



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

2023 Oil and Gas Competitive Lease Sale

Environmental Assessment

DOI-BLM-NV-B000-2023-0002-EA

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Trap Springs Oil Field,
Railroad Valley, NV

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Acronyms & Definitions

ACEC	Area of Critical Environmental Concern
AFY	acre-feet (AF) or acre-feet per year
APD	Application for Permit to Drill
AQI	Air Quality Index
AQRV	Air Quality Related Values
AR	Assessment Report
ARMPA	Approved Resource Management Plan Amendment
AUM	Animal Unit Month
BAPC	Bureau of Air Pollution Control
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMD	Battle Mountain District
BMPs	Best Management Practices
CAA	Clean Air Act
CAP	Criteria Air Pollutants
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
COAs	Conditions of Approval
CSU	Controlled Surface Use
DOE	Department of Energy
DOI	United States Department of the Interior
EA	Environmental Assessment
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EOI	Expression of Interest
ESA	Endangered Species Act
EPA	Environmental Protection Agency
EUR	Estimated Ultimate Recovery
FLPMA	Federal Land Policy and Management Act of 1976
FONSI	Finding of No Significant Impact
FOGLRA	Federal Onshore Oil and Gas Leasing Reform Act

FR	Federal Register
FRP	Facility Response Plan
GBNP	Great Basin National Park
GHG	Greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GHMA	General Habitat Management Area
GIS	Geographic Information System
GRSG	Greater Sage-Grouse
GWP	Global Warming Potential
HAP	Hazardous Air Pollutants
HF	Hydraulic Fracturing
HMA	Herd Management Area
ID Team	interdisciplinary team
IM	Instruction Memorandum
IPCC	International Panel Climate Change
LN	Lease Notice
LUP	Land Use Plan
MBTA	Migratory Bird Treaty Act
MD	Management Decision
MLA	Mineral Leasing Act
MLFO	Mount Lewis Field Office
MOU	Memorandum of Understanding
MR	Mineral Resources
MT	Megatonne
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NCLS	Notice of Competitive Lease Sale
NDA	Nevada Department of Agriculture
NDEP	Nevada Division of Environmental Protection
NDOM	Nevada Division of Minerals
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NDWQ	Nevada Division of Water Quality
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NNHP	Nevada Natural Heritage Program
NOAA	National Oceanic and Atmospheric Administration
NVSO	Nevada State Office
NSO	No Surface Occupancy
OG	Oil and gas
OHMA	Other Habitat Management Area
ONRR	Office of Natural Resources Revenue
PHMA	Priority Habitat Management Area
PL	Public Law
PLO	Public Land Order
PRMP	Proposed Resource Management Plan
RFD	Reasonably Foreseeable Development
RFFD	Reasonably Foreseeable Future Development
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-Way
SETT	Sagebrush Ecosystem Technical Team
SFA	Sagebrush Focal Area
SHPO	Nevada State Historical Preservation Office
SI	Supplemental Information
SOP	Standard Operating Procedures
SRMA	Special Recreation Management Area
SSS	Special Status Species
TFO	Tonopah Field Office
TL	Timing Limitation
U.S.	United States
USC	United States Constitution
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGCRP	United States Climate Research Panel
USGS	United States Geological Survey
VOC	Volatile Organic Compound

VRI	Visual Resource Inventory
VRM	Visual Resource Management
WMA	Wildlife Management Area
WO	Washington Office
WSA	Wilderness Study Area

Chapter 1. Introduction

1.1 Background

It is the policy of the Bureau of Land Management (BLM), as mandated by various laws including the Mineral Leasing Act (MLA) of 1920 and the Federal Land Policy and Management Act (FLPMA) of 1976 (FLPMA), to make mineral resources available and to encourage their development to meet national, regional, and local needs. The MLA establishes that deposits of oil and gas owned by the United States are subject to disposition in the form and manner provided by the MLA under the rules and regulations prescribed by the Secretary of the Interior, where consistent with FLPMA and other applicable laws, regulations, and policies. Additionally, the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (FOOGLRA) states that lease sales shall be held for each State where eligible lands are available at least quarterly and more frequently if the Secretary of the Interior determines such sales are necessary. Eligible lands are those that are open for leasing, and which the BLM has received Expressions of Interest (EOIs) nominating lands to be offered for lease.

During the land use planning process required by the FLPMA¹, the BLM analyzes several alternatives before deciding which public lands and minerals are open for leasing and under what terms and conditions. In accordance with the Land Use Plan (LUP), lands can be deemed open to leasing under standard terms and conditions, closed to leasing, or open under special operating constraints—including No Surface Occupancy (NSO)—identified as lease stipulations at the lease stage. Lease stipulations (43 Code of Federal Regulations [CFR] 3101.1-2) are used to mitigate potential impacts to resources. Any surface management of non-BLM administered land overlaying federal minerals is determined by the BLM in consultation with the appropriate surface management agency or the private surface owner.

The BLM implements the LUP by processing public EOIs on a quarterly basis. The Nevada State Office (NVSO) reviews the EOIs and determines whether or not the existing NEPA analyses prepared for the LUPs provide basis for leasing oil and gas resources within these parcels, or if additional analysis is needed before making a leasing decision. Once the NSO reviews the nominations, removes lands not legally available for leasing, and compiles the remaining lands, NSO sends a preliminary parcel list to the appropriate District Office where the parcels are located. Whereas the decision to open lands to leasing was not an irretrievable commitment of resources, implementing the decision by offering parcels may be. As such, when the BLM incrementally implements the RMP decision by proposing to lease specific parcels, its resource specialists review the area potentially affected to determine if there is new information or circumstances, and if there is, if it would substantially change the analysis in the planning documents (keeping in consideration the lease stipulations), and effects are similar both quantitatively and qualitatively to those identified in the programmatic documents, again, keeping in consideration the lease stipulations.

District and field office staff review the legal descriptions of the parcels to confirm they are in areas open to leasing under the relevant LUPs, ensures appropriate stipulations have been applied and identify any special resource conditions of which potential bidders should be made aware, resulting in the attachment of lease notices (LN) (43 CFR 3101.1-3).

Once the Field Office completes the interdisciplinary parcel review (ID Team) the BLM determines if preparation of an EA is necessary for considering the public nominated parcels for the lease sale. If so,

¹ The land use planning process can result in several types of Land Use Plans (LUPs) or the amendment of existing LUPs. The most common LUP is a Resource Management Plan (RMP), which guides the management of all resources within the boundaries of a BLM Field Office. Older LUPs may be limited to managing part of a Field Office, or multiple Field Offices.

this EA and an unsigned FONSI are made available to the public, along with the list of available parcels and stipulations and notices, for a 30-day public comment period on the BLM's NEPA Register (also known as ePlanning).² Additional information regarding the BLM's leasing process is also made available for public review and reference. When the public comment period ends, the BLM analyzes and incorporates the comments, where appropriate, into the EA. The final parcel list with stipulations and notices is made available to the public through a Notice of Competitive Lease Sale (NCLS), which starts a 30-day protest period, and includes the revised EA and unsigned FONSI. If any changes to the parcels, lease notices, or stipulations result from the protests, an erratum to the NCLS would be posted to the BLM website and on NEPA Register to notify the public of the change, prior to the lease sale. The parcels would be available for sale at an online auction held by the BLM, tentatively scheduled for December 5th, 2023.

Once the lease has been issued, the lessee has the right to use as much of the leased land as necessary to explore for, drill for, extract, remove, and dispose of oil and gas deposits located under the leased lands, subject to non-discretionary statutes, the standard lease terms and stipulations. Even if no restrictions are attached to the lease, the operations must be conducted in a manner that avoids unnecessary or undue degradation of the environment and minimizes adverse effects on the land, air, water, cultural, biological, and visual elements of the environment, as well as other land uses or users. An issued lease may be held for ten years, after which the lease expires unless oil or gas is produced in paying quantities (43 CFR 3107.2)³. A producing lease can be held indefinitely by economic production.

The Mineral Leasing Act (MLA) of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976, affect an entity's qualifications to obtain an oil and gas lease. Section 2(a)(2)(A) of the MLA, 30 U.S.C. 201(a)(2)(A), requires that any entity that holds and has held a Federal Coal Lease for 10 years beginning on or after August 4, 1976, and that is not producing coal in commercial quantities from each such lease cannot qualify for the issuance of any other lease granted under the MLA. 43 CFR 3472 explains coal lessee compliance with Section 2(a)(2)(A). Lease notice, HQ-MLA-1, is added to all parcels notifying lessees of this situation.

1.2 Project Location

The Bureau of Land Management (BLM) Battle Mountain District (BMD) office encompasses about 13.5 million acres, of which approximately 10.4 million acres are public lands managed by the BLM. The December 2023 preliminary parcel list (Table 1) contains 5 parcels covering 4,538.342 acres in Mount Lewis and Tonopah Field Offices (Figures 1-3). The lease parcels are located in Sulphur Springs, Fish Creek Valley, and Railroad Valley.

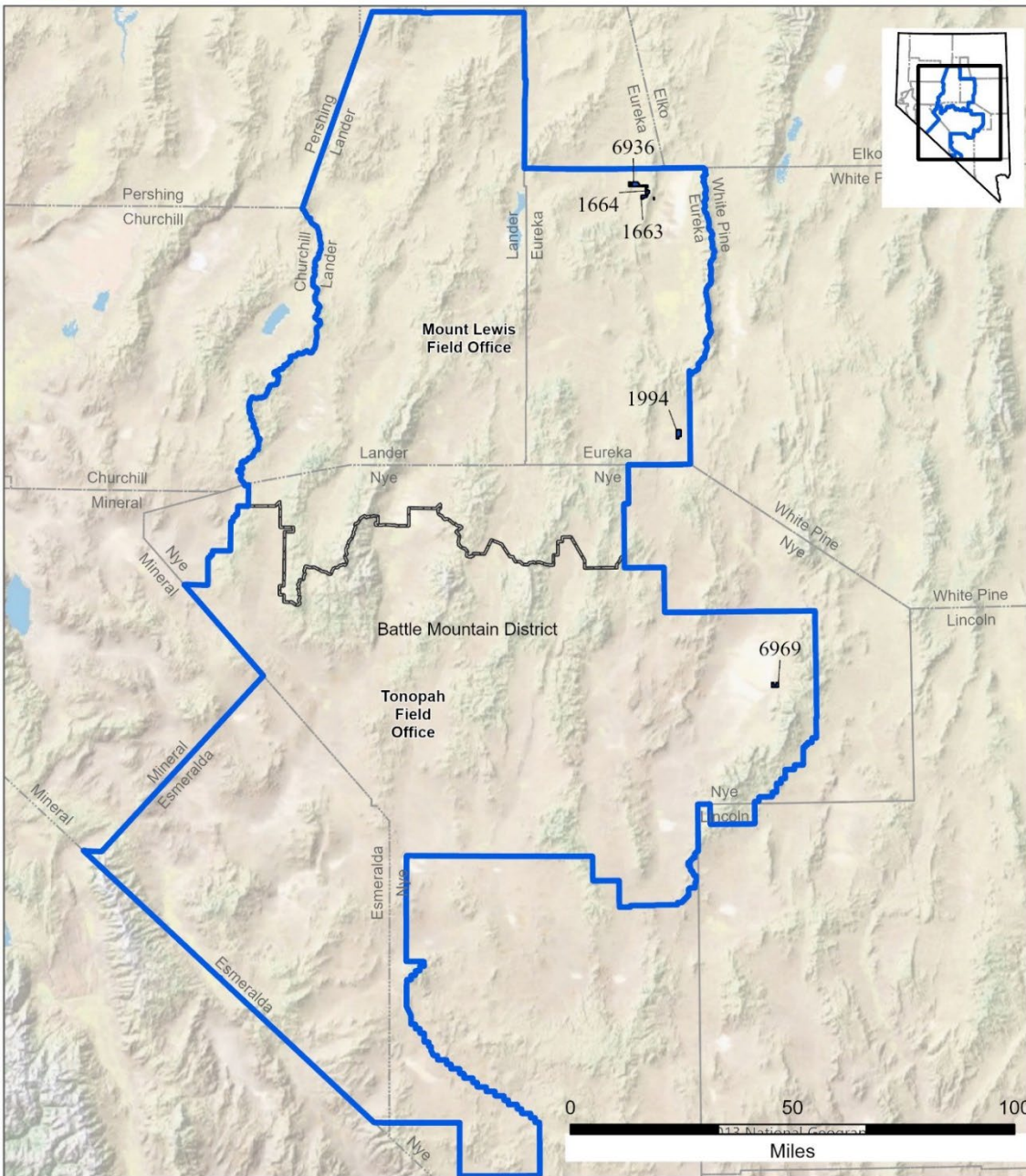
² The NEPA Register is a BLM environmental information internet site and can be accessed online at: <https://eplanning.blm.gov/eplanning-ui/home>.

³ Unless the lease is within an Operating Unit and the Unit is held by production of wells on other leases within the Unit.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District



- 2023_BMDO_OGParcels
- County Boundary
- Field Office Boundary
- District Office Boundary

1:2,000,000



U.S. Department of the Interior
Bureau of Land Management
Battle Mountain District Office
50 Bastian Road
Battle Mountain, NV 89820

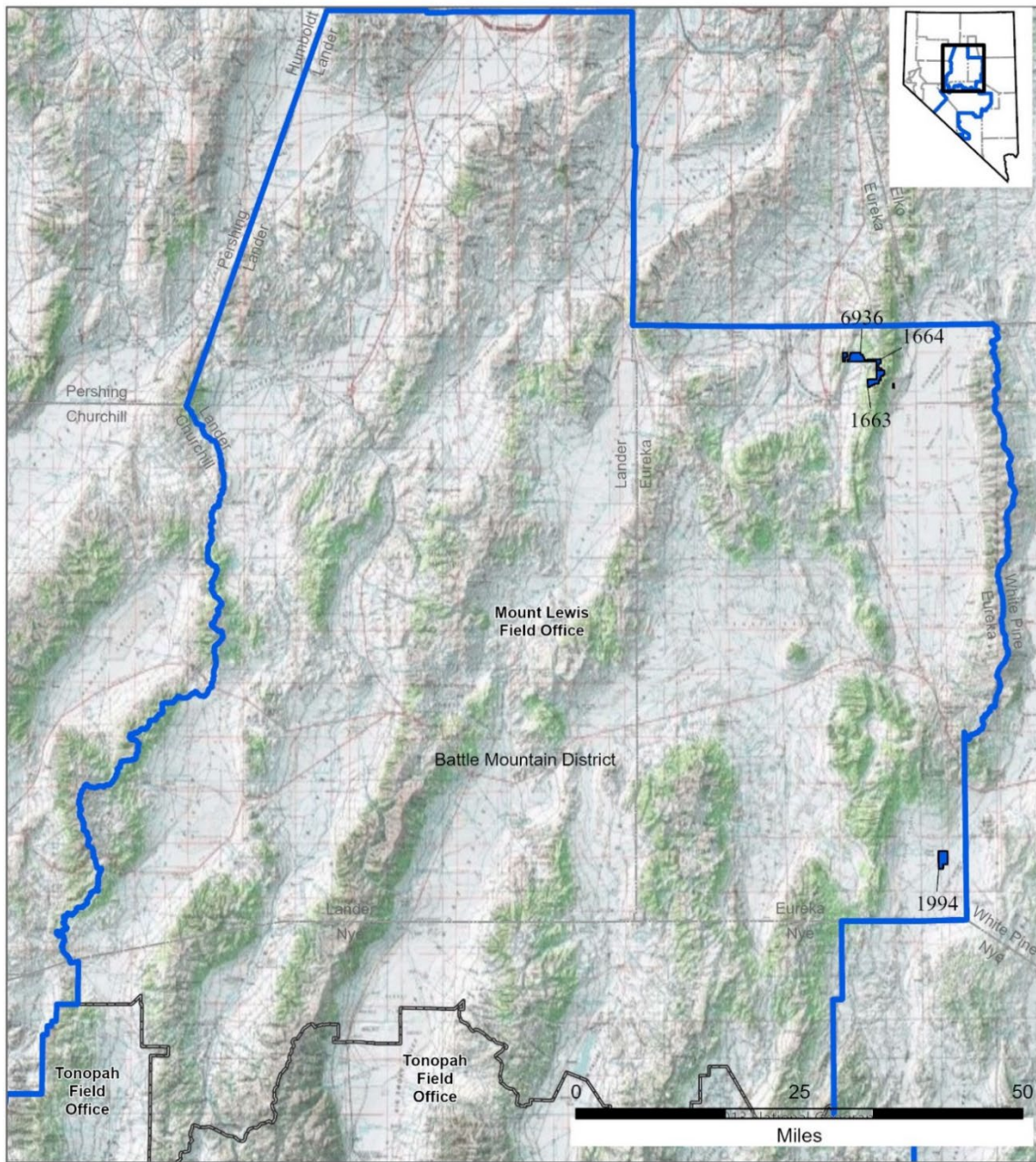
No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual use or aggregate use with other data.

Figure 1. Oil and Gas Lease Sale proposed parcels overview, Battle Mountain District.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Field Office Boundary
- District Office Boundary

1:1,000,000



U.S. Department of the Interior
Bureau of Land Management
Battle Mountain District Office
50 Bastian Road
Battle Mountain, NV 89820

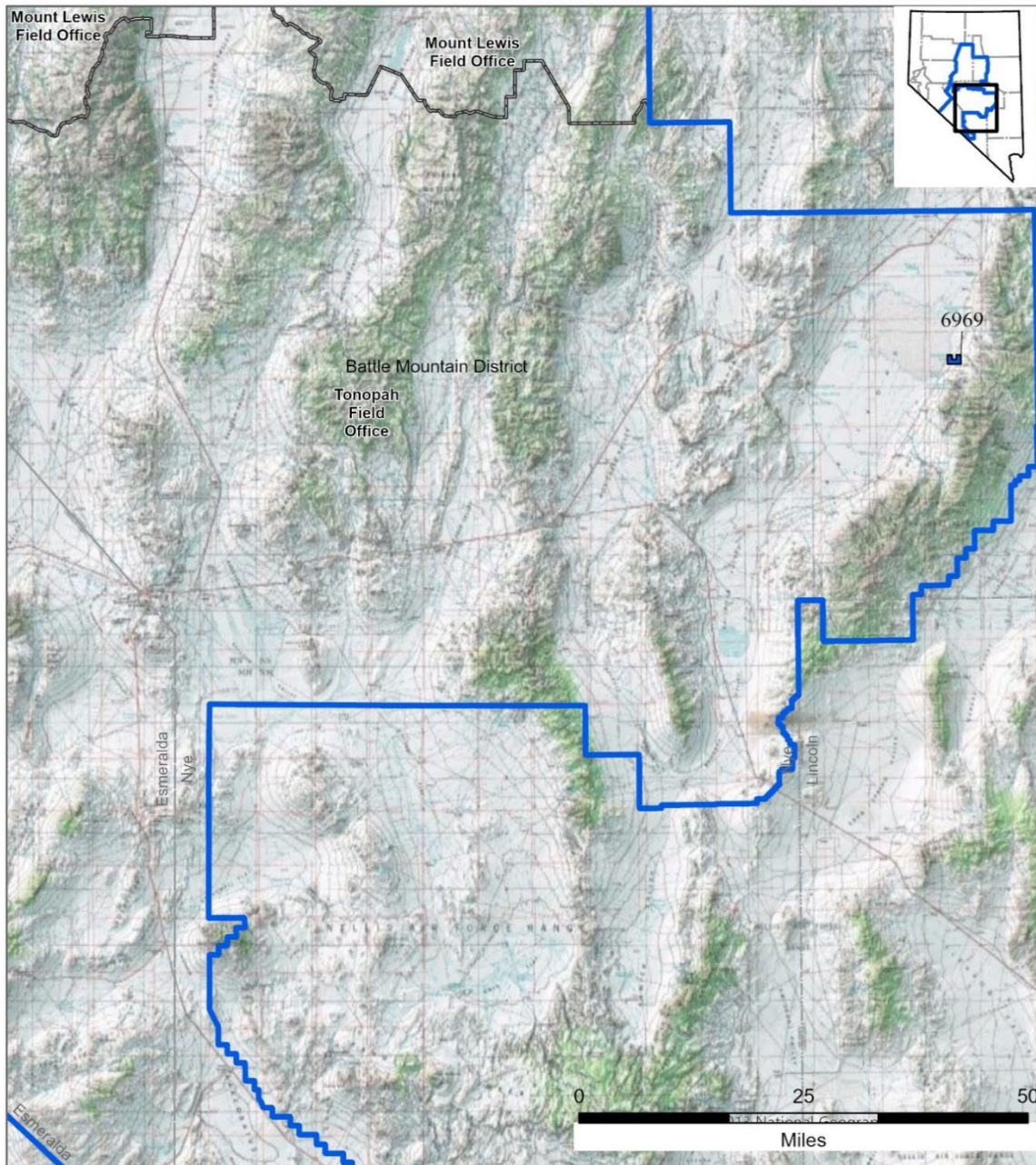
No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual use or aggregate use with other data.

Figure 2. December 2023 Oil and gas proposed lease sale parcels Mount Lewis Field Office.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Tonopah Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Field Office Boundary
- District Office Boundary

1:1,000,000



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Battle Mountain, NV 89820

No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual use or aggregate use with other data.

Figure 3. December 2023 Oil and gas proposed lease sale parcels Tonopah Field Office.

1.3 Purpose and Need for Action

The purpose of this action is for the BMD to respond to Expressions of Interest. The need for the Proposed Action is established by the BLM's mandates under the Acts discussed in Section 1.1, as well as the Mining and Minerals Policy Act of 1970, as amended.

1.4 Decision to be Made

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

1.5 Land Use Plan Conformance

Under FLPMA, the BLM must manage for multiple uses of public lands in a combination that will best meet the present and future needs of the public and their various resources based on an approved land use plan or resource management plan (RMP). For split-estate lands where the mineral estate is an interest owned by the United States, the BLM has no authority over use of the surface by the surface owner; however, the BLM is required to declare in the RMP how the federal mineral estate will be managed, including identification of all appropriate lease stipulations (43 CFR 3101.1 and 43 CFR 1601.0-7(b); BLM Manual 1601.09 and Handbook H-1624-1).

The Proposed Action is in conformance with the Tonopah RMP and Shoshone-Eureka RMP, and the associated Records of Decision, and all subsequent applicable amendments. The RMPs address land use goals and objectives, allowable uses, and management actions for the field office.

Tonopah RMP (Tonopah Field Office), approved 1997

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

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

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

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

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

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

It has been determined that the nominated lease parcels are a subset of the of 4.4 million acres managed by the Mount Lewis Field Office that is open to fluid minerals leasing subject to standard terms and conditions. The RMP and parcel list have been reviewed for applicability of RMP decisions imposing restrictions on fluid minerals activities.

2015 Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA) (BLM, 2015), which amends several BLM land use plans including the Tonopah and Shoshone-Eureka RMPs. The proposed parcels include some areas mapped as General Habitat Management Area (GHMA), or Other Habitat Management Area (OHMA).

- GRSG Plan Amendment Section 2.2, Management Decisions (MD) for Mineral Resources (MR), Unleased Fluid Minerals include the following applicable MD:
- MD MR 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. [These would be applied at the time of additional project-specific analysis.]
- MD MR 3: In PHMAs outside of SFA, no waivers or modifications to an oil and gas lease no-surface occupancy stipulation will be granted.
- MD MR 5: In GHMAs, manage oil and gas and geothermal fluid minerals with moderate constraints, timing limitations, and controlled surface use stipulations.
- MD SSS 20: Once a hard trigger has been reached, all responses in Table J-1 and Table J-2 in Appendix J will be implemented. This includes where soft triggers have been reached for both population and habitat.

GRSG Plan Amendment Appendix G, Fluid Mineral Stipulations, Waivers, Modifications, and Exceptions, specifies the stipulations to apply to each habitat type. 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), See Supplemental Information - A.

2022 Plan Maintenance to the 2015 Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA)

"On May 12, 2022, a Plan Maintenance Action to the Nevada and Northeastern California Sub-Region Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment (September 15, 2015) was signed. This Maintenance Action consisted of two parts, updating the Greater Sage-Grouse Habitat Management Area (HMA) Map with the latest data from USGS and the State of Nevada, and updating the Habitat Objectives for GRSG in line with the latest science.

The overall goal of the 2015 ARMPA is to conserve, enhance, and restore the sagebrush ecosystem upon which Greater Sage-Grouse populations depend, in an effort to maintain and/or increase their abundance and distribution in cooperation with other conservation partners. As the BLM implements the 2015 ARMPA, it sometimes becomes necessary to make minor changes, refinements, or clarifications of the plan. Potential minor changes, refinements, or clarifications in the plan may take the form of maintenance actions.

The updated 2021 HMA map that this Maintenance Action adopted includes additional areas in California that were not included in the 2016 map and removes some areas that no longer meet the definition of HMAs because they no longer support breeding GRSG, nor connect populations within HMAs. In addition, it adopts boundary modifications made by the State of Nevada to the 2016 map."

1.6 Relationship to Statutes, Regulations and Policy

The Proposed Action and alternatives are in conformance with the NEPA of 1969 (P.L. 91-190 as amended; 42 U.S.C. §4321 et seq.); the MLA of 1920 as amended and supplemented (30 U.S.C. 181 et seq.); the FOGLRA of 1987, with regulatory authority under 43 CFR Part 3100, Onshore Oil and Gas Operations (43 CFR Part 3160); 43 CFR 3170; and Title V of the FLPMA of 1976, Rights-of-Way (ROW), with regulatory authority under 43 CFR Part 2800, ROW.

Purchasers of oil and gas leases are required to abide by all applicable federal, state, and local laws and regulations. This includes obtaining all required permits if they develop the lease. All activities will be subject to regulations including, but not limited to, the following:

Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668) prohibits the direct or indirect take of an eagle, eagle part or product, nest, or egg. The term "take" includes "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." The U.S. Fish and Wildlife Service (USFWS) has guidance for proposed projects that have the potential to impact eagles or their habitat; BLM biologists and USFWS would address this at the time of additional project-specific analysis.

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

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

Clean Air Act of 1970, as amended and supplemented by subsequent legislation, established air quality standards to protect health and public welfare and to regulate emissions of hazardous air pollutants.

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."

Endangered Species Act (ESA) of 1973, Section 7, requires federal agencies to "insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species."

Energy Policy Act of 2005, which is directed towards a reduced dependence on foreign energy sources and encourages the development of alternative energy.

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

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

Executive Order 12898 required federal agencies to promote environmental justice by determining, and addressing as needed, whether the agency’s programs, policies, and activities have a disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. When considered at a scale of county sub-regions surrounding the Analysis Area, while there are no known communities with disproportionate representation of any minority race or ethnicity as compared to the state of Nevada overall, the region does have an American Indian population as compared to the state overall; however, it would not be disproportionately affected. See Section 3.5.18.

Executive Order 14008 required federal agencies to consider the effects of greenhouse gas emissions and climate change when deciding on federal actions.

Federal Land Policy and Management Act of 1976, as amended, directs the Secretary of the Interior to manage the public lands for multiple use and sustained yields.

Instruction Memo 2023-008 Impacts of the Inflation Reduction Act of 2022 (Pub. L. No. 117-169) to the Oil and Natural Gas: Summarizes the changes to BLM fiscal terms and the termination of noncompetitive leasing, including the impact on pending leases.

Instruction Memo 2023-010 Oil and Gas Leasing – Land Use Planning and Lease Parcel Reviews: Replaces IM 2021-027 to update the leasing process, including consistency with the Inflation Reduction Act. This includes identifying potential lease parcels, setting out opportunities for public participation and requirements for environmental analysis, providing a specific option for the BLM to use a formal nomination process and confirming the Inflation Reduction Act’s prohibition on noncompetitive leasing.

Mineral Leasing Act of 1920, as amended and supplemented by subsequent legislation, provides for the authorization of BLM to administer leasing of public lands for leasable minerals.

National Historic Preservation Act (NHPA) Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties. The BLM also must comply with the Nevada State Historic 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.

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

Secretarial Order 3289 addresses current and future impacts of climate change on America’s land, water, wildlife, cultural-heritage, and tribal resources.

Secretarial Order 3347 tasks the Department with enhancing conservation stewardship, increasing outdoor recreation opportunities, and improving the management of game species and their habitat.

Secretarial Order 3356 directs the Department to use best available scientific information and to coordinate with State fish and game agencies on energy-related development decisions.

Secretarial Order 3362 directs the Department to improve habitat quality in Western Big-Game Winter Range and Migration Corridors.

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

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

1.7 Public Involvement

External scoping: In preparation for the lease sale, BLM released the current parcel list and map to the public for scoping comments from May 15 to June 14, 2023. Three scoping letters were received. Each letter acknowledged the leasing effort and topics highlighted include BLM mismanagement of resources, comprehensive resource analysis in the NEPA document (greenhouse gases, climate change and adaptation, biological habitats and avoidance, tribal consultation, human health and safety, water resource protection), the reasonably foreseeable development scenario, and responsible oil and gas development. This list is not all inclusive.

