016 SESW;
016 PROT E2;
Eureka County

NV-17-06-086 2400.000 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 021 E2W2;
021 PROT E2;
022 PROT ALL;
023 PROT ALL;
024 PROT ALL;

Eureka County

NV-17-06-087 2560.000 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 025 PROT ALL;
026 PROT ALL;
027 PROT ALL;
028 W2;
028 PROT E2;
Eureka County

NV-17-06-088 1901.000 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 029 E2SE,SWSE;
032 E2,E2W2;
033 W2;
033 PROT E2;
034 PROT ALL;
Eureka County

NV-17-06-089 1283.000 Acres
T.0250N, R.0530E, 21 MDM, NV
Sec. 035 PROT ALL;
036 PROT ALL;
Eureka County

NV-17-06-090 1496.690 Acres
T.0180N, R.0540E, 21 MDM, NV
Sec. 007 LOTS 4;
017 W2SW,SESW,SWSE;
018 LOTS 1,3,4;
018 S2NE,NENW,NESE,SESW;
019 LOTS 1-4;
019 NENW,E2SW,S2SE;
020 E2,S2SW;
Eureka County

NV-17-06-091 2219.220 Acres
T.0180N, R.0540E, 21 MDM, NV
Sec. 029 ALL;
030 LOTS 1-4;
030 E2,E2W2;
031 LOTS 1-7;
031 NE,E2NW,NESW,N2SE;
032 N2,NWSW;
Eureka County

NV-17-06-092 2099.000 Acres
T.0210N, R.0540E, 21 MDM, NV
Sec. 001 PROT ALL;
002 PROT ALL;
010 E2E2;
011 PROT ALL;
Eureka County

NV-17-06-093 2054.000 Acres
T.0210N, R.0540E, 21 MDM, NV

Sec. 012 PROT ALL;
013 PROT ALL;
014 PROT ALL;
015 E2E2,SESW,SWSE;
Eureka County

NV-17-06-094 1840.000 Acres
T.0210N, R.0540E, 21 MDM, NV
Sec. 022 E2,E2W2;
023 N2NE,SWNE,NW;
024 NE,N2NW,SENW;
027 NE,E2W2,NWSE;
034 NENW,S2NW,SW;
Eureka County

NV-17-06-095 1025.940 Acres
T.0212N, R.0540E, 21 MDM, NV
Sec. 035 LOTS 1-3;
035 S2NE,SENW,S2;
036 LOTS 1-3;
036 S2NE,SENW,S2;
Eureka County

NV-17-06-096 1920.840 Acres
T.0220N, R.0540E, 21 MDM, NV
Sec. 001 LOTS 1-4;
001 S2N2,S2;
012 ALL;
013 ALL;
Eureka County

NV-17-06-097 2190.000 Acres
T.0240N, R.0540E, 21 MDM, NV
Sec. 001 PROT ALL;
002 PROT ALL;
011 PROT ALL;
012 PROT ALL;
Eureka County

NV-17-06-098 1925.070 Acres
T.0240N, R.0540E, 21 MDM, NV
Sec. 004 LOTS 4;
004 SWNW,SW;
005 LOTS 1-4;
005 S2N2,S2;
008 ALL;
009 NWNE,W2,SWSE;
Eureka County

NV-17-06-099 2546.820 Acres
T.0240N, R.0540E, 21 MDM, NV
Sec. 006 LOTS 1-7;
006 S2NE,SENW,W2SW,SE;
007 LOTS 1-4;
007 E2,E2W2;
017 ALL;
018 LOTS 1-4;

018 E2,E2W2;
Eureka County

NV-17-06-100 1791.000 Acres
T.0240N, R.0540E, 21 MDM, NV
Sec. 013 PROT ALL;
014 PROT ALL;
024 PROT ALL;
Eureka County

NV-17-06-101 1922.960 Acres
T.0240N, R.0540E, 21 MDM, NV
Sec. 019 LOTS 1-4;
019 E2,E2W2;
020 ALL;
029 ALL;
Eureka County

Formerly Lease No.

NV-17-06-102 1920.000 Acres
T.0240N, R.0540E, 21 MDM, NV
Sec. 028 ALL;
032 ALL;
033 ALL;
Eureka County

NV-17-06-103 1291.080 Acres
T.0240N, R.0540E, 21 MDM, NV
Sec. 030 LOTS 1-4;
030 E2,E2W2;
031 LOTS 1-4;
031 E2,E2W2;
Eureka County

NV-17-06-104 610.000 Acres
T.0200N, R.0550E, 21 MDM, NV
Sec. 019 PROT ALL;
Eureka County

NV-17-06-105 1958.250 Acres
T.0240N, R.0550E, 21 MDM, NV
Sec. 007 PROT W2;
018 PROT W2;
019 PROT W2;
030 PROT W2,SE;
031 PROT ALL;
Eureka County

NV-17-06-106 640.000 Acres
T.0070N, R.0560E, 21 MDM, NV
Sec. 021 ALL;
Nye County

Number of Parcels – 106

Total Acreage – 195,731.94

Total number of Parcels with Presale Offers – 0

Parcel Number of Parcels with Presale Offers – 0

Total Acreage with Presale Offers - 0

Proposed Reinstatement Parcel

NVN77856 1280.000 Acres
T. 0070N, R. 0570E, 21 MDM, NV
Sec. 28 All;
Sec. 29 All;
Nye County

Appendix B: Stipulations and Lease Notices

This appendix identifies stipulations and Lease Notices to be applied to specific parcels or parts of parcels.

Stipulations are restrictions that are included in the current applicable land use plan – the Tonopah RMP or Shoshone-Eureka RMP – as amended by the GRSG Plan Amendment (see Section 1.3 of this EA).

Lease Notices serve to inform prospective lessees of other regulatory authorities that may apply to a parcel.

Stipulation: Mule Deer Migration Corridors
(#NV-B-02-B-TL)

Stipulation: Timing Limitation (TL) -No surface activity within Mule Deer migration corridors from December 1 through May 1. 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-17-06-001	ALL LANDS
NV-17-06-002	ALL LANDS

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-17-06-30	T.0160N, R.0450E, 21 MDM, NV Sec. 016 ALL; 017 E2SE, SWSE, SENE;
NV-17-06-31	T.0160N, R.0450E, 21 MDM, NV Sec. 020 E2, SESW; 021 ALL;
NV-17-06-32	T.0160N, R.0450E, 21 MDM, NV Sec. 027 LOTS 1-4; 027 E2,E2W2; 028 ALL; 029 E2, E2W2;
NV-17-06-42	ALL LANDS
NV-17-06-43	T.0160N, R.0520E, 21 MDM, NV Sec. 025 PROT W2, W2E2; 026 PROT ALL;
NV-17-06-44	T.0160N, R.0520E, 21 MDM, NV Sec. 034 PROT ALL; 035 PROT ALL; 036 PROT W2, W2E2;
NV-17-06-45 through 51	ALL LANDS
NV-17-06-90	T.0180N, R.0540E, 21 MDM, NV Sec. 007 LOTS 4; 017 W2SW 018 LOTS 1,3,4; 018 NENW, NESE, SESW; 019 LOTS 1-4; 019 NENW, E2SW,S2SE; 020 SWSW;
NV-17-06-91	T.0180N, R.0540E, 21 MDM, NV Sec. 029 NW, W2SW; 030 LOTS 1-4; 030 E2,E2W2; 031 LOTS 1-7; 031 NE,E2NW,NESW,N2SE; 032 NENW, SWNW, NWSW;
NV-17-06-92 through 98	ALL LANDS
NV-17-06-99	T.0240N, R.0540E, 21 MDM, NV Sec. 006 LOTS 1-3; 006 S2NE,SENW,W2SW,SE; 007 E2,E2W2; 017 ALL; 018 E2,E2W2;
NV-17-06-100 through 104	ALL LANDS

Lease Notice - T&E, Sensitive and Special Status Species
(#NV-B-06-A-LN)

Endangered Species Act Section 7 Consultation Lease Notice:
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.

See Appendix D for the current Battle Mountain District Special Status Species List.

Parcel #	**Legal Land Description**
ALL PARCELS	ALL LANDS
NVN77856	ALL LANDS

Lease Notice – Timing Limitation – Migratory Birds
(#NV-B-06-C-LN)

Surface-disturbing activities during the migratory bird nesting season (March 1 to July 31) may be restricted in order to avoid potential violation of the Migratory Bird Treaty Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, or if other evidence of nesting is observed (mating pairs, territorial defense, carrying of nesting material, transporting of food), the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites. Protection measures may include avoidance or restricting or excluding development in certain areas until nests and nesting birds will not be disturbed. After July 31, no additional avian surveys should be required until the following year.

Parcel #	**Legal Land Description**
NV-17-06-001 Through NV-17-06-106	ALL LANDS
NVN77856	ALL LANDS

Lease Notice – Cultural Resources and Tribal Consultation
(#NV-B-07-A-LN)

Cultural Resources and Tribal Consultation Notice:
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 NHP A 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.

Parcel #	**Legal Land Description**
NV-17-06-001 Through NV-17-06-106	ALL LANDS
NVN77856	ALL

Lease Notice - Fossils (PFYC-2)
(#NV-B-08-A-LN)

This area has low potential for vertebrate paleontological resources. This area may contain vertebrate paleontological resources. 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 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.

Parcel #	**Legal Land Description**
NV-17-06-001	ALL LANDS
NV-17-06-002	ALL LANDS
NV-17-06-003	T.0110N, R.0430E, 21 MDM, NV Sec. 006 LOTS 9,14
NV-17-06-010	T.0140N, R.0430E, 21 MDM, NV Sec. 011 N2NW,W2NE
NV-17-06-013	T.0140N, R.0430E, 21 MDM, NV Sec. 021 LOTS 1-4; 021 N2,SE; 022 NWSW
NV-17-06-014	T.0140N, R.0430E, 21 MDM, NV Sec. 028 N2NE,W2,SWSE; 032 N2NE,SWNE,W2,SE; 033 W2W2,SENW
NV-17-06-015	
NV-17-06-016	T.0130N, R.0440E, 21 MDM, NV Sec. 004 LOT 1; 004 SENE; 016 E2SE;
NV-17-06-019	T.0130N, R.0440E, 21 MDM, NV Sec. 031 E2SE,SWSE
NV-17-06-020	T.0130N, R.0440E, 21 MDM, NV Sec. 032 LOTS 1-6; 032 SENW,SW
NV-17-06-021	T.0130N, R.0440E, 21 MDM, NV Sec. 021 SESE; 028 E2SW,SWSW,E2NE,SWNE; 033 LOTS 1-12; 033 NE
NV-17-06-024	T.0150N, R.0440E, 21 MDM, NV Sec. 025 SENE,SE,S2SW
NV-17-06-027	ALL LANDS
NV-17-06-028	ALL LANDS
NV-17-06-029	ALL LANDS

Parcel #	Legal Land Description
NV-17-06-031	T.0160N, R.0450E, 21 MDM, NV Sec. 021 E2,E2NW
NV-17-06-032	T.0160N, R.0450E, 21 MDM, NV Sec. 027 LOTS 1-4; 027 E2,E2W2; 028 E2NE
NV-17-06-033	T.0250N, R.0510E, 21 MDM, NV Sec. 002 LOTS 2-4; 002 S2NW,SWSE,SW,W2SE,SESE; 003 LOTS 3,4; 003 S2NW,SW
NV-17-06-034	T.0250N, R.0510E, 21 MDM, NV Sec. 005 LOT 4; 005 SWNW,NWSW,SENE; 007 LOTS 1-3; 007 SESW; 008 E2SW,W2SE,SENW
NV-17-06-035	T.0250N, R.0510E, 21 MDM, NV Sec. 011 ALL; 014 W2,NWNE,SWSE; 015 ALL; 022 ALL
NV-17-06-036	T.0250N, R.0510E, 21 MDM, NV Sec. 016 S2S2,NWSW,SWNW; 017 E2,E2NW,S2SW,NESW; 020 ALL; 021 ALL
NV-17-06-037	T.0250N, R.0510E, 21 MDM, NV Sec. 018 E2W2,W2SE,SESE; 019 E2NW,N2NE,SENE,NESE
NV-17-06-038	T.0250N, R.0510E, 21 MDM, NV Sec. 025 E2E2; 026 N2N2,S2NW,SWNE,W2SE,N2SW,SESW; 027 ALL; 028 NW,NE,SE,N2SW,SESW
NV-17-06-039	T.0250N, R.0510E, 21 MDM, NV Sec. 029 NE,NWNE; 033 E2,S2SW
NV-17-06-040	T.0250N, R.0510E, 21 MDM, NV Sec. 034 SWNE,NW,N2SE,N2SW,SWSW; 035 NE,SENW,SW,W2SE; 036 E2NE
NV-17-06-041	T.0260N, R.0510E, 21 MDM, NV Sec. 026 SE,SENE; 034 W2SW,SESW,SWSE; 036 N2,W2SW
NV-17-06-043	T.0160N, R.0520E, 21 MDM, NV Sec. 025 PROT E2SW,NW,NE,SE