Internal scoping: In preparing the preliminary EA that would be released for public comment, the BMD ID Team conducted internal scoping, identified potential resource conflicts, and proposed draft stipulations and lease notices for each parcel.

Native American Coordination: The BMD initiated coordination regarding the proposed lease parcels with the Ely Shoshone and Duckwater Shoshone Tribes by letter on July 18, 2023. Coordination with the Tribes is always ongoing. If any lease parcel is later found to contain resources protected under the NHPA, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders, BLM will not approve ground-disturbing activities that may affect such resources until completing its tribal consultation obligations; and may require modification to exploration or development proposals or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

Nevada Department of Wildlife and U.S. Fish and Wildlife Service input: Concurrently with initial internal scoping, BMD provided the proposed lease sale parcel locations to Nevada Department of Wildlife (NDOW) and U.S. Fish and Wildlife Service (USFWS). Both agencies were available for a coordination meeting with the Nevada State Office regarding preliminary concerns.

Public comment periods and EA revisions: The public comment period is August 8 to September 7, 2023. [Reserved]

Recent Court Decisions:

On February 11, 2022, the United States District Court for the Western District of Louisiana issued an order that, in general, enjoined the Department, among other agencies, from taking action in connection

with Section 5 of Executive Order 13990 and the Interagency Working Group (“IWG”) established by that Order relating to the measurement of the Social Cost of Greenhouse Gases.

Because this proposed sale relies upon the IWG and Section 5 of the Executive Order, the District Court’s injunction precluded the Department from advancing this and similar proposed sales. On March 16, 2022, the Court of Appeals for the Fifth Circuit stayed the injunction pending appeal. *Louisiana by & through Landry v. Biden*, No. 22-30087, 2022 WL 866282 (5th Cir. Mar. 16, 2022).

Previously, on January 27, 2022, the United States District Court for the District of Columbia issued a decision in *Friends of the Earth v. Haaland*, vacating offshore oil and gas lease sale 257 because the Department did not quantify the effects of that sale on emissions from the foreign consumption of oil and gas, despite (in the Court’s view) possessing the tools and methodology to do so. 2022 WL 254526 (D.D.C. Jan. 27, 2021). Given the analysis presently available to BLM, *Friends of the Earth* does not affect BLM’s analysis of this proposed lease sale.

Unlike the Bureau of Ocean Energy Management (“BOEM”)—the agency responsible for sale 257—the Bureau of Land Management has not traditionally used simulation tools like MarketSim (the tool at issue in *Friends of the Earth* and used by BOEM in preparation for sale 257) when evaluating effects on foreign consumption from proposed BLM State Office lease sales. Indeed, the *Friends of the Earth* Court recognized that it had previously upheld BLM’s decision not to consider foreign effects where BLM had “refused to quantify emissions resulting from particular lease parcels, and thus could not conceptualize the extent to which the lease sales would contribute to the local, regional, and global climate change.” 2022 WL 254526, at *13 n.13 (quotation omitted). Likewise, the Court ruled against BOEM for forgoing the foreign consumption analysis for sale 257 in part because BOEM shortly thereafter applied that analysis to a draft NEPA analysis for proposed offshore sale 258. The court’s reasoning does not apply to BLM, which, as noted above, lacks access to any historic or imminent foreign effects analysis at the level of individual BLM State Office lease sales. If and when BLM undertakes this or similar analysis in the future, it may be appropriate to include and consider that analysis when proposing onshore lease sales.

Chapter 2. Proposed Action and Alternatives

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 to the federal government and the lease can be resold.

If leases are issued and lease operations are proposed in the future, BLM would conduct additional project specific NEPA analysis when an Application for Permit to Drill (APD) or other exploration, development or production project application is submitted. In addition to the stipulations and notices attached to the parcel; requirements outlined in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (The Gold Book); and guidelines and Best Management Practices (US DOI and USDA, 2007) would be applied.

Stipulations and/or lease notices would be attached to each offered lease parcel. The stipulations for each alternative are shown under Supplemental Information - A, with the parcels to which each stipulation would apply.

2.1 Proposed Action Alternative

The BLM would offer for lease all 5 nominated parcels (covering approximately 4,538 acres) in the lease sale. The leases would include the standard lease terms and conditions for development of the surface of oil and gas leases provided in 43 CFR 3100 (BLM Form 3100-11) along with all stipulations mandated by policy (such as the Competitive Leasing Handbook, H-3120-1) and by the governing LUP.

Legal land descriptions are shown in Table 1 below. In this document parcels all lease parcel numbers beyond this table are shortened to their last four digits for simplicity.

Table 1. Legal land descriptions and acres by lease parcel.

Parcel	Legal Land Description	Acres	County	Field Office
NV-2023-12-1663	T. 25 N., R. 52 E., MOUNT DIABLO MER Sec. 14 PROT W2NE, W2NENE, W2SENE, NW, N2NWSE, N2SW, SWSW, N2SESW, SWSESW; Sec. 22 PROT N2, N2NWSE, N2SW, N2SWSW; Sec. 23 PROT W2NW, N2NENW; Sec. 24 PROT E2NESE, E2SESE.	950.00	Eureka	Mount Lewis
NV-2023-12-1664	T. 25 N., R. 52 E., MOUNT DIABLO MER Sec. 2 PROT S2SW; Sec. 3 PROT S2S2; Sec. 11 N2NW, SWNW, NWSW, S2SW, SWSWSE.	492.38	Eureka	Mount Lewis
NV-2023-12-1994	T. 16 N., R. 53 E., MOUNT DIABLO MER Sec. 12 S2; Sec. 13 ALL; Sec. 24 NW.	1040.00	Eureka	Mount Lewis
NV-2023-12-6936	T. 25 N., R. 52 E., MOUNT DIABLO MER Sec. 4 PROT W2NW, SENW, SW, W2NWSE, SWSE, S2SESE; Sec. 5 PROT E2, SW, S2NW, NENW, E2NWNW; Sec. 6 PROT W2NE, E2W2, SESE.	1255.97	Eureka	Mount Lewis
NV-2023-12-6969	T. 7 N., R. 57 E., MOUNT DIABLO MER Sec. 27 W2; Sec. 28 W2, SE.	800.00	Nye	Tonopah

Lease parcels along with corresponding stipulations and lease notices used to identify resource concerns during the analysis and review are located in Supplemental Information A. Areas offered for oil and gas leasing would be subject to measures necessary to mitigate adverse impacts, according to the categories, terms, conditions, and stipulations identified in the land use plans, as amended. Under the Proposed Action, the BLM Authorized Officer also has the authority to selectively lease and subsequently issue leases, or to defer, in the light of the analysis of potential effects presented in this EA.

BLM regulations at 43 CFR 3101.1-2 allow for the relocation of proposed oil and gas leasing operations up to 200 meters and/or timing limitations up to 60 days to provide additional protection to ensure that proposed operations minimize adverse impacts to resources, uses, and users.

In addition to the stipulations provided for by the governing LUP (as amended) and BLM policies, Lease Notices have been developed for conservation measures and would be applied on specific parcels as warranted by subsequent IDT review. A BLM interdisciplinary team reviewed all the parcels and applied stipulations and lease notices designed to avoid or minimize impacts to resources.

At the leasing stage it is uncertain whether development on all leased parcels will move forward; however, for the purposes of this analysis, and in order to disclose the effects, a Reasonably Foreseeable Development (RFD) Scenario is assumed wherein all 5 nominated parcels will be developed.

2.2 No Action or No Leasing Alternative

In accordance with BLM NEPA guidelines H-1790-1, Chapter 6, this EA evaluates a No Leasing Alternative which forms a baseline for assessing and comparing the potential impacts of the Proposed Action. Under this alternative, no parcels in the Battle Mountain District would be offered for lease in December 2023. Any new oil and gas development would take place on parcels that were leased in other lease sales. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, and state leases.

2.3 Reasonably Foreseeable Development (RFD) Scenario Summary- Battle Mountain District

The surface disturbance estimate used to analyze the alternatives in this EA is based on the RFD scenario in Supplemental Information - E which comes from the combined Tonopah RMP and Shoshone-Eureka RMP for the BMD. Based on historic information and anticipated activity, approximately 25 wells could 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 BMD over the next ten years on all leased parcels in the district. Potential oil and gas exploration and production activities associated with this RFD would most likely occur in areas of high potential, such as Railroad Valley, where the proposed parcels are located.

Types of activities that could occur are assumed to be those associated with technologies currently in use in geologically similar areas, as described in Supplemental Information - E and would be limited by the stipulations applied (see Supplemental Information - A).

Chapter 3. Affected Environment, Environmental Effects, and Cumulative Effects

3.1 Analysis Process Overview

The act of leasing parcels would not cause direct effects to resources because no surface disturbance would occur. The only effects of leasing are the creation of valid existing rights and impacts related to revenue generated by the lease sale receipts. However, if a lease is sold, the lessee retains certain rights and is responsible for existing disturbance if present. Once a parcel is leased, the lessee has the right to explore for and develop oil and gas resources, subject to standard lease terms and special stipulations pertaining to the conduct of operations. This chapter addresses the affected area, degree of effects of the Proposed Action and No Action Alternative, and Cumulative Effects to resources expected from this action, combined with past actions, and future actions. Additional site-specific NEPA analysis, based on the project, would address effects of any future exploration, development, or production.

3.2 Affected Environment

An EA must analyze and describe the affected area of the proposed action. The term “Analysis Area” refers to the parts of the Battle Mountain District in which the lease parcels occur. It includes Sulphur Springs Valley, in central Eureka County and Fish Creek Valley in Southeast Eureka County within Mount Lewis Field Office and eastern Railroad Valley, Nye County Nevada in Tonopah Field Office (Figures 1-3).

BLM resource specialists prepared this EA to document the analysis of the lease parcels and recommended appropriate stipulations based upon professional knowledge of the areas involved, review of current databases, scientific literature, and file information. At the time of this review, it is unknown whether or not a particular parcel will be sold, and a lease issued. It is also unknown when, where, or if

future well sites, roads, and facilities might be proposed; therefore, the types, magnitude and duration of potential impacts cannot be precisely quantified at this time and would vary according to many factors.

This analysis is tiered to the respective RMP for each geographic location of the nominated parcels, and the lease parcels within areas that are open to oil and gas leasing in their respective RMP.

3.3 Environmental Effects

Effects or impacts “means changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives” and include “ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic (such as the effects on employment), social, or health effects. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial” (40 CFR 1508.1).

The temporal scale of effects includes the 10-year period of a lease term, unless the lease is held by production, in which case the temporal scale is extended to the life of the producing well. If the lease parcels are developed, short-term effects would be stabilized or mitigated rapidly (within two to five years). Long-term effects are those that would substantially remain for more than five years.

3.4 Cumulative -Past, Present, and Reasonably Foreseeable Future Actions

The Battle Mountain District envelops 10.5 million acres and the BLM has numerous projects that occur throughout this vast area. Past actions include mineral exploration, mining, grazing, recreation, realty and land use actions, mineral sales, and fluid mineral exploration, development, and production. Refer to the next section for the affected environment, environmental effects for presently authorized activities affecting the nominated parcels, and reasonable foreseeable future actions.

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

- geothermal exploration and development
- mineral exploration and mining
- gravel pit development and production
- solar or wind energy developments
- communication site construction
- road building
- powerline construction
- livestock grazing
- fence construction
- off-highway vehicle use
- non-motorized recreation such as hunting, mountain biking, and 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

3.5 Supplemental Authorities and Other Resources Considered

To comply with NEPA, BLM is required to address certain elements of the environment that are subject to requirements, called “supplemental authorities,” which are specified in statute, regulation or by executive order (BLM 1988, BLM 1997, BLM 2008). Table 2 outlines these elements. Other resources considered are shown in Table 3. Resources not present or not affected are not addressed further.

Table 2. 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 3.5.1 and 3.5.2
Areas of Critical Environmental Concern	√			The proposed lease parcels are not located in or near any established Area of Critical Environmental Concern.
Cultural resources			√	See Section 3.5.10
Environmental justice		√		An American Indian population is present and is not expected to be disproportionately affected. See Section 3.5.18.
Farmlands, prime or unique	√			There are no Prime or Unique Farmlands, as defined by the Farmland Protection Policy Act, in the BMD.
Noxious weeds and invasive, non-native species			√	See Section 3.5.7
Native American cultural concerns			√	See Section 3.5.11
Floodplains			√	See Section 3.5.5
Riparian/wetlands			√	See Section 3.5.5
Threatened or endangered species			√	See Sections 3.5.6 and 3.5.8
Migratory birds			√	See Sections 3.5.8
Waste, hazardous/solid			√	See Sections 3.5.19
Water			√	See Sections 3.5.5
Wild and Scenic Rivers	√			The proposed parcels are not located in or near any designated Wild and Scenic Rivers.
Wilderness and Wilderness Study Areas (WSAs)	√			None of the proposed parcels are within a designated Wilderness or WSA.
Lands with wilderness characteristics			√	See Sections 3.5.14

Table 3. Other resources considered in the EA.

Other Resources	Not Present	Present/Not Affected	Present/May be Affected	Rationale
Fire management		√		Standard fire management stipulations would be included in any lease sale. Any potential impacts from subsequent exploration and development activities would be analyzed under a separate, project specific analysis.
Forestry and woodland products			√	See Section 3.5.5
Geology and minerals			√	See Section 3.5.15
Health and Human Safety			√	See Sections 3.5.1, 3.5.19, and 3.5.20.
Land use authorization			√	See Section 3.5.16.
Paleontological resources	√			All of the rock units within the nominated parcels have low potential for significant paleontological resources; however, best management practices or conditions of approval 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. To help minimize any potential effects to paleontological resources, a standard Lease Notice, NV-B-00-A-LN, regarding fossils is included in Stipulations and attached to all parcels.
Rangeland resources			√	See Section 3.5.9.
Recreation		√		See Section 3.5.12
Socioeconomic values			√	See Section 3.5.17
Soils			√	See Section 3.5.3
Specially designated areas	√			No specially designated areas were identified during the IDT Review.
Special status species			√	See Section 3.5.6 (plants) and 3.5.8 (animals).
Vegetation			√	See Section 3.5.6
Visual resources		√		See Section 3.5.13
Wild horses and burros	√			None of the lease sale parcels overlap HMA boundaries.

Other Resources	Not Present	Present/Not Affected	Present/May be Affected	Rationale
Wildlife			√	See Section 3.5.8.

3.5.1 Air Quality

Affected Environment

Under the authority of the Clean Air Act (CAA), the Environmental Protection Agency (EPA) has established nationwide air quality standards, known as the National Ambient Air Quality Standards (NAAQS) for six air pollutants. Pollutants for which standards have been set are called criteria pollutants, and include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ & PM_{2.5}), sulfur dioxide (SO₂) and lead (Pb). The NAAQS are protective of human health and the environment. Compliance with the NAAQS is typically demonstrated by monitoring for ground-level atmospheric air pollutant concentrations. Areas where pollutant concentrations are below the NAAQS are designated as attainment or unclassifiable, and air quality is generally considered to be good. Locations where monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is considered unhealthy.

Two additional pollutants of concern, nitrogen oxides (NO_x) and volatile organic compounds (VOCs) contribute to the formation of ozone in the atmosphere, which is a regulated criteria pollutant. Additionally, greenhouse gases (GHGs) became regulated pollutants on January 2, 2011, because of their contribution to global climate change.

While the EPA sets the NAAQS and established Federal regulations, many air quality permitting and State Implementation Plan regulatory activities under the CAA are delegated to the state. The Nevada Division of Environmental Protection (NDEP) Bureau of Air Pollution Control and Air Quality Planning (BAPC) is tasked with permitting and maintaining air quality data for Nevada, as well as long-term strategies for air quality improvement.

CAA regulations also control the release of hazardous air pollutants (HAPs): chemicals that are known or suspected to cause cancer or other serious health effects, such as reproductive effects, birth defects, or adverse environmental effects. EPA currently lists 189 compounds as HAPs, some of which, such as benzene, toluene, and formaldehyde, can be emitted from oil and gas development operations. NAAQS have not been set for HAPs, rather HAP emissions are controlled by source type- or industrial sector-specific regulations. Hydrogen sulfide (H₂S) gas is not regulated under the NAAQS or as a HAP. However, it is known to be hazardous, and is monitored for health and safety at oil and gas sites. There has been no H₂S discovered in oil wells drilled in Nevada since required monitoring began in 2000.

The EPA air quality index (AQI) is an index used for reporting daily criteria pollutant levels to the public (<https://www.airnow.gov>). The AQI index is one way to evaluate how clean or polluted an area's air is and whether associated health effects might be a concern. The EPA calculates a daily AQI based on local air monitoring data. When the AQI value is between 0 and 50, air quality is categorized as "good" and criteria air pollutants pose little or no risk. AQI between 51 and 100 indicates moderate air quality posing little risk. An AQI of 100 indicates at least one pollutant is at the NAAQS concentration. Air monitoring data and daily AQIs are available near the proposed lease areas in the counties shown in Table 4. AQI data shows air quality is generally good within the analysis area and that there is little risk to the general public from poor air quality based on available data for the most recent 5-year period (2017-2021).

Table 4. Air Quality Index Data 2017-2021

County	Avg Days with AQI per year	Avg Days Rated Good	Avg Days Rated Moderate	Avg Days Rated Unhealthy ¹	% Days Rated Good	% Days Rated Moderate	% Days Rated Unhealthy
Nye	365	345	18	1.8	94.6%	4.9%	0.5%

County	Avg Days with AQI per year	Avg Days Rated Good	Avg Days Rated Moderate	Avg Days Rated Unhealthy ¹	% Days Rated Good	% Days Rated Moderate	% Days Rated Unhealthy
White Pine	359	284	73	2.4	79.0%	20.4%	0.7%
Average	362	315	46	2.1	86.8%	12.6%	0.6%

1 - Includes days rated Unhealthy for Sensitive Groups, Unhealthy, Very Unhealthy, and Hazardous

Source - AQI by County data downloaded from EPA Air Data https://aqs.epa.gov/aqsweb/airdata/download_files.html#AQI

Air Quality Related Values (AQRVs) are resources that are sensitive to air quality and include aesthetic values such as visibility and biological and terrestrial resources such as vegetation, soils, water, and wildlife. Air pollution can effect AQRVs through exposure to elevated atmospheric concentrations, such as O₃ effects to vegetation, impairment of scenic views by pollutant particles in the atmosphere, and deposition of air pollutants, such as sulfur and nitrogen compounds, on the earth's surface through precipitation or dry deposition. AQRVs on federal lands are identified and managed within the respective jurisdictions of several land management agencies in designated Class I areas. Class I areas are afforded specific AQRV protection under the CAA. There are no Class I areas in or adjacent to the analysis area. The nearest Class I areas are the John Muir Wilderness, approximately 180 miles southwest of the southernmost lease parcels, and the Jarbidge Wilderness, approximately 115 miles north of the northernmost lease parcel.

Pollutant particles in the atmosphere can impair scenic views, degrading the contrast, colors, and distance an observer is able to see. Visibility is a measure of how far and how well an observer can see a distant and varied scene and can be assessed in terms of the distance that a person can distinguish a large dark object on the horizon; it is measured as the standard visual range in miles. Visibility degradation is primarily due to anthropogenic sulfate, nitrate, particulate emissions, or smoke from wildfires. Air pollutants affecting visibility can be transported hundreds of miles.

A deciview (dv) is a unit of measurement to quantify human perception of visibility. It is derived from the natural logarithm of atmospheric light extinction coefficient. One (1) deciview is roughly the smallest change in visibility (haze) that is barely perceptible. Because visibility at any one location is highly variable throughout the year, it is characterized by three groupings: the clearest 20% days, average 20% days, and haziest 20% days.

The Great Basin National Park (GBNP), located approximately 80 miles east of the proposed lease sale parcels, is the closest monitoring station for visibility. The figure below shows current visibility trends at GBNP, an area that could potentially be affected from development on proposed lease sale parcels. GBNP is not a Class I area. Visibility in GBNP is generally very good. For context, the 2021 high reading of 15 deciviews recorded in 2021 indicates a visible range of more than 60 miles. The haziest days metric is designed to show the effect of wildfire smoke on visibility. It indicates that the uptick in haze index in 2020 and 2021 may have been due to regional wildfires.

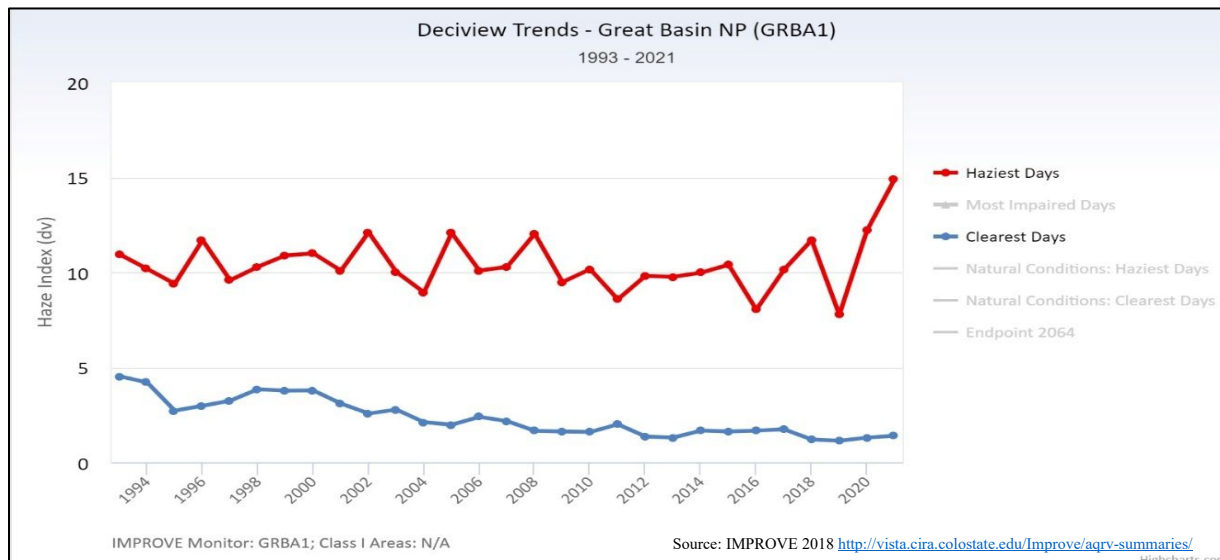


Figure 4. Air quality at Great Basin National Park.

Atmospheric deposition occurs when gaseous and particulate air pollutants are deposited on the ground, water bodies, or vegetation. The pollutants may settle as dust or be washed from the atmosphere in rain, fog, or snow. When air pollutants such as sulfur and nitrogen are deposited into ecosystems, they may cause acidification, or enrichment of soils and surface waters. Atmospheric nitrogen and sulfur deposition may affect water chemistry, resulting in effects to aquatic vegetation, invertebrate communities, amphibians, and fish. Deposition can also cause chemical changes in soils that alter soil microorganisms, plants, and trees. Although nitrogen is an essential plant nutrient, excess nitrogen from atmospheric deposition can stress ecosystems by favoring some plant species and inhibiting the growth of others.

Environmental Effects of the Proposed Action

Leasing the subject parcels would have no effects on air quality or air quality related values. Any potential effects on air quality would occur if and when the leases are developed for oil and gas activities. Air quality is affected by various natural and anthropogenic factors. Industrial sources such as power plants, mines, and oil and gas extraction activities in Nevada contribute to local and regional air pollution. It is unknown if the parcels would be sold and developed, or the extent of development, so it is not possible to feasibly quantify potential air quality effects via methods such as dispersion modeling. Table 5 presents estimated criteria pollutant and HAP emissions from well development and operations for the reasonably foreseeable development scenario. As shown in the table, these emissions would make up approximately 0.1% of expected total emissions in the BMD during a typical year or over the expected 30-year production life of any wells drilled. This small increase in emissions would not be expected to cause a discernable change in air quality.

Table 5. Estimated Maximum Year, Average Year, and Production Life Criteria and Hazardous Air Pollutant Emissions (tons per year) with Context.

Activity	PM ₁₀	PM _{2.5}	VOC	NO _x	CO	SO ₂	HAPs
Max Year	44.2	5.8	97.8	39.3	27.8	2.5	11.3
Average Year	26.0	3.3	81.9	19.2	18.7	1.8	9.5

Activity	PM ₁₀	PM _{2.5}	VOC	NO _x	CO	SO ₂	HAPs
Production Life Total	780.5	99.1	2,456.2	576.7	562.1	54.6	285.4
Context							
BMD Region Annual Total¹	44,330	7,635	107,640	12,940	52,571	489	23,606
BMD Region Production Life Total	1,329,900	229,050	3,229,200	388,200	1,577,130	14,670	708,172
<small>1 - Total annual pollutant emissions for Esmerelda, Eureka, Lander, and Nye Counties reported in the 2017 NEI (https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#dataq)</small>							

The RFD scenario assumes new development would have similar characteristics as prior, older developments in existing Nevada oil fields, with similar equipment, access roads, and infrastructure. Historically in the lease area 95% of exploration results in dry holes, less than 20% of completed wells produce commercially viable quantities of oil, and no commercial quantities of gas have been discovered. Future effects to air quality, visibility, and atmospheric deposition from leasing and existing development would be similar to past years. Accordingly, estimated emissions presented in Table 5 are conservative and represent a total of 25 wells drilled, with three (3) of those wells coming into production.

Design Constraints

The BLM does look to mitigate pollutants via lease stipulations and notices and further NEPA actions throughout the lease process. Air quality control measures may be warranted and if so, would be imposed at the APD stage (such as mitigation measures, best management practices (BMPs), and an air emissions inventory). The BLM would do this in coordination with the NDEP BAPC, EPA, and other agencies that have jurisdiction on air quality. At the APD stage, further conditions of approval (COAs) could be applied based on the environmental analysis for the APD. These control measures are dependent on emissions inventory and future modeling studies or other analysis or changes in regulatory standards.

No Action Alternative

Under the No Action Alternative, the parcel(s) would not be leased, and no new foreseeable oil and gas development would occur on the subject lease parcels. As stated in Section 2.2, only those leased lands would see development after undergoing resource review and NEPA analysis.

Cumulative effects

As shown in Table 5, the cumulative effects on air quality from the incremental impact of the proposed action, when added to the past actions, present actions, RFFAs, and expected emissions from other sources in the District, including fugitive, point source, and related mobile combustion emissions, which would remain low. Any air quality regulations implemented by BAPC and the BLM would serve to mitigate the regulated emissions and help to maintain the attainment status of the current regional air quality. The relatively small increases in air emissions related to the RFD would not be expected to substantially change air quality in the District. See Section 3.5.1 and Table 5 above for quantitative information on the potential for cumulative air resource impacts.

Environmental effects to air quality and climate change within the analysis area from past, present, and reasonably foreseeable future actions include: fugitive dust emissions, including particulate (PM_{2.5} and

PM₁₀), combustion emissions from vehicle-based activities such as agriculture, road construction and maintenance, off-highway vehicle (OHV) use, exploration and mining activities, aggregate operations, public land management activities, wildland fire, and greenhouse gas emissions from grazing. Industrial and mining activities within the analysis area greater than five acres (20 acres for minerals projects) of surface disturbance are required to obtain and operate under an air quality permit from the State of Nevada Bureau of Air Pollution Control (BAPC).

3.5.2 Greenhouse Gas (GHG) and Climate Change

Future development of lease parcels under consideration could lead to emissions of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), the three most common greenhouse gases associated with oil and gas development. These GHG emissions would be emitted from leased parcels if developed, and from the consumption of any fluid minerals that may be produced. However, the BLM cannot reasonably determine at the leasing stage whether, when, and in what manner a lease would be explored or developed. The uncertainty that exists at the time the BLM offers a lease for sale includes crucial factors that would affect actual GHG emissions and associated impacts, including but not limited to the future feasibility of developing the lease, well density, geological conditions, development type (vertical, directional, or horizontal), hydrocarbon characteristics, specific equipment used during construction, drilling, production, abandonment operations, production and transportation, and potential regulatory changes over the 10-year primary lease term. Actual development on a lease may vary from what is analyzed in this EA and may be evaluated through site-specific NEPA analysis when an operator submits an APD or plan of development to the BLM.

Affected Environment

For the purposes of this analysis, the BLM has evaluated the potential effects of the proposed leasing action on climate change by estimating and analyzing potential GHG emissions from projected oil and gas development on the parcels proposed for leasing using estimates based on past oil and gas development and available information from existing development within the State.

Further discussion of climate change science and predicted impacts, as well as the reasonably foreseeable and cumulative GHG emissions associated with BLM's oil and gas leasing actions, are included in the *BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (BLM, 2022) (hereinafter referred to as the Annual GHG Report). This report presents the estimated emissions of greenhouse gases attributable to development and consumption of fossil fuels produced on lands and mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference as an integral part of this analysis and is available at <https://www.blm.gov/content/ghg/2021>. Additional information on observed and projected climate change effects in Nevada is available from the State of Nevada Climate Initiative at <https://climateaction.nv.gov/policies/climate-nv/>.

Climate change is a global process that is affected by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from a single proposed land management action cannot be accurately translated into its potential effect on global climate change or any localized effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources as a result of specific emissions. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to climate change resulting from the accumulation of GHG emissions over time. GHGs influence the global climate by increasing the amount of solar energy retained by land, water bodies, and the atmosphere. GHGs can have long atmospheric lifetimes, which allows them to become well mixed and uniformly distributed over the entirety of the Earth's surface no matter their point of origin. Therefore, potential emissions resulting from the proposed action can be compared to state, national and global GHG emission totals to provide context of their significance and potential contribution to climate change impacts.

Table 6 shows the total estimated GHG emissions from fossil fuels at the global, national, and state scales over the last five years. Emissions are shown in million metric tonnes or megatonnes (Mt) per year of carbon dioxide equivalent (CO₂e). Chapter 3 of the Annual GHG Report contains additional information on GHGs and an explanation of CO₂e. State and national energy-related CO₂ emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) and are released at the location where the fossil fuels are consumed.

Additional information on current state, national, and global GHG emissions as well as the methodology and parameters for estimating emissions from BLM fossil fuel authorizations and cumulative GHG emissions is included in the Annual GHG Report (see Chapters 4, 5, and 6).

Table 6. Global and U.S. GHG Emissions 2015 - 2020 (Mt CO₂e/yr)

Scale	2016	2017	2018	2019	2020
Global	36,465.6	36,935.6	37,716.2	37,911.4	35,962.9
U.S.	5,077.0	5,005.5	5,159.3	5,036.0	4,535.3
Nevada	44.3	44.1	45.4	46.8	43.1

Source: Annual GHG Report, Chap. 6, Table 6-1 (Global and U.S.) and Nevada Statewide Greenhouse Gas Emissions Inventory and Projections, 2022 Report, www.ndep.nv.gov/uploads/air-pollutants-docs/ghg_report_2022.pdf

Mt (megatonne) = 1 million metric tons

The continued increase of anthropogenic GHG emissions over the past 60 years has contributed to global climate change impacts. A discussion of past, current, and projected future climate change impacts is described in Chapters 8 and 9 of the Annual GHG Report. These chapters describe currently observed climate impacts globally, nationally, and in each State, and present a range of projected impact scenarios depending on future GHG emission levels. These chapters are incorporated by reference in this analysis.

Environmental Effects of the Proposed Action

While the leasing action does not directly result in development that will generate air emissions, emissions from potential future development of the leased parcels are reasonably foreseeable and can be estimated for the purposes of this lease sale. There are four general phases of post-lease development that would generate air pollutant emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations (extraction, separation, gathering), 3) mid-stream (refining, processing, storage, and transport/distribution), and 3) end-use (combustion or other uses) of the fuels produced. While well development and production operation emissions occur on-lease and the BLM has program authority over these activities, mid-stream and end-use emissions typically occur off-lease where the BLM has no program authority. Off-lease criteria pollutant and HAP emissions are monitored, regulated and accounted for by the EPA and delegated State and Local other agencies under the Clean Air Act, and are not analyzed further in this Environmental Assessment.

Emissions inventories at the leasing stage are imprecise due to uncertainties including the type of mineral development (oil, gas, or both), scale, and duration of potential development, types of equipment (drill rig engine tier rating, horsepower, fuel type), and the mitigation measures that a future operator may propose in their development plan. In order to estimate reasonably foreseeable on-lease emissions at the leasing stage, the BLM uses estimated well numbers based on State data for past lease development combined with per-well drilling, development, and operating emissions data from representative wells in the area. The amount of oil or gas that may be produced if the offered parcels are developed is unknown. For

purposes of estimating production and end-use emissions, potential wells are assumed to produce oil and gas in similar amounts as existing nearby wells. While the BLM has no authority to direct or regulate the end-use of the products, for this analysis, the BLM assumes all produced oil or gas will be combusted (such as for domestic heating or energy production). The BLM acknowledges that there may be additional sources of GHG emissions along the distribution, storage, and processing chains (commonly referred to as midstream operations) associated with production from the lease parcels. These sources may include emissions of methane (a more potent GHG than CO₂ in the short term) from pipeline and equipment leaks, storage, and maintenance activities. These sources of emissions are highly speculative at the leasing stage, therefore, the BLM has chosen to assume that mid-stream emissions associated with lease parcels for this analysis will be similar to the national level emissions identified by the Department of Energy's National Energy Technology Laboratory (NETL, 2009) (NETL, 2019).

The emission estimates calculated for this analysis were generated using the assumptions previously described above using the BLM Lease Sale Emissions Tool. Emissions are presented for each of the four phases of post-lease development described above.

- Well development emissions occur over a short period and may include emissions from heavy equipment and vehicle exhaust, drill rig engines, completion equipment, pipe venting, and well treatments such as hydraulic fracturing.
- Well production operations, mid-stream, and end-use emissions occur over the entire production life of a well, which is assumed to be 30 years for this analysis based on the productive life of a typical oil/gas field.
- Production emissions may result from storage tank breathing and flashing, truck loading, pump engines, heaters and dehydrators, pneumatic instruments or controls, flaring, fugitives, and vehicle exhaust.
- Mid-stream emissions occur from the transport, refining, processing, storage, transmission, and distribution of produced oil and gas. Mid-stream emissions are estimated by multiplying the estimated ultimate recovery (EUR) of produced oil and gas with emissions factors from NETL life cycle analysis of U.S. oil and natural gas. Additional information on emission factors can be found in the Annual GHG report (Chapter 4, Table 4-7 and 4-9).
- For the purposes of this analysis, end-use emissions are calculated assuming all produced oil and gas is combusted for energy use. End-use emissions are estimated by multiplying the EUR of produced oil and gas with emissions factors for combustion established by the EPA (Tables C-1 and C-2 to Subpart C of 40 CFR § 98). Additional information on emission factors and EUR factors can be found in the Annual GHG Report (Chapter 4).

Table 7 lists the estimated annual and production life direct (well development and production operations) and indirect (mid-stream and end-use) GHG emissions in metric tons (tonnes) for the RFD.

Table 7. Estimated Direct and Indirect GHG Emissions from the Lease Parcels on an annual and life of lease basis (Metric Tonnes)

Time Span	CO ₂	CH ₄	N ₂ O	CO ₂ e (100-yr)	CO ₂ e (20-yr)
Max Year	25,550	76.64	0.167	27,879	31,918
Average Year	8,237	48.03	0.048	9,681	12,212
Life of Lease	210,638	936.94	1.237	238,896	288,273

Source: BLM Lease Sale Emissions Tool

Table 8 presents a breakdown of estimated direct and indirect GHG emissions in metric tons (tonnes) for the RFD over the average 30-year production life of the lease.

Table 8. Estimated Production Life GHG Emissions from Well Development, Well Production Operations, Mid-stream, and End-use (tonnes)

Activity	CO ₂	CH ₄	N ₂ O	CO ₂ e (100-yr)	CO ₂ e (20-yr)
Well Development	36,977	299.46	0.226	45,962	61,743
Production Operations	33,874	475.03	0.085	48,053	73,088
Mid-Stream	18,513	158.72	0.282	23,320	31,685
End-Use	121,274	3.73	0.644	121,560	121,757
Total	210,638	936.94	1.237	238,896	288,273

Source: BLM Lease Sale Emissions Tool

GHG emissions vary annually over the production life of a well due to declining production over time. Figure 5 shows the estimated GHG emissions profile over the production life of a typical lease including well development, well production operations, mid-stream, end-use, and gross (total of well development, well production, mid-stream, and end-use) emissions. In the BMD, as described in Section 3.5.2 and shown on this chart, well development could take as long as ten years and only three of 25 wells are expected to produce oil, thus maximum emissions are reached in year 10 and decline over the life of the lease.

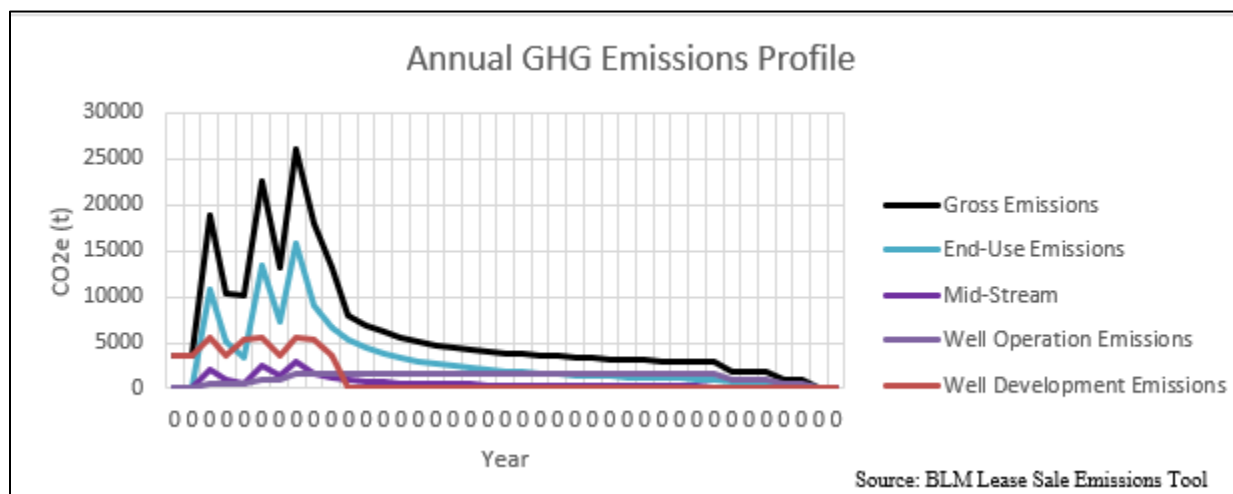


Figure 5. Estimated GHG Emissions Profile over the Life of a Lease.

To put the estimated GHG emissions for this lease sale in a relatable context, potential emissions that could result from development of the lease parcels for this sale can be compared to other common activities that generate GHG emissions and to emissions at the state and national level. The EPA GHG equivalency calculator can be used (<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>) to express the potential average year GHG emissions on a scale relatable to everyday life. For instance, the projected average annual GHG emissions from potential development of the subject lease are equivalent to 2,086 gasoline-fueled passenger vehicles driven for one year, or the emissions that could be avoided by operating three wind turbines as an alternative energy source or offset by the carbon sequestration of 11,525 acres of forest land.

Table 9 compares emission estimates over the 30-year production life compared to the 30-year projected Federal emissions in the state and nation from existing wells, the development of approved APDs, and emissions related to reasonably foreseeable lease actions.

Table 9. Comparison of the RFD Production Life GHG Emissions to other Federal Oil and Gas Emissions.

Reference	Mt CO2e (30-yr total)	Life of Lease % of Reference
Life of Lease	0.239	100.000%
NV Reasonably Foreseeable Short-Term Onshore Federal (O&G)¹	2.74	8.719%
NV Projected Long-Term Onshore Federal (O&G)²	4.83	4.947%
U.S. Reasonably Foreseeable Short-Term Onshore Federal (O&G)	4,614.81	0.005%
Projected Long-Term Onshore¹ Federal (O&G)²	13,560.24	0.002%
Source: U.S. and Federal emissions from BLM Lease Sale Emissions Tool and Annual GHG Report Tables 5-17 and 5-18. ¹ Short-term foreseeable is estimated Federal emissions from existing producing wells, approved APDs, and one year of leasing. ² Long-term foreseeable are estimated Federal emissions to meet EIA projected energy demand.		

Compared to emissions from other existing and foreseeable short-term Federal oil and gas development, the life of lease emissions for the RFD is between 4.9% to 8.7% of Federal fossil fuel authorization emissions in the state and between 0.002% to 0.005% of Federal fossil fuel authorization emission in the nation (EPA , 2022). If foreseeable “long-term” Federal oil and gas development and production-remains a constant percentage of EIA projected energy demand, then the estimated emissions from the life of leases in the Proposed Action is approximately 0.0002% of total emissions in the nation the next 30 years. In summary, potential GHG emissions from the Proposed Action could result in GHG emissions of 0.239 MT CO₂e over the life of the lease.

The “social cost of carbon”, “social cost of nitrous oxide”, and “social cost of methane” – together, the “social cost of greenhouse gases” (SC-GHG) are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year. Such analysis should not be construed to mean a cost determination is necessary to address potential impacts of GHGs associated with specific alternatives. These numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document SC-GHG is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decision-making. For Federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the social cost of carbon dioxide (SC-CO₂), methane (SC-CH₄), and nitrous oxide (SC-N₂O) developed by the Interagency Working Group (IWG) on the SC-GHG. Select estimates are published in the Technical Support Document (IWG 2021) and the complete set of annual estimates are available on the Office of Management and Budget’s website. ⁴⁵

The SC-GHGs associated with estimated emissions from future potential development of the lease parcels are reported in Table 10. These estimates represent the present value (from the perspective of 2023) of future market and nonmarket costs associated with CO₂, CH₄, and N₂O emissions from potential well development and operations, and potential end-use, as described above. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM’s estimates

of emissions in each year. They are rounded to the nearest \$1,000. The estimates assume development will start in 2023 and end-use emissions complete in 2060, based on experience with previous lease sales.

Table 10. SC-GHG Associated with Future Potential Development

	Social Cost of GHGs (2020 \$)			
	Average Value, 5% discount rate	Average Value, 3% discount rate	Average Value, 2.5% discount rate	95 th Percentile Value, 3% discount rate
Development and Operations	\$700,000	\$2,465,000	\$3,657,000	\$7,246,000
Mid-Stream and End-Use	\$1,892,000	\$6,967,000	\$10,472,000	\$21,030,000
Total	\$2,592,000	\$9,432,000	\$14,129,000	\$28,276,000

As detailed in the Annual GHG Report (BLM, 2022), which the BLM has incorporated by reference, the BLM also looked at other tools to inform its analysis, including the MAGICC model (see Section 7.0 of the Annual GHG Report). This model run suggests that “30-plus years of projected federal emissions would raise average global surface temperatures by approximately 0.0158 °C., or 1% of the lower carbon budget temperature target.” As this is an assessment of what BLM has projected could come from the entire Federal fossil fuel program, including the projected emissions from the proposed action, over the next 30 years, the reasonably foreseeable lease sale emissions contemplated in this EA are not expected to substantially affect the rate of change in climate effects, bring forth impacts that are not already identified in existing literature, or cause a change in the magnitude of impacts from climate change at the state, national, or global scales.

No Action Alternative

Neither the proposed RFD scenario in Supplemental Information - E nor the scenario currently used have any significant influence on current cumulative demand for petroleum products (EIA, 2022). The BLM has no information regarding what energy source would replace existing production if oil and gas development decreased or ended in Nevada. Although the change in emissions compared to typical oil and gas development could range from a 98.5% decrease if hydroelectricity is substituted to a 210% increase if coal is substituted, see Table 10-3 in Section 10.0 of the *BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends (2021)* (BLM, 2022) (hereinafter referred to as the Annual GHG Report). This report presents the estimated emissions of greenhouse gases attributable to fossil fuels produced on lands and mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference as an integral part of the analysis for this proposed lease sale and is available at <https://www.blm.gov/content/ghg/>.

Over the past decade the increasing mix of natural gas has contributed to lower emissions as it has replaced energy produced from coal. In 2022, high prices for natural gas and demand exceeding supply have resulted in some countries reactivating or delaying planned closures of coal fired power plants (Reuters, 2022). In the future, renewable energy is anticipated to become a larger part of the U.S. energy mix and reducing energy related carbon emissions. It has been estimated that with a 35% integration of wind and solar energy into the Western United States electric grid, there would be an additional 25-45% reduction in carbon emissions (BLM, 2022) . Because petroleum production would likely continue in BMD whether or not the proposed RFD scenario was established, BLM estimated that the SC-GHG estimates provided in Table 10 are representative of the No Action Alternative.

Although electricity-generating capacity from renewable energy sources is anticipated to continue to grow in 2022 and 2023, it will not have a significant impact on short-term supply and demand. EIA studies and

recent U.S. activities regarding short-term domestic “supply disruptions” or sudden increases in demand suggest that reducing domestic supply (in the near-term under the current supply / demand scenario) would lead to the import of more oil and natural gas from other countries, including countries with lower environmental and emission control standards than the United States, or even causes a release from the current U.S. stockpile to meet consumer demand and maintain stable prices.

The EIA 2021 AEO long-term energy outlook for the high U.S. domestic natural gas supply scenario describes a potential 1.2% growth in natural gas-related GHG emissions for the power sector through year 2050 and an almost 3% decline in coal-related emissions over the 30-year period. For the EIA projected low oil and gas supply scenario, power sector related GHG emissions reduce for both natural gas and coal through the period and at a smaller relative percentage for coal resulting in coal-related emissions still being higher than those associated with natural gas at year 2050 (U.S. Energy Information Administration (EIA), 2021). A detailed discussion of past, present, and projected global and state GHG emissions can be found in Chapter 6 of the Annual Report.

Although no new GHG emissions from the development of these lease parcels would occur under the No Action Alternative, recent projections indicate that U.S. production levels are expected to remain static or even increase in the short-term.

Cumulative effects

Cumulative impacts to air quality would occur only following an APD approval and subsequent development, and not from the proposed action of offering the lease parcels. The study area includes the regional air shed of central Nevada encompassing the whole analysis area. Impacts to air quality from past and present actions have included particulate (PM_{2.5} and PM₁₀) and combustion emissions from agriculture, road construction and maintenance, off-highway vehicle (OHV) use and recreation, exploration, mining and processing activities, aggregate operations, public land management activities, and wildland fire. All activities with more than five acres (20 acres for minerals projects) of surface disturbance would operate under an air quality permit from the State of Nevada Bureau of Air Pollution Control (BAPC).

Impacts to air quality from RFFAs could result from the localized generation of dust and combustion emissions from OHV use and recreational traffic on unpaved roads, livestock grazing, agricultural use, road construction and maintenance, exploration, aggregate operations, public land management activities, and fugitive emissions from wildland fire. Dust from public traffic on unpaved roads would likely create a low impact to air quality and impacts would be localized.

Climate Change - The analysis of GHGs contained in this EA includes estimated emissions from the RFD as described above. An assessment of GHG emissions from other BLM fossil fuel authorizations including coal leasing and oil and gas leasing and development is included in the BLM Specialist Report on Annual GHG Emissions (referred to as Annual Report, see Chapter 5). The Annual Report includes estimates of reasonably foreseeable GHG emissions related to BLM lease sales anticipated during the fiscal year, as well as the best estimate of emissions from ongoing production, and development of parcels sold in previous lease sales. It is, therefore, an estimate of cumulative GHG emissions from the BLM fossil fuel leasing program based on actual production and statistical trends.

The Annual Report provides an estimate of short-term and long-term GHG emissions from activities across the BLM’s oil and gas program. The short-term methodology presented in the Annual Report includes a trends analysis of (1) leased federal lands that are held-by-production, (2) approved applications for permit to drill (APDs), and (3) leased lands from competitive lease sales occurring over the next annual reporting cycle (12 months), to provide a 30-year projection of potential emissions from Federal oil and gas lease actions over the next 12 months. The long-term methodology uses oil and gas

production forecasts from the Energy Information Administration (EIA) to estimate GHG emissions out to 2050 that could occur from past, present, and future development of Federal fluid oil and gas. For both methodologies, the emissions are calculated using life-cycle-assessment emissions and data factors. These analyses are the basis for projecting GHG emissions from lease parcels that are likely to go into production during the analysis period of the Annual Report and represent both a hard look at GHG emissions from oil and gas leasing and the best available estimate of reasonably foreseeable cumulative emissions related to any one lease sale or set of quarterly lease sales.

Table 4 shows the aggregate GHG emissions estimate that would occur from Federal leases, existing and foreseeable, between the years 2022 and 2050, using the methodology described above. The 5-year lease averages include all types of oil and gas leases, including leases granted under the Mineral Leasing Act as well as other authorities, that have been issued over the last five years. As such the projections made from the 5-year averages represent the potential for all types of future oil and gas development activity, and although not at exact acreages, include emissions that would be associated with the subject leases. However, they may also over-estimate the potential emissions from the 12-month cycle of competitive oil and gas leasing activities if the projected lease sale or development activity does not actually occur or is less than estimated.

Table 5. Reasonably Foreseeable Projected Emissions from Federal Lease Development

State (BLM Administrative Unit)	GHG Emissions from Past, Present, and Foreseeable Federal Lease Development (Mt CO₂e per year)*
Alabama (ES)	9.34
Alaska	136.9
Arkansas (ES)	9.34
California	51.49
Colorado	243.1
Idaho	0.17
Illinois	0.31
Kansas (ES)	3.32
Kentucky (ES)	0.19
Louisiana (ES)	43.29
Michigan (ES)	1.95
Mississippi (ES)	2.89
Montana	58.82
Nebraska (WY)	0.21
Nevada	2.74
New Mexico	1,939.52
New York	0.01
North Dakota (MT)	379.63
Ohio (ES)	0.37
Oklahoma (NM)	20.43
Pennsylvania	0.46
South Dakota (MT)	2.31
Texas (NM)	49.55
Utah	187.84
Virginia	0.15

State (BLM Administrative Unit)	GHG Emissions from Past, Present, and Foreseeable Federal Lease Development (Mt CO ₂ e per year)*
West Virginia (ES)	0.45
Wyoming	1,487.65
Total	4,614.81

*Emissions obtained from 2021 Annual Report, Figure 5-1

The most recent short-term energy outlook (STEO) published by the EIA (<https://www.eia.gov/outlooks/steo/>) (EIA, 2022) predicts that the world’s oil and gas supply and consumption will increase over the next 18-24 months. The latest STEO projections are adequate to use for the No Action discussion as the global forecast models used for the STEO are not dependent on whether the BLM issues onshore leases but are based on foreseeable short-term global supply and demand and include oil and gas development /operations on existing U.S. onshore leases. The most recent STEO includes the following projections for the next two years:

- Global liquid fuels consumption is projected to be 99.82 million barrels per day (b/d) in 2022 and increase to 100.98 million b/d in 2023.
- U.S. crude oil production averaged 11.2 million b/d in 2021. Production is expected to average 11.9 million b/d in 2022 and to rise to 12.3 million b/d in 2023.
- Natural gas production is expected to average 99.7 Bcf/d in 2023, 2% more than in 2022.
- U.S. LNG export capacity increases will contribute to LNG exports of 10.85 billion cubic feet/day (Bcf/d) in 2022, up from 9.76 Bcf/d in 2021. LNG exports are predicted to average 12.33 Bcf/d in 2023.
- Coal production is expected to total 595 million short tons (MMst) in 2022, up 3% from 2021. The increase reflects strong international demand for U.S. coal and a need among power plant operators to replenish coal stocks. Monthly U.S. coal inventories through August 2022 were 19% lower compared with the same period in 2021 as production was not sufficient to both replenish stocks and satisfy summer power demand. 2023 projected coal production is expected to decrease to 573 MMst.
- Generation from renewable sources will make up an increasing share of total U.S. electricity generation, rising from 22% this year to 24% in 2023.

Based on recent events both domestically and internationally that have resulted in abrupt changes to the global oil and gas supply, other EIA studies and recent U.S. analyses (associated with weather impacts, etc.) regarding short-term domestic supply disruptions and shortages or sudden increases in demand demonstrate that reducing domestic supply (in the near-term under the current supply and demand scenario) will likely lead to the import of more oil and natural gas from other countries, including countries with lower environmental and emission control standards than the United States (EIA, 2021). Current global supply disruptions have also led to multiple releases from the U.S. Strategic Petroleum Reserve in order to meet consumer demand and curb price surges.

The EIA 2022 Annual Energy Outlook (<https://www.eia.gov/outlooks/aeo/>) projects energy consumption increases through 2050 as population and economic growth outweighs efficiency gains. As a result, U.S. production of natural gas and petroleum and liquids will rise amid growing demand for exports and industrial uses. In the AEO 2022, crude oil production is forecast to rise in 2022 and 2023 to record high level with production then remaining relatively flat through 2050. However, renewable energy will be the fastest-growing U.S. energy source through 2050. Energy-related CO₂ emissions decrease from 2022 to 2037 due to a transition away from more carbon-intensive coal to less carbon-intensive natural gas and renewable energy for electricity generation. After 2037, CO₂ emissions begin to trend upward as

increasing energy consumption, resulting from population and economic growth, outpaces continuing reductions in energy intensity and CO₂ intensity. Further discussion of past, present, and projected global and state GHG emissions can be found in Chapter 6 of the Annual Report.

Mitigation Strategies

GHG emissions contribute to changes in atmospheric radiative forcing resulting in climate change impacts. GHGs act to contain solar energy loss by trapping longer wave radiation emitted from the Earth's surface and act as a positive radiative forcing component. The buildup of these gases has contributed to the current changing state of the climate equilibrium towards warming. Chapters 8 and 9 of the Annual Report provides a detailed discussion of climate change science, trends, and impacts. The relationship between GHG emissions and climate impacts is complex, but a project's potential to contribute to climate change is reduced as its net emissions are reduced. When net emissions approach zero, the project has little or no contribution to climate change. Net-zero emissions can be achieved through a combination of controlling and offsetting emissions. Emission controls (e.g., vapor recovery devices, no-bleed pneumatics, leak detection and repair, etc.) can substantially limit the amount of GHGs emitted to the atmosphere, while offsets (e.g., sequestration, low carbon energy substitution, plugging abandoned or uneconomical wells, etc.) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual Report provides a more detailed discussion of GHG mitigation strategies.

The Federal government includes several agencies that work responsibly in concert for implementing climate change strategies and meeting U.S. emissions reduction goals all while supporting U.S. oil and gas development and operations. The EPA is the Federal agency charged with regulation of air pollutants and establishing standards for protection of human health and the environment. EPA has issued regulations that will reduce GHG emissions from any development related to the proposed leasing action. These regulations include the New Source Performance Standard for Crude Oil and Natural Gas Facilities (49 CFR 60, subpart OOOOa) which imposes emission limits, equipment design standards and monitoring requirements on oil and gas facilities. A detailed discussion of existing regulations and Executive Orders that apply to BLM management of federal lands as well as current Federal and state regulations that apply to oil and gas development and production can be found in Chapter 2 of the Annual Report.

(NDEP BAPC manages the greenhouse gas emissions inventory for the State of Nevada, you can find the information here: https://ndep.nv.gov/uploads/air-pollutants-docs/ghg_report_2020.pdf).

The majority of GHG emissions resulting from federal fossil fuel authorizations occur outside of the BLM's authority and control. These emissions are referred to as indirect emissions and generally occur off-lease during the transport, distribution, refining, and end-use of the produced federal minerals. The BLM's regulatory authority is limited to those activities authorized under the terms of the lease, which primarily occur in the "upstream" portions of natural gas and petroleum systems. This decision authority is applicable when development is proposed on public lands and BLM assesses its specific location, design, and proposed operation. In carrying out its responsibilities under NEPA, the BLM has developed Best Management Practices (BMPs) designed to reduce emissions from field production and operations. BMPs may include limiting emissions on stationary combustion sources, mobile combustion sources, fugitive sources, and process emissions occurring on a lease parcel. Analysis and approval of future development may include application of BMPs within BLM's authority, as Conditions of Approval or Lease Stipulations, to reduce or mitigate GHG emissions. Additional measures proposed at the project development stage also may be incorporated as applicant-committed measures by the project proponent or added to necessary air quality permits. Additional information on mitigation strategies, including emissions controls and offset options, are provided in Chapter 10 of the Annual GHG Report.

3.5.3 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. Soils in the analysis area are principally those found in valley floors, deep and poorly drained due to high clay content with a highly alkali pH.

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

The additive effects of oil and gas exploration and development on soils are generally expected to be minimal due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs. The Water Resources Stipulation and development away from wetlands and riparian soils and vegetation further reduces effects to these resources. Development for any purpose removes available vegetation and increases the susceptibility of soil to wind and water erosion, soil compaction and invasion by invasive species, and disturbs microbiotic crusts and topsoil.

Environmental Effects of the Proposed Action

Future projects on any leased parcels could affect soils. These might include activities such as seismic studies, exploratory drilling, developing a well for production (with or without using Hydraulic Fracturing (HF)), production infrastructures, road construction, and gravel pit expansion. These actions would remove vegetation, potentially increasing wind, and water erosion; cause soil compaction; and disturb microbiotic crusts and topsoil. Removal of topsoil would change soil texture and structure by mixing soil horizons and breaking up soil aggregates. The effects of surface disturbance would include changes in nutrient and water cycling, bulk density, water holding capacity, percent organic matter, and microbial activity. Removal and crushing of vegetation would occur through exploration and development activities. Considering the amount of disturbance anticipated in the RFD scenario, the effects to soils are expected to be comparatively minor when compared to the areas offered for lease and temporary in nature because much of the disturbance (roads and pads) would be reclaimed.

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

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

A CSU stipulation for slopes greater than 30 percent requires engineering and reclamation that would avoid impacts, wherever these slopes exist on a parcel. Using GIS all proposed parcels were examined for slopes greater than 30 percent and none were found to meet the criteria for stipulation. Sensitive riparian/wetland area soils generally have high susceptibility to disturbance and alteration; these would be protected by the Water Resources stipulation, NV-B-10-B-CSU, is applied to all or part of two parcels. The degree of protection would be adequate because vulnerable soils would not be expected to extend

beyond the area within which impacts would not be allowed (within 500 feet of wetland/riparian areas, floodplains or playas).