Parcel #	Legal Land Description
NV-17-06-044	T.0160N, R.0520E, 21 MDM, NV Sec. 036 PROT E2,E2W2
NV-17-06-045	T.0170N, R.0520E, 21 MDM, NV Sec. 003 PROT W2NE,NWSW,S2SW; 004 PROT E2NE
NV-17-06-046	T.0170N, R.0520E, 21 MDM, NV Sec. 009 PROT N2SE,SWNE; 010 PROT W2NW
NV-17-06-048	T.0170N, R.0520E, 21 MDM, NV Sec. 029 PROT SW,S2NW,NWNW; 030 PROT ALL
NV-17-06-049	T.0170N, R.0520E, 21 MDM, NV Sec. 033 PROT W2SW,SESW
NV-17-06-050	T.0210N, R.0520E, 21 MDM, NV Sec. 026 PROT NE,E2NW,SWNW,NESW,N2SE,SESE; 035 PROT NENE; 036 PROT N2,SE,N2SW,SESW
NV-17-06-051	T.0212N, R.0520E, 21 MDM, NV Sec. 003 LOTS 4,5,12; 003 W2NW; 004 LOT 1; 004 E2NE
NV-17-06-052	T.0230N, R.0520E, 21 MDM, NV Sec. 001 LOTS 2; 001 S2NE,SENW,E2SW,SE; 012 NE,E2NW,NESW,SE; 013 LOTS 1,2,8; 013 NE
NV-17-06-057	T.0250N, R.0520E, 21 MDM, NV Sec. 002 PROT W2NW, SW; 003 PROT ALL;
NV-17-06-058	T.0250N, R.0520E, 21 MDM, NV Sec. 005 ALL; 007 SESE
NV-17-06-059	T.0250N, R.0520E, 21 MDM, NV Sec. 008 PROT ALL; 017 PROT ALL; 018 PROT E2,E2SW;
NV-17-06-060	T.0250N, R.0520E, 21 MDM, NV Sec. 011 PROT W2W2; 015 PROT E2,NW,NWSE;
NV-17-06-061	T.0250N, R.0520E, 21 MDM, NV Sec. 024 SE,SENE;
NV-17-06-062	T.0250N, R.0520E, 21 MDM, NV Sec. 019 E2,SW,E2NW,SWNW; 020 PROT ALL;
NV-17-06-063	T.0250N, R.0520E, 21 MDM, NV Sec. 022 PROT SENW;

Parcel #	Legal Land Description
NV-17-06-065	T.0250N, R.0520E, 21 MDM, NV Sec. 028 PROT W2NW,SENE;
NV-17-06-069	T.0230N, R.0530E, 21 MDM, NV Sec. 001 LOTS 1,2; 001 S2NE2,E2SE;
NV-17-06-070	T.0230N, R.0530E, 21 MDM, NV Sec. 005 SWSW; 006 LOTS 3-7; 006 S2, SENW; 007 LOTS 1-4; 007 E2,E2W2; 008 ALL;
NV-17-06-071	T.0230N, R.0530E, 21 MDM, NV Sec. 009 SW; 009 PROT S2SE; 010 PROT SE,S2SW,S2NE; 011 SE; 011 PROT SW,S2NW;
NV-17-06-074	T.0240N, R.0530E, 21 MDM, NV Sec. 005 LOTS 4; 005 W2SW,SWNW; 007 LOTS 4; 007 SENE,E2SW,SE; 008 W2; 017 W2,SWSE; 018 NE,E2NW,NESE;
NV-17-06-077	T.0240N, R.0530E, 21 MDM, NV Sec. 019 E2E2; 020 W2,W2E2; 029 S2SW 030 E2SW,S2SE; 031 LOTS 1-4; 031 E2W2,NE,NWSE; 032 N2NW
NV-17-06-081	T.0240N, R.0530E, 21 MDM, NV Sec. 036 NWSE; 036 PROT N2,SW;
NV-17-06-082	T.0250N, R.0530E, 21 MDM, NV Sec. 003 PROT SWNW,NWSW; 004 SESW; 004 PROT E2;
NV-17-06-083	T.0250N, R.0530E, 21 MDM, NV Sec. 018 E2NW,W2NE 019 LOTS 2,3; 006 SWSE; 007 E2W2;

Parcel #	Legal Land Description
NV-17-06-084	T.0250N, R.0530E, 21 MDM, NV Sec. 009 E2NW,NESW; 009 PROT E2;
NV-17-06-085	T.0250N, R.0530E, 21 MDM, NV Sec. 016 PROT NE,NWSE;
NV-17-06-088	T.0250N, R.0530E, 21 MDM, NV Sec. 029 SWSE; 032 E2NW;
NV-17-06-090	T.0180N, R.0540E, 21 MDM, NV Sec. 019 S2SE; 020 S2SW;
NV-17-06-092	T.0210N, R.0540E, 21 MDM, NV Sec. 002 PROT W2; 010 E2E2; 011 PROT W2;
NV-17-06-093	T.0210N, R.0540E, 21 MDM, NV Sec. 014 PROT W2W2; 015 E2E2,SESW,SWSE;
NV-17-06-094	T.0210N, R.0540E, 21 MDM, NV Sec. 022 E2,E2W2; 023 W2NW; 027 E2NW,W2NE; 034 SW, SWNW;
NV-17-06-095	T.0212N, R.0540E, 21 MDM, NV Sec. 035 LOT 3; 035 E2W,W2SW
NV-17-06-098	T.0240N, R.0540E, 21 MDM, NV Sec. 004 LOTS 4; 004 SWNW,SW; 005 LOTS 1-4; 005 NESE; 009 NWNE,W2,SWSE;
NV-17-06-099	T.0240N, R.0540E, 21 MDM, NV Sec. 017 E2, E2W2;
NV-17-06-101	T.0240N, R.0540E, 21 MDM, NV Sec. 020 ALL; 029 ALL;
NV-17-06-102	T.0240N, R.0540E, 21 MDM, NV Sec. 028 ALL; 032 ALL; 033 ALL;
NV-17-06-103	T.0240N, R.0540E, 21 MDM, NV Sec. 030 SE, E2NE; 031 LOTS 2-4; 031 NE,SE,E2W2;

Lease Notice - Fossils (PFYC-3)
(#NV-B-08-B-LN)

This area has moderate potential for vertebrate paleontological resources. Inventory and/or on-site monitoring during disturbance or spot checking may be required by the operator.
Operations within 250 feet of 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.

Parcel #	**Legal Land Description**
NV-17-06-003	T.0110N, R.0430E, 21 MDM, NV Sec. 004 LOTS 5-20; 005 LOTS 5-14; 006 LOTS 8,15; 009 N2,N2S2,SESE
NV-17-06-004	ALL LANDS
NV-17-06-005	ALL LANDS
NV-17-06-006	ALL LANDS
NV-17-06-007	ALL LANDS
NV-17-06-008	ALL LANDS
NV-17-06-009	ALL LANDS
NV-17-06-010	T.0140N, R.0430E, 21 MDM, NV Sec. 011 SE,E2NE,SWNE; 012 NWNW,S2N2,S2
NV-17-06-011	ALL LANDS
NV-17-06-012	ALL LANDS
NV-17-06-013	T.0140N, R.0430E, 21 MDM, NV Sec. 022 S2NE,SE,E2SW,SWSW; 027 S2NW; 027 PROT E2,SW; 034 SW; 034 PROT N2,SE
NV-17-06-014	T.0140N, R.0430E, 21 MDM, NV Sec. 028 SESE 033 E2E2,SESW,SWSE
NV-17-06-016	T.0130N, R.0440E, 21 MDM, NV Sec. 004 LOTS 2,5-12; 004 SWNE,SE; 009 ALL; 016 W2,NE,NWSE
NV-17-06-017	ALL LANDS
NV-17-06-018	ALL LANDS
NV-17-06-019	T.0130N, R.0440E, 21 MDM, NV Sec. 019 PROT ALL; 030 SE; 030 PROT N2,SW; 031 NE,SW,NWSE; 031 PROT NW

Parcel #	**Legal Land Description**
NV-17-06-020	T.0130N, R.0440E, 21 MDM, NV Sec. 020 SE; 020 PROT N2,SW; 029 NE,NENW; 032 NENW,SWNW
NV-17-06-021	T.0130N, R.0440E, 21 MDM, NV Sec. 021 W2,NE,W2SE,NESE; 028 NWNE,NWNW,S2NW,NWSW
NV-17-06-022	ALL LANDS
NV-17-06-023	ALL LANDS
NV-17-06-024	T.0150N, R.0440E, 21 MDM, NV Sec. 013 ALL; 024 ALL; 025 NW,N2NE,SWNE,N2SW; 026 ALL
NV-17-06-025	ALL LANDS
NV-17-06-026	T.0150N, R.0440E, 21 MDM, NV Sec. 015 NE,SENW,SESW,SE; 021 NE,E2SE; 022 NE,NENW,N2SW,SESW,SWSE; 027 N2N2
NV-17-06-030	T.0160N, R.0450E, 21 MDM, NV Sec. 017 SW,W2SE,SESE; 018 LOT 4; 018 SE,SESW
NV-17-06-031	T.0160N, R.0450E, 21 MDM, NV Sec. 019 LOTS 1-4; 019 E2,E2W2; 020 ALL; 021 SW,W2NW
NV-17-06-032	T.0160N, R.0450E, 21 MDM, NV Sec. 028 W2,SE,W2NE; 029 ALL; 030 LOTS 1-4; 030 E2,E2W2
NV-17-06-033	T.0250N, R.0510E, 21 MDM, NV Sec. 002 LOT 4; 003 LOTS 1,2; 003 S2NE,SE
NV-17-06-034	T.0250N, R.0510E, 21 MDM, NV Sec. 005 LOTS 1-3; 005 S2NE,SE,E2SW,SWSW; 006 LOTS 1,2; 006 S2NE,SE; 007 LOT 4; 007 NESW,E2; 008 NE,E2SE,W2SW,W2NW,NENW

Parcel #	Legal Land Description
NV-17-06-024	T.0150N, R.0440E, 21 MDM, NV Sec. 013 ALL; 024 ALL; 025 NW,N2NE,SWNE,N2SW; 026 ALL
NV-17-06-026	T.0150N, R.0440E, 21 MDM, NV Sec. 015 NE,SENW,SESW,SE; 021 NE,E2SE; 022 NE,NENW,N2SW,SESW,SWSE; 027 N2N2
NV-17-06-030	T.0160N, R.0450E, 21 MDM, NV Sec. 017 SW,W2SE,SESE; 018 LOT 4; 018 SE,SESW
NV-17-06-031	T.0160N, R.0450E, 21 MDM, NV Sec. 019 LOTS 1-4; 019 E2,E2W2; 020 ALL; 021 SW,W2NW
NV-17-06-032	T.0160N, R.0450E, 21 MDM, NV Sec. 028 W2,SE,W2NE; 029 ALL; 030 LOTS 1-4; 030 E2,E2W2
NV-17-06-033	T.0250N, R.0510E, 21 MDM, NV Sec. 002 LOT 4; 003 LOTS 1,2; 003 S2NE,SE
NV-17-06-034	T.0250N, R.0510E, 21 MDM, NV Sec. 005 LOTS 1-3; 005 S2NE,SE,E2SW,SWSW; 006 LOTS 1,2; 006 S2NE,SE; 007 LOT 4; 007 NESW,E2; 008 NE,E2SE,W2SW,W2NW,NENW
NV-17-06-036	T.0250N, R.0510E, 21 MDM, NV Sec. 016 NE,N2SE,NESW,E2NW,NWNW; 017 W2NW,NWSW
NV-17-06-037	T.0250N, R.0510E, 21 MDM, NV Sec. 018 LOTS 1-4; 018 NE,NESE; 019 LOTS 1-4; 019 NESW,NWSE,SWNE,S2SE; 030 LOTS 1,4; 030 NENE,S2NE,E2SW,SE; 031 LOTS 1-4; 031 E2,E2W2