No action alternative

The No Action Alternative would not impact cultural resources. Activities on currently leased parcels adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mine development, grazing management, wildfires, fire rehabilitation and range improvement projects and previous oil and gas and geothermal exploration. Creating new roads, constructing drill pads and developing wells and mines removes available vegetation and increases the susceptibility of soil to wind and water erosion, soil compaction and invasion by invasive or non-native species, and disturbs microbiotic crusts and topsoil. However, the cumulative impacts of oil and gas exploration and development on soils are generally expected to be minimal due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs.

3.5.4 Paleontological Resources

Affected Environment

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

Environmental Consequences of the Proposed Action

Paleontological resources may be subject to impacts from oil and gas exploration and development activities; therefore, identification and evaluation of these resources would be required on a case-by-case basis prior to project implementation or ground disturbing activities. BLM Instruction Memorandum (IM) No. 2009-011 provides guidelines for assessing potential impacts to paleontological resources in order to determine mitigation steps for federal actions on public lands under FLPMA (Public Law [PL] 94–579, codified at 43 U.S.C. 1701–1782 and 18 U.S.C. 641) and NEPA. This IM also provides procedures for field survey and monitoring to avoid adversely affecting significant paleontological resources.

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

Additionally, Lease Stipulation (NV-B-08-A-NSO) may be attached to all parcels within the limits of identified paleontological resource occurrences classified by WO-IM-2008-009 (Potential Fossil Yield Classification [PFYC] System for Paleontological Resources on Public Lands) as PFYC 5 (being of scientific or educational interest). These areas have very high potential for significant paleontological resources or are known to contain significant paleontological resources of scientific or educational importance, and protected by Public Law 111-11, Paleontological Resources Preservation Act. Any

quarter-quarter-quarter section (10-acre parcel) within or intersected by the limits of the site are subject to NSO.

Based on the above requirements, it is unlikely that the affected area and degree of effects to paleontological resources from leasing the parcels would be substantial.

No action alternative

The No Action Alternative would create no additional impacts to paleontological resources in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

Several ongoing and potential actions in the area, such as mining, solid and fluid mineral exploration, off-highway vehicle use, and livestock grazing, have the potential to impact paleontological resources. The geographic scope or extent of impacts for paleontological resources is generally the geographic formation in question. None of the proposed parcels have been surveyed to determine the boundaries and geographic extent of fossil resources or any paleontological localities. Parcels identified as having low potential for containing significant paleontological resources would not be subject to effects; however, BMPs and COAs would apply in the event a significant paleontological resource was encountered as a result of any ground-disturbing oil and gas exploration or development activities. Parcels identified as having unknown or 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 significant paleontological resources resulting from past, present, or reasonably foreseeable actions in the analysis area. It is expected that the proposed action may contribute to impacts through the reasonably foreseeable role of oil and gas exploration and development; however, with implementation of appropriate mitigation, BMPs, and the COAs, impacts may be avoided.

3.5.5 Water

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. Daily weather station data collected at the Blue Eagle climate station indicates the average annual precipitation is 8.5 inches, and snowfall generally occurs from November through April. The highest temperatures (average 94.7°F) are reached in July and the lowest temperatures (average 16.5°F) are reached in January (Western Regional Climate Center, 1978-2016). The Blue Eagle climate station is located 1 mile east of parcel 6969. Evapotranspiration rates in the vicinity of the proposed lease parcels in BMD (Hydrographic Areas 173B-Railroad Valley, Northern Part) range from about 4.6 to 4.9 acre-feet each year (Nevada Division of Water Resources (NDWR), 2020).

Affected Environment

Surface water: The proposed lease parcels in BMD are located in Hydrographic Region 16, Great Basin. The lease parcels are located within Railroad Valley, Little Smoky Valley, Pine Valley, and Diamond Valley hydrographic area watershed sub-basins. Many of the surface water features in the analysis area are the result of artesian flow of groundwater from wells: examples include Lockes Ponds, Big Well Ponds, and Blue Eagle Ponds. Other surface water features surrounding the analysis area are spring sources: examples include Blue Eagle Spring, Tom Spring, Kate Spring, North Spring, and Reynolds Spring.

Water is a fundamental component of ecosystem health, especially in arid regions where state appropriative water rights, springs, seeps, wetlands, ephemeral, and perennial streams are essential to biodiversity and play an important role in wildlife habitat and in the food chain for many wildlife taxa. The water quality of surface waters supports a variety of uses. The surface water quality standards of Nevada support 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). Additional information may be found at the NDWR website (<http://water.nv.gov/>) using the legal land descriptions for each parcel.

Riparian/Wetland Zones: Riparian and wetland areas are the most productive and important ecosystems in the District. While they represent less than one percent of the area in the District, they contain the majority of the biodiversity and perform vital ecologic functions. Research has shown that riparian and wetland habitat characteristically have a greater diversity of plant and animal species than adjoining areas. According to the National Hydrography Dataset and the National Wetlands Inventory, one parcel (2023-12-6969) proposed for lease contains multiple springs/seeps, spring/seep related riparian area estimated at about 10 acres, and about 30 acres of separate mapped wetlands.

Groundwater: The parcels are located in Pine Valley, Diamond Valley, Little Smoky Valley (Northern Part), and Railroad Valley (Northern Part) hydrographic areas the NDWR designated as numbers 053, 153, 155A, and 173B respectively. The NDWR Basin details are shown below.

Table 6. NDWR Basins, Size, and Perennial Yield for Parcels

NDWR Hydrographic Area	Parcel #	Size of Basin (Sq. Mi.)	Perennial Yield (Acre-Feet)	Manner of Use
Pine Valley – 053	6936 1663 1664	1,001	20,000	Irrigation, Mining, Milling & Dewatering, Stockwater
Diamond Valley – 153	1663	746	30,000	Irrigation, Mining, Milling & Dewatering, Municipal, Stockwater
Little Smoky Valley (Northern Part) – 155A	1994	580	5,000	Irrigation, Stockwater
Railroad Valley – 173B	6969	2,140	75,000	Irrigation, Mining, Milling & Dewatering, Recreation, Stockwater

Surface water runoff from upland areas of the Project infiltrates pediment deposits and transitions into the basin. Groundwater is either directed toward playas or is lost to the atmosphere and vegetation as evapotranspiration, or seeps into deeper aquifers that compose larger regional flow systems. Perennial base flow from springs is largely driven by snowmelt runoff recharge. Depth to groundwater varies from a few feet to hundreds of feet depending on location.

Nevada’s groundwater quality standards are based on the assumption that groundwater should be maintained suitable for use as a drinking water source, unless the natural water quality prevents this. The State adopts the Federal primary and secondary drinking water standards (maximum contaminant limits) for groundwater resources. The chemical character and quality of groundwater varies in the lease area and depends largely on the mineral content of the rock, residence time, evapotranspiration, and temperature.

State Appropriative Water Rights: State appropriative water rights, surface waters, and groundwater in the lease area are owned by the people of Nevada; however, the right to use surface water and groundwater and management of water appropriations are administered by and issued by the State Engineer at the NDWR. Any entity can apply and secure appropriative water rights from the NDWR, including the BLM. BLM water rights, where secured and beneficially used, can support a variety of uses like wild horses and burros, wildlife, grazing, mining, recreation, fire-fighting, and more. Perfected BLM water rights are often an important property right to hold that support multiple use and sustained yield of resources from Federal lands in the arid west.

Where secured by any entity, state appropriative water rights that are beneficially used promote land uses based on the prior appropriation doctrine, or “first in time-first in right.” Thus, the older the water right, the more seniority the water use and water right holder has to protect its right from other uses and over-appropriation of surface and groundwater resources that would limit or end the water source’s use. Proposed lease parcels are located in the four NDWR Hydrographic Areas listed in Table 16. Two of the proposed lease parcels (1664 and 6969) have water rights located on them. Parcel 1664 contains two privately-owned state appropriative water rights (one a piped spring and the second a groundwater well). Parcel 6969 contains two springs that are public water reserve (PWR) 107 (Federal Reserved) water rights filed with the NDWR. Additionally, many other springs exist on Parcel 6969 in a concentrated area that may also qualify as potential PWR 107 water rights if the NDWR has not adjudicated this area.

Environmental Effects of the Proposed Action

HF is one method of well stimulation used in oil and gas production, though in Nevada only five wells have used HF and only one was successful. HF is designed to change the producing formations’ physical properties by increasing the flow of water, gas, and/or oil around the wellbore. This change in physical properties may open up new fractures or enhance existing fractures that could result in freshwater aquifers being contaminated by natural gas, condensate and/or chemicals used in drilling, completion and HF. Historically, impacts to groundwater resources are due to improper well construction including insufficient or poorly installed surface and/or borehole seals (cementing), unsuitable construction materials and/or inadequate construction practices, introduction of surface contaminants into groundwater through surface spills, and/or loss of drilling, completion and hydraulic fluids into groundwater. Types of chemical additives used in completion activities may include acids, hydrocarbons, gelling or thickening agents, lubricants, and other additives that are specific for the well being treated.

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

Exploration and development of a lease may result in long-and short-term alterations to the hydrologic regime depending upon the location and intensity. The U.S. EPA (2016) identifies six activities are most likely to cause potential impacts to waters in some circumstances from hydraulic fracturing to develop oil and gas production when management controls are not adequate. These are: 1) Water withdrawals impacting groundwater resources; 2) Spills of hydraulic fracturing fluids or chemicals or produced water

with chemicals that reach groundwater resources; 3) Wells lacking mechanical integrity allowing gases or liquids to migrate into groundwater; 4) Injection of hydraulic fracturing fluids into groundwater; 5) Inadequately treated hydraulic fracturing waste water into surface water resources; and 6) Infiltration of hydraulic fracturing wastewater into groundwater from unlined pits.

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.

Additionally, clearing, grading, and soil stockpiling related to the construction and maintenance of oil and gas production infrastructure 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 and the CSU for steep slopes greater than 30%. The BLM may move a proposed well site up to 200 meters at its discretion to mitigate water resource impacts, and the requirements of the Clean Water Act may necessitate relocating the well further.

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 move downstream during heavy storms and may be carried into contained basins and sloughs. This would be especially true in areas with steep slopes, which would be more susceptible to erosion and consequent deposition into perennial streams, springs and seeps, and wetlands and riparian areas.

Springs, Seeps, Riparian and Wetland Areas: Analysis of various water data show that one of the proposed lease parcels (6969) wetlands and also riparian area coincide with springs/seeps and related discharge (of which at least some of these springs/seeps are water rights). A second parcel (1664) also contains a spring that is a state appropriative water right. The consequences of oil and gas exploration or development in wetlands and riparian areas are potentially severe, as these environments are extremely sensitive to perturbation. The hydrogeology that results in spring discharge is often unique and complex. For springs, seeps, and spring-fed wetlands, there would be a slight risk that drilling would lead to subsurface modification due to the possibility that drilling would interfere with groundwater flow in a fault. For any future proposed drilling, geophysical studies may be required which provide a subsurface view of the strata and their permeability, in which case the likelihood of penetrating a fault with groundwater flow would be minimized.

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

Three of the five proposed parcels lack sensitive water resources on them to require the Water Resources stipulation NV-B-10-B-CSU. The Water Resources stipulation has been applied to all or portions of two of five proposed lease sale parcels. This stipulation employs Controlled Surface Use (CSU) restrictions with measures designed to protect water resources and prevent erosion by using avoidance buffers, engineering controls, and mitigation for these resources wherever they may occur within a parcel. Proper application of the stipulation will protect water resources from unnecessary or undue degradation. It is applied to the $\frac{1}{4}$ $\frac{1}{4}$ sections that encompass the target resource to ensure even the smallest area of surface water resources would be protected while maximizing the area available for lease. The proposed combination of avoidance buffers, engineering controls and mitigation requirements, along with the additional project and site-specific analysis and Conditions of Approval at the exploration and

development stage, will meet the requirements of Executive Order 11988, Executive Order 11990, The Safe Drinking Water Act, and The Clean Water Act of 1972, and provide sufficient protection for water resources on the parcels.

Groundwater: All activities would be subject to BMPs, State and Federal Regulations and COAs. Potential future impacts of developing a lease may include degradation of water quality, drawdown of existing water levels or possible impacts to drinking water sources should drinking water sources exist nearby in communication with fracking activities at depth. 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 quality by infiltration of contaminants, particularly from sumps and spills or possibly from hydraulic fracturing fluids. 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.

State Appropriate Water Rights: According to NDWR, about 97.1%, 452.4%, 101.0%, and 42.4% of the perennial groundwater yield of Pine Valley, Diamond Valley, Little Smoky Valley (Northern Part), and Railroad Valley (Northern Part), respectively, is appropriated. Accordingly, the NDWR has determined that groundwater remains available for new appropriative uses in Railroad Valley Hydrographic Area. While it is clear that groundwater in Diamond Valley is over-appropriated, only a small fraction (about 35 acres or 3.7% of parcel area) of one of the proposed lease parcels (2023-12-1663) is located in the Diamond Valley Hydrographic Area. Further, the Nevada Supreme Court approved a Nevada State Water Engineer Ground Water Management Plan (GMP) that cuts water pumping in the over-appropriated and over-pumped *Diamond Valley Hydrologic Area (153)* to its perennial yield in a June 16, 2022 decision (*Diamond Natural Resource Protection & Conservation Association, et al (Appellants) vs. Diamond Valley Ranch, LLC, et al (Respondents)*, 2022). Since groundwater appropriation levels are below, just at, or will be cut to perennial yield and this action is only a leasing action, effects to groundwater are not anticipated.

No Action Alternative

The No Action Alternative would create no additional impacts to surface and groundwater resources in the analysis area outside that occurring under current management. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

Cumulative effects of the Proposed Action, when combined with other current and potential future area activities, could result in increased potential for impacts to groundwater quality and quantity. Mining, oil and gas exploration and production, geothermal resource development, grazing, land use authorizations, and recreation activities could affect water quality in areas of accumulation of surface water runoff. Surface waters evaporate and leave residual salts that could be high in minerals extracted from mining. Potential impacts to groundwater temperature and quantity would be avoided or minimized through the use of BMPs for well construction and through implementation of Water Monitoring Plans. Drilling and well construction would be conducted in accordance with state and federal permit requirements. Percolation of geothermal fluids from well testing could have a temporary local impact on groundwater quality and water levels but would be minimized through the use of BMPs (i.e., bentonite clay lining of surface impoundments). Potential impacts to down gradient surface water would be temporary and local, and avoided or minimized through the use of stipulation NV-B-10-B-CSU.

3.5.6 Vegetation and Special Status Plant Species

Affected Environment

Vegetation in the Analysis Area provides forage and cover for wildlife and livestock. It also provides ground cover and root mass to stabilize soils and aids in infiltration of water into the ground. The type of vegetation in a particular area depends largely on soil types and average precipitation. The Natural Resource Conservation Service completed soil surveys and has developed ecological site descriptions from the information collected. Each ecological site description provides detailed information regarding vegetative communities and precipitation zones and is used for evaluating land-use potential, potential plant communities and developing reclamation and rehabilitation plans. Vegetative communities in the Analysis Area include Saline Meadows, Saline Bottoms, Sodic Terraces, and Playas. These vegetative communities, as well as BMD Endangered and Threatened or Special Status Species (SSS) plants occurring in BMD, are listed in Supplemental Information - D.

Several Special Status Plant Species have occurrences within the general area of the proposed action, these include Current Milkvetch (*Astragalus uncialis*) and Railroad Valley globemallow (*Sphaeralcea caespitosa* var. *williamsiae*); however, Calloway Milkvetch (*Astragalus callithrix*) and Eastwood milkweed (*Asclepias eastwoodiana*) have potential to occur.

Forestry products within the Analysis Area includes fuelwood, native seed for collection, desert specific plants, pine nuts, and woody biomass. Forestry ecological site descriptions provide detailed information on available forestry products and native vegetation that could be utilized for seed collection permits within the area.

The disturbance associated with oil and gas exploration and production would add to existing oil and gas development and other overall surface disturbance, including grazing, recreation, mineral exploration, range improvement projects, land development and other projects that use the land. Creating new roads, constructing drill pads, and developing wells and mines removes available vegetation and increases the susceptibility of soil to wind and water erosion, soil compaction and invasion by invasive species, and disturbs microbiotic crusts and topsoil.

Environmental Effects of the Proposed Action

There could be effects to vegetation and special status plant species from future projects on any leased parcels. This includes effects to availability of forestry products within the area due to changes in vegetation community composition. It is anticipated that most of the exploration is likely to occur in Saline Meadows, Saline Bottoms, Sodic Terraces, and Playas. Removal and crushing of vegetation would increase the amount of bare ground, thus increasing wind and water erosion; and increase the potential for invasion by nonnative and noxious species. Considering the amount of disturbance anticipated in the RFD scenario, the effect on vegetation is expected to be comparatively minor when compared to the areas offered for lease (approximately 4,538 acres), and temporary because most of the disturbance (roads and pads) would be reclaimed. Impacts would be considered under additional site-specific analysis when an action is proposed and specifics are known, like location, well depth, water consumption needs, and area of disturbance. Special status plant surveys would be conducted as needed at that time. Through this process, site-specific preventative measures, such as weed prevention, and BMPs, such as cleaning vehicles before and after entering the work area, would be attached as COAs for each proposed activity. Impacts to most vegetation communities are expected to be relatively minor, short term, and localized.

Oil and gas development could potentially affect the quality and quantity of water in parcels where important wetland, springs, and playas occur. Riparian vegetation communities are fragile environments that could be affected by disturbances to the timing and amount of water capture, water storage, and water

release. If water resources were affected in these parcels, despite mitigation measures and BMPs, it could create changes in interspecies competition and potentially decrease biodiversity in riparian areas. There is a potential for more drought tolerant species and annual invasive species to outcompete native riparian species for limited nutrients and water. However, the Water Resources stipulation provides protection for riparian-wetland vegetation because it requires avoidance, minimization or mitigation within 500 feet of wetland/riparian areas (see Water Resources section above).

No Action Alternative

The No Action Alternative would create no additional impacts to vegetation or special status plant resources in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mine development, grazing management, wildfires, fire rehabilitation and range improvement projects and previous geothermal exploration. Creating new roads, constructing drill pads and developing wells and mines removes available vegetation and increases the susceptibility of soil to wind and water erosion, soil compaction and invasion by invasive or non-native species, and disturbs microbiotic crusts and topsoil. However, the cumulative impacts of oil and gas exploration and development on vegetation and special status plants are generally expected to be minimal due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs. Vegetation near water sources are protected by the standard lease notice and NV-B-11-C-CSU, while NV-B-11-A-CSU and NV-B-11-C-CSU, notify the lessee of steep slopes that may require engineering controls.

3.5.7 Noxious Weeds and Invasive, Non-Native Species

Affected Environment

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

Noxious weeds and invasive exotic plants are highly competitive and aggressive, and spread easily. They typically establish and infest disturbed sites, along roadsides and waterways. Invasive exotic and noxious plants are commonly found in Nevada in areas where there are seeps and springs or year-round water; regardless of whether a site is heavily disturbed, readily available water will increase the likelihood of all plant life including weeds. Wind, water, animals, vehicles/equipment, and humans spread invasive exotic and noxious weeds. Movement of plants from one site to another is greatly increased by introducing humans and equipment to an area. Changes in plant community composition from native species to non-native species can change fire regimes, negatively affect habitat quality, biodiversity, and ecosystem structure and function. The Analysis Area is favorable for infestation by the common invasive plant Saltlover (*Halogeton glomeratus*), and physical treatments have occurred on parcels 1664 and 6936. Invasive, non-native species also include animals; however, there are no records of invasive, non-native animal species in or near the Analysis Area.

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, wildfires, fire rehabilitation and range improvement projects; disturbed areas would be more susceptible to invasion by invasive species. The overall effects of oil and gas exploration and development are expected to be minimal in most areas due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs, likewise noxious weed treatments are very small in size in comparison to parcel acreages. The Water Resources CSU stipulation applied to the Proposed Action is expected to reduce cumulative effects to noxious weeds and invasive species in riparian and wetlands vegetation communities.

Environmental Effects of the Proposed Action

Offering, selling, and issuing federal oil and gas leases would not produce any effect on noxious weeds. However, future ground disturbing activities on any leased parcels could have effects on noxious weeds, and effects are determined using the Reasonably Foreseeable Development scenario. The effects that may occur would be an increase of movement of humans and vehicles to, from, and around the proposed parcels, which could slightly expand any disturbed areas within the sites and assist with the movement of noxious and invasive exotic seeds and other plant matter both within the sites and from the sites to other areas, or vice versa. Wind, water, recreation vehicles, livestock and wildlife would also assist with the distribution of weed seed into the newly disturbed areas.

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

If parcels were developed in the future, additional site-specific mitigation measures, BMPs, and COAs would be implemented to reduce impacts. These would include, but not be limited to, washing equipment at washing stations before bringing it to the project area, and after use; using certified weed-free seed to stabilize any topsoil stockpiles and for interim and final reclamation; and monitoring and treatment programs to detect and halt the spread of any invasive weed species.

No Action Alternative

Under the No Action Alternative, the parcel(s) would not be leased, and no new oil and gas development would occur on the subject lease parcels; therefore, no new noxious weeds or invasive, non-native species could occur on those lands except through transmission from other nearby or adjacent activities to the proposed parcels from on-going or future permitted activities on surrounding federal, state, and private lands.

Cumulative Effects

Potential effects of 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 oil and gas exploration and production would add to the disturbances from mining exploration, mine development, grazing management, wildfires, fire rehabilitation, range improvement projects, and past geothermal exploration; disturbed areas would be more susceptible to invasion by invasive species, as described above. However, the cumulative impacts of oil and gas exploration and development are expected to be minimal in most areas due to the relatively small area of disturbance in the RFD

timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs, likewise noxious weed treatments are very small in size in comparison to parcel acreages. The BLM Standard Lease Notices are applied to all parcels to reduce cumulative effects to noxious weeds and invasive species in riparian and wetlands vegetation communities.

3.5.8 Wildlife Resources

Affected Environment

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

Fish and aquatic invertebrates generally occupy limited, isolated habitats in Nevada. BLM, NDOW and USFWS biologists identified the following species of conservation concern that are known to, or may, occupy habitat in or near proposed parcels. Several proposed lease parcels are located adjacent to or overlap water resources or wetland areas with significant visible riparian vegetation suggesting surface water flow exists. These parcels are located near these sensitive species' known ranges or habitats, and some parcels may contain unidentified potential habitat.

- Lockes pyrg – (*Pyrgulopsis lockensis*) The Lockes pyrg was petitioned for listing under the Endangered Species Act (ESA) previously; however, the FWS found that the petition did not present substantial information; therefore, the FWS did not evaluate this species for listing under the ESA.
- Railroad Valley tui chub (*Siphaletes bicolor ssp-7.*) a BLM and Nevada State sensitive species, occurs within Railroad Valley.

Amphibians: The Analysis Area is within the range of two BLM Sensitive amphibians: western toad and northern leopard frog. These amphibians are dependent on the water sources that are found within their areas of distribution and any negative effects to these water sources would be detrimental to their populations. According to NDOW the current range of this species is severely restricted, suggesting its populations are especially vulnerable to environmental changes.

- The Railroad Valley toad (*Bufo nevadensis*) a newly described species, occurs at the Lockes Ranch complex. This amphibian is dependent on the water source within its area of distribution. Any negative impact to the water source on which it depends would be detrimental.

Big Game: The analysis area and all parcels overlap pronghorn (*Antilocapra americana*) year-round habitat (Supplemental Information – B). No crucial pronghorn winter habitat intersects proposed parcels, but pronghorn are widely distributed across the Analysis Area; fawning can occur anywhere within their distribution depending on yearly habitat conditions, including playas when forage, water or cover is available. Mule deer (*Odocoileus hemionus*) use a variety of vegetation types and habitats seasonally for forage, thermal cover, and escape cover; riparian areas, meadows and aspen stands are important fawn-rearing areas. Mule deer winter and crucial winter ranges are located within portions of three parcels

(Supplemental Information – B Figures 19-21). Thus stipulation, NV-B-02-TL will be applied to the applicable areas in parcels 1663, 6936, and 6969. Parcel 6969 overlaps with mule deer migration corridors thus stipulation NV-B-02-B-TL will be applied to the affected portion (Figure 16-18, Supplemental Information – B).

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

- **Dark and pale kangaroo mouse** (*Microdipodops megacephalus* ssp., *Microdipodops pallidus*) are found in shadscale scrub, sagebrush scrub, and alkali sink plant communities; the former prefers loose sand and gravel, while the latter are nearly restricted to fine sands.
- **Bats** many species of which are BLM Sensitive species, inhabit or use many habitat niches including caves, abandoned mines, cliffs, springs, riparian, and desert shrub.
- **Pygmy Rabbit** (*Brachylagus idahoensis*) are typically found in areas of tall, dense sagebrush (*Artemisia* spp.) cover, and are highly dependent on sagebrush to provide both food and shelter throughout the year. Their diet in the winter consists of up to 99 percent sagebrush. Pygmy rabbit burrows are typically found in relatively deep, loose soils of wind-borne or water-born origin. They occasionally make use of burrows abandoned by other species and as a result, may occur in areas of shallower or more compact soils that support sufficient shrub cover.

Migratory Birds: A wide variety of bird species protected by the MBTA are found throughout all habitat types in the Analysis Area; see Supplemental Information - C for a discussion of major avian communities. Riparian vegetation associated with perennial streams, seeps and springs is particularly important for a diverse migratory bird community. The Analysis Area provides important wetland habitat for waterfowl and shorebird species. Playas, if consistently flooded during the breeding season, may provide breeding habitat for the sensitive western snowy plover (*Charadrius nivosus*); and pooled waters from occasional flooding could provide feeding and stopover habitat for migrating shorebirds. The Yellow-billed Cuckoo (*Coccyzus americanus*) was recently documented in the Lockes area. The western distinct population segment of the yellow-billed cuckoo is listed as threatened under the ESA and is state protected and further classified as sensitive. See the standard lease notice NV-B-00-A-LN, which apply to all parcels and lands and represent standard Best Management Practices for ensuring compliance with the MBTA.

Raptors: Several raptor species are widespread. Golden eagles, prairie falcon, ferruginous hawk, red-tailed hawk, and burrowing owl are among the BLM Sensitive raptor species known to forage in the Analysis Area on a year-round or seasonal basis. All native North American birds of prey are strictly protected. Mountain ranges in or adjacent to the Analysis Area include important raptor habitats. In the BMD, raptor surveys and presence of raptor nests are further scrutinized at the project specific level.

Sage-grouse: The greater sage-grouse (GRSG) is a sagebrush-obligate species. They are dependent on sagebrush habitat for lekking, nesting, brood rearing, and wintering (feeding almost exclusively on sagebrush leaves during the winter). GRSG are known to occur in foothills, plains, and mountain slopes with nearby sagebrush meadows. Dense sagebrush overstory and an herbaceous understory of grasses are important to provide shade and security. Both new herbaceous growth and residual cover are important in the understory. Sage-grouse have specific habitat requirements for carrying out each of their life cycle functions (e.g., courtship and mating on lek habitat, nesting habitat, brood-rearing habitat, and wintering habitat). Each of these habitat types can be widely separated geographically, hence having corridors between habitats is important. Early spring breeding sites called “leks” are usually situated on ridge tops or grassy areas surrounded by a substantial brush and herbaceous components. Leks have less herbaceous and shrub cover than surrounding areas. In early spring, males gather on leks where they strut to attract females. In the Battle Mountain District, greater sage-grouse occur in Eureka, Lander, northern Nye, and west White Pine Counties, in foothills, plains and mountain slopes where sagebrush and meadows are in

close proximity. Habitats used by sage-grouse often vary by season (breeding, nesting, early and late brood rearing, and wintering), but some habitats may be used year-round depending on the area. Figures 22-24 Supplemental Information - B shows the greater sage-grouse habitat determinations.

The Analysis Area includes 5 parcels which are located within designated BLM Habitat Management Areas (General or Other) for greater sage-grouse. Parcel 1994 contains General Habitat Management in at least a quarter-quarter of a section as mapped under the 2022 Plan Maintenance to the 2015 GRSG Plan Amendment, as described under Regulatory Framework above; see Stipulation NV-B-16-B-NSO for the intersection of proposed parcels within GHMA and all greater sage-grouse habitats. Available spatial data from NDOW indicates that nesting, brood rearing, summer, and winter habitat may occur within all of the 5 parcels overlapping habitat management areas. Applicable TL and NSO stipulations have been applied using applicable maps from the 2022 Plan Maintenance to the 2015 Nevada and Northeastern California Greater Sage-grouse ROD and ARMPA.