Parcel #	Legal Land Description
NV-17-06-038	T.0250N, R.0510E, 21 MDM, NV Sec. 028 SWSW
NV-17-06-039	T.0250N, R.0510E, 21 MDM, NV Sec. 029 S2,W2NW,SENW; 032 ALL; 033 NW,N2SW
NV-17-06-041	T.0260N, R.0510E, 21 MDM, NV Sec. 026 W2,N2NE,SWNE; 027 ALL; 034 N2,NESW,N2SE,SESE
NV-17-06-043	T.0160N, R.0520E, 21 MDM, NV Sec. 025 PROT W2SW; 026 PROT ALL
NV-17-06-043	T.0160N, R.0520E, 21 MDM, NV Sec. 025 PROT W2SW; 026 PROT ALL
NV-17-06-044	T.0160N, R.0520E, 21 MDM, NV Sec. 034 PROT ALL; 035 PROT ALL; 036 PROT W2W2
NV-17-06-045	T.0170N, R.0520E, 21 MDM, NV Sec. 003 PROT E2,E2W,NESW; 004 PROT W2, SWNE,SESE; 005 PROT S2NW,NE,SW,W2SE,NESE
NV-17-06-046	T.0170N, R.0520E, 21 MDM, NV Sec. 008 PROT W2,W2NE,W2SE; 009 PROT SW,E2NW,N2NE,SENE,S2SE; 010 PROT E2NW,NE,SW,SE
NV-17-06-048	T.0170N, R.0520E, 21 MDM, NV Sec. 028 PROT ALL; 029 PROT E2,NENW
NV-17-06-049	T.0170N, R.0520E, 21 MDM, NV Sec. 033 PROT E2,NW,NESW; 036 PROT ALL
NV-17-06-051	T.0212N, R.0520E, 21 MDM, NV Sec. 004 LOTS 2-12; 004 NW,W2NE
NV-17-06-052	T.0230N, R.0520E, 21 MDM, NV Sec. 003 PROT ALL
NV-17-06-057	T.0250N, R.0520E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT E2NW,E2;
NV-17-06-060	T.0250N, R.0520E, 21 MDM, NV Sec. 011 PROT E2,E2W2; 014 PROT ALL; 015 PROT S2SW,NESW;

Parcel #	Legal Land Description
NV-17-06-061	T.0250N, R.0520E, 21 MDM, NV Sec. 012 PROT ALL; 013 PROT ALL; 024 PROT W2,W2NE,NENE;
NV-17-06-062	T.0250N, R.0520E, 21 MDM, NV Sec. 022 SE, NWNW, NWNE, NENE, SWNE, NWSW, SESW; 023 PROT ALL;
NV-17-06-063	T.0250N, R.0520E, 21 MDM, NV Sec. 022 E2,SW,W2NW,NENW; 023 PROT ALL;
NV-17-06-065	T.0250N, R.0520E, 21 MDM, NV Sec. 027 PROT ALL; 028 PROT SW,E2NW,W2NE,NENE,SE; 034 PROT ALL;
NV-17-06-067	T.0180N, R.0530E, 21 MDM, NV Sec. 013 PROT NE,N2SE,SW; 014 PROT S2SW,SE; 026 PROT W2NE,S2SW,SE; 026 PROT W2NE,SWSW,SE;
NV-17-06-069	T.0230N, R.0530E, 21 MDM, NV Sec. 001 LOTS 3,4; 001 S2NW,SW,W2SE; 002 LOTS 1,2; 002 S2NE; 002 PROT W2,SE; 003 PROT ALL; 004 LOTS 3,4; 004 S2NW; 004 PROT E2,SW;
NV-17-06-070	T.0230N, R.0530E, 21 MDM, NV Sec. 005 LOTS 1-4; 005 S2N2,SE,N2SW,SESW; 006 LOTS 1-2; 006 S2NE;
NV-17-06-071	T.0230N, R.0530E, 21 MDM, NV Sec. 009 PROT N2,N2SE; 010 PROT N2NE,NW,N2SW; 011 PROT NE,N2NW; 012 NENE,W2NE,W2,W2SE,SESE;
NV-17-06-073	T.0240N, R.0530E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT ALL; 003 PROT ALL; 004 LOTS 3,4; 004 S2NW; 004 PROT E2,SW;

Parcel #	Legal Land Description
NV-17-06-074	T.0240N, R.0530E, 21 MDM, NV Sec. 005 LOTS 1-3; 005 SENW,S2NE,SE,E2SW; 008 E2; 017 NE,NWSE,E2SE;
NV-17-06-081	T.0240N, R.0530E, 21 MDM, NV Sec. 035 PROT ALL; 036 S2SE,NESE; 036 PROT N2,SW;
NV-17-06-082	T.0250N, R.0530E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT ALL; 003 PROT E2,E2W2,NWNW,SWSW;
NV-17-06-083	T.0250N, R.0530E, 21 MDM, NV Sec. 006 LOTS 3-7; 006 SENW,E2SW; 007 LOTS 1-4; 007 E2W2; 018 LOTS 1-3;
NV-17-06-084	T.0250N, R.0530E, 21 MDM, NV Sec. 010 PROT ALL; 011 PROT ALL; 012 PROT ALL;
NV-17-06-085	T.0250N, R.0530E, 21 MDM, NV Sec. 013 PROT ALL; 014 PROT ALL; 015 PROT ALL; 016 SESW; 016 PROT S2SE,NESE;
NV-17-06-088	T.0250N, R.0530E, 21 MDM, NV Sec. 029 E2SE; 032 E2,E2SW; 033 W2; 033 PROT E2; 034 PROT ALL;
NV-17-06-090	T.0180N, R.0540E, 21 MDM, NV Sec. 007 LOTS 4; 017 W2SW,SESW,SWSE; 018 LOTS 1,3,4; 018 S2NE,NENW,NESE,SESW; 019 LOTS 3-4; 019 NENW,E2SW; 020 E2;
NV-17-06-092	T.0210N, R.0540E, 21 MDM, NV Sec. 001 PROT ALL; 002 PROT E2; 011 PROT E2;

Parcel #	Legal Land Description
NV-17-06-093	T.0210N, R.0540E, 21 MDM, NV Sec. 012 PROT ALL; 013 PROT ALL; 014 PROT E2, E2W2;
NV-17-06-094	T.0210N, R.0540E, 21 MDM, NV Sec. 023 N2NE,SWNE,E2NW; 024 NE,N2NW,SENW; 027 E2NE,NWSE, SESW; 034 NENW,SENW;
NV-17-06-095	T.0212N, R.0540E, 21 MDM, NV Sec. 035 LOTS 1-2; 035 E2; 036 LOTS 1-3; 036 S2NE,SENW,S2;
NV-17-06-098	T.0240N, R.0540E, 21 MDM, NV Sec. 005 SW,S2SE,NWSE; 008 ALL;
NV-17-06-099	T.0240N, R.0540E, 21 MDM, NV Sec. 006 LOTS 1-7; 006 S2NE,SENW,W2SW,SE; 007 LOTS 1-4; 007 E2,E2W2; 017 W2W2 018 LOTS 1-4; 018 E2,E2W2;
NV-17-06-101	T.0240N, R.0540E, 21 MDM, NV Sec. 019 LOTS 1-4; 019 E2,E2W2;
NV-17-06-103	T.0240N, R.0540E, 21 MDM, NV Sec. 030 LOTS 1-4; 030 E2W2,W2NE; 031 LOT 1;
NV-17-06-104	T.0200N, R.0550E, 21 MDM, NV Sec. 019 E2SE,N2NW,S2SW,NESW,E2NW;
NV-17-06-105	T.0240N, R.0550E, 21 MDM, N*V* Sec. 007 PROT E2W2; 018 PROT W2SW; 019 PROT W2W2; 030 PROT W2,SE; 031 PROT ALL;

Lease Notice - Fossils (PFYC-4)
(#NV-B-08-C-LN)

This area has high and very high potential for paleontological resources. This land is underlain by geologic units that have been documented to contain a high occurrence of fossils, which may consist of scientifically significant paleontological resources protected by Public Law 111-11, Paleontological Resources Preservation Act. A field survey by a qualified paleontologist, and at the lessee's expense, will be required prior to surface-disturbing activities. If significant paleontological resources of scientific or educational importance are discovered, they will require avoidance or data recovery prior to their disturbance. On-site monitoring may be necessary during construction activities.

Parcel #	**Legal Land Description**
NV-17-06-033	T.0250N, R.0510E, 21 MDM, NV Sec. 001 LOT 1; 001 SENE;
NV-17-06-038	T.0250N, R.0510E, 21 MDM, NV Sec. 025 W2W2, NENW; 026 SENE,NESE;
NV-17-06-040	T.0250N, R.0510E, 21 MDM, NV Sec. 034 S2SE,SESW; 035 SESE; 036 NWNW
NV-17-06-041	T.0260N, R.0510E, 21 MDM, NV Sec. 036 N2SE,NESW;
NV-17-06-058	T.0250N, R.0520E, 21 MDM, NV Sec. 006 PROT W2; 007 W2;
NV-17-06-059	T.0250N, R.0520E, 21 MDM, NV Sec. 018 PROT W2NW;
NV-17-06-094	T.0210N, R.0540E, 21 MDM, NV Sec. 023 SWNE; 024 W2NE,E2NW,NWNW; 027 SENE,NWSE,SESW; 034 E2NW;
NV-17-06-104	T.0200N, R.0550E, 21 MDM, NV Sec. 019 PROT SWNW,NWSW;

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-17-06-033	T.0250N, R.0510E, 21 MDM, NV Sec. 003 SWNW,NWSW,W2SENW,W2NESW
NV-17-06-033	T.0250N, R.051E, 21 MDM, NV Sec. 003 SWSE
NV-17-06-038	T.0260N, R.051E, 21 MDM, NV Sec. 026 SENWSW,SWNESW,NWSESW
NV-17-06-041	T.0260N, R.051E, 21 MDM, NV Sec. 034 N2SESE,NESE

Lease Notice - Saleable Minerals: Community Pits
(#NV-B-12-B-LN)

The lessee accepts this lease subject to the right of individuals, authorized by Bureau of Land Management District Office, to remove sand and gravel from the land embraced in Community Pit No. (see below) The lessee agrees that its operations will not interfere with the use of the pit(s) by these individuals.

Parcel #	Legal Land Description
NV-17-06-001	T.0120N, R.0420E, 21 MDM, NV Sec. 013 SENESE,NESESE

Lease Notice - Mining Claims
(#NV-B-13-A-LN)

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.

Parcel #	Legal Land Description
NV-17-06-001 through 106	ALL LANDS
NVN77856	ALL LANDS

Lease Notice - Fire
(#NV-B-15-A-LN)

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.

Parcel #	**Legal Land Description**
NV-17-06-001 Through NV-17-06-106	ALL LANDS
NVN77856	ALL LANDS

Sage-Grouse Habitat
(#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-17-06-034	ALL LANDS
NV-17-06-035	T.0250N, R.0510E, 21 MDM, NV, Sec. 015, 022
NV-17-06-036 through 040	ALL LANDS
NV-17-06-041	T.0250N, R.0510E, 21 MDM, NV, Sec. 026, 027
NV-17-06-059	T.0250N, R.0510E, 21 MDM, NV, Sec. 017, 018
NV-17-06-062	ALL LANDS

Sage-Grouse Habitat
(#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 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-17-06-029	T.0170N, R.0440E, 21 MDM, NV, Sec. 024, ¼ NWNW, NENW, NWNE, NENE, SWNW, SENW, SWNE, SENE, NWSW, NESW
NV-17-06-034	T.0250N, R.0510E, 21 MDM, NV, Sec. 007, 008
NV-17-06-035	T.0250N, R.0510E, 21 MDM, NV, Sec. 022
NV-17-06-036 through 040	ALL LANDS

Sage-Grouse Habitat
(#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-17-06-002	T.0120N, R.0420E, 21 MDM, NV, Sec. 002, ¼ L2, L7, L10, L11; Sec. 011
NV-17-06-014	T.0130N, R.0430E, 21 MDM, NV, Sec. 020, ¼ NWNW, SWNW, SENW, NENW
NV-17-06-015	T.0150N, R.0430E, 21 MDM, NV, Sec. 026, ¼ NWSE; Sec. 036, ¼ NWNW, NWSE, SWSE, NESE
NV-17-06-029	T.0170N, R.0440E, 21 MDM, NV, Sec. 024, ¼ NWNW, NENW, NWNE, SWNW, SENW, SWNE, NWSW
NV-17-06-034 through 041	ALL LANDS
NV-17-06-059	T.0250N, R.0510E, 21 MDM, NV, Sec. 017, 018
NV-17-06-062	ALL LANDS

Sage-Grouse Habitat
(#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-17-06-002	T.0120N, R.0420E, 21 MDM, NV, Sec. 002, ¼ L2, L7, L10, L11; Sec. 011
NV-17-06-014	T.0130N, R.0430E, 21 MDM, NV, Sec. 020, ¼ NWNW, SWNW, SENW, NENW
NV-17-06-015	T.0150N, R.0430E, 21 MDM, NV, Sec. 026, ¼ NWSE; Sec. 036, ¼ NWNW, NWSE, SWSE, NESE
NV-17-06-029	ALL LANDS
NV-17-06-034	ALL LANDS
NV-17-06-035 through 041	ALL LANDS
NV-17-06-059	T.0250N, R.0510E, 21 MDM, NV, Sec. 017, 018
NV-17-06-062	ALL LANDS

Sage-Grouse Habitat
(#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.

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-17-06-002	T.0120N, R.0420E, 21 MDM, NV, Sec. 002, ¼ L2, L7, L10, L11; Sec. 011
NV-17-06-014	T.0130N, R.0430E, 21 MDM, NV, Sec. 020, ¼ NWNW, SWNW, SENW, NENW
NV-17-06-015	T.0150N, R.0430E, 21 MDM, NV, Sec. 026, ¼ NWSE; Sec. 036, ¼ NWNW, NWSE, SWSE, NESE
NV-17-06-029	ALL LANDS
NV-17-06-034 through 41	ALL LANDS
NV-17-06-059	T.0250N, R.0510E, 21 MDM, NV, Sec. 017, 018
NV-17-06-062	ALL LANDS

Sage-Grouse Habitat
(#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 #	**Legal Land Description**
NV-17-06-037	T.0250N, R.0510E, 21 MDM, NV, Sec. 031, 1/4SWSE; 1/4SESE
NV-17-06-039	T.0250N, R.0510E, 21 MDM, NV, Sec. 032. 1/4SWSW

Sage-Grouse Habitat
(#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 #	**Legal Land Description**
(0.25 mi) NV-17-06-037	T.0250N, R.0510E, 21 MDM, NV, Sec. 031, 1/4SWSE; 1/4SESE
(0.25 mi) NV-17-06-039	T.0250N, R.0510E, 21 MDM, NV, Sec. 032. 1/4SWSW
(1.2 mi) NV-17-06-037	T.0250N, R.0510E, 21 MDM, NV, Sec. 031
(1.2 mi) NV-17-06-039	T.0250N, R.0510E, 21 MDM, NV, Sec. 032
(3.1 mi) NV-17-06-036	T.0250N, R.0510E, 21 MDM, NV, Sec. 020, 021
(3.1 mi) NV-17-06-037	ALL LANDS
(3.1 mi) NV-17-06-038	T.0250N, R.0510E, 21 MDM, NV, Sec. 026. 027
(3.1 mi) NV-17-06-039	ALL LANDS
(3.1 mi) NV-17-06-040	ALL LANDS
(3.1 mi) NV-17-06-062	ALL LANDS

Appendix C: Deferrals Proposed Under Partial Deferral Alternative

Parcels or parts of parcels are proposed for deferral under the Partial Deferral Alternative based on resource concerns and land use conflicts that cannot be resolved via stipulations in the existing RMPs as amended. For each proposed deferral, the ID Team recommended a new stipulation or other measure to address the issue in an upcoming revised RMP. Under the Partial Deferral Alternative, the parcels or parts of parcels would be withheld from lease sale until the RMP is updated to include the new stipulations, or until the resource concerns are resolved by other means.

The proposed stipulations, along with the standardized system for numbering them, are derived from a list provided by the BLM Nevada State Office as suggested verbiage for fluid minerals stipulations to be included in updated RMPs with the goal of achieving consistency across the state.

The stipulations proposed at this time represent the Battle Mountain District's current intentions for addressing the resource concerns. All proposed future stipulations would be subject to comprehensive NEPA analysis, including public review, as part of the Environmental Impact Statement process that is required for developing an RMP.

In brief, the proposed stipulations are:

- No Surface Occupancy for sites eligible for National Register of Historic Places (NV-B-07-C-NSO)
- No Surface Occupancy for National Historic Trails (NV-B-07-D-NSO)
- No Surface Occupancy for water bodies, riparian and wetland areas (NV-B-10-A-NSO)
- Controlled Surface Use for a 500 ft. riparian-wetland habitat buffer (NV-B-10-B-CSU)
- No Surface Occupancy for 100-year floodplains (NV-B-10-C-NSO)
- No Surface Occupancy for seasonally flooded playas (NV-B-10-D-NSO)
- No Surface Occupancy for slopes >40% (NV-B-11-B-NSO)

The proposed stipulations are presented below in full, followed by a table indicating which parcels or parts of parcels are proposed for deferral pending development of the new stipulations.

PROPOSED Stipulation: Sites Eligible for National Register of Historic Places
(Proposed #NV-B-07-C-NSO)

Stipulation: No Surface Occupancy (NSO) within National Register-eligible Properties and Districts. Prior to surface disturbance, a survey would be required confirm the Area of Potential Effect of National Register-eligible Properties (NRHP) and Districts.

Objective [Purpose]: To protect National Register-eligible Properties and Districts setting and visual integrity critical to their eligibility.

Exception: The Authorized Officer may grant an exception if the BLM determines, in consultation with the Nevada SHPO (if required by the Statewide Protocol Agreement), that the action, as proposed or otherwise restricted, will not adversely affect National Register-listed Properties and Districts, National Historic Landmarks, and Traditional Cultural Properties listed or eligible for the NRHP. An exception may also be granted if BLM, in consultation with the Nevada State Historic Preservation Office (SHPO), negotiate mitigation that would satisfactorily take into account any anticipated adverse effects. The authorized officer may also grant an exception if the BLM determines, in consultation with Tribes, interested parties, and the Nevada SHPO (if required by the Statewide Protocol Agreement) that the action, as proposed or otherwise restricted, does not adversely affect Traditional Cultural Properties (TCP) listed on, or eligible for the NRHP.

Modification: The Authorized Officer may modify the size and shape of the NSO restricted area if the BLM determines, in consultation with the Nevada SHPO, interested parties, and/or Tribes, that the Area of Potential Effect to the National Register-listed Properties and Districts, National Historic Landmarks, and TCPs listed or eligible on the NRHP may be modified without causing adverse effects from those described in the original stipulation. 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: NSO restrictions may be waived if it is determined that the described lands do not, in fact, contain sites listed on the NRHP or TCPs listed or eligible for the NRHP, or if the described lands within extended boundaries are determined to be not necessary to protect listed sites or listed or eligible TCPs where the setting and visual integrity are critical to their eligibility. 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.

PROPOSED Stipulation: Trails
(Proposed #NV-B-07-D-NSO)

Stipulation: No Surface Occupancy (NSO) will be applied directly on National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation and within National Trail Management Corridors. NSO may be applied to additional bordering lands; the extent will be dependent upon the topography and integrity of the setting surrounding individual trail segments along the designated NHT and National Historic Trail Corridor. Prior to the establishment of a National Trail Management Corridor, at a minimum, NSO will be applied 1/8-mile on either side of the center line of the trail (for a total of a 1/4-mile wide corridor). The center line will be established either through the GIS-based line provided by the Trail Administering Agency (NPS or BLM) or through GPS-based inventories uploaded on the Nevada Cultural Resource Inventory System (NVCRIS).

Objective [Purpose]: To protect the National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation, and National Trail Management Corridor resources, qualities, values, and associated settings.

Exception: The Authorized Officer may grant an exception if, through the National Historic Preservation Act (NHPA) and Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation Manual 6280 requirements, it is determined that the action, as proposed or otherwise restricted, does not adversely affect the resource. An exception may be granted for actions designed to enhance the long-term utility or availability of the trail.

Modification: The Authorized Officer may modify the size and shape of the restricted area if the NHPA and Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation Manual 6280 requirements indicate the proposed action does not adversely impact the resource. 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 if the NHPA and Management of National Scenic and Historic Trails and Trails under Study or Recommended as Suitable for Congressional Designation Manual 6280 requirements determine that the described lands are not contributing elements to the resource. This determination can only come after consultation with the National Park Service, Nevada State Historic Preservation Office and other interested publics. 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.

PROPOSED Stipulation: Water Bodies; Wetland and Riparian Habitat
(Proposed #NV-B-10-A-NSO)

Stipulation: No Surface Occupancy (NSO) on and within water bodies and riparian-wetland vegetated areas to protect the values and functions of these areas.

Objective [Purpose]: To protect the values and functions of riparian and wetland areas based on the nature, extent, and value of the area potentially affected.

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. An exception may also be granted if the proponent, BLM, and other affected interests (e.g. NDOW) negotiate mitigation that would satisfactorily offset the anticipated negative impacts. An exception may be granted for actions designed to enhance the long-term utility or availability of the riparian habitat.

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 if it is determined that the described lands do not contain the subject resource, or are incapable of serving the requirements of the resource and therefore no longer warrant consideration as a component necessary for protection of the resource. 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.

PROPOSED Stipulation: Riparian Habitat Buffer
(Proposed #NV-B-10-B-CSU)

Stipulation: Controlled Surface Use (CSU) will be applied within 500 feet of riparian-wetland vegetation to protect the values and functions of these areas. An engineering plan or a study may be required by the operator that identifies the extent of the resource or how the resource will be managed or protected.

Objective [Purpose]: To protect the values and functions of riparian and wetland areas based on the nature, extent, and value of the area potentially affected.

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. An exception may also be granted if the proponent, BLM, and other affected interests (e.g. NDOW) negotiate mitigation that would satisfactorily offset the anticipated negative impacts. An exception may be granted for actions designed to enhance the long-term utility or availability of the riparian habitat.

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 if it is determined that the described lands do not contain the subject resource, or are incapable of serving the requirements of the resource and therefore no longer warrant consideration as a component necessary for protection of the resource. 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.

PROPOSED Stipulation: 100-year Floodplains
(Proposed #NV-B-10-C-NSO)

Stipulation: No Surface Occupancy (NSO) on 100-year flood plains of major rivers that have a one percent chance of flooding in any given year.

Objective [Purpose]: To protect the unique biological and hydrological features associated with 100-year flood plains of major rivers.

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. An exception may also be granted if the proponent, BLM, and other affected interests (e.g. NDOW) negotiate mitigation that would satisfactorily offset the anticipated negative impacts. An exception may be granted for actions designed to enhance the long-term utility or availability of the 100-year flood plain.

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 if it is determined that the described lands do not contain the subject resource, or are incapable of serving the requirements of the resource and therefore no longer warrant consideration as a component necessary for protection of the resource. 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.

PROPOSED Stipulation: Playas
(Proposed #NV-B-10-D-NSO)

Stipulation: No Surface Occupancy (NSO) on playas. Playas are defined as the ephemeral round depressions within areas of dry lake beds in which water collects after a rain event and evaporates relatively quickly.

Objective [Purpose]: Protection of playas.

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. An exception may also be granted if the proponent, BLM, and other affected interests (e.g. NDOW) negotiate mitigation that would satisfactorily offset the anticipated negative impacts. An exception may be granted for actions designed to enhance the long-term utility or availability of the playa resource.

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 if it is determined that the described lands do not contain the subject resource, or are incapable of serving the requirements of the resource and therefore no longer warrant consideration as a component necessary for protection of the resource. 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.