In 2019, sage-grouse population and habitat trends within PMUs were evaluated for triggers by a statewide technical team using collected data and the U.S. Geological Survey modeling Targeted Annual Warning System (TAWS). A stakeholder driven process identified the casual factor of each population and habitat trigger reached within each PMU and adaptive management recommendations were developed. The results of this process were reported by the State of Nevada Sagebrush Ecosystem Program, in the report, *Fall 2019 Adaptive Management Trigger Summary*. In 2020, a supplemental summary was developed after additional triggers were reached. These triggers are used to prioritize funding for restoration and implementing management actions as stated in Appendix J of the 2015 GRSG Plan Amendment (BLM, 2015).

The Fall 2019 Summary and the 2020 Supplemental Summary reported population hard trigger was reached within the Diamond PMU, where Parcel 1994 is located. Since a hard trigger has been reached in the Diamond PMU, more restrictive allocations (stipulations) and management actions were implemented in conformity with the adaptive management trigger responses detailed in the 2015 GRSG Plan Amendment, Appendix J, Tables J-1 and J-2 (BLM, 1994). NSO stipulations with limited exceptions (#NV-B-16-B-NSO) were applied in GHMA based on the adaptive management trigger responses.

The 2015 ROD/ARMPA specifies that mineral resource developments must adhere to the management directive (MD) mineral resources and fluid minerals (MR), and MR 4a. If leased, developments would require compliance with state regulation under State of Nevada EO 2018-32, which requires coordination with both the sagebrush ecosystem technical team (SETT) and NDOW, and the use of the mitigation hierarchy and the State's mitigation policies and programs.

Environmental Effects of the Proposed Action

Offering, selling, and issuing federal oil and gas leases would not produce any effect on wildlife. However, future ground disturbing activities on any leased parcels could have effects on wildlife resources. It is not possible to know the specific acres and habitat that might be disrupted, and the BLM would not receive any applications for exploration or development until after the lease sale. Additional resource mitigation measures and BMPs would be included in the proposal or attached as COAs for each proposed activity, which would be analyzed under project specific NEPA analysis including consultation with NDOW and USFWS as needed.

The Headquarters Standard Lease Notice, HQ-TES-1, attached to all parcels, alert prospective lessees that the parcel “may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species” and summarizes steps that may be required to address them. The BLM Standard Lease Notice, NV-B-00-A-LN, outlines requirements to protect migratory birds under the MBTA. Bald and Golden eagles are further protected by the BGEPA, and project activity would be

restricted within one mile of active nests. Stipulations are used to notify lessees of potential conflicts with wildlife that could occur during future projects, providing direction that must be followed in the specified habitat.

The Department of Interior (DOI) is tasked with avoiding development in crucial winter range or migration corridors; minimizing development that would fragment winter range and primary migration corridors; limiting disturbance of big game on winter range; and utilizing other proven actions necessary to conserve and/or restore the vital big game winter range and migration corridors across the West (SO 3362 and NV-IM-2021-022). These conservation goals would be considered during future NEPA analysis of projects.

Parcels that have seasonal habitats, as identified by NDOW's geospatial data, would be addressed by timing limitation (TL) stipulations, restricting use during the critical seasons to protect populations from disturbance (See *Stipulations*). When a proposal for exploration or development is approved, the proponent would be required to plan work to comply with timing limitations. Parcel development that affects crucial habitat, such as parcels within migration or movement corridors adjacent to crucial habitat would be analyzed to minimize fragmentation, and BMPs would be developed to reduce or avoid impacts to these special areas. If, due to unanticipated delays, operations are ongoing when a restricted season begins, the authorized officer would confer with the proponent and a BLM or NDOW wildlife biologist familiar with the area and decide if and how operations may proceed.

Four lease parcels identified (1663, 1664, 6936 & 6969) are located outside designated Greater Sage-grouse (GRSG) Priority and General Habitat Management Areas (PHMA & GHMA). However, future exploration or development proposals that fall within 6 kilometers of GRSG habitat are required to consult with the State of Nevada Sagebrush Ecosystem Technical Team.

In addition to TL stipulations for wildlife, the Water Resources CSU stipulation is attached to parcels that intersect perennial water, springs, wetland or riparian areas, playas, floodplain, or wells. The Water Resources stipulation notifies the lessee of water resources on the parcel. The NSO stipulation has been applied to all parcels that overlap with the WMA. Aquatic invertebrates and amphibians of conservation concern whose presence cannot be confirmed due to incomplete survey data will be identified and further protected during future parcel disturbance proposals and NEPA analysis. Stipulations cannot be attached to a parcel to protect resources that are off-parcel; however, off-parcel resources, such as aquatic and amphibious species would be identified during project specific site inspections, NDOW and USFWS would be consulted, and potential effects would be identified and mitigated or avoided at that time.

In other habitats, generally mobile animals would avoid and move away from the project-associated noise and activities; some mortality could occur among small animals unable or less likely to move away; and there would be some loss of habitat.

Based on the RFD scenario, oil and gas exploration and production activities would continue to be minimal in the Analysis Area. Artificial lighting from drilling rigs and infrastructure has the potential to affect wildlife such as insectivorous bats and insects. Guidelines for lighting intensity and orientation would be recommended at the time of any project proposal to avoid, minimize, and mitigate such impacts. Exploration activities are temporary in nature, but some wildlife could be displaced. The conclusion of project activities, including reclamation and restoration of native vegetation, would make those areas available to wildlife.

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

No Action Alternative

The No Action Alternative would create no additional impacts to wildlife resources in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

Cumulative effects from oil and gas exploration and production activities would add to the impacts of other past and present actions and RFFAs that impact habitat or displace wildlife. In upland habitats, the cumulative impact to wildlife and associated wildlife resources from oil and gas activities would generally be expected to be short term and minimal due to the relatively small area of disturbance in the RFD scenario timeframe, combined with concurrent reclamation and development of site-specific mitigation and BMPs, the Proposed Action is not expected to substantially contribute to cumulative effects to wildlife.

3.5.9 Grazing Management

Livestock production is a major industry within the BMD. The Range Program permits and manages public land grazing on 93 allotments for 95 permittees and approximately 377,810 Animal Unit Months (AUMs). An AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. Most grazing allotments are comprised of both public and private lands; however, the majority of the allotments are dominated by public lands. Grazing permits are issued to qualified individuals or entities, and specify livestock numbers, season of use, kind of livestock and number of AUMs allowed for use. Other terms and conditions may be added to grazing permits for the orderly management of the permit and/or the livestock within the allotment(s). Each allotment may have one or multiple permittees. Range improvement projects on the allotments may include fences, cattle guards, pipelines, seedings, vegetation manipulation projects, troughs, and wells.

Affected Environment

Five grazing allotments include all or portions of the parcels proposed for leasing (Supplemental Information – B, Figures 26-28). Table 6 shows grazing allotments within the Analysis 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. Boundary grazing allotments may be managed by the adjacent District.

Table 7. Grazing allotments with proposed lease parcels for December 2023 lease sale.

Allotment Name	Allotment Public Acres	Approximate Lease Parcel Acres	Number of Authorizations	Kind	AUMs	Suspended AUMs
Butterfield	118,879	318	1	Cattle	4,776	470
Flynn/Parman Individual	26,670	2,739	1	Cattle	1,357	758
Nyala	320,289	485	1	Cattle	13,255	6,742
Fish Creek Ranch	289,483	1,130	4	Cattle	4,013	32,000
				Sheep	802	0
North Diamond	1,600	38	2	Cattle	3,579	2,849

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

Environmental Effects of the Proposed Action

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

No Action Alternative

The No Action Alternative would create no additional impacts to grazing or range management resources in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

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

3.5.10 Cultural Resources

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.

Cultural Resources Inventory: The BLM starts every project with a Cultural Resources Inventory Needs Assessment or CRINA. This effort identifies the Area of Potential Effects (APE) from the Proposed

Action. The Direct APE and Indirect APE are identified and a records search for Cultural Resources is conducted using *Guidelines and Standards for Archaeological Inventory, Six Edition* (2019). Based on this search, thirty-six archaeological sites, one architectural resource, and one historic district were identified. These consist of prehistoric, historic, and multicomponent resources, with varying eligible statuses for the National Register of Historic Places.

Affected Environment

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

The RFD for oil and gas exploration and development could result in adverse effects to cultural resources. Several ongoing and potential actions in the area, such as mining, mineral and oil and gas exploration, off-highway vehicle use, and livestock grazing, have the potential to cumulatively impact cultural resources. The majority of parcels nominated for this 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 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 analysis area. Appropriate mitigation, BMPs, and COAs would be implemented to resolve any adverse effects to historic properties.

Environmental Effects of the Proposed Action

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

Conservatively, based on the RFD scenario surface disturbance associated with potential oil and gas exploration and production activities could be expected to occur in the BMD. Cultural resources located within the proposed parcels could be affected by oil and gas exploration and development activities (e.g. ground disturbance and facilities construction). As such, identification and evaluation of these resources on a case-by-case basis for compliance with Section 106 of the National Historic Preservation Act (NHPA) would be required prior to project implementation or ground disturbing activities.

The Standard Lease Notice, HQ-CR-1, would be attached to all leases within the BMD 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 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.

No Action Alternative

The No Action Alternative would create no additional impacts to cultural resources in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

The Proposed Action does not authorize any ground disturbance and therefore has no direct effect to cultural resources; however, the reasonably foreseeable role of oil and gas exploration and development could cumulatively result in adverse effects to cultural resources. Several ongoing and potential actions in the area, such as mining, mineral and geothermal exploration, off-highway vehicle use, and livestock grazing, have the potential to cumulatively impact cultural resources. The majority of parcel area nominated for this lease sale has not been inventoried for cultural resources; therefore, the types of resources that may be present in any particular area within parcels are unknown. A cumulative effects study area 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 study area. Appropriate mitigation, BMPs, and COAs would be implemented to resolve any adverse effects to historic properties.

3.5.11 Native American Cultural and Religious Concerns

Affected Environment

The parcels are located among the traditional homelands of the Western Shoshone Tribes. Modern, federally recognized tribes include the Te-Moak Tribe of Western Shoshone, the Yomba Shoshone Tribe, the Ely Shoshone Tribe, the Duckwater Shoshone Tribe, the Shoshone-Paiute Tribes of the Duck Valley Reservation, and the Timbisha Shoshone Tribe. 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, water sources, or a rock cairn; large areas, such as landscapes and viewsheds; 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. Consultation efforts with tribes may reveal such sites, activities, or resources within the parcels. Consultation with tribes is currently ongoing for this lease sale, and additional consultation will be conducted for each associated project-specific NEPA analysis. Specific information regarding ethnographic resources, as shared by tribal representatives during consultation, is confidential.

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

Fluid mineral leasing and exploration may directly affect sites and associated activities of a cultural, traditional and spiritual nature. Potential residual effects of any surface occupancy that results from oil

and gas leasing may be cumulative with other past, present, and future actions. Consultation with tribes is key in identifying sites and associated activities of a cultural, traditional, and spiritual nature that may be impacted by project activities. Thus, effects to many cultural, traditional, spiritual sites and associated activities can be avoided through Native American consultation efforts. In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P. L.94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L.101-601) and Executive Order 13007, the BLM must provide affected tribes an opportunity to comment and consult on proposed actions.

The BLM must also attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/spiritual sites, activities, and resources. Only the potential impacts to tribal resources were analyzed in this EA because it evaluates the leasing of oil and gas parcels, not specific areas of proposed surface disturbance. If, as a result of leasing, a ground disturbing plan to explore or develop is submitted to the BLM, all applicable laws, regulations, directives, SOPs, and stipulations and limitations would apply. The BLM would work with the operator to mitigate effects to traditional/cultural or religious sites from activities associated with any surface occupancy that results from oil and gas leasing. Consequently, the BLM must take steps to identify locations having traditional/cultural or religious values to Native Americans and ensure that its actions do not unduly or unnecessarily burden the pursuit of traditional religion or traditional values. If specific concerns are identified, a thorough cumulative effects analysis would be part of the additional project specific, site-specific NEPA analysis conducted at that time.

Tribal Consultation and Information Sharing: The BLM sent letters to the following tribes on July 18, 2023: the Timbisha Shoshone Tribe, the Yomba Shoshone Tribe, the Duckwater Shoshone Tribe, the Shoshone – Paiute Tribe of the Duck Valley Reservation, the Ely Shoshone Tribe, and the Te-Moak Tribe of Western Shoshone, including the South Fork Band, Elko Band, Wells Band, and Battle Mountain Band to identify areas of concern, mitigation measures, operating procedures or alternatives that may eliminate or reduce impacts to any existing tribal resources. The majority of lands in the parcels have not been analyzed for ethnographic resources or Native American cultural concerns. The BLM BMD has an ongoing invitation for consultation and information sharing with the tribes. Consultation and communication with tribal/band governments has 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 BLM will conduct additional Native American consultation and coordination during future, site specific proposals on public lands for these lease parcels and all other leasing activities involving surface disturbance.

Environmental Effects of the Proposed Action

Although the act of issuing oil and gas leases does not directly authorize exploration, development, or production, or any other related ground-disturbing activities, the potential exists for future such activities on leased parcels to affect Native American spiritual, cultural, or traditional sites. Such effects can be difficult to effectively mitigate; however, effects can be minimized and/or mitigated when affected Tribes provide input and actively and fully participate in the decision-making process. The Standard Lease Notice, HQ-CR-1, is attached to all parcels and states that the BLM will not approve any ground-disturbing activities until it conducts its tribal consultation obligations and may require modification to exploration or development proposals or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated. If projects are proposed on any leased parcel in the future, each would be analyzed under project specific NEPA analysis. At that time the BLM

would consult with the tribes and site-specific mitigation measures and BMPs would be attached as COAs.

No Action Alternative

The No Action Alternative would create no additional impacts to Native American cultural and religious resources in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

Oil and gas leasing would not have direct effects on sites and associated activities of a cultural, traditional, and spiritual nature. Future projects for oil and gas exploration and development have the potential to affect such sites and activities. 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. Consultation with tribes is key in identifying sites and associated activities of a cultural, traditional, spiritual nature that may be impacted by project activities. Thus, effects to many cultural, traditional, spiritual sites and associated activities can be avoided through Native American consultation efforts.

In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P. L.94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L.101-601) and Executive Order 13007, the BLM must provide affected tribes an opportunity to comment and consult on proposed actions. The BLM must also attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/spiritual sites, activities, and resources. Only the potential impacts to tribal resources were analyzed in this EA because it evaluates the leasing of oil and gas lease sale parcels, not specific areas of proposed surface disturbance. If, as a result of leasing, a ground disturbing plan to explore or develop is submitted to the BLM, all applicable laws, regulations, directives, SOPs, and stipulations and limitations would apply.

The BLM has initiated consultation with the following federally recognized tribes: the Timbisha Shoshone Tribe, the Yomba Shoshone Tribe, the Duckwater Shoshone Tribe, the Shoshone-Paiute Tribes of the Duck Valley Reservation, the Ely Shoshone Tribe, and the Te-Moak Tribe of Western Shoshone, including the South Fork Band, Elko Band, Wells Band, and Battle Mountain Band to identify areas of concern, as well as 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 is taking steps to identify locations having traditional/cultural or religious values to Native Americans and ensure that its actions do not unduly or unnecessarily burden the pursuit of traditional religion or traditional values. If specific concerns are identified, a thorough cumulative effects analysis would be part of the additional project specific NEPA analysis conducted at that time.

3.5.12 Recreation

Affected Environment

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

Oil and gas exploration and development is the landscape in the Analysis Area. Development may reduce the opportunity to recreate but generally provides roads and access to areas that may not be seen otherwise. The RFD scenario for fluid minerals does not impede recreation opportunities. Increased

commercial development could slightly increase the area's population, which would create an increase in numbers of recreationists.

Environmental Effects of the Proposed Action

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

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

No Action Alternative

The No Action Alternative would create no additional impacts to recreation resources in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

Past and present actions and RFFAs with the greatest potential to affect recreation include oil and gas exploration and development, mineral exploration and mining, and solar and wind power generation projects. Given that many outdoor recreation activities are dependent upon a high quality visual/aesthetic environment, such developments, including fluid mineral development, have the potential to cumulatively lower the quality of recreational experiences in the Analysis Area. A reduction in opportunity for primitive and unconfined recreation could affect visitor use of the area as well as quality of the experience.

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

3.5.13 Visual Resources

Affected Environment

BLM Manual Series 8400 outlines the visual resource management (VRM) program. The BLM assigns VRM classes to public lands through the land use planning process, with management direction for each class. Attempts are made to mitigate visual contrasts from surface-disturbing activities regardless of the VRM class. VRM classes are based in part on a Visual Resources Inventory (VRI) which rates existing scenic values.

Parcels 6936 and 1663 overlap VRI Class III. Parcels 1664, 1663, and 1994 overlap VRI Class IV. These parcels are within the MLFO and would be managed for multiple use until the next RMP revision. Parcel 6969 falls into VRM Class IV. Management direction for this class, as stated in Tonopah RMP Determinations (p. 6), is as follows:

- Class IV Areas: Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements (form, line, color, texture) inherent in the characteristic landscape.

If and when a project is proposed, effects to visual resources, and measures to minimize them, would be considered as part of the additional project specific environmental analysis. As stated above, a VRM class will be established for each project. Effects would be assessed from key observation points, such as roads, scenic overlooks, or homes. 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 Analysis Area, generally offers outstanding night sky viewing opportunities with frequent clear weather and many areas of little or no light pollution.

Past and future oil and gas exploration and development, mineral exploration and mining, gravel pit development and production, wind power construction, communication site construction, and road building have the potential to affect the visual resources present in the area. Oil and gas development is a prominent feature in Railroad Valley. Given that many outdoor recreation activities are dependent upon a high quality visual/aesthetic environment, such developments, including fluid mineral development, have the potential to cumulatively lower the quality of recreational experiences in the Analysis Area.

Increased commercial development and increasing population will affect visual resources. These changes would occur slowly over time and continued oil and gas development would be gradual with limited surface disturbance. Visual resources are mitigated on a case-by-case basis and many of the activities would be temporary, with visual contrasts essentially eliminated when reclamation (re-contouring and revegetation) is completed, also eliminating affects to the appearance of naturalness.

Environmental Effects of the Proposed Action

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

- designing lighting to reduce the impacts to night skies
- screening any stationary lights and light plants
- directing lighting onto the pertinent site only and away from adjacent areas not in use, with safety and proper lighting of the active work areas being the primary goal
- hooding and shielding lighting fixtures as appropriate
- using topographic features to visually screen facilities
- locating drill sites where they will be least conspicuous (BLM has the discretion to move proposed drill site locations up to 200 meters within the lease boundary)
- reducing the size or changing the configuration of drill pads
- using low profile tanks

- matching colors (approved by BLM VRM specialist) of facilities and equipment to blend in with the surroundings
- planning road alignment to minimize visual contrast
- required reclamation, which may include re-contouring drill pads; reclaiming roads; re-seeding drill sites and roads; and removing equipment and facilities

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

No Action Alternative

The No Action Alternative would create no additional impacts to visual resource in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

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

3.5.14 Lands with Wilderness Characteristics

Affected Environment

The BMD completed an inventory for lands with wilderness characteristics in 2017, defined by the Wilderness Act of 1964 as land that “(1) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” Section 201 of the Federal Land Management Policy Act (FLPMA) requires the BLM to maintain, on a continuing basis, an inventory of all public lands and their resources and other values, which includes wilderness characteristics. It also provides that the preparation and maintenance of the inventory shall not, of itself, change or prevent change of the management or use of public lands. It does not address or affect policy related to Congressionally designated Wilderness or existing Wilderness Study Areas. The Shoshone-Eureka RMP does not address lands with wilderness characteristics. They will be addressed in future RMP amendments. In the interim, the District will manage lands with wilderness characteristics for multiple use.

In accordance with BLM Manual 6310, an inventory identifies any unit of land with at least 5,000 roadless acres or otherwise meeting criterion (3), then determines if that unit meets criteria (1) and (2). Lands meeting all three of these criteria are considered to have wilderness characteristics. There are 3 inventory units in the Analysis Area that were found to have wilderness characteristics intersecting all of the proposed lease parcels. A list of units with wilderness characteristics and parcels intersecting each is shown below.

Table 8. Inventory Units with Wilderness characteristics

Units with Lands Wilderness Characteristics (LWC)	Parcel # that intersects the LWC Unit
NV-060-543	NV-2023-12-1663
NV-060-543	NV-2023-12-1664

NV-060-255A, NV-060-256, NV-040-141	NV-2023-12-1994
NV-060-551	NV-2023-12-6936

Environmental Effects of the Proposed Action

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

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

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

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

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

No Action Alternative

The No Action Alternative would create no additional impacts to lands with wilderness characteristics in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

The disturbance associated with oil and gas exploration and development would add to the disturbances from mining exploration, mine development, grazing management, wildfires, fire rehabilitation and range improvement projects and previous oil and gas and geothermal exploration. Creating new roads,

constructing drill pads and developing wells and mines removes available vegetation and increases the susceptibility of soil to wind and water erosion, soil compaction and proliferation of invasive weeds or non-native species. Ultimately, these changes could take many years to tens of years to recover after the project is complete, affecting criteria of wilderness characteristics temporarily or permanently, but can be minimized due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs. Most of the future activities would be on valley floors. Lands with Wilderness Characteristics are mitigated on a case-by-case basis and many of the activities would be temporary, with visual contrasts essentially eliminated when reclamation (re-contouring and revegetation) is completed, also eliminating impacts to the appearance of naturalness.

3.5.15 Geology and Mineral Resources

Affected Environment

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

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

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

Mineral Material Sale of common minerals encompasses petrified wood and common varieties of sand, stone, gravel, pumice, pumicite, cinder, and clay. Less common are sales of topsoil and specialty sand, gravel, or decorative rock. Saleable mineral sites with a priority for use are located along State, County, and BLM managed roads. These types of saleable minerals are distributed throughout Nevada and overlap with oil and gas lease parcels should be expected. Parcels that overlap existing mineral material sale permits are listed in lease notice, NV-B-12-A-LN and NV-B-12-B-LN.

Leasable Minerals are those that may be extracted from leases on public lands and are subdivided into solid and fluid leasable mineral groups. Solid minerals include coal, sodium, sulfur, potassium, and phosphate (and under certain conditions, sand, and gravel). Fluid minerals include oil, gas, and geothermal resources.

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

Typically 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.

As of July 7, 2021, there are 488 authorized oil and gas leases in Nevada (Nevada Division of Minerals (NDOM)). Since 1907, roughly 770 oil and gas wells had been drilled in Nevada. Total oil production from 1955 to 2019 is 54 million barrels of oil. Oil production in 2015-2019 averaged 266,872 barrels of oil per year (source: NDOM).

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

Geothermal – All land within the BMD is open to geothermal leasing and development with the exception of specific closures such as Wilderness Areas, Wilderness Study Areas, community watersheds, critical wildlife habitat areas, and military reservations; 20 percent of the land within the District is potentially valuable for geothermal resources, located mainly in Esmeralda and Lander counties. The 2008 *Geothermal Programmatic Environmental Impact Statement for Geothermal Leasing in the Western U.S.* expedites processing geothermal lease applications. There are no geothermal leases overlapping lease sale parcels.

Since fluid and solid minerals are non-renewable resources, the combined effects of producing either or both would result in mineral depletion. However, considering the RFD scenario and that site-specific mitigation measures would be required for exploration and development, the Proposed Action's contribution to overall effects would not be substantial.

Environmental Effects of the Proposed Action

If any parcels are leased and developed, design features, project specific mitigation measures, and BMPs would be attached as COAs for each proposed activity, which would be developed through additional site-specific NEPA analysis. The included stipulations offer an advantage to prospective lessees in that they identify important natural resource issues associated with particular parcels – water resources, steep slopes, and deer and pronghorn seasonal habitats – in advance, along with measures to protect them. This would reduce some of the uncertainty of waiting for project-specific NEPA analysis to identify resources of concern and define appropriate conditions of approval.

The potential that oil and gas interests may overlap with other solid or fluid mineral exploration exists. The majority of acres that may be used for oil and gas exploration and production are usually reclaimed within 5 years. In most instances, oil and gas exploration is a short-term endeavor (1-12 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 effects 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 additional gravel pit expansion, but the small requirements for each project would not greatly increase the size or number of gravel pits, nor would it burden the communities that use gravel.

No Action Alternative

The No Action Alternative would create no additional impacts to geology and mineral resource in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands. New development on existing authorized oil and gas leases not held by production would be subject to additional NEPA analysis at the project proposal stage.

Cumulative Effects

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

3.5.16 Land Use Authorizations

Affected Environment

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

Table 9. Parcels intersecting ROW and the legal land description.

Parcel #	Legal Lands Description	ROW Case File/ROW Holder Range Improvement Description
1663	All Lands	None
1664	All Lands	None
1994	T. 16 N., R. 53 E., MOUNT DIABLO MER Sec. 12 S2;	N-65765 10’ AT&T Buried Fiber N-05638 12.5’ NV Bell Overhead telephone line to Rocky Pt. Microwave Station N-75659 Community Pit
6936	T. 25 N., R. 52 E., MOUNT DIABLO MER Sec. 6 PROT W2W2	N-53976 20’ Mobil Oil Corp. Road

Parcel #	Legal Lands Description	ROW Case File/ROW Holder Range Improvement Description
6969	T. 7 N., R. 57 E., MOUNT DIABLO MER Sec. 27 W2; Sec. 28 SE.	N-88596 6' NDOT Road N-5368 12.5' Transmission Line

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.

Environmental Effects of the Proposed Action

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

No Action Alternative

The No Action Alternative would create no additional impacts to land use authorizations in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining activities and off-highway vehicle use. Creating new roads, constructing drill pads and developing wells removes land available for renewable resources such as vegetation, wildlife, grazing, or forage. Based on the RFD scenario the cumulative impacts of the proposed action on land use authorizations are expected to be minimal due to the relatively small area of disturbance, concurrent reclamation, and comingling of resources.

3.5.17 Socioeconomic Values

Affected Environment

The proposed lease parcels are located within northern Nye and eastern Eureka counties. Data was obtained from the U.S. Department of Labor, the Bureau of Labor Statistics, local area unemployment statistics, the U.S. Department of Commerce, and the Census Bureau, as compiled by the Headwaters Economics Socioeconomic Profiles Tool developed for the BLM.

As of the 2019 U.S. census the average population density in Nye County is 2.4 persons per square mile (Table 18).

Table 10. Population density by county.

County	Area, mile ²	Population, 2021 census	Population density per mile ²
Nye	18,199	50,096	2.75
(Nevada)	(110,572)	(2,972,382)	(26.9)

Population centers for Nye County include Pahrump, Tonopah, and Beatty with significantly differing populations. Census tract data is more applicable for this analysis, which divides Nye County into multiple parts. Socioeconomic (SE) data are typically available at the county level; however, census tract boundaries are used to define the SE study area in this case, these include census tracts 9601 and 9602 combined, which provide a better estimate of population in this region of Nye County.

Table 11. Population density by county.

County	Area, mile ²	Population, 2021	Population density per mile ²
Northern Nye ¹	~11,700	5,065	0.43
Eureka	4,180	1,603	0.38
(Nevada)	110,414	2,972,382	26.92

¹ Census tract 9601 and 9602 combined, area estimated using GIS.

Jobs by Industry

In 2021, there were an estimated 2,175 total jobs in non-services industries in the study area. In the same year there were around 526 jobs in service-related industries. The majority (48%) of civilian employees who worked in the study area are employed in agriculture, forestry, fishing and hunting, and/or mining. By contrast, the next highest fields of employment are retail trade (12%) and sales and education, health care, and social assistance (10%).

Population, Employment, and Income

The total population in the study area was 6,688 (based on the 2021 census), which is less than one percent of the State of Nevada population. This value represents a combined net decrease of 938 people, or 12.3% from 2010 to 2021, as opposed to an increase in Nevada’s population of 16.2%. The number of employed workers in the study area in 2021 was 2,882 (ages 16 to 64 years of age) which is 68% of the total population in that age group for the study area. In 2021, the total number of the population, ages 16 to 64, who did not work was 28 percent (for the study area). In 2021, 92 percent of workers aged 16 and over within the study area worked in their county of residence. Per capita income in the study area in 2021 was between \$26,443 and \$29,216 and the median household income was between \$33,080 and \$68,307 (2021 dollars). The highest paying industry is mining.

Poverty, Minorities, and Other Demographic Indicators

In 2021, the total number of people living below poverty, as defined by the U.S. Census Bureau, was 15.8 percent of the population in the study area. In the same year, there were 11.4 percent of all families living below poverty. Out of all persons living within the study area in 2021, 763 people self-identified as being a member of a minority group. Of those, 338, or 5.1 percent of the total population, self-identified as Native Americans and 263 or 3.9 percent identify as being American Indian. The mean median age within the study area in 2021 was between 39.8 and 57.4 years of age. The total number of housing units was 4,188 of which 69.0 percent were occupied and 11.0 percent were seasonal, recreational, or occasionally occupied properties. Of those living within the study area aged 25 or older, 93.0 percent had graduated from high school and 11.0 percent had earned a bachelor’s degree or higher in 2021.