PROPOSED Stipulation: Soil Slopes >40 percent
(#NV-B-11-B-NSO)

Stipulation: No Surface Occupancy (NSO) on slopes greater than 40 percent.

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

Exception: The Authorized Officer may grant an exception if a staff review determines that the proposed action is of a scale (pipeline, vs. road, vs. well pad) or sited in a location or a site specific evaluation determines that the slope would not result in mass slope failure or accelerated erosion and the operator would be able to meet BLM's reclamation standards.

Modification: The Authorized Officer may modify the area subject to the stipulation based upon a BLM evaluation of the area. 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: The restriction may be waived if it is determined that the described lands do not include lands with slopes greater than 40 percent. This determination shall be based upon USGS mapping and a BLM evaluation of the area. 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.

Partial Deferral Alternative: parcels proposed for deferral, with rationales (proposed future stipulations for updated RMP; see full text above)

Parcel #	Proposed stipulation NV-B-07-C-NSO	Proposed stipulation NV-B-07-D-NSO	Proposed stipulation NV-B-10-A-NSO	Proposed stipulation NV-B-10-B-CSU	Proposed stipulation NV-B-10-C-NSO	Proposed stipulation NV-B-10-D-NSO	Proposed stipulation NV-B-11-B-NSO	Deferred acreage	All or part of parcel
NV-17-06-004			X	X	X	X		1898.00	All
NV-17-06-005			X	X	X	X		1725.00	All
NV-17-06-006			X	X	X	X		1910.00	All
NV-17-06-007			X	X	X	X		1920.00	All
NV-17-06-008			X	X	X	X		1549.00	All
NV-17-06-009			X	X	X	X		1280.00	Partial
NV-17-06-010			X	X	X	X		920.00	All
NV-17-06-011			X	X	X	X		2529.00	All
NV-17-06-012			X	X	X	X		2491.00	All
NV-17-06-013			X	X	X	X		1200.00	Partial
NV-17-06-014			X	X	X	X		160.00	Partial
NV-17-06-016			X	X	X	X		783.65	Partial
NV-17-06-017			X	X	X	X		960.00	Partial
NV-17-06-018			X	X	X	X		1923.00	All
NV-17-06-019			X	X	X	X		1920.36	All
NV-17-06-020			X		X	X		1340.81	All
NV-17-06-021			X	X	X	X		1708.62	All
NV-17-06-022					X	X		800.00	Partial
NV-17-06-023			X	X	X	X		2190.00	All
NV-17-06-024					X	X		800.00	Partial
NV-17-06-025					X	X		1200.00	All
NV-17-06-026			X	X	X	X		1720.00	All
NV-17-06-040			X	X	X			480.00	Partial
NV-17-06-046			X	X	X	X		640.00	Partial
NV-17-06-047			X	X	X	X		1920.00	Partial
NV-17-06-050			X	X	X	X		433.33	Partial
NV-17-06-052			X	X	X	X		1761.35	All
NV-17-06-067			X	X	X	X		982.25	All
NV-17-06-069			X	X	X	X		2458.30	All
NV-17-06-070			X	X	X	X		2532.27	All
NV-17-06-071			X	X	X	X		2551.00	All
NV-17-06-072			X	X	X	X		2228.48	All
NV-17-06-073			X	X	X	X		2135.40	All

NV-17-06-074			X	X	X	X		2520.49	All
NV-17-06-075			X	X	X	X		2418.00	All
NV-17-06-076			X	X	X	X		2453.00	All
NV-17-06-077			X	X	X	X		2365.68	All
NV-17-06-078			X	X	X	X		2459.00	All
NV-17-06-079			X	X	X	X		2475.00	All
NV-17-06-080			X	X	X	X		1290.00	All
NV-17-06-081			X	X	X	X		1286.00	All
NV-17-06-082			X	X	X	X		2133.00	All
NV-17-06-084			X	X	X	X		2350.00	All
NV-17-06-085			X	X	X	X		2280.00	All
NV-17-06-086			X	X	X	X		2400.00	All
NV-17-06-087			X	X	X	X		2560.00	All
NV-17-06-088			X	X	X	X		1901.00	All
NV-17-06-089			X	X	X	X		1283.00	All
NV-17-06-090			X	X	X	X	X	120.00	Partial
NV-17-06-092			X	X	X	X	X	640.00	Partial
NV-17-06-093			X	X	X	X	X	2054.00	All
NV-17-06-094			X	X	X	X	X	480.00	Partial
NV-17-06-095							X	1025.94	All
NV-17-06-096			X	X	X	X	X	1920.84	All
NV-17-06-097			X	X	X	X	X	2190.00	All
NV-17-06-098			X	X	X	X		1120.00	Partial
NV-17-06-099			X	X	X	X		2546.82	All
NV-17-06-100			X	X			X	1791.00	All
NV-17-06-101			X	X	X	X		1922.96	All
NV-17-06-102			X	X	X	X		640.00	Partial
NV-17-06-103			X	X	X	X		1291.08	All
NV-17-06-104			X	X			X	610.00	All
NV-17-06-105	X	X	X	X			X	1958.25	All
NV-17-06-106			X	X	X	X		640.00	All

Total Deferral Acreage: 104,175.88

NV-B-07-C-NSO National Register-eligible Properties (NRHP) and Districts
NV-B-07-D-NSO National Scenic & Historic Trails
NV-B-10-A-NSO Riparian-wetland vegetated areas
NV-B-10-B-CSU Within 500 feet of Riparian-wetland vegetation
NV-B-10-C-NSO 100-year flood plain
NV-B-10-D-NSO Playas
NV-B-11-B-NSO Slopes greater than 40%.

Appendix D: Special Status Species List

BLM Battle Mountain District Special Status Plant Species List		
Common Name	Scientific Name	Status*
Eastwood milkweed	*Asclepias eastwoodiana*	NS
Cima milkvetch	*Astragalus cimae* var. *cimae*	NS
Tonopah milkvetch	*Astragalus pseudiodanthus*	NS
Toquima milkvetch	*Astragalus toquimanus*	NS
Currant milkvetch	*Astragalus uncialis*	NS
Elko rockcress	*Boechera falcifructa*	NS
Monte Neva paintbrush	*Castilleja salsuginosa*	NS
Tecopa birdbeak	*Cordylanthus tecopensis*	NS
Goodrich biscuitroot	*Cymopterus goodrichii*	NS
Nevada willowherb	*Epilobium nevadense*	NS
Windloving buckwheat	*Eriogonum anemophilum*	NS
Beatley buckwheat	*Eriogonum beatleyae*	NS
Tiehm buckwheat	*Eriogonum tiehmii*	NS
Sand cholla	*Grusonia pulchella*	NS
Lunar Crater buckwheat	*Johanneshowellia crateriorum*	NS
Holmgren lupine	*Lupinus holmgrenianus*	NS
Low feverfew	*Parthenium ligulatum*	NS
Pahute Mesa beardtongue	*Penstemon pahutensis*	NS
Lahontan beardtongue	*Penstemon palmeri* var. *macranthus*	NS
Bashful beardtongue	*Penstemon pudicus*	NS
Tiehm beardtongue	*Penstemon tiehmii*	NS
Clarke phacelia	*Phacelia filiae*	NS
Williams combleaf	*Polyctenium williamsiae*	NS
Blaine pincushion	*Sclerocactus blainei*	NS
Tonopah pincushion	*Sclerocactus nyensis*	NS
Railroad Valley globemallow	*Sphaeralcea caespitosa* var. *williamsiae*	NS
Lone Mountain goldenhead	*Tonestus graniticus*	NS
*Status FE = Federal Endangered FP = Federal Proposed Endangered FT = Federal Threatened FC = Federal Candidate NS = Nevada BLM Sensitive Species		

BLM Battle Mountain District Special Status Wildlife Species List		
Common Name	Scientific Name	Status*
BIRDS		
Northern goshawk	*Accipiter gentilis*	NS
Golden eagle	*Aquila chrysaetos*	NS
Burrowing owl	*Athene cunicularia*	NS
Ferruginous hawk	*Buteo regalis*	NS
Swainson's hawk	*Buteo swainsoni*	NS
Greater sage-grouse	*Centrocercus urophasianus*	NS
Snowy plover	*Charadrius alexandrinus*	NS
Yellow-billed cuckoo	*Coccyzus americanus*	FT,NS
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE, NS
Peregrine falcon	*Falco peregrinus*	NS
Greater sandhill crane	*Grus Canadensis tabida*	NS
Pinyon jay	*Gymnorhinus cyanocephalus*	NS
Bald eagle	*Haliaeetus leucocephalus*	NS
Loggerhead shrike	*Lanius ludovicianus*	NS
Black rosy-finch	*Leucosticte atrata*	NS
Lewis' woodpecker	*Melanerpes lewis*	NS
Sage thrasher	*Oreoscoptes montanus*	NS
Brewer's sparrow	*Spizella breweri*	NS
FISH		
Railroad Valley springfish	*Crenichthys nevadae*	FT
Charnock Ranch tui chub	*Gila bicolor ssp ?*	NS
Hot Creek Valley tui chub	*Gila bicolor* ssp. 5	NS
Pleasant Valley tui chub	*Gila bicolor ssp ?*	NS
Railroad Valley tui chub	*Gila bicolor* ssp. 7	NS
Fish Lake Valley tui chub	*Gila bicolor* ssp. 4	NS
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	FT
Smoky Valley speckled dace	*Rhinichthys osculus* ssp. ?	NS
Monitor Valley speckled dace	*Rhinichthys osculus* ssp. 5	NS
MAMMALS		
Pronghorn antelope	*Antilocarpa Americana*	NS
Pallid bat	*Antrozous pallidus*	NS
Pygmy rabbit	*Brachylagus idahoensis*	NS
Desert pocket mouse	*Chaetodipus penicillatus*	NS

Townsend's big-eared bat	*Corynorhinus townsendii*	NS
Desert kangaaroo rat	*Dipodomys deserti*	NS
Big brown bat	*Eptesicus fuscus*	NS
Spotted bat	*Euderma maculatum*	NS
Silver-haired bat	*Lasionycteris noctivagans*	NS
Western red bat	*Lasiurus blossevillii*	NS
Hoary bat	*Lasiurus cinereus*	NS
Sagebrush vole	*Lemiscus curtatus*	NS
Dark kangaroo mouse	*Microdipodops megacephalus*	NS
Pale kangaroo mouse	*Microdipodops pallidus*	NS
California myotis	*Myotis californicus*	NS
Western small-footed myotis	*Myotis ciliolabrum*	NS
Long-eared myotis	*Myotis evotis*	NS
Little brown myotis	*Myotis lucifugus*	NS
Fringed myotis	*Myotis thysanodes*	NS
Long-legged myotis	*Myotis volans*	NS
Yuma myotis	*Myotis yumanensis*	NS
Crawford's desert shrew	*Notiosorex crawfordi*	NS
Western pipistrelle	*Pipistrellus hesperus*	NS
American Pika	*Ochotona princeps*	NS
Bighorn sheep	*Ovis canadensis*	NS
Merriam's shrew	*Sorex merriami*	NS
Inyo shrew	*Sorex tenellus*	NS
American water shrew	*Sorex pallustrus*	NS
Brazilian free-tailed bat	*Tadarida brasiliensis*	NS
Botta's pocker gopher	*Thomomys bottae*	NS
Fish Spring pocket gopher*	*Thomomys bottae abstrusus*	NS
San Antonio pocket gopher*	*Thomomys bottae curatus*	NS
*Genetic analysis one specie		
AMPHIBIANS		
Amargosa toad	*Anaxyrus nelsoni*	NS
Western toad	*Anaxyrus borea*	NS
Columbia spotted frog	*Rana luteiventris*	FC* NS
*removed as candidate		
Northern leopard frog	*Rana [Lothbates] pipeans*	NS
Great Basin spadefoot	*Spea intermontana*	NS
REPTILES		
Desert tortoise	*Gopherus agassizii*	FT, NS
Banded gila monster	*Heloderma suspectum cinctum*	NS
Desert horned lizard	*Phrynosoma platyrhinos*	NS
Western red-tailed skink	*Plestiodon gilberti rubricaudatus*	NS

INSECTS		
Crescent Dunes aegialian scarab	*Aegialia crescenta*	NS
Aegialian scarab beetle	*Aegialia knighti*	NS
Crescent Dunes aphodius scarab	*Aphodius* sp. 2	NS
Big Smoky wood nymph	*Cercyonis oetus alkalorum*	NS
White River wood nymph	*Cercyonis pegala pluvialis*	NS
White Mountains skipper	*Hesperia miriamae longaevicola*	NS
Railroad Valley skipper	*Hesperia uncas fulvapalla*	NS
White River valley skipper	*Hesperia uncas grandiosa*	NS
Great Basin small blue	*Philotiella speciosa septentrionalis*	NS
Crescent Dunes serican scarab	*Serica ammomenisco*	NS
Sand Mountain serican scarab	*Serica psammobunus*	NS
MOLLUSCS		
California floater	*Anodonta californiensis*	NS
Southern duckwater pyrg	*Pyrgulopsis anatine*	NS
Large-gland carico pyrg	*Pyrgulopsis basiglans*	NS
Carinate duckwater pyrg	*Pyrgulopsis carinata*	NS
Dixie Valley pyrg	*Pyrgulopsis dixensis*	NS
Oasis Valley pyrg	*Pyrgulopsis micrococcus*	NS
Wong's pyrg	*Pyrgulopsis wongi*	NS

*Status
FE = Federal Endangered
FP = Federal Proposed Endangered
FT = Federal Threatened
FC = Federal Candidate
NS = Nevada BLM Sensitive Species

Appendix E: Hydraulic Fracturing White Paper

This White Paper on hydraulic fracturing is derived from the Hydraulic Fracturing White Paper (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 maximize the extraction of underground resources – oil, natural gas and geothermal energy. The HF process includes the acquisition of water, mixing of chemicals, 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 further open existing fractures and/or create new fractures. This allows the hydrocarbons to more readily flow into the wellbore. HF has gained interest recently as hydrocarbons previously 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 sand reacts when it hits the bottom of the wellbore, slowly increasing the density of sand 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 and 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 sand 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 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 50,000 to 300,000 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 tight sand gas 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 large volumes of gas production, but this may change depending on the formation.

Gas emissions associated with the HF process are captured when the operator utilizes a green completion process. Where a green completion process is not utilized, gas 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 95to 99 percent water and a small percentage of special-purpose chemical additives and proppant. 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 5,000 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 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 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. 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.

About 77 percent of water withdrawals are for agricultural use. 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 greywater), 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).

Potential Sources of Water for Hydraulic Fracturing

Freshwater-quality water 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.

Several sources of water are available for drilling and/or HF in NV. Because Nevada's water rights system is based in the prior appropriation doctrine, water cannot be diverted from a stream/reservoir or pumped out of the ground for drilling and/or HF without reconciling that diversion with the prior appropriation doctrine. 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 satisfy the water appropriation doctrine. 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.

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 Department of Environmental Protection, State Engineer's Office (NDEP) 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 "over appropriated," that is, the flows do not reliably occur in such a magnitude that all of the vested water rights on those streams can be satisfied. Therefore, the only time that an operator may be able to divert water directly from a river is during periods of high flow and less demand. These periods do occur but not reliably or predictably.

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 NDEP 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 NDEP to drill and use a new water supply well. These wells are usually drilled on location to provide an on-demand supply. These industrial-type water supply wells are typically drilled deeper than nearby domestic and/or stock wells to minimize drawdown interference, and have large capacity pumps. 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 and are under the jurisdiction of the NDEP. Plugging these wells is under the jurisdiction of the NDEP and BLM.

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. Water wells developed for oil and gas drilling could also result in a draw down in the quantity of water in nearby residential areas depending upon the geology; however it is not currently possible to predict whether or not such water wells would be developed.

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.

Potential impacts on usable groundwater resources from fluid mineral extraction activities can result from the five 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.

5. 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.

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.

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. For example, according to a 2012 Bipartisan Policy Center report, the fracturing process itself is unlikely to directly affect freshwater aquifers because 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. Fractures created during HF have not been shown to span the distance between the targeted oil formation and freshwater bearing zones. 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 would be 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 may be recovered at the surface. 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. 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, hydrogeologic, 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.

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.

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.

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. References

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Appendix F: State of Nevada Hydraulic Fracturing Regulations

ADOPTED REGULATION OF THE COMMISSION ON MINERAL RESOURCES

LCB File No. R011-14

Effective October 24, 2014

AUTHORITY: §§1-19 and 22, NRS 522.040 and 522.119; §20, NRS 522.040 and 522.150; §21, NRS 534A.090.

A REGULATION relating to natural resources; providing for the regulation of hydraulic fracturing in this State; revising provisions governing the operation of wells for the extraction of oil, gas and geothermal resources; and providing other matters properly relating thereto.

Legislative Counsel's Digest:

Existing law authorizes the Division of Minerals of the Commission on Mineral Resources to regulate wells drilled for the production of oil, gas and geothermal resources. (Chapters 522 and 534A of NRS) In 2013, Senate Bill No. 390 required the Division of Minerals and the Division of Environmental Protection of the State Department of Conservation and Natural Resources, jointly, to develop a hydraulic fracturing program for the State of Nevada. This regulation adopted by the Commission on Mineral Resources generally establishes that program.

Sections 9-13 of this regulation provide for the regulation of a well for which an operator intends to engage in hydraulic fracturing. Section 9 provides for the sampling, testing and continued monitoring of certain water sources located within a specified sampling area. Section 10 requires an operator to include with his or her application to drill certain information. Section 11 establishes certain additional requirements for the installation and cementing of certain casing strings in a well used for hydraulic fracturing. Section 12 establishes certain notice, reporting, monitoring and certification requirements for the operator of a hydraulic fracturing operation and additionally establishes certain requirements for the use of chemicals during the hydraulic fracturing process and the containment and disposal of liquids that are returned to the surface and discharged from the wellbore during hydraulic fracturing. Section 13 authorizes an operator of certain existing oil or gas wells to request and the Division of Minerals to approve a hydraulic fracturing operation at the oil or gas well.

Sections 14-20 of this regulation revise provisions of general applicability to all oil and gas wells. Section 14: (1) requires an operator to maintain a copy of the drilling permit at the site of the well during the operation of the well; (2) prescribes certain notice requirements relating to spudding a well and installing or cementing casing or equipment for the prevention of a blowout; (3) requires an operator to ensure compliance with certain industry standards relating to casing; and (4) provides for the management, containment and disposal of spills or releases and liquids that are returned to the surface and discharged from the wellbore during the drilling operation. Section 15 prescribes certain safety measures for the safe operation of the well. Section 18 revises provisions governing certain applications submitted to and permits issued by the Division. Section 19 revises provisions relating to the installation and cementing of

the surface casing string, an intermediate casing string or liner and a production casing string or liner in an oil or gas well. Section 19 additionally requires an operator to report certain information to the Division of Minerals to ensure the safe operation of the well. Section 20 increases the amount of the administrative fee that a producer or purchaser of oil or natural gas must pay to offset the expenses of the Division.

Section 21 of this regulation revises provisions prescribing certain safety measures for the safe operation of geothermal wells.

Section 22 of this regulation repeals certain regulations relating to wells drilled with cable tools and administrative fees for the new production of oil or natural gas.

Section 1. Chapter 522 of NAC is hereby amended by adding thereto the provisions set forth as sections 2 to 15, inclusive, of this regulation.

Sec. 2. "Area of review" means:

1. The area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing; and

2. Any additional area of land prescribed by the Division or specified by an operator pursuant to subsection 3 of section 10 of this regulation.

Sec. 3. "Available water source" means a water source for which the person who owns, holds or has the right of use to the water source has consented to the sampling and testing of the water source and to making the results of the sampling and testing available to the public.

Sec. 4. "Division of Environmental Protection" means the Division of Environmental Protection of the State Department of Conservation and Natural Resources.

Sec. 5. "Hydraulic fracturing" has the meaning ascribed to it in paragraph (b) of subsection 3 of NRS 522.119.

Sec. 6. "Sampling area" means the area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing.

Sec. 7. "Water source" means a water well or spring that is regulated by the Division of Water Resources of the State Department of Conservation and Natural Resources.

Sec. 8. Except as otherwise provided in section 13 of this regulation, the provisions of sections 2 to 13, inclusive, of this regulation, apply for each oil or gas well for which the operator intends to engage in hydraulic fracturing.

Sec. 9. 1. Except as otherwise provided in subsections 2 and 4, an operator shall collect an initial baseline sample and subsequent monitoring samples from each available water source, not to exceed four available water sources, located within the sampling area. If more than four available water sources are

located within the sampling area, the operator shall select the four available water sources for sampling based on:

(a) The proximity of the available water sources to the proposed oil or gas well. Available water sources closest to the proposed oil or gas well are preferred.

(b) The orientation of the sampling locations relative to the available water sources. To the extent that the direction of the flow of groundwater is known or can reasonably be inferred, sample locations from both down-gradient and up-gradient locations are preferred over cross- gradient locations.

(c) The depth of the available water sources. The sampling of the deepest of the available water sources is preferred.

(d) The condition of the available water sources. An operator is not required to sample an available water source if the Administrator determines that the available water source is improperly maintained or nonoperational, or has physical characteristics which would prevent the safe collection of a representative sample or which would require nonstandard sampling equipment.

(e) The construction and use of the water source. If an operator constructs a temporary well within the sampling area to use as a water source for the purpose of supporting the drilling or operation of an oil or gas well, the operator must include the water source as an available water source for the purpose of sampling and monitoring pursuant to this section.

2. An operator may, before a well is spudded or drilled for oil or gas, request an exception from the requirements of this section by filing a sundry notice (Form 4) with the Administrator. The Administrator may grant the request for an exception if the Administrator finds that:

(a) No available water sources are located within the sampling area;

(b) The only available water sources are unsuitable pursuant to paragraph (d) of subsection 1; or

(c) Each owner of a water source that is suitable for testing and located within the sampling area has refused to grant the operator access to the water source for sampling and additionally finds that the operator has made a reasonable and good faith effort to obtain the consent of the owner to conduct the sampling.

An operator seeking an exception on the grounds set forth in paragraph (b) shall provide to the Administrator documentation of the conditions of each available water source which is deemed unsuitable. An operator seeking an exception on the grounds set forth in paragraph (c) shall provide to the Administrator documentation of the efforts of the operator to obtain the consent of each owner of a water source.

3. Except as otherwise provided in subsections 2 and 4, an operator shall collect from each available water source for which the operator is required to collect samples pursuant to this section:

(a) An initial sample during the 12-month period immediately preceding the commencement of hydraulic fracturing at an oil or gas well.

(b) A first subsequent sample, collected not earlier than 6 months but not later than 12 months after the commencement of hydraulic fracturing. If a well that has been drilled produces hydrocarbons for a period of less than 6 months after the commencement of hydraulic fracturing and the well is subsequently plugged and abandoned, or if the well is plugged and abandoned without having produced hydrocarbons after the commencement of hydraulic fracturing, the operator shall collect each first subsequent sample at the time the well is plugged.

A second subsequent sample, collected not earlier than 60 months but not later than 72 months after the commencement of hydraulic fracturing. If a well that has been drilled produces hydrocarbons for a period of less than 60 months and the well is subsequently plugged and abandoned, the operator shall collect each second subsequent sample at the time the well is plugged. An operator is not required to collect second subsequent samples if a well that is drilled is plugged and abandoned without having produced hydrocarbons.

4. For the purposes of satisfying the requirements for sampling available water sources pursuant to paragraphs (a) and (b) of subsection 3, an operator may rely on the test results of a previous sample from an available water source if:

(a) The previous sample was collected and tested during the respective period prescribed for sampling pursuant to paragraph (a) or (b) of subsection 3.

(b) The procedure for collecting and testing the sample, and the constituents for which the sample was tested, are substantially similar to those required by this section.

(c) The Administrator receives the test results not less than 14 days before the commencement of hydraulic fracturing.

5. The Administrator may require an operator to collect and test samples of an available water source in addition to the collection and testing protocol prescribed by this section if the Administrator finds that additional testing is warranted.

6. The testing of a water sample pursuant to this section must be conducted by a laboratory certified pursuant to NAC 445A.0552 to 445A.067, inclusive. Upon request, an operator shall provide his or her protocol for collection and testing to the Administrator.