Environmental Consequences of Proposed Action

The only direct effect of issuing new oil and gas leases on socioeconomic values within the Analysis Area would be generation of revenue from the lease sale, as the State of Nevada retains 49 percent of the

proceeds. Revenues generated from both competitive and non-competitive oil and gas lease sales in the state of Nevada for fiscal year 2018 totaled \$3.1 million; statewide revenues from 2014 to 2018 totaled \$23.9 million (ONRR, 2018). Subsequent oil and gas exploration, development and production could affect the local economy in terms of additional jobs, income and tax revenues. Oil and gas companies typically provide in-house scientists and technicians for most pre-drilling exploration work. Subsequent oil and gas exploration and development activities could include road and drill pad construction, which could be contracted to local contractors. Wells would typically be drilled over a period of time and not at the same time. Since these parcels fall near producing fields, it is unlikely that a large number of jobs would be created and because there are few developments in Railroad Valley to support work crews, companies exploring for or developing oil and gas leases often bring workers to the site, where they live in company or personally owned mobile housing units until the work is complete. The local communities of Eureka, Tonopah, or Ely could see some benefit during construction. These could include consumables such as fuel or food; additionally, waste storage and pickup services may be retained at these locations.

During development and production phases, the potential for local socioeconomic impacts could increase. Local community services such as emergency response, health care, housing, and food supplies may be burdened. Many rural Nevada communities do not have the flexibility to increase housing or food supplies. New or additional roads and drill pads could be needed, construction personnel would come from 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 industrial products and consumables. The additional economic activity and employment results in a trickle-down effect, supporting employment and economic activity in other sectors of the economy including housing, retail, services, and government.

Positive indirect impacts to socioeconomics would likely be minor, given the RFD scenario (Supplemental Information - E); however, bonus bids (the amount paid at time of auction), annual rent fees (for 10 years regardless of activity on a leased parcel), and royalties (if and when production occurs) may provide substantial income to county governments for schools and other expenditures. The potential for adverse effects to the human environment, including human health hazards, is low (see effects analyses for air quality, section 3.5.1; water quality, 3.5.5; and hazardous and solid waste, 3.5.19). The Proposed Action would not induce substantial growth or concentration of population, displace a large number of people, cause a substantial reduction in employment, reduce wage and salary earnings, cause a substantial net increase in county expenditures, or create a substantial demand for public services.

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

No Action Alternative

The No Action Alternative would not result in additional positive or negative effects to socioeconomic values in the analysis area. Activities on areas adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

As described above, it is expected that the socioeconomic effects of the Proposed Action would be minor and beneficial. The same would be expected for cumulative effects. Specific information regarding the timing, duration, and level of employment is not available for other RFFAs that may occur within the Analysis Area, precluding a comprehensive analysis of potential cumulative socioeconomic impacts.

Additional project-specific analysis would be required for any future exploration or development project, including socioeconomic and environmental justice effects.

3.5.18 Environmental Justice

Affected Environment

Federal analysis of environmental justice was initiated with President Clinton’s February 11, 1994, Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” and an accompanying Presidential memorandum. Executive Order 12898 requires that each federal agency consider environmental justice to be part of its mission. Its intent is to promote fair treatment of people of all races and income levels, so no person or group of people bears a disproportionate share of the negative effects from the country’s domestic and foreign programs. Specific to the EIS process, the Executive order requires that proposed projects be evaluated for “disproportionately high adverse human health and environmental effects on minority populations and low-income populations.”

For this project the study area has been identified as selected census block groups (BG) in Eureka and Nye counties (Table 11, Supplemental Information – B Figure 4). This study area was selected because they contain populations that project action (and future development) may impact. The population in the study area totals 6,628 (using the BGs below). The reference area is NV non-metro counties for low income and minority populations. The reference area for Tribal communities is the State of Nevada. The project block group locations are BG 320110001001 (lease parcels 1663, 1664, and 6936) and 320239601002 (lease parcels 1994 and 6969).

Table 12. BMDO Nov. 2023 Oil & Gas Lease Sale Environmental Justice Study Area Block Group Data

Block Group	Description (ST, County, Key Relative Locations)	Low Income *	Minority *	Tribal #
320110001001	NV, Eureka Co., Simpson Park Mountains	22.5 percent	26.0 percent	9.5 percent
320110001002	NV, Eureka Co., Eureka	46 percent	5 percent	0.0 percent
320239601002	NV, Nye Co., Railroad Valley	27 percent	27 percent	10.0 percent
320239602001	NV, Nye Co., Warm Springs	41.1 percent	39.5 percent	0.0 percent
320339702004	NV, White Pine Co., West Ely, Hwy 50	22 percent	47 percent	0.0 percent
BG Totals		31.7 percent	28.9 percent	1.9 percent
Reference area # (See above)		28.3 percent	27.6 percent 30.4 percent (MGA)	2.5 percent

Data Sources: * BLM Environmental Justice Mapping Tool; ^ Headwaters Economics BLM EPS and SEP Tool; # U.S. Census Bureau American Community Survey.

Low-Income Environmental Justice Community Analysis

A low-income community of concern is present if 1) the population experiencing poverty in one or more study area geographies are near, at, or below 200 percent of the federal poverty threshold of the reference area OR 2) if the population of the community experiencing poverty is at or above 50 percent. Low-income environmental justice communities of concern are identified in the study area. It is estimated that

31.6 percent of the study area population is identified as low-income. This is greater than the reference area low-income percentage threshold. This screening identified that two census block groups within the study area had a low-income population that met this criterion including:

- BG 320110001002 NV, Eureka Co., Eureka,
- BG 320239602001 NV, Nye Co., Warm Springs, Tonopah

Minority Environmental Justice Community Analysis

A minority community of concern is present if the percentage of the population identified as belonging to a minority group in a study area is 1) equal to or greater than 50 percent of the population OR 2) meets the “meaningfully greater” threshold. Meaningfully greater is calculated by comparing the minority group population percentage with 110 percent of the reference area minority population. Minority environmental justice communities of concern are identified in the study area. It is estimated that 28.8 percent of the study area population is identified as belonging to a minority population group. This is less than the reference area minority population percentage. This screening identified that one census block groups within the study area had a minority identified population that met this criterion including:

- BG 320239602001 NV, Nye Co., Warm Springs, Tonopah

Tribal / Native American Environmental Justice Community Analysis

Tribal communities of concern are present if the percentage of the population identified as belonging to an indigenous community is equal to or greater than the reference population. Tribal communities of concern are identified in the study area. It is estimated that 3.9 percent of the study area population is identified as belonging to a tribal population group. This is equal to the reference area tribal population percentage. This screening identified that two census block groups within the study area had a tribal identified population that met this criterion including:

- BG 320110001001 NV, Eureka Co., Simpson Park Mountains
- BG 320239601002 NV, Nye Co., Railroad Valley

Environmental Effects

Low-income, minority, and tribal / Native American environmental justice populations are present. Low-income and minority populations are clustered in Nye and east Eureka counties, NV. While the act of leasing parcels does not have direct effects, it is likely that exploration and development of lease parcels especially, but not limited to, parcels NV-2023-12-6969 and NV-2023-12-1994 would disproportionately and adversely affect both low-income and minority environmental justice communities. Exploration and development could exacerbate the already high potential for disproportionate and adverse cumulative impacts to environmental justice communities near these lease parcels; there are numerous renewable energy and mining projects located near these lease parcels.

Tribal / Native American environmental justice populations are present and there is potential for the project to yield disproportionate and adverse impacts to these communities. Prior to exploration and development, special consideration and outreach (beyond traditional government-to-government outreach) should be required to all tribal communities – especially those in BG 320239601002 and BG 320110001001 – in order to allow for meaningful involvement and discovery of potential impacts.

Future site development and production on leased parcels will require an additional Environmental Justice analysis to assess and evaluate potential disproportionate adverse effects to EJ population(s) present in the project area. Analysis should consist of a) identification of potential environmental justice communities; b) incorporation of community input and local knowledge following the development of a robust environmental justice outreach plan; and c) an aggregate analysis of potential community impacts regarding direct and indirect impact across all resource areas based on differential exposure, differential

sensitivity, differential ability to take mitigating actions, and/or a differential ability to participate in the Project development process.

No Action Alternative

Under the No Action Alternative, the lease sale would not occur, and impacts to environmental justice communities would also not occur. Activities on currently leased parcels adjacent to the proposed parcels would remain on-going as permitted on surrounding federal, state, and private lands.

Cumulative Effects

Several ongoing and potential actions in the area, such as mining, oil and gas development, geothermal exploration, off-highway vehicle use, and livestock grazing, have the potential to cumulatively impact socioeconomics; likewise, environmental justice could be affected in ways already described above. The geographic scope or extent of cumulative effects for socioeconomics and environmental justice resources is dependent upon geographic area and proximity to population centers. Future project specific proposals will need to consider past, present and RFFAs in the required analysis for both socioeconomics and environmental justice.

3.5.19 Waste, Hazardous and Solid

Affected Environment

Lease parcels are proposed in three remote, minimally populated locations, Railroad Valley, Garden Valley between the Sulphur Spring Range and Table Mountain, and Little Smoky Valley. Each of these areas are sparsely populated with individual ranches and agriculture (alfalfa). In the case of Railroad Valley, the most prominent features are oil and gas extraction wells, several tank farms, and a small refinery in the valley. Oil and gas exploration extends north toward Duckwater. Lease parcels north of Eureka are just two miles south of the Blackburn oil field. Although there is recent interest in soluble lithium, the type of extraction is expected to be smaller than oil and gas exploration using similar equipment and generating similar waste types as one expects from oil and gas or water well drilling.

The small acreage of oil and gas activity and associated disturbance identified in the RFD and, considering the existing oil and gas development in the area, the contribution to further effects would be negligible. 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. Environmental consequences of the proposed action are discussed below.

Environmental Effects of the Proposed Action

Under the Proposed Action, the BLM would offer for lease 5 parcels (covering 4,538.342 acres) in the lease sale. The act of selling oil and gas leases in itself does not have the potential to cause environmental effects from hazardous materials, hazardous waste, or solid waste. Lease sales do not authorize exploration, development, or production that could directly affect the environment; however, once issued, a lease bestows upon its owner the “right to use so much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold” (43 CFR§ 3101.1-2) subject to specific nondiscretionary statutes and lease stipulations.

Oil and gas activities including exploration drilling, extraction, production facilities, pipeline transport, and tanker loading, unloading and transport, have the potential to affect the environment through production of waste fluids and emissions resulting from field development and related infrastructure. Oil and gas production wells generate some petroleum contaminated soil, but this is typically cleaned and removed to containment areas for later disposal. Oil spills, produced waters, drill fluids/cuttings, and

hazardous materials could be encountered at a facility or drill pad. The analysis area is not near activities generating hazardous or solid waste such as mining exploration or extraction operations. Under any alternative, all appropriate statutes, regulations and policies (see Section 1.6) and Gold Book standards, guidelines and BMPs would be applied.

The RFD scenario predicts that approximately 25 exploration 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. Environmental effects from hazardous materials, hazardous waste, and solid waste which might be encountered during each phase are provided below. However, most of these incidental effects, if not all, can be avoided or lessened through proper inspection and maintenance.

Exploration: Effects 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 depending on the project proposal. Accidental releases from reserve pits or wastewater collection systems could include hazardous water treatment chemicals such as chlorine. Storm water runoff could contain elevated quantities of heavy metals and volatile organic compounds. When fracked water comes back to the surface as backflow, it can contain high levels of salts, introduced chemical additives, and various chemicals and compounds that occur naturally within the earth. Backflow spills have been known to kill off all vegetation and render the soil unusable. Nonhazardous solid waste such as drill cuttings or mud could be generated at this stage.

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

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

When the RFD scenario is considered, effects to human health would generally be negligible because the substances involved would be properly handled, stored, and disposed of in accordance with applicable federal, state, and local regulations. Proper management of these substances would ensure that no soil, ground water, or surface water contamination would occur with any adverse effect on wildlife, worker health and safety, or surrounding communities. Additional project- and site-specific environmental analysis of any future exploration, development and/or production would allow inclusion of updated mitigation measures, BMPs, and COAs; and performance standards would be defined at that time.

Effects of hazardous waste spills in areas with surface water resources could be exacerbated and difficult to mitigate though the CSU Water Resources stipulation would require avoiding impacts within 500 feet of surface waters and riparian areas; and effects to floodplains and playas. Application of this stipulation would not only prevent surface disturbance within the defined areas but would also prevent accidental contamination.

No Action Alternative

Under the No Action Alternative, the parcel(s) would not be leased, and no new oil and gas development would occur on the subject lease parcels; therefore, no new wastes, either hazardous or solid would occur on those lands except on adjacent authorized leases for activities on surrounding federal, state, and private lands.

Cumulative Effects

The disturbance associated with oil and gas exploration and production would add to the disturbances from mineral exploration, mine development, grazing management, wildfires, fire rehabilitation and range improvement projects, land use authorizations, and fluid mineral exploration and development. Incremental surface disturbance and infrastructure removes the base for ecological systems. Although all human activities influence the natural setting, it is a matter of federal law to properly dispose of waste. Developments on public lands usually include waste, hazardous and solid, disposal plans prior to project approval. This includes oil and gas drilling and development; thus, the cumulative impacts to the environment from wastes is expected to be minimal due to the relatively small area of disturbance in the RFD scenario, concurrent reclamation, and the development of site-specific mitigation and BMPs.

3.5.20 Human Health and Safety

Affected Environment

The BMD consists of 10.4 million acres of BLM-managed public land. There are 106 abandoned, expired, active, and shut-in oil and gas wells. The majority are located in Railroad Valley. The development has resulted in the following public health and safety-related risks: occasional fire starts; spills of hazardous materials, hydrocarbons, and produced water and corresponding potential contamination of air, soil, or water; exposure to naturally occurring radioactive material in drill cuttings or produced water (see Supplemental Information - E and F); infrequent industrial accidents; presence of hydrogen sulfide (H₂S); or increased levels of fugitive dust (PM₁₀ and PM_{2.5}), other criteria air pollutants (CAPs), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs). See the air quality analysis in 3.5.1 and 3.5.2 for projected levels of CAPs, HAPs, and their effects on air quality standards. HAPs are known or suspected to cause cancer or other serious health effects, such as compromises to immune and reproductive systems, birth defects, developmental disorders, or adverse environmental effects resulting from either chronic (long-term) and/or acute (short-term) exposure, and/or adverse environmental effects. Breathing ozone (O₃) can trigger a variety of health problems, including coughing and sore or scratchy throat; difficulty breathing deeply and vigorously and pain when taking deep breaths; inflammation and damage to the airways; increased susceptibility to lung infections; aggravation of lung diseases such as asthma, emphysema, and chronic bronchitis; and an increase in the frequency of asthma attacks. Some of these effects have been found even in healthy people, but effects are more serious in people with lung diseases such as asthma. Particulate matter, also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Smaller particles are associated with more negative health effects, including respiratory and cardiovascular problems, because they can become more deeply embedded in the lungs and may even get into the bloodstream.

The following links provide additional information on air pollution health effects:

Criteria Pollutants

- Ozone (<https://www.epa.gov/ground-level-ozone-pollution>) (EPA, 2023)
- Particulates (<https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>) (EPA, 2023)
- Nitrogen dioxide (<https://www.epa.gov/no2-pollution/basic-information-about-no2>) (EPA, 2023)

- Carbon monoxide (<https://www.epa.gov/co-pollution/basic-information-about-carbonmonoxide-co-outdoor-air-pollution#What%20is%20CO>) (EPA, 2023)
- Lead (<https://www.epa.gov/lead-air-pollution/basic-information-about-lead-airpollution#health>) (EPA, 2023)
- Sulfur dioxide (<https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects>) (EPA, 2023)
- Hazardous air pollutants (<https://www.epa.gov/haps/health-effects-notebook-hazardous-airpollutants>) (EPA, 2023)

While the air quality analysis, Section 3.5.1 and 3.5.2, estimates the risk of cancer and/or other health impacts solely based on exposure to HAPs, other economic or social indicators can also influence the general health risks of a population, such as poverty status, educational attainment, or language proficiency. Headwaters Economics data for populations at risk (i.e., more likely to experience adverse health outcomes due to demographic or socioeconomic factors) show that most of the indicators for populations at risk are lower for the state of Nevada compared with the nation as a whole (U.S. Department of Commerce, 2023)

Human health risk assessments cannot be performed until project-specific details are known so that frequency, timing, and levels of contact with potential stressors may be identified (EPA, 2023). However, each of the reasonably foreseeable environmental trends and planned actions have been, or will be, subject to relevant rules and regulations regarding public health and safety. Ongoing and future potential development would continue to present aggregate risks to human health as detailed above. When wells reach the end of their useful life and are properly plugged and reclaimed, they would no longer contribute to health and safety effects; however, depending on the level and duration of individual's exposure during well operation, some of the public health effects from air pollution may endure beyond the life of the wells (e.g., chronic respiratory problems such as asthma).

Future potential development on the nominated lease parcels is estimated to be 25 new wells for this lease sale. This is a 0.5% increase in addition to the 103 existing active wells. When authorizing development, federal and state laws, regulations, and policy are applied to reduce effects or respond to incidents. These include the following:

- Federal, state, county, and municipal fire managers shall coordinate on fire response and mitigation.
- Developers who install and operate oil and gas wells, facilities, and pipelines are responsible for complying with the applicable laws and regulations governing hazardous materials and for following all hazardous spill response plans and stipulations. The Nevada Division of Minerals requires similar spill response measures after release of hydrocarbons, produced water, or hydraulic fracturing fluids.

Environmental effects of the proposed action are discussed below.

Environmental Effects of the Proposed Action

The proposed lease parcels are located in three areas in BMD. Parcel 1994 is located adjacent to private land and lies approximately three miles northwest of the Duckwater Shoshone Indian Reservation in Fish Creek Valley by the Fish Creek Ranch. Parcel 6969 is also adjacent to private land and adjacent to Bullwhacker Springs, less than two miles from Lockes Ranch, and about three miles from Currant. Parcels 1663, 1664, and 6936 are approximately six miles north of Eureka between Table Mountain and the Sulphur Spring Range with several private land holdings within a one-mile radius. These rural areas are remote with no school or population centers nearby. Although private lands exist nearby, few are inhabited. The nearest populated area that could be impacted is the Duckwater Shoshone Indian Reservation.

The analysis area is not near activities generating hazardous or solid waste such as mining exploration or extraction operations. Although there is recent interest in soluble lithium, the type of extraction is expected to be smaller than oil and gas exploration using similar equipment and generating similar waste types as one expects from oil and gas or water well drilling.

The small acreage of oil and gas activity and associated disturbance identified in the RFD and, considering the existing oil and gas development in the area, the contribution to further effects would be negligible. 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.

No Action Alternative

Under the No Action Alternative, the parcel(s) would not be leased, and no new oil and gas development would occur on the subject lease parcels; therefore, no new health and human safety issues could arise other than from previously permitted activities and for new proposals on public lands, not associated with this lease sale. All activities occurring on public land would be required to follow local, state, and federal laws and regulations.

Cumulative Effects

The disturbance associated with oil and gas exploration and production would add to the disturbances from mineral exploration, mine development, grazing management, wildfires, fire rehabilitation and range improvement projects, land use authorizations, and fluid mineral exploration and development. Incremental surface disturbance and cumulative activities on public land increase opportunities for pollution, and pollutants in air, water, and soil. Public health and safety regulations exist for these resources; thus, the cumulative impacts to health and human safety are expected to be minimal due to the relatively small area of disturbance in the RFD timeframe, concurrent reclamation, and the development of site-specific mitigation and BMPs.

Chapter 4. List of Preparers

An ID Team prepared the document and analyzed the effects of the proposed action and alternatives upon the various resources (Table 12). They considered the affected environment and documented the effects to resources in the body of the EA.

Table 13. List of specialists

Resources	Specialists
Air Quality, Greenhouse Gas, and Climate Change	Franklin Giles
Water Resources	Thomas Gibbons
Soils, Vegetation, Rangeland Resources	Thomas Mendoza
Noxious Weeds, Invasive Non-native Species	Thomas Mendoza
Wildlife Resources and Special Status Species	Gabrielle Buttermore/Rachelle Peppers
Cultural Resources and Paleontology	Ariel Belanger
Native American Cultural and Religious Concerns	David Dick
Recreation, Visual Resources, Wilderness Characteristics	Melissa Jennings
Geology and Minerals	Melissa Jennings
Land Use Authorizations	Cassy Ault
Socioeconomics and Environmental Justice	Matthew Fockler
Waste, Hazardous and Solid, Health and Human Safety	Jensen Reese
NEPA compliance	Jeffrey Kirkwood

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Supplemental Information

A: Stipulations and Lease Notices

NV-B-00-A-LN

BLM Nevada Standard Lease Notices

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

Migratory Birds

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

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

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

Fossils

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

Water

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

Mining Claims

This parcel may contain existing mining claims and/or mill sites located under the 1872 Mining Law. To the extent it does, the oil and gas lessee must conduct its operations, so far as reasonably practicable, to avoid damage to any known deposit of any mineral for which any mining claim on this parcel is located, and should not endanger or unreasonably or materially interfere with the mining claimant's operations, including any existing surface or underground improvements, workings, or facilities which may have been

made for the purpose of mining operations. The provisions of the Multiple Mineral Development Act (30 U.S.C. 521 et seq.) shall apply on the leased lands.

Fire

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

- All vehicles should carry fire extinguishers and a minimum of 10 gallons of water.
- Adequate fire-fighting equipment i.e. shovel, Pulaski, extinguisher(s) and a minimum 10 gallons of water should be kept at the drill site(s).
- Vehicle catalytic converters should be inspected often and cleaned of all brush and grass debris.
- When conducting welding operations, they should be conducted in an area free from or mostly free from vegetation. A minimum of 10 gallons water and a shovel should be on hand to extinguish any fires created from the sparks. Extra personnel should be at the welding site to watch for fires created by welding sparks.
- Report wildland fires immediately to the BLM Central Nevada Interagency Dispatch Center (CNIDC) at (775) 623-3444. Helpful information to reported is location (latitude and longitude if possible), what is 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) 650-4000 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
ALL	ALL LANDS

HQ-MLA-1

Notice to Lessee Concerning Mineral Leasing Act Section 2 (A)(2)(A)

Provisions of the Mineral Leasing Act (MLA) of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976, affect an entity's qualifications to obtain an oil and gas lease. Section 2(a)(2)(A) of the MLA, 30 U.S.C. 201(a)(2)(A), requires that any entity that holds and has held a Federal Coal Lease for 10 years beginning on or after August 4, 1976, and that is not producing coal in commercial quantities from each such lease cannot qualify for the issuance of any other lease granted under the MLA. 43 CFR 3472 explains coal lessee compliance with Section 2(a)(2)(A).

In accordance with the terms of this oil and gas lease with respect to compliance by the initial lessee with qualifications concerning Federal coal lease holdings, all assignees and transferees are hereby notified that this oil and gas lease is subject to cancellation if: (1) the initial lessee as assignor or as transferor has falsely certified compliance with Section 2(a)(2)(A) because of a denial or disapproval by a State Office of a pending coal action, i.e., arms-length assignment, relinquishment, or logical mining unit; (2) the initial lessee as assignor or as transferor is no longer in compliance with Section 2(a)(2)(A); or (3) the assignee or transferee does not qualify as a bona fide purchaser and, thus, has no rights to bona fide purchaser protection in the event of cancellation of this lease due to noncompliance with Section 2(a)(2)(A).

The lease case file, as well as in other Bureau of Land Management (BLM) records available through the State Office issuing this lease, contains information regarding assignor or transferor compliance with Section 2(a)(2)(A).

Parcel #	Legal Land Description
ALL	ALL LANDS

HQ-CR-1

Cultural Resource Protection

This lease may be found to contain historic properties and/or resources protected under National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 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 under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

Parcel #	Legal Land Description
ALL	ALL LANDS

HQ-TES-1

Threatened and Endangered Species Act

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that would contribute to a need to list such a species or their habitat. The 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. The BLM will not approve any ground-disturbing activity 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.

Parcel #	Legal Land Description
ALL	ALL LANDS

NV-B-02-A-TL Mule Deer Seasonal Habitat

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

NV-B-02-A-TL	Mule Deer Seasonal Habitat
Parcel #	Legal Land Description
NV-2023-12-1663	T. 25 N., R. 52 E., 21 MDM, NV Sec. 24 PROT E2SE
NV-2023-12-6936	T. 25 N., R. 52 E., 21 MDM, NV Sec. 05 PROT All Lands; Sec. 06 PROT W2NE, SESE, E2SW, E2NW
NV-2023-12-6969	T. 07 N., R. 57 E., 21 MDM, NV Sec. 27 W2; Sec. 28 SE, SESW

NV-B-02-B-LN Lease Notice – Mule Deer Migration Corridors

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

NV-B-02-B-LN	Mule Deer Migration Corridors
Parcel #	Legal Land Description
NV-2023-12-6969	T. 07 N., R. 57 E., 21 MDM, NV Sec. 27 W2; Sec. 28 SE, SESW

NV-B-10-B-CSU Stipulation – Water Resources

Stipulation: A Controlled Surface Use (CSU) stipulation will be applied to oil and gas leases and land use authorizations to avoid impacts to the following areas: 1) identified 100-year flood plains, and playas; 2) areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas, and 3) areas from 150 feet (for groundwater sources and related places of use) to as much as 500 feet (for surface water sources and related places of use) where the BLM holds state appropriative water rights. Surface disturbing activities may require special engineering design, construction and implementation measures, potentially including relocation of operations more than 200 meters to protect water resources.

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

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

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

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

NV-B-10-B-CSU	Water Resources
Parcel #	Legal Land Description
NV-2023-12-1664	T. 25 N., R. 52 E., MOUNT DIABLO MER Sec. 11 PROT SWNW.
NV-2023-12-6969	T. 7 N., R. 57 E., MOUNT DIABLO MER Sec. 27 SW; Sec. 28 N2NW, NESW.

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

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.

NV-B-12-B-LN	Community Saleable Mineral Pits
Parcel #	Legal Land Description
NV-2023-12-1994	T. 16 N., R. 53 E., MOUNT DIABLO MER Sec. 12 W2SE;

NV-B-16-B-NSO Stipulation – Sage-Grouse Habitat, GHMA, Adaptive Management Plan (modified)

Stipulation: No Surface Occupancy (NSO). Manage Nevada geothermal resources in General Habitat Management Areas (GHMA) as NSO, with one exception pursuant to the Adaptive Management Plan identified in Appendix J of the 2015 Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (See Table J-2).

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

Exception: Oil and gas projects within portions of the Nevada GHMA may be considered for authorization, if all of the following conditions are met:

- A team composed of BLM, USFWS, and NDOW specialists advises the BLM State Director on appropriate mitigation measures for the project and its ancillary facilities, including lek buffer distances using the best available science.
- Mitigation actions are consistent with this ARMPA’s mitigation strategy, such as the Nevada Conservation Credit System.
- The footprint of the project is consistent with the Disturbance Management Protocols identified in this Plan (see NV/CA GRSG Amendment ROD Action SSS 2 and Appendix I).

Modification: None.

Waiver: None

NV-B-16-B-NSO	Sage-Grouse Habitat, GHMA, Adaptive Management Plan
Parcel #	Legal Land Description
NV-2023-12-1994	T. 0160 N, R 0530 E, 21 MDM, NV Sec. 12 SW, N2SE, SWSE; Sec. 13 NWNW.

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

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 State Director may grant an exception to the allocations and stipulations if one of the following applies (in coordination with NDOW, SETT):

- i. The location of the proposed authorization is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et al 2015) and lacks the ecological potential to become marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat, and/or
- ii. The proposed activity's impacts could be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy consistent with Federal law and the state's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order) would be one mechanism by which a proponent achieves the Approved RMP Amendment goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification would be based, in part, on criteria consistent with the State's GRSG management plans and policies.

Modification: The authorized officer, in coordination with the appropriate state wildlife agency (NDOW, and/or CDFW), can modify and/or waive dates for seasonal timing restrictions based on the criteria described below, based on site-specific information that indicates:

- i. A project proposal's NEPA analysis and/or project record, and correspondence from NDOW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions all together) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario modifications can occur if:
 - a) A proposed authorization would have beneficial or neutral impacts on GRSG and its habitat.
 - b) Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat.
 - c) There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period.
- ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).

Waiver: The stipulation may be waived if the authorized officer, in consultation with the appropriate state wildlife agency (NDOW), determines that the entire leasehold is within unsuitable habitat (see

exceptions above) and would not result in direct, indirect, or cumulative impacts to GRSG and/or its habitat.

NV-B-16-D-TL	Sage-Grouse Habitat, GHMA, Early Brood-Rearing
Parcel #	Legal Land Description
NV-2023-12-1994	T. 0160 N, R 0530 E, 21 MDM, NV Sec. 12 SW, N2SE, SWSE; Sec. 13 NWNW.

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

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

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

Exception: The State Director may grant an exception to the allocations and stipulations if one of the following applies (in coordination with NDOW, SETT):

- i. The location of the proposed authorization is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et al 2015) and lacks the ecological potential to become marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat, and/or
- ii. The proposed activity’s impacts could be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy consistent with Federal law and the state’s mitigation policies and programs, such as the State of Nevada’s Executive Order 2018-32 (and any future regulations developed to implement this order). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State’s mitigation policies and programs, such as the State of Nevada’s Executive Order 2018-32 (and any future regulations developed to implement this order) would be one mechanism by which a proponent achieves the Approved RMP Amendment goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification would be based, in part, on criteria consistent with the State’s GRSG management plans and policies.