7. The test results of initial and subsequent samples collected pursuant to this section must include, without limitation:

(a) The level of each analyzed constituent identified in the routine domestic water analysis of the Nevada State Public Health Laboratory of the University of Nevada School of Medicine.

(b) The levels of benzene, toluene, ethylbenzene and xylene.

(c) The levels of dissolved methane, ethane, propane and hydrogen sulfide gases within the sample.

8. If a dissolved methane concentration greater than 10 milligrams per liter (mg/l) is detected in a sample of water collected pursuant to this section, an analysis of the gas composition, including, without limitation, an analysis of the stable isotope ratios of carbon (13C vs. 12C) and hydrogen (2H vs. 1H) and

an analysis of the origin (biogenic vs. thermogenic), must be performed on the sample using gas chromatography and mass spectrometry, as necessary.

9. An operator shall immediately notify the Administrator and the owner of an available water source if the test results of a sample collected pursuant to this section indicate:

(a) The presence of benzene, toluene, ethylbenzene, xylene or hydrogen sulfide in a concentration greater than the specified maximum contaminant level set forth in the primary and secondary standards for drinking water pursuant to NAC 445A.453 and 445A.455.

(b) If the sample is a subsequent sample, any change in water chemistry indicative of a degradation in water quality.

10. An operator shall provide copies of the test results of each sample collected pursuant to this section to the Administrator and to the respective owner of the available water source not later than 30 days after the operator receives the test results from a laboratory. The Division will, upon request, make the test results available to a member of the public for inspection at the office of the Division located in Carson City.

11. An operator shall include with the copy of the test results of a sample provided pursuant to subsection 10 a description of the location of the available water source and any field observations recorded by the operator during the collection of the sample. The operator shall describe the location of the available water source by public land survey and the county assessor's parcel number and shall include the global positioning system coordinates of the available water source in the manner prescribed by subparagraph (2) of paragraph (b) of subsection 2 of NAC 534.340.

12. An operator shall not commence hydraulic fracturing at a well until the operator has complied with subsections 1, 2 and 4 to 11, inclusive, and paragraph (a) of subsection 3.

13. As used in this section, "public land survey" has the meaning ascribed to it in NAC 534.185.

Sec. 10.1. An operator must include with his or her application to drill an oil or gas well:

(a) The water appropriation permit number and the name of the owner of each water source within the area of review that is on file with the Division of Water Resources of the State Department of Conservation and Natural Resources.

(b) The well log number, well depth and the diameter of the water well casing.

(c) The static water level below the surface of the ground or the rate of flow of the water, if any.

(d) A description of the location of each water source located within the area of review in the manner prescribed by subsection 11 of section 9 of this regulation.

(e) Publically available maps and cross-sections of the area of review which describe the surface and subsurface geology of the area of review, including, without limitation, the location of known or suspected faults.

(f) A map showing the location of each water source or perennial stream located within the area of review, the overall project area or lease holdings, the boundaries of the area of review, all known well locations, land ownership and applicable assessor parcel numbers.

(g) The source and estimated volume of water required for hydraulic fracturing in each well.

(h) A plan for the management and disposal of all fluids to be used in the proposed hydraulic fracturing operation.

2. If an operator discovers inconsistencies with respect to publically available and proprietary hydrologic or geologic information within an area of review that the operator reasonably believes to be relevant with respect to potential contamination from hydraulic fracturing, the operator shall disclose the inconsistencies to the Division.

3. The Division may prescribe or an operator may specify an area of review that includes an area of land in addition to that area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing for the purposes of compliance with this section or the collection of additional data based on population density, residential locations, water source locations or for other good cause as the Division or an operator may deem reasonable.

Sec. 11. In addition to the requirements prescribed by NAC 522.265, the operator of an oil or gas well shall:

1. Ensure that:

(a) The surface location of the well is at a lateral distance of not less than 300 feet from any known perennial water source, existing water well or existing permitted structure.

(b) The edge of the drilling pad is at a lateral distance of not less than 100 feet from any known perennial water source, existing water well or existing permitted structure.

An owner or an operator may request and the Division may approve an exception to the requirements prescribed by this subsection.

2. For the intermediate casing string installed in the well directly below the surface casing, install the intermediate casing string through the surface casing from the installed depth of the intermediate casing string to the surface of the ground.

3. For a production casing string, conduct a pressure test of the casing string in which the casing is pressurized to 3,000 pounds or more per square inch gauge (psig), not to exceed 80 percent of the burst-pressure rating of the casing, for a period of not less than 30 minutes. A pressure test must be conducted and the results of the test must be reported in the manner prescribed by subsection 7 of NAC 522.265.

Sec. 12. 1. An operator of an oil or gas well shall:

(a) Not less than 14 days before the commencement of hydraulic fracturing:

(1) Provide written notice to each owner of real property and any operator of an oil, gas or geothermal well located within the area of review of the hydraulic fracturing operation.

(2) Provide written notice to the board of county commissioners in the county in which the oil or gas well is located.

(3) Submit to the Division an affidavit (Form 15) certifying that each strata is sealed and isolated with casing and cement in accordance with NAC 522.260. The affidavit must be signed by the operator or a competent person designated by the operator and must incorporate and include a copy of each relevant cement evaluation log as evidence of compliance with NAC 522.260.

(4) Submit for approval by the Division a sundry notice (Form 4) and a report describing all specific aspects of the proposed hydraulic fracturing operation. The report must identify each stage of the hydraulic fracturing operation, the measured depth and true vertical depth below the surface of the ground for each stage, the duration of each stage, all intervals to be perforated in measured depth and true vertical depth below the surface of the ground, the number and diameter of perforations per foot and the estimated hydraulic pressures to be utilized.

(b) Maintain a record as to the manner in which each owner, operator and board of county commissioners was notified pursuant to subparagraphs (1) and (2) of paragraph (a), including, without limitation, the method of notification.

(c) Before the commencement of hydraulic fracturing:

(1) Ensure that each chemical used in the hydraulic fracturing process is identified on the Internet website maintained by the Division as a chemical which is approved by the Division for hydraulic fracturing. An operator may request and the Division may approve the use of a chemical that is not identified as an approved chemical if the operator submits the request to the Division on a sundry notice (Form 4) not less than 30 days before the commencement of hydraulic fracturing.

(2) Disclose to the Division each additive that the operator intends to use in the hydraulic fracturing fluid, including, without limitation, any additive that may be protected as a trade secret. The operator shall include with the identity of each additive the trade name and vendor of the additive and a brief description of the intended use or function of the additive.

2. The operator shall monitor and record all well head pressures, including each annular space pressure, during the hydraulic fracturing operation. The maximum hydraulic pressure to which a segment of casing is exposed must not exceed the burst-pressure rating of the casing, but the Division may require a lower maximum hydraulic pressure as the Division determines is necessary. The operator shall immediately stop the hydraulic fracturing process and notify the Division if any change in annular space pressure is observed which suggests communication with the hydraulic fracturing fluids. The operator shall provide the Division with a report documenting all recorded hydraulic fracturing pressures for each stage of the hydraulic fracturing operation not later than 15 days after the completion of each stage.

3. The operator shall contain all liquids that are returned to the surface and discharged from the wellbore at the conclusion of each stage of the hydraulic fracturing operation. The operator shall contain

the liquids in enclosed tanks or in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC.

4. Except as otherwise provided in subsection 5 and not later than 60 days after the completion of a hydraulic fracturing operation, the operator shall report, at a minimum, to the Internet website www.fracfocus.org for inclusion in FracFocus, or its successor registry:

(a) The name of the operator, the well name and well number and the American Petroleum Institute well number.

(b) The date of the hydraulic fracturing treatment, the county in which the well is located, any public land surveys relevant to the location of the well and the global positioning system coordinates of the well.

(c) The true vertical depth of the well and the total volume of water used in the hydraulic fracturing treatment of the well or if the operator utilizes a base fluid other than water, the type and total volume of the base fluid used in the hydraulic fracturing treatment.

(d) The identity of each additive used in the hydraulic fracturing fluid, including, without limitation, the trade name and vendor of the additive and a brief description of the intended use or function of the additive.

(e) The identity of each chemical intentionally added to the base fluid.

(f) The maximum concentration, measured in percent by mass, of each chemical intentionally added to the base fluid.

(g) The Chemical Abstracts Service Registry Number for each chemical intentionally added to the base fluid, if applicable.

5. Proprietary information with respect to a trade secret does not constitute public information and is confidential. An operator may submit a request to the Division to protect from disclosure any information which, under generally accepted business practices, would be considered a trade secret or other confidential proprietary information of the business. The Administrator shall, after consulting with the operator, determine whether to protect the information from disclosure. If the Administrator determines to protect the information from disclosure, the protected information:

(a) Is confidential proprietary information of the operator.

(b) Is not a public record.

(c) Must be redacted by the Administrator from any report that is disclosed to the public.

(d) May only be disclosed or transmitted by the Division:

(1) To any officer, employee or authorized representative of this State or the United States:

(I) For the purposes of carrying out any duties pursuant to the provisions of this chapter or chapter 522 of NRS; or

(II) If the information is relevant in any judicial proceeding or adversary administrative proceeding under this chapter or chapter 522 of NRS or under the provisions of any federal law relating to oil or gas wells or hydraulic fracturing, and the information is admissible under the rules of evidence; or

(2) Upon receiving the consent of the operator.

The disclosure of any proprietary information pursuant to this subsection must be made in a manner which preserves the status of the information as a trade secret.

6. The Division shall make available to the public for inspection any information, other than a trade secret or other proprietary information that is maintained confidentially pursuant to subsection 5, that is submitted by an operator pursuant to this section.

7. As used in this section, "trade secret" has the meaning ascribed to it in NRS 600A.030.

Sec. 13.1. Notwithstanding any provision of sections 2 to 12, inclusive, of this regulation to the contrary, an operator of an oil or gas well that was drilled and spudded before October 24, 2014, may request approval from the Division to conduct a hydraulic fracturing operation at the oil or gas well by submitting a sundry notice (Form 4) to the Division. The sundry notice must include, without limitation:

(a) A cement evaluation log of the production casing string that has been conducted not less than 5 years before the submission of the sundry notice.

(b) A pressure test of the production casing string conducted in the manner prescribed by subsection 7 of NAC 522.265.

(c) Any other information required by the Division.

2. The Division will, upon receipt of a request pursuant to subsection 1, evaluate each well design which is the subject of the request and approve or disapprove the request.

Sec. 14. An operator of an oil or gas well shall:

1. Maintain a copy of the approved drilling permit at the site of the well during the operation of the well, including, without limitation, during the stages of drilling, hydraulic fracturing, reconditioning and completion.

2. Not less than 24 hours before a well is spudded for oil or gas, notify the Division by telephone or electronic mail

3. Not less than 24 hours before installing or cementing casing, installing any equipment for the prevention of a blowout or conducting a formation integrity test, notify the Division by telephone or electronic mail.

4. Ensure that the casing installed in the well meets the minimum specifications for casing prescribed by the American Petroleum Institute in Specification 5CT, "Specification for Casing and Tubing, Ninth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.

5. Notify the Division if any casing or casing material has been previously used in a hydraulic fracturing operation or in any other oil or gas well.

6. Ensure that the cementing of each casing string meets the minimum specifications prescribed by the American Petroleum Institute in Specification 10A, “Specification for Cements and Materials for Well Cementing, Twenty-Fourth Edition,” or by its successor organization, or as may be otherwise prescribed by the Administrator.

7. Store and contain all materials at the site of the well in a safe and orderly manner.

8. Manage spills or releases in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC.

9. Except as otherwise provided in subsection 3 of section 12 of this regulation, contain all liquids that are returned to the surface and discharged from the wellbore in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC. A reserve pit for drilling liquids must not subsequently be used for the discharge of wellbore liquids during the testing of the well without the prior approval of the Administrator

10. If an unintentional mechanical failure of the well or an uncontrolled flow or spill from the well site occurs, immediately notify:

(a) The Division at the telephone number of the Division.

(b) The Division of Environmental Protection at the spill reporting hotline maintained on its Internet website.

An operator may obtain information on the types of spills which must be reported pursuant to this subsection at the Internet website http://ndep.nv.gov/BCA/spil_rpt.htm.