Modification: The authorized officer, in coordination with the appropriate state wildlife agency (NDOW, and/or CDFW), can modify and/or waive dates for seasonal timing restrictions based on the criteria described below, based on site-specific information that indicates:

- i. A project proposal’s NEPA analysis and/or project record, and correspondence from NDOW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions all together) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario modifications can occur if:
 - a) A proposed authorization would have beneficial or neutral impacts on GRSG and its habitat.
 - b) Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat.

- c) There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period.
- ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).

Waiver: The stipulation may be waived if the authorized officer, in consultation with the appropriate state wildlife agency (NDOW), determines that the entire leasehold is within unsuitable habitat (see exceptions above) and would not result in direct, indirect, or cumulative impacts to GRSG and/or its habitat.

NV-B-16-E-TL	Sage-Grouse Habitat, GHMA, Late Brood-Rearing
Parcel #	Legal Land Description
NV-2023-12-1994	T. 0160 N, R 0530 E, 21 MDM, NV Sec. 12 SW, N2SE, SWSE; Sec. 13 NWNW.

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Figure 3. December 2023 Oil and gas proposed lease sale parcels Tonopah Field Office. 5

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Figure 5. Map of EJ Screen Blockgroups used for the Environmental Justice Analysis..... 1

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Figure 7. Oil and Gas Lease Sale parcels near Fish Creek Valley in the Mount Lewis Field Office and Land Status..... 3

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2023 Geothermal Lease Sale Parcels

Battle Mountain District

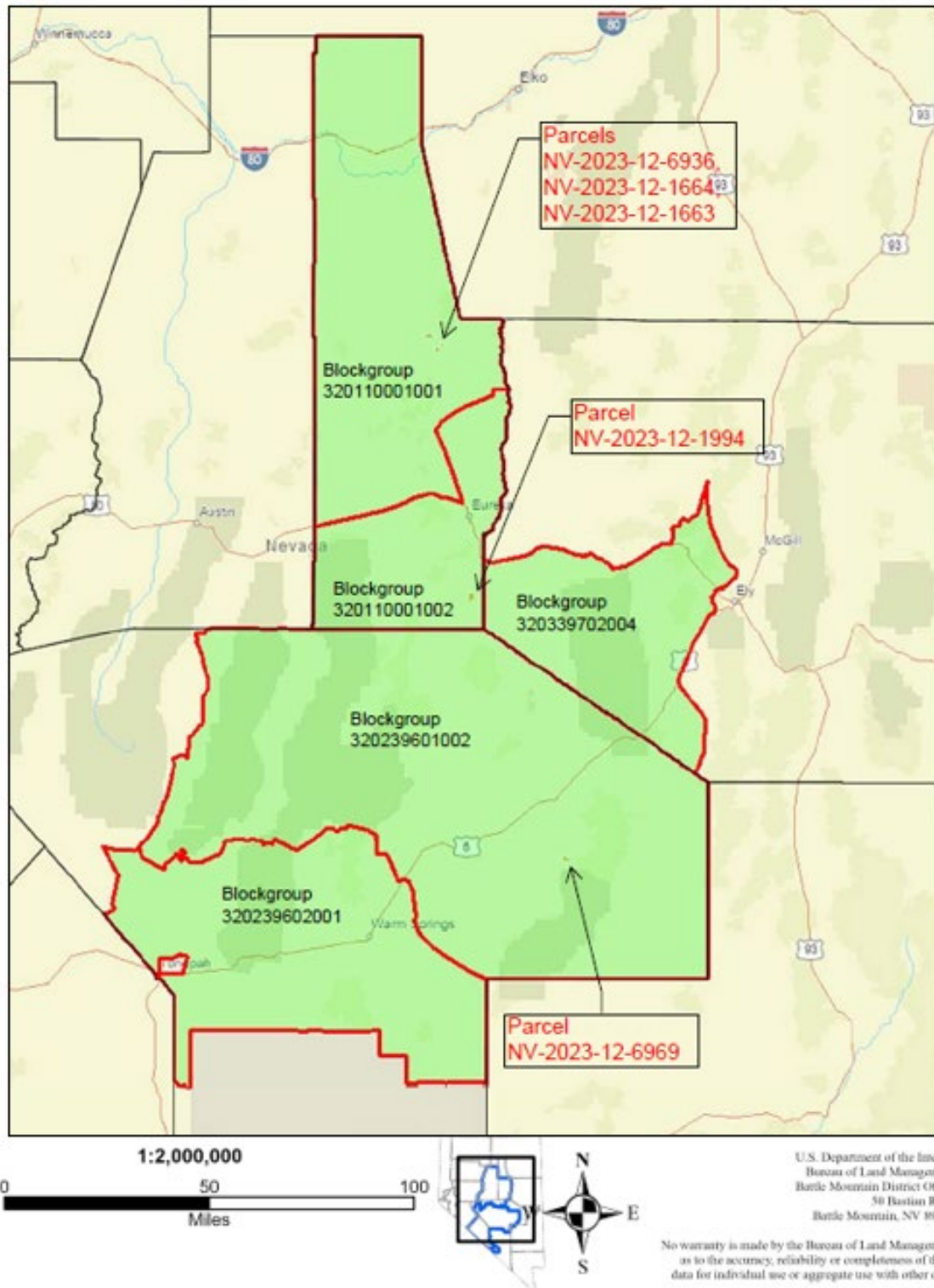
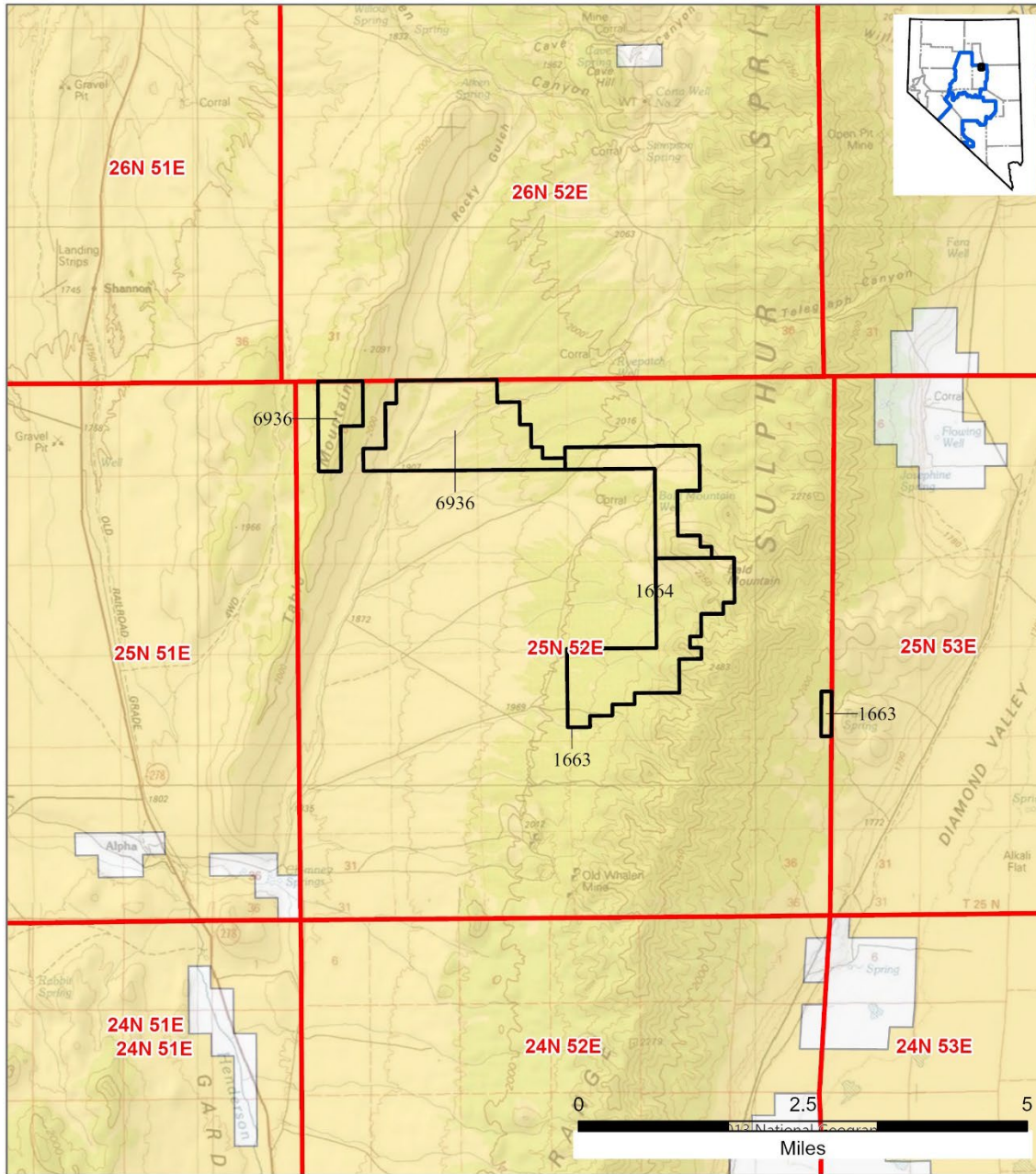


Figure 6. Map of EJ Screen Blockgroups used for the Environmental Justice Analysis



2023 Oil&Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Township

- Agency
- Bureau of Land Management
 - Private



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Figure 7. Oil and Gas Lease Sale parcels near Sulphur Springs Range in the Mount Lewis Field Office and Land Status.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office

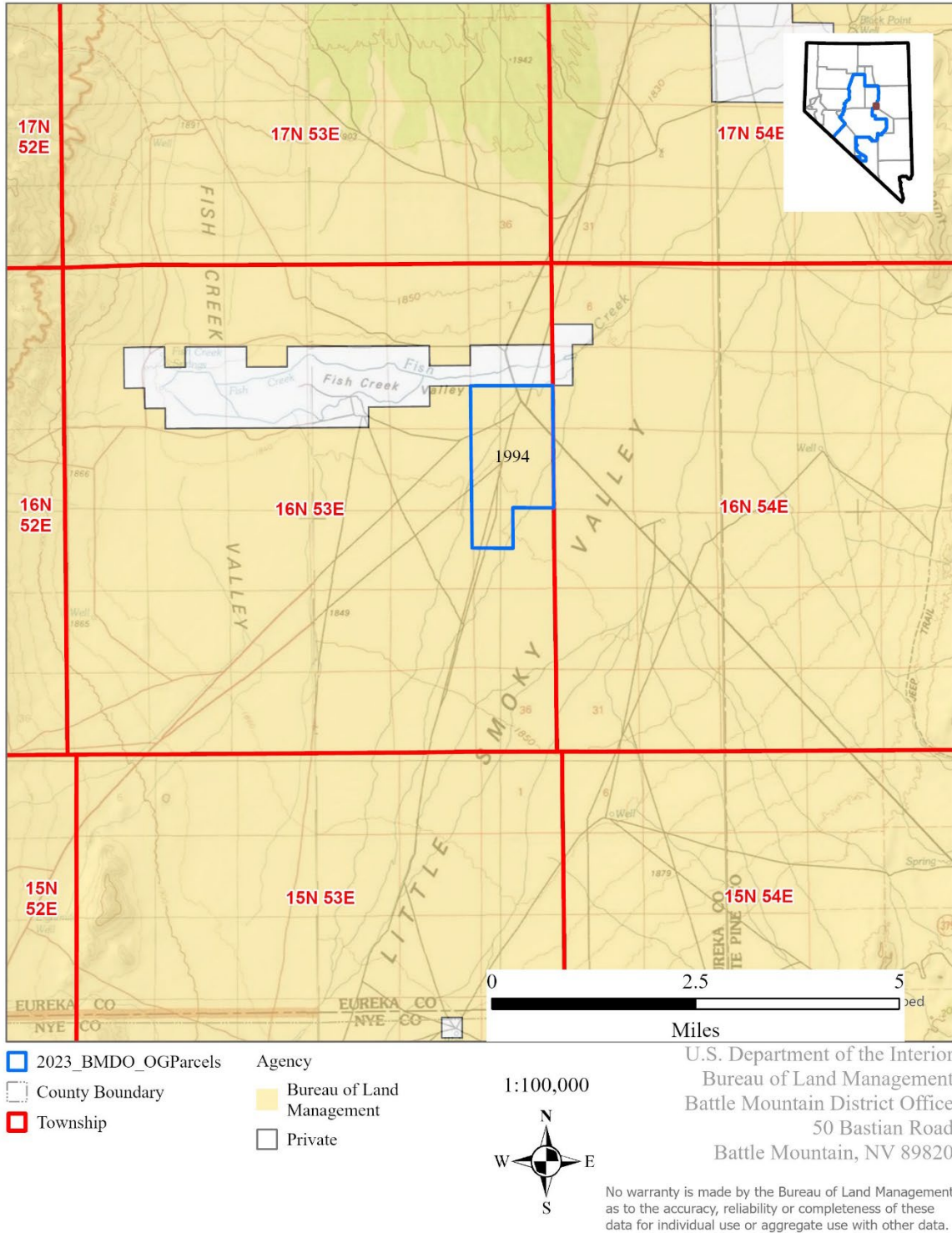
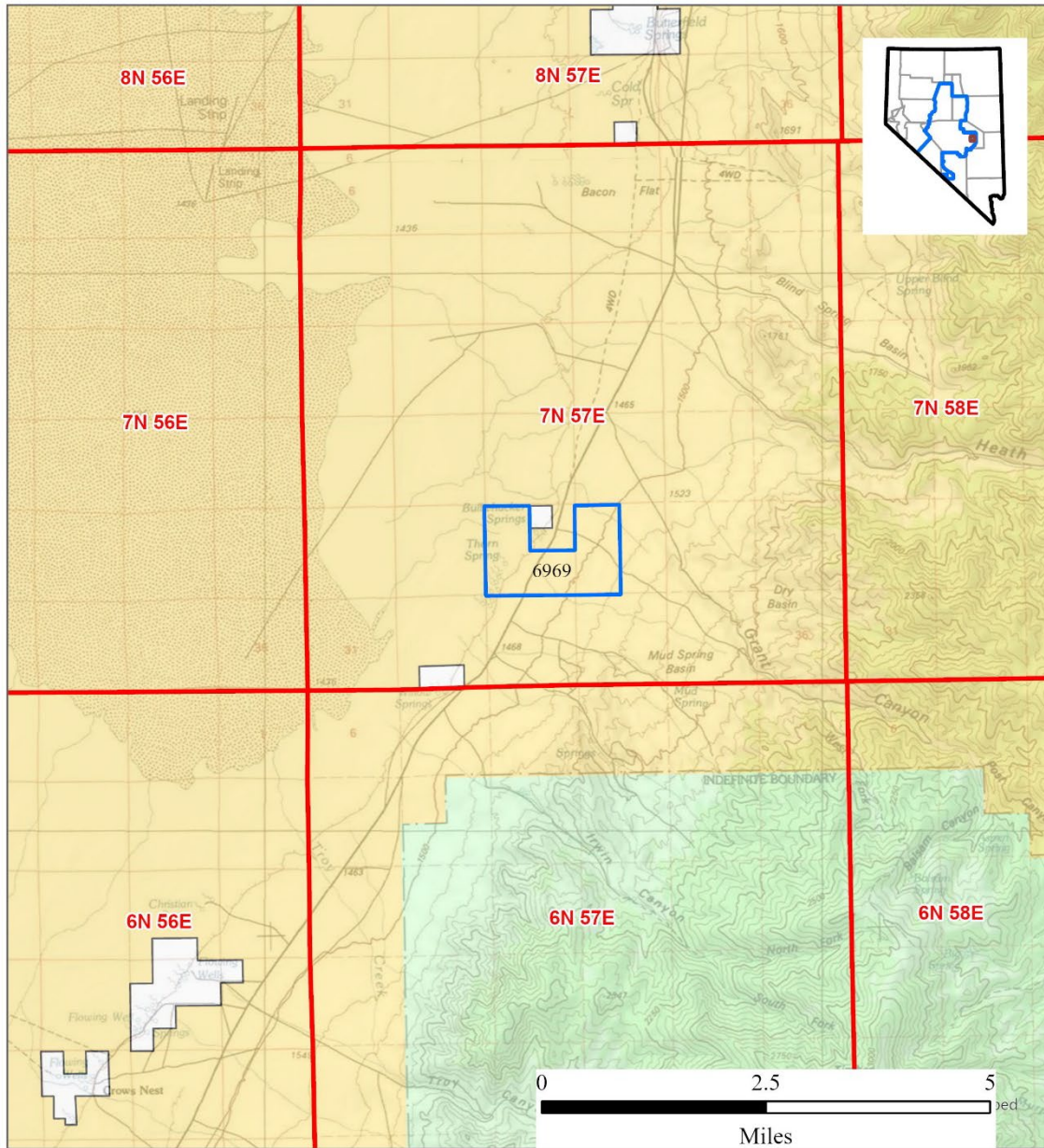


Figure 8. Oil and Gas Lease Sale parcels near Fish Creek Valley in the Mount Lewis Field Office and Land Status.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Tonopah Field Office



- | | |
|---------------------|---------------------------|
| 2023_BMDO_OGParcels | Agency |
| County Boundary | Bureau of Land Management |
| Township | Forest Service |
| | Private |



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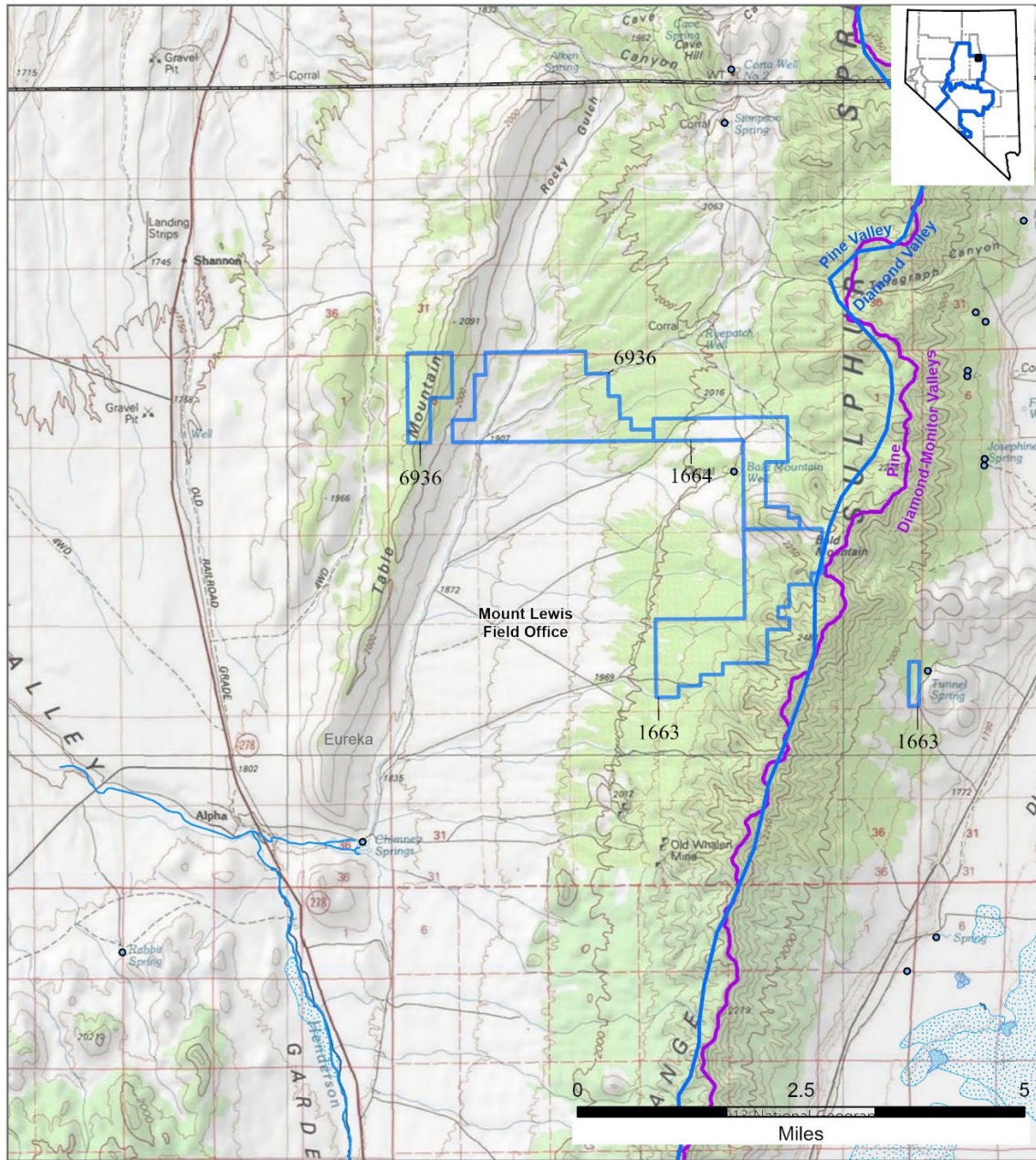
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Figure 9. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office and Land Status.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



- 2023 BMDO_OGParcels
- County Boundary
- Field Office Boundary
- NHDFlowline
- 100k Springs
- 100K Perennial Stream
- 100k Lakes
- Playas
- FWSWetland
- FWSCriticalHabitat
- HUC 8 (Sub-Basin)
- NV Basin Boundaries



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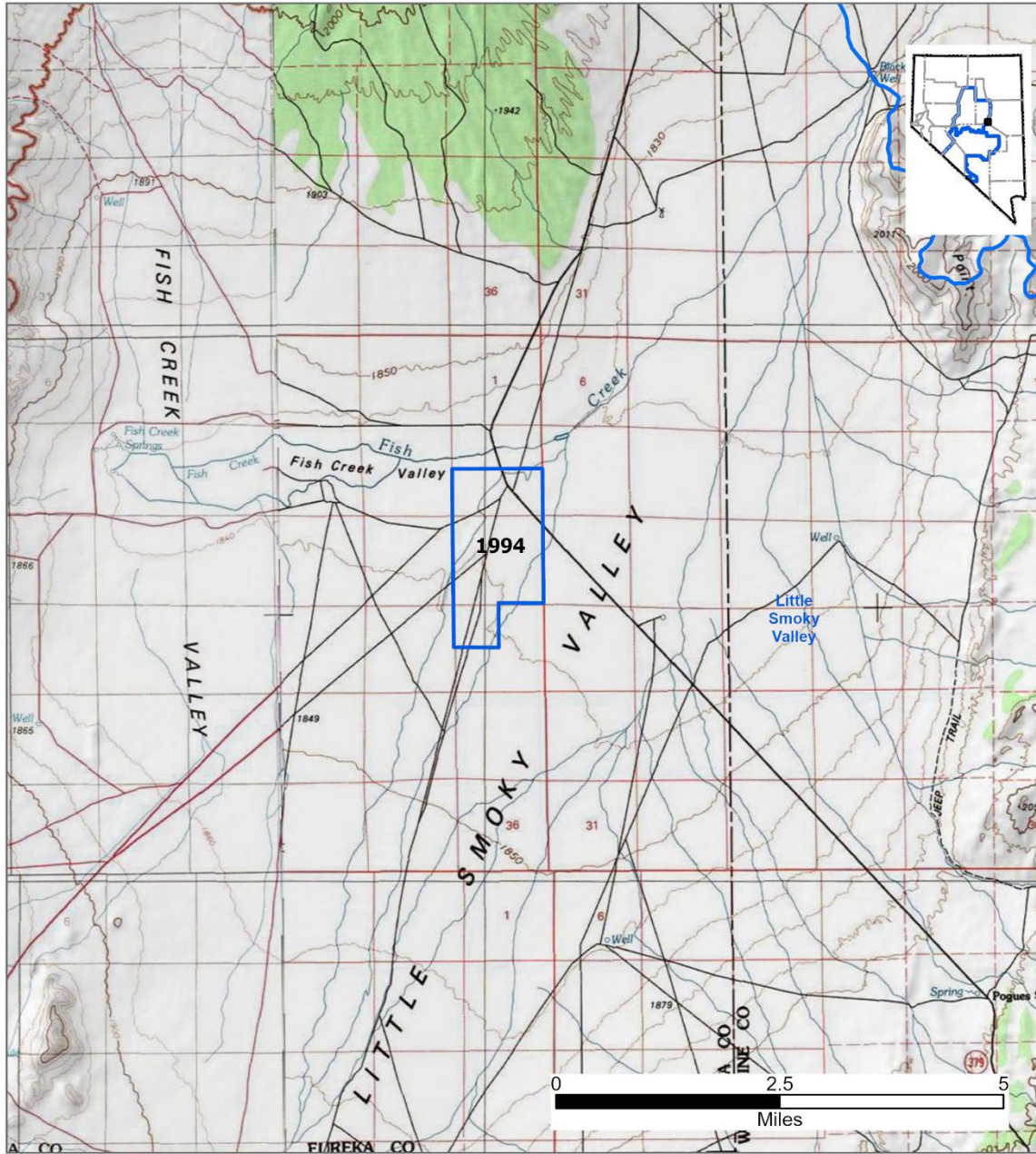
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Figure 10. Oil and Gas Lease Sale parcels near Sulphur Springs Range in the Mount Lewis Field Office and Water Resources.

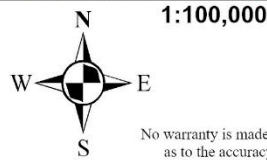


2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



- HUC 8 (Sub-Basin)
- NV Basin Boundaries



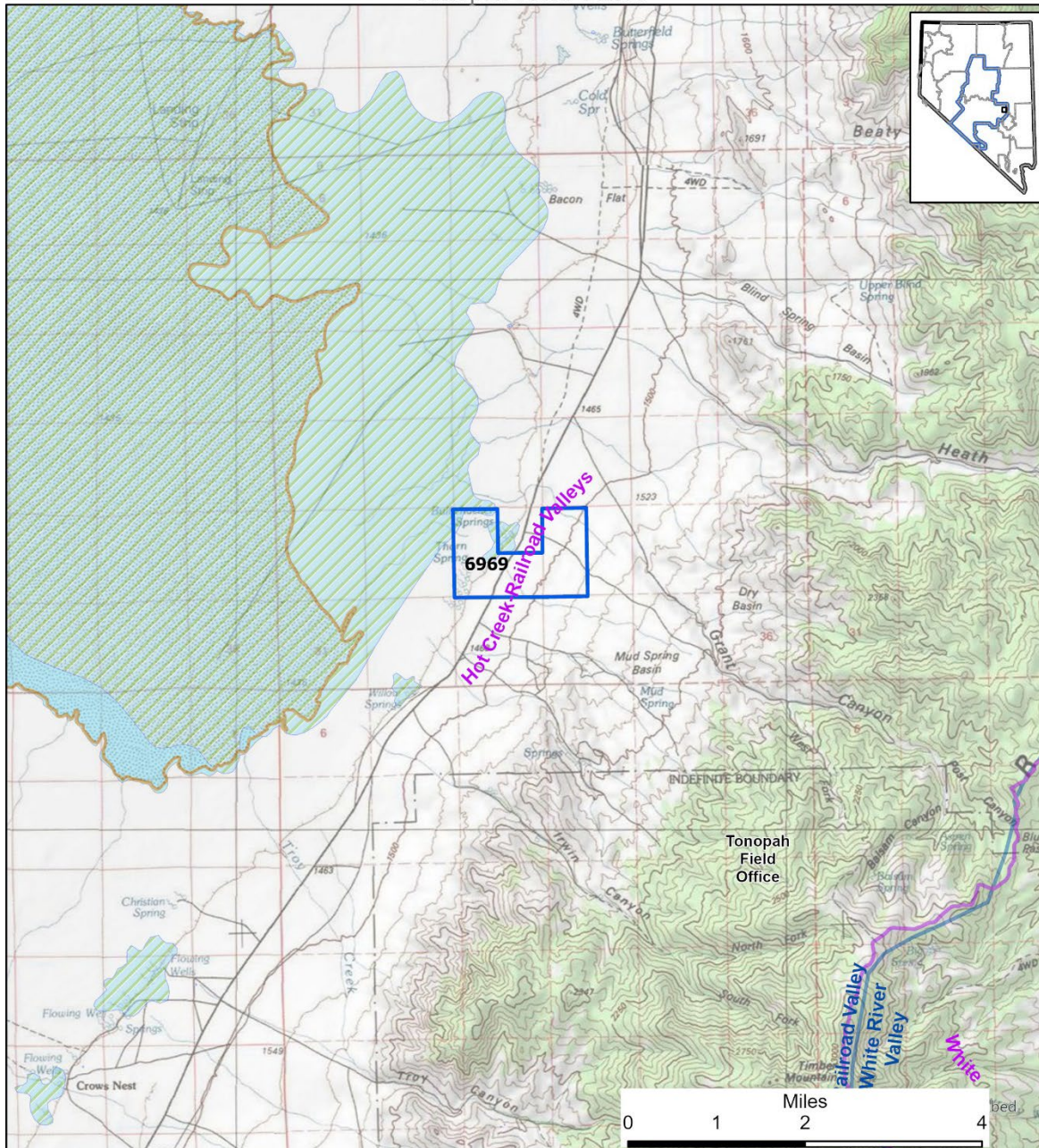
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Figure 11. Oil and Gas Lease Sale parcels near Fish Creek Valley in the Mount Lewis Field Office and Water Resources.