Sec. 15.1. An operator shall take all precautions which are necessary to keep wells under control and operating safely at all times. Well control and wellhead assemblies used in an oil or gas well must meet the minimum specifications for assemblies prescribed by the American Petroleum Institute in Standard 53, “Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition,” or by its successor organization, or as may be otherwise prescribed by the Administrator.

2. Equipment for the prevention of a blowout which is capable of shutting in the well during operation must be installed on the surface casing and maintained in good operating condition at all times. The equipment must have a rating for pressure greater than the maximum anticipated pressure at the wellhead. The equipment must include casing outlet valves with adequate provisions for mud kill and bleed-off lines of appropriate size and working pressure.

3. An operator shall test the equipment for the prevention of a blowout under pressure immediately after installing the casing and the equipment at the wellhead. A representative of the Division must observe the test in person or otherwise approve the results of the test before the operator drills the shoe out of the casing. An operator shall notify the Division not less than 24 hours before conducting a test pursuant to this subsection.

4. The operator shall submit to the Division the pressure data and supporting information for the equipment for the prevention of a blowout as soon as practicable after the conclusion of the test. The operator shall record the results of each test in the daily drilling log of the operator.

Sec. 16. NAC 522.100 is hereby amended to read as follows:

522.100 "Gas well" means a well which produces primarily natural gas or any well classified as a gas well by the Division. The term includes an exploratory well or a well that is otherwise drilled for exploratory purposes.

Sec. 17. NAC 522.115 is hereby amended to read as follows:

522.115 "Oil well" means any well which is not a gas well and which is capable of producing oil or condensate. The term includes an exploratory well or a well that is otherwise drilled for exploratory purposes.

Sec. 18. NAC 522.210 is hereby amended to read as follows:

522.2101. Before any well is spudded in or drilled for oil or gas, application must be made to and a permit obtained from the Division.

2. The application must be made on Form 2, properly completed and accompanied by Form 1, the required fee and a location plat prepared by a land surveyor licensed in Nevada. Evidence of a federal bond for drilling on a federal lease must be included in the space provided on Form 2. The source and estimated volume of water required for drilling each well must be included with the application.

3. If the well is to be drilled on state or private land, Form 3 or 3a, properly completed, must accompany the application.

4. The Division will, upon the approval of an application for a permit to drill or a sundry notice (Form 4) for a permit to conduct a hydraulic fracturing operation, make a copy of the permit available on the Internet website maintained by the Division.

Sec. 19. NAC 522.265 is hereby amended to read as follows:

522.265 Unless a special provision requires otherwise, the following applies to all oil and gas wells [drilled with rotary tools:

1. Suitable and safe surface casing must be used in all wells for proper anchorage. In all wells being drilled, surface and other protection casing must be run to sufficient depth to afford safe control of any pressures which might be encountered and must be sufficiently tested therefor. Surface casing must be set into an impervious formation and be cemented with sufficient cement to circulate to the top of the hole. If cement does not circulate, the annulus outside the casing must be cemented before drilling plug or initiating tests.

2. On all strings of casing below surface pipe, sufficient cement must be used to fill the annular volume behind the casing for a minimum distance of 500 feet above the bottom of the casing. A cement plug or shoe must not be drilled until a minimum compressive strength of 300 pounds per square inch at

bottom hole conditions has been attained according to the manufacturer's tables of cement strength for the particular cement mix being used.

3. After cementing the surface casing, each well being drilled must be equipped with adequate blowout preventers. The use of blowout equipment must be in accordance with good established oil field practice. The control equipment must include casing outlet valves with adequate provisions for mudkill and bleed-off lines of proper size and working pressure. All equipment must be in good operating condition at all times.] :

1. An operator shall install conductor casing and cement the annular space surrounding the conductor casing from the shoe to the surface with cement, cement grout or concrete grout.

2. An operator shall install surface casing to a depth of not less than 500 feet below the surface of the ground. The annular space surrounding the surface casing string must be cemented with sufficient cement to circulate to the top of the hole. If the cement does not circulate to the top of the hole, the operator shall:

(a) Measure the distance from the surface of the ground to the top of the cement and report the measurement to the Division.

(b) Take any remedial action that may be required by the Administrator to ensure compliance with NAC 522.260 before the operator resumes drilling or conducts any testing pursuant to this section.

3. Except as otherwise provided in section 11 of this regulation, each successive intermediate casing string or liner or production casing string or liner installed in a well below an existing casing string must overlap with the shoe of the existing casing string or liner, as applicable, by not less than 100 feet.

4. For each intermediate casing string or production casing string installed in a well, the operator shall cement the annular space surrounding the casing string to a depth of not less than 500 feet above the shoe of the casing string or, if the casing string enters a known hydrocarbon-producing zone of interest, to a depth of not less than 500 feet above the zone of interest.

5. As soon as practicable after an operator has completed the cementing of the surface casing string, an intermediate casing string or a production casing string, the operator shall submit to the Division a cementing evaluation report to ensure that the operator has complied with the cementing requirements prescribed by this section. The report must include, without limitation, the weight and volume of cementing materials used to cement the respective casing string and the pumping rates and pressures which are related to the cementing of the respective casing string.

6. If the Administrator determines that an operator must take remedial action to ensure compliance with NAC 522.260, the operator shall complete such remedial action before the operator resumes drilling or conducts any testing pursuant to this section.

7. Except as otherwise provided by section 11 of this regulation, before drilling the cement out of the bottom joints of the surface casing string, an intermediate casing string or a production casing string, an operator shall conduct a pressure test of the respective casing string in which the casing is pressurized to 0.22 pounds per square inch gauge (psig) per foot of casing string length or 1,500 pounds per square

inch gauge (psig), whichever is greater, not to exceed the maximum anticipated bottom-hole pressure or 80 percent of the burst-pressure rating of the casing. The casing string must be pressurized for a period of not less than 30 minutes. The operator shall submit to the Division the pressure test results for the respective casing string as soon as practicable after the conclusion of the test. If the results of the test indicate a drop in pressure of 10 percent or more, the operator shall notify the Division of a failed pressure test and shall immediately cease operations at the well. In the event of a failed pressure test, an operator shall not resume operations at the well until the Administrator approves a remediation plan, the operator successfully implements the plan and the operator conducts a successful pressure test for the respective casing string. A subsequent pressure test resulting in a drop in pressure of less than 10 percent after 30 minutes or more shall be deemed to be proof satisfactory that the condition has been corrected.

8. The Administrator may require the operator to submit a cement evaluation log evaluating the bonding integrity of the cement from the shoe of the surface casing string to the surface. The Administrator may require the submission of an initial cement evaluation log pursuant to this subsection if:

(a) The Administrator determines that a significant amount of cement was lost during the cementing of the surface casing string; or

(b) The surface casing string fails a formation integrity test conducted pursuant to subsection 10.

If the initial cement evaluation log does not indicate sufficient bonding integrity of the cement occupying the annular space, the Administrator may require the operator to submit a subsequent cement evaluation log evaluating the bonding integrity of the cement occupying the annular space. An operator shall provide to the Division a copy of each cement evaluation log required pursuant to this subsection as soon as practicable after a copy of the cement bond log becomes available to the operator.

9. An operator shall, upon completion of cementing operations with respect to an intermediate casing string or production casing string, submit to the Division a cement evaluation log evaluating the bonding integrity of the cement at the level of the respective casing string from the shoe of the casing string to the surface of the cement filling the annular space surrounding the casing string. If the initial cement evaluation log does not indicate sufficient bonding integrity of the cement occupying the annular space, the Administrator may require the operator to submit a subsequent cement evaluation log evaluating the bonding integrity of the cement occupying the annular space. An operator shall provide to the Division a copy of each cement evaluation log required pursuant to this subsection as soon as practicable after a copy of the cement bond log becomes available to the operator.

10. An operator shall, to verify that the cement and the formation below the casing shoe can withstand the wellbore pressure which is required to safely drill to the next depth at which casing will be installed, conduct a formation integrity or leakoff test at the time the operator drills the cement out of the bottom joints of the surface casing string, an intermediate casing string or a production casing string. The operator shall submit to the Division the results of a formation integrity or leakoff test conducted pursuant to this subsection as soon as practicable after the conclusion of the test. If the results of the formation integrity or leakoff test indicate a poor cement bond at the casing shoe, an operator shall not resume operations at the well until the Administrator approves a remediation plan, the operator successfully

implements the plan and the operator conducts a successful pressure test for the respective casing string to ensure compliance with NAC 522.260.

Sec. 20. NAC 522.342 is hereby amended to read as follows:

522.3421. The amount of the administrative fee that a producer or purchaser of oil or natural gas must pay pursuant to subsection 2 of NRS 522.150 is [10] 15 cents per barrel of oil or per 50,000 cubic feet of natural gas, as appropriate.

2. The administrative fee must be paid on or before the last day of each month and must be prorated to reflect the amount of oil or natural gas produced during the preceding month.

Sec. 21. NAC 534A.270 is hereby amended to read as follows:

534A.270 1. [All necessary] An operator shall take all precautions [must be taken] which are necessary to keep wells under control and operating safely at all times. Well control and wellhead assemblies used in any geothermal well must meet the minimum specifications for assemblies prescribed by the American Petroleum Institute in Standard 53, "Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.

2. Equipment for the prevention of a blowout, capable of shutting in the well during any operation, must be installed on the surface casing and maintained [ready for use] in good operating condition at all times. This equipment must [be made of steel and] have a rating for pressure [equal to] greater than the maximum anticipated pressure at the wellhead. Equipment for the prevention of a blowout is required on any well where temperatures may exceed 250°F.

3. [Immediately after installation, the casing and] An operator shall test the equipment for the prevention of a blowout [must be tested] under pressure. [These tests must be witnessed by] A representative of the Division must observe the test in person or otherwise approve the results of the test before the [guide] operator drills the casing shoe [is drilled] out of the casing. [The Division must be given reasonable notice of any such test. If necessary, conductor pipe must be equipped with annular blowout equipment which is hydraulically activated from a remote control station.] An operator shall notify the Division not less than 24 hours before conducting a test pursuant to this subsection.

4. The [use of any equipment for the prevention of a blowout must be in accordance with established good practices of the oil field.] operator shall submit to the Division the pressure data and supporting information for the equipment for the prevention of a blowout as soon as practicable after the conclusion of the test conducted pursuant to subsection 3. The operator shall record the results of each test in the daily drilling log of the operator.

Sec. 22. NAC 522.270 and 522.343 are hereby repealed.

TEXT OF REPEALED SECTIONS

522.270 Wells drilled with cable tools. The following applies to all wells drilled with cable tools:

1. Before drilling begins, adequate slush pits must be constructed.

2. Surface casing must be set in the same manner as described in NAC 522.265. Surface casing must be tested by bailing or pressure test to ensure a shutoff before drilling proceeds below the casing point.

3. The use of blowout equipment must be in accordance with good established oil field practice. After cementing the surface casing, a well being drilled must be equipped with adequate blowout preventers. All equipment must be in good operating condition at all times.

522.270Reduced administrative fee for new production. (NRS 522.040, 522.150)

1. Notwithstanding the provisions of NAC 522.342, the amount of the administrative fee that a producer or purchaser of oil or natural gas must pay pursuant to subsection 2 of NRS 522.150 for new production is one-half cent per barrel of oil or per 50,000 cubic feet of natural gas, as appropriate, and in accordance with the provisions of this section.

2. Upon the filing of Form 5, the well completion report, pursuant to NAC 522.510, the Division shall determine whether the production from the well that is the subject of the report qualifies as new production. If the Division determines that the production from the well qualifies as new production, the producer or purchaser is entitled to pay the administrative fee required by subsection 2 of NRS 522.150 for that new production at the reduced rate prescribed in subsection 1 for 12 consecutive calendar months, beginning on the put-on-production date reported in Form 5 for that well. At the end of the 12-month period, the producer or purchaser must pay the administrative fee required by NRS 522.150 for further production from the well in the amount prescribed in NAC 522.342.

3. A producer or purchaser may, pursuant to NRS 522.110, challenge a determination made by the Division pursuant to subsection 2.

4. As used in this section, “new production” means production from a new or existing well that is completed in a new interval, as determined by the Division.

Appendix G: List of Acronyms and Abbreviations

APD	Application for Permit to Drill
AQRV	air quality related values
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
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
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
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management