2023 Oil & Gas Lease Sale Parcels Battle Mountain District Tonopah Field Office



- | | |
|-------------------------------------|--------------------|
| 2023_December OG Lease Sale Parcels | Playas |
| HUC 8 (Sub-Basin) | 100yrFlood1Percent |
| NV Basin Boundaries | LakePond |
| FWS Wetlands | |



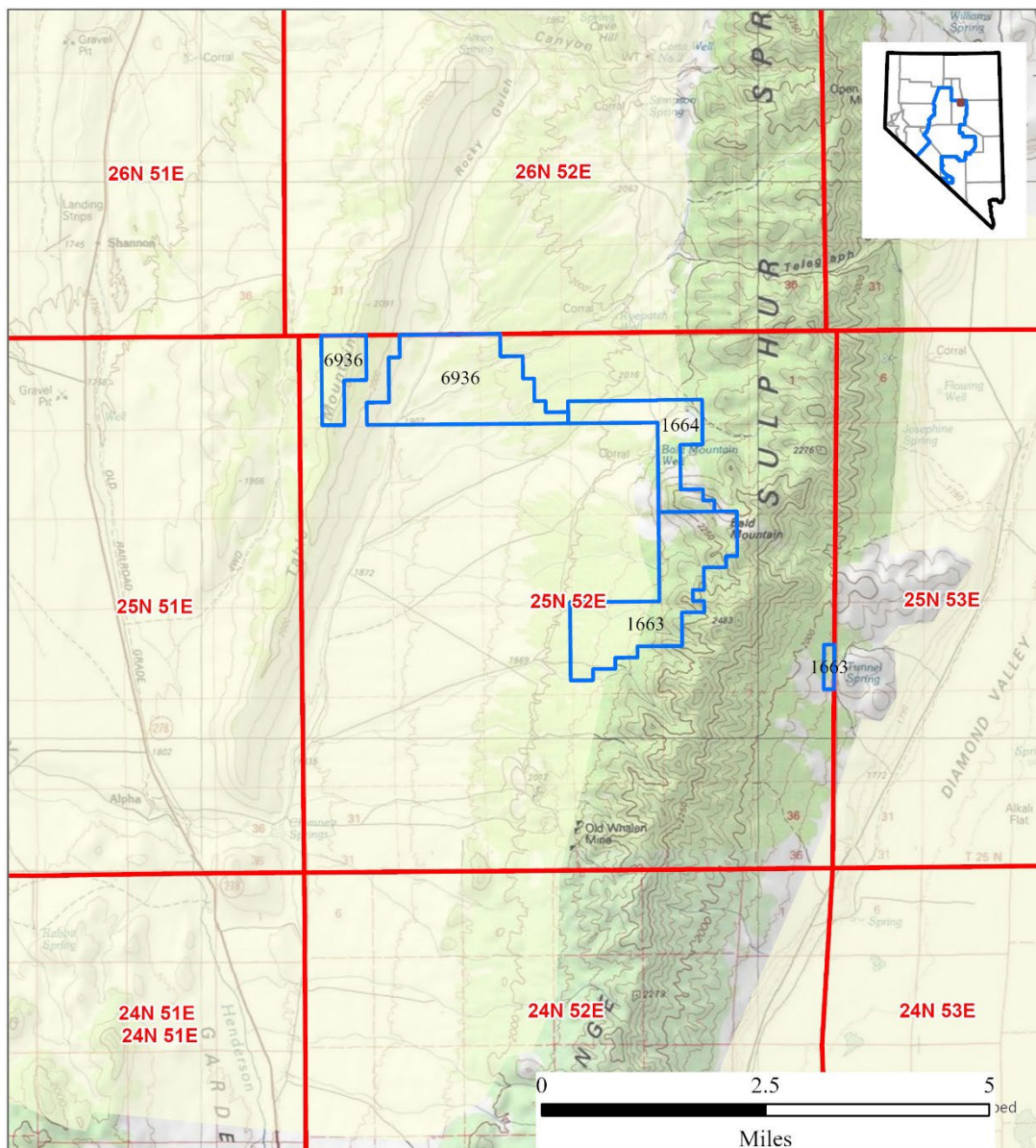
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Figure 12. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Water Resources.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Township
- Pronghorn
- Year-round



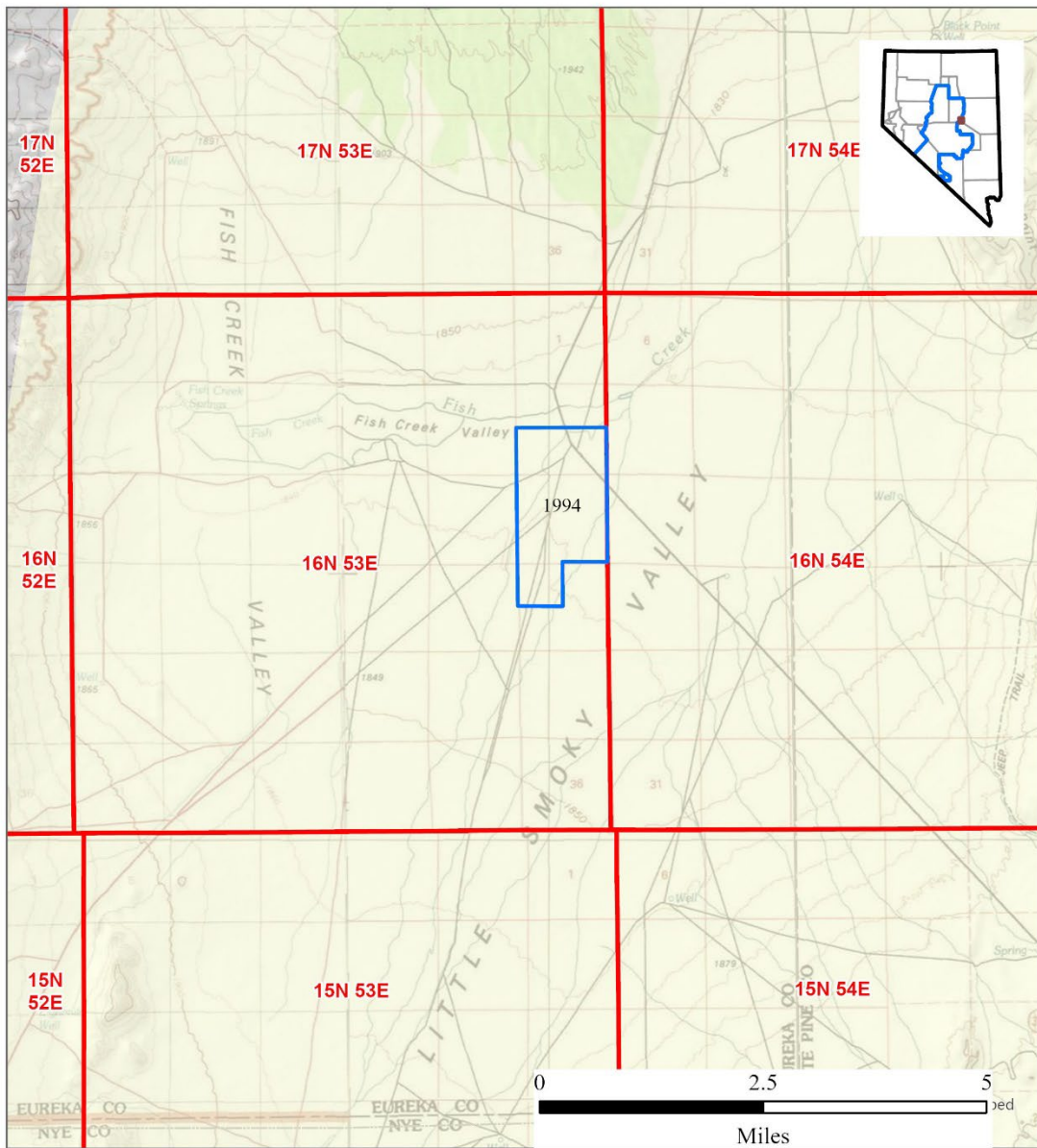
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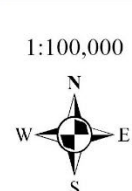
Figure 13. Oil and Gas Lease Sale parcels near Sulphur Springs Range in the Mount Lewis Field Office and Pronghorn Habitat.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Township
- Pronghorn
- Year-round



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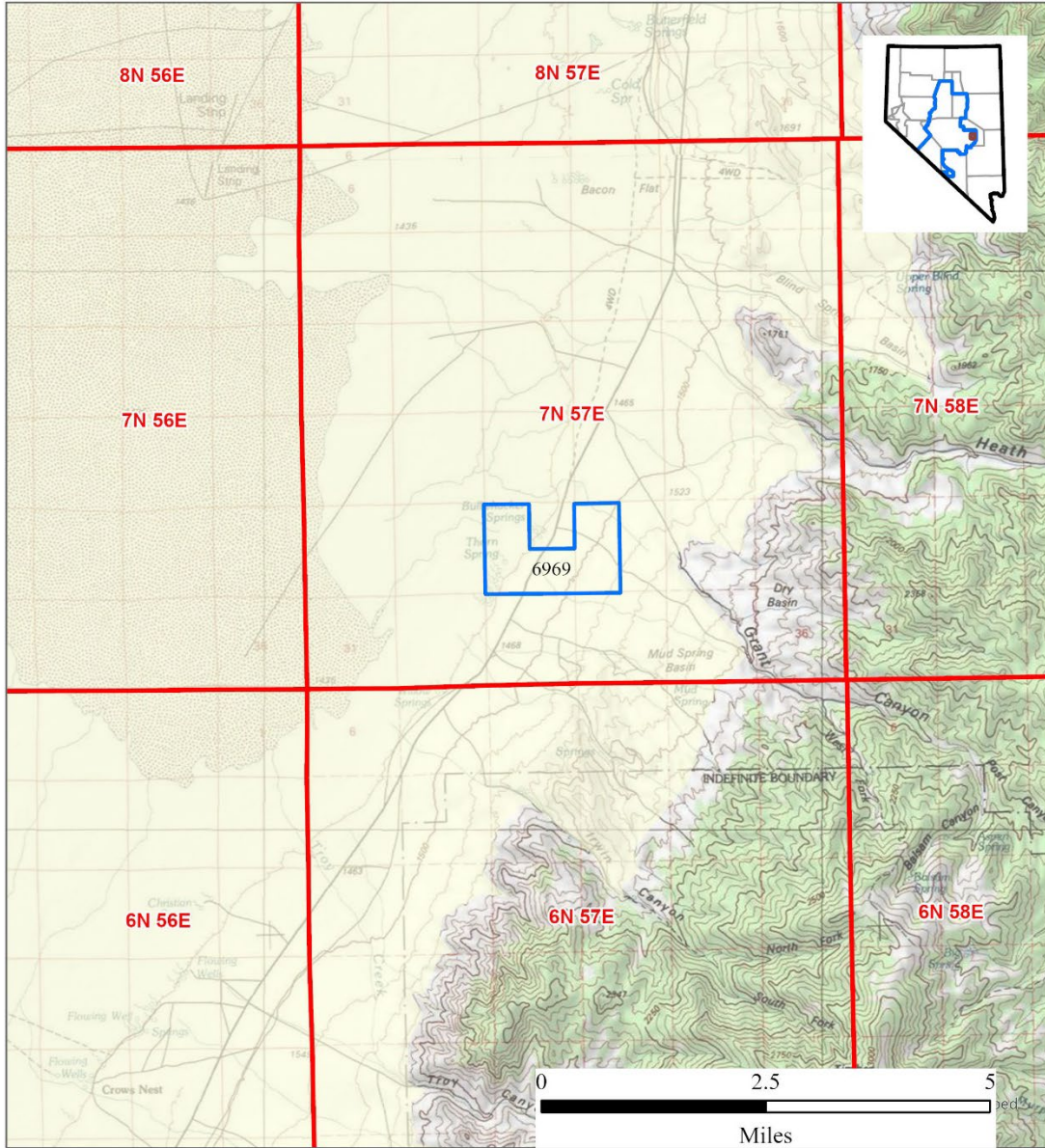
Figure 14. Oil and Gas Lease Sale parcels near Fish Creek, Mount Lewis Field Office and Pronghorn Habitat.



2023 Oil&Gas Lease Sale Parcels

Battle Mountain District

Tonopah Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Township
- Pronghorn
- Year-round

1:100,000



U.S. Department of the Interior
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 Battle Mountain District Office
 50 Bastian Road
 Battle Mountain, NV 89820

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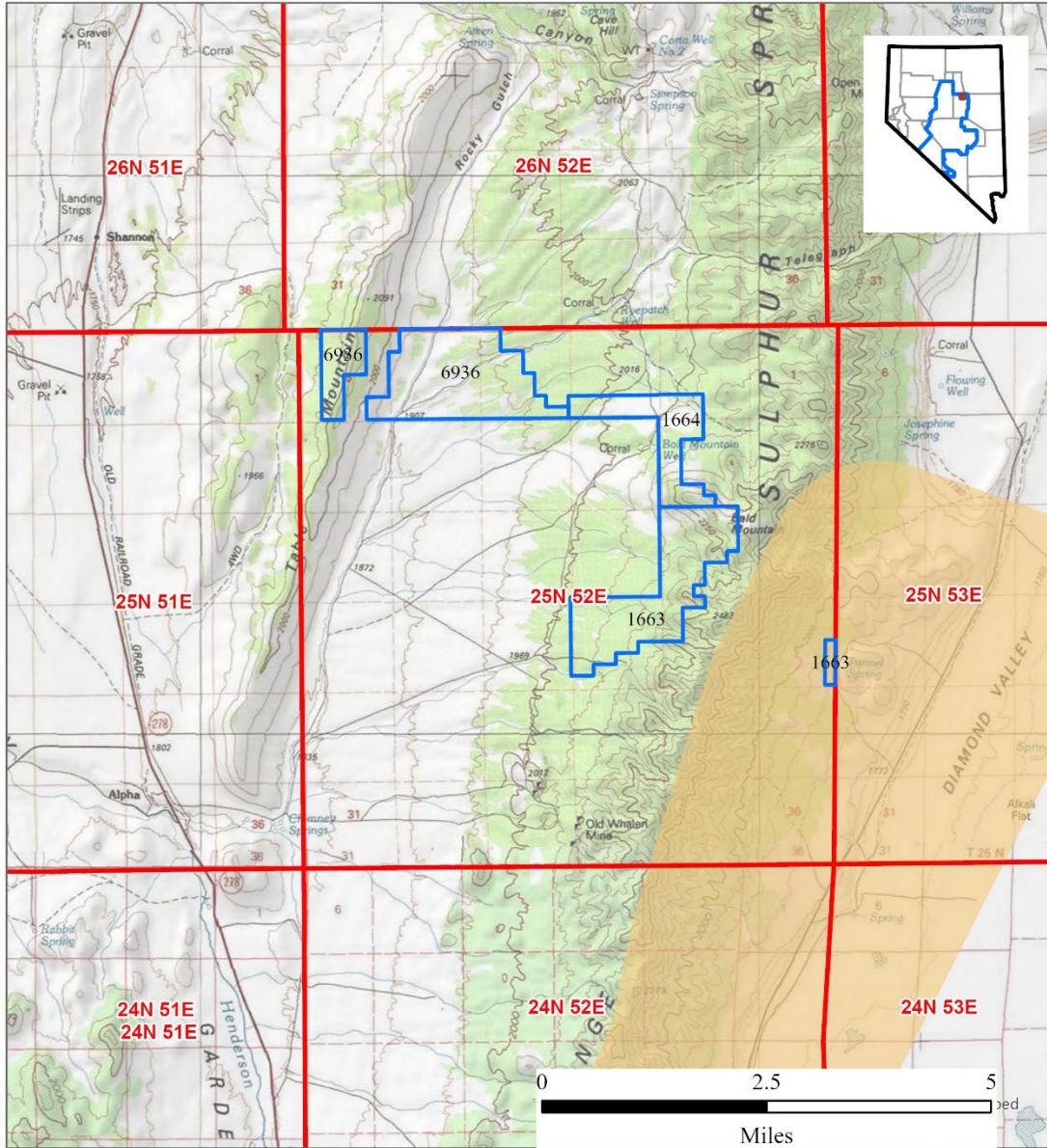
Figure 15. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Pronghorn Habitat.



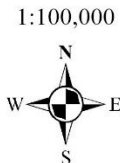
2023 Oil&Gas Lease Sale Parcels

Battle Mountain District

Mount Lewis Field Office



- 2023_BMDO_OGParcels
- MuleDeer_Corridors
- County Boundary
- Township



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 Battle Mountain, NV 89820

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Figure 16. Oil and Gas Lease Sale parcels near Sulphur Springs Range, Mount Lewis Field Office, and Mule Deer Corridors.



2023 Oil&Gas Lease Sale Parcels

Battle Mountain District

Mount Lewis Field Office

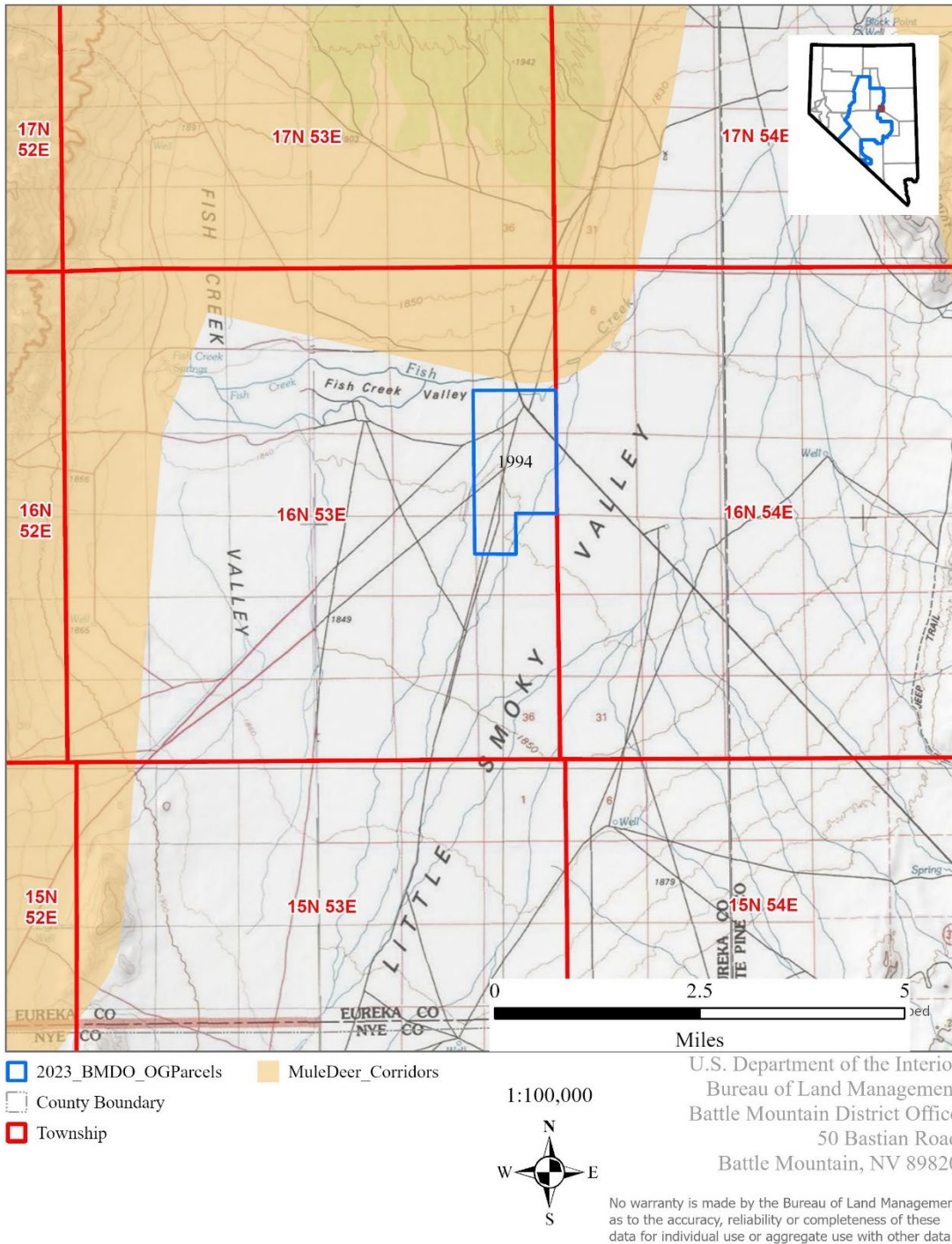
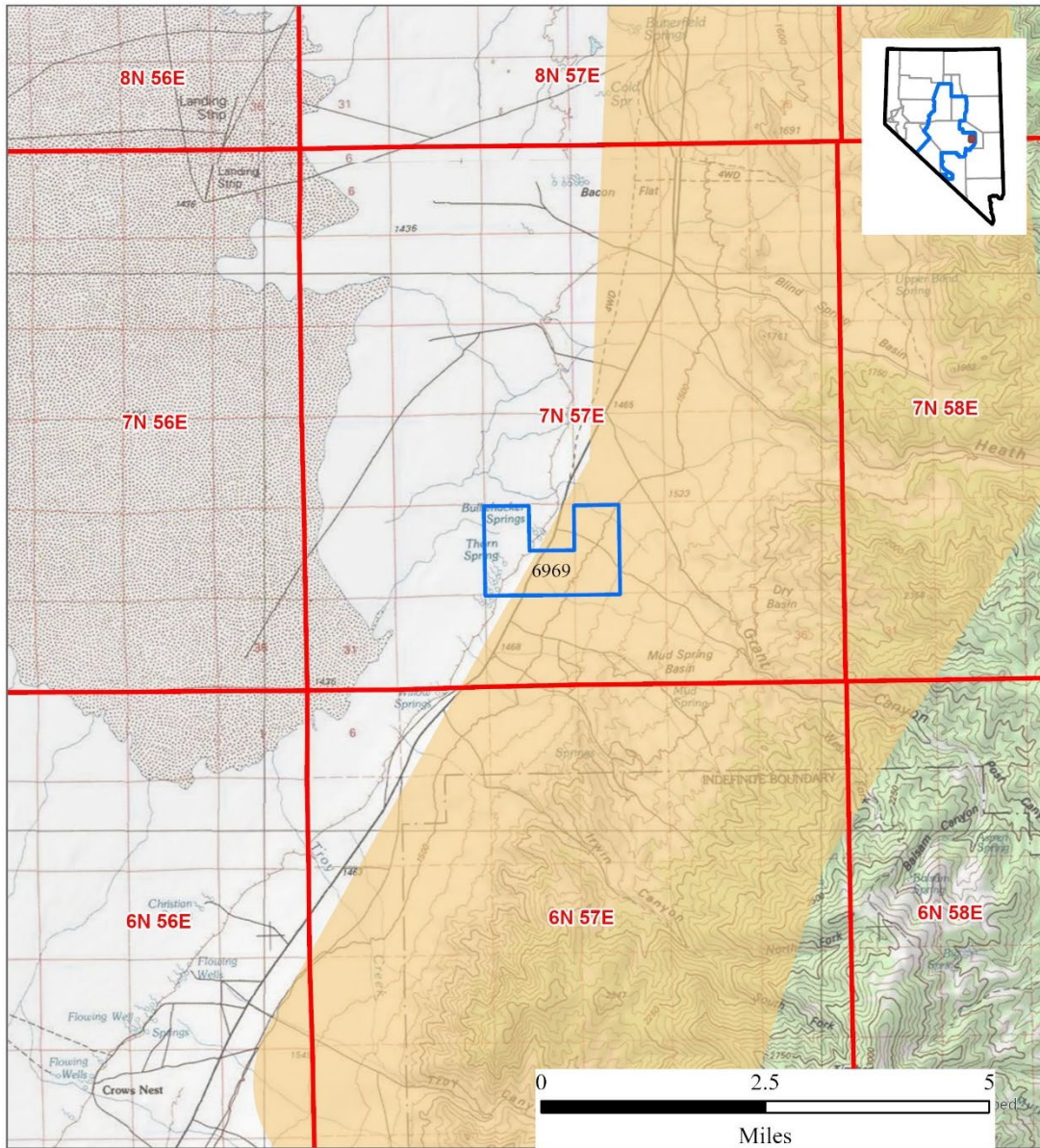


Figure 17. Oil and Gas Lease Sale parcels near Fish Creek, Mount Lewis Field Office and Mule Deer Corridors.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Tonopah Field Office



- 2023_BMDO_OGParcels
- MuleDeer_Corridors
- County Boundary
- Township

1:100,000



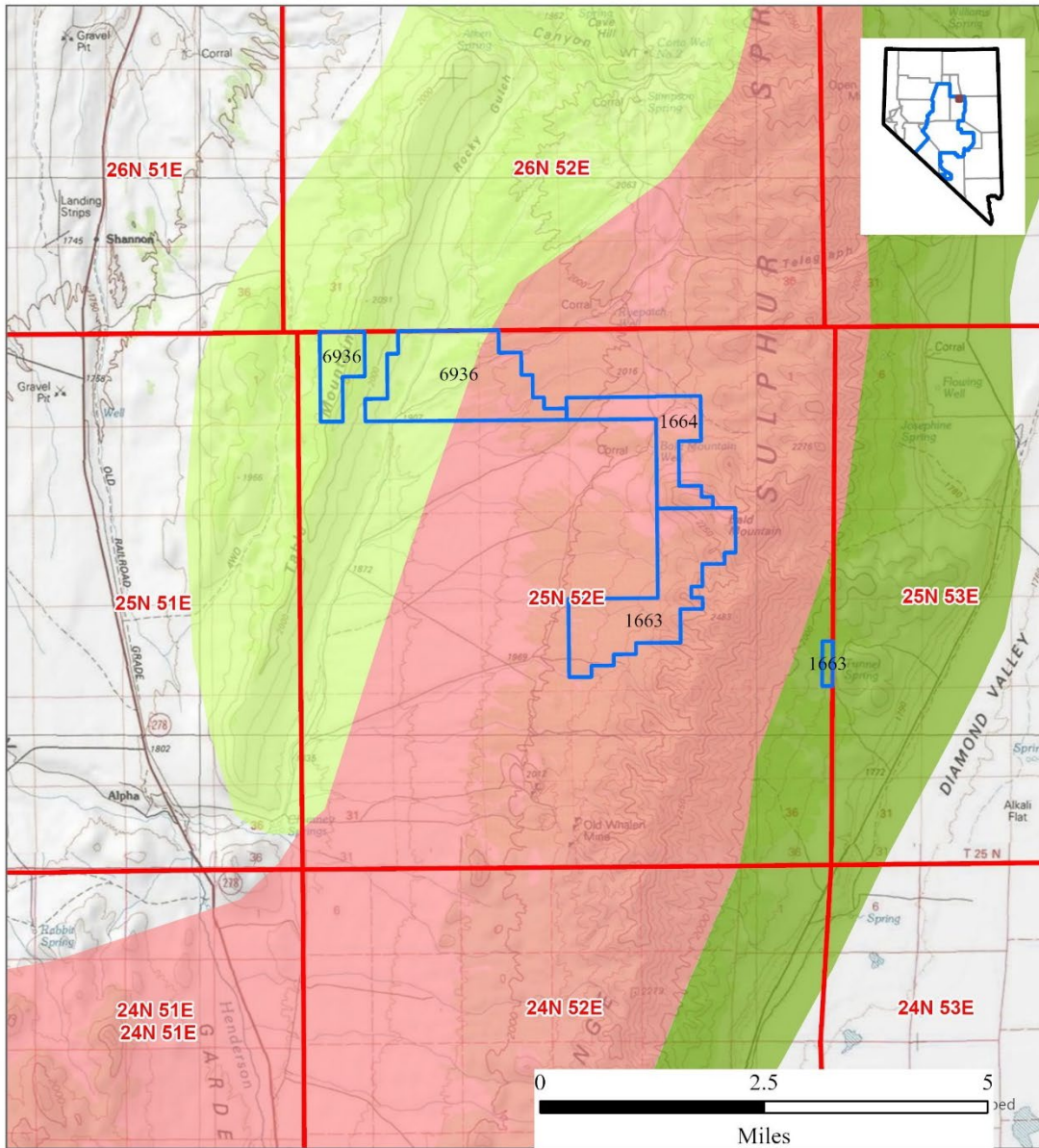
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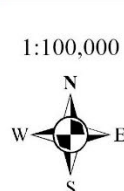
Figure 18. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Mule Deer Corridors.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office



- | | |
|---|---|
| 2023_BMDO_OGParcels | Mule Deer |
| County Boundary | Crucial Winter |
| Township | Summer Range |
| | Winter Range |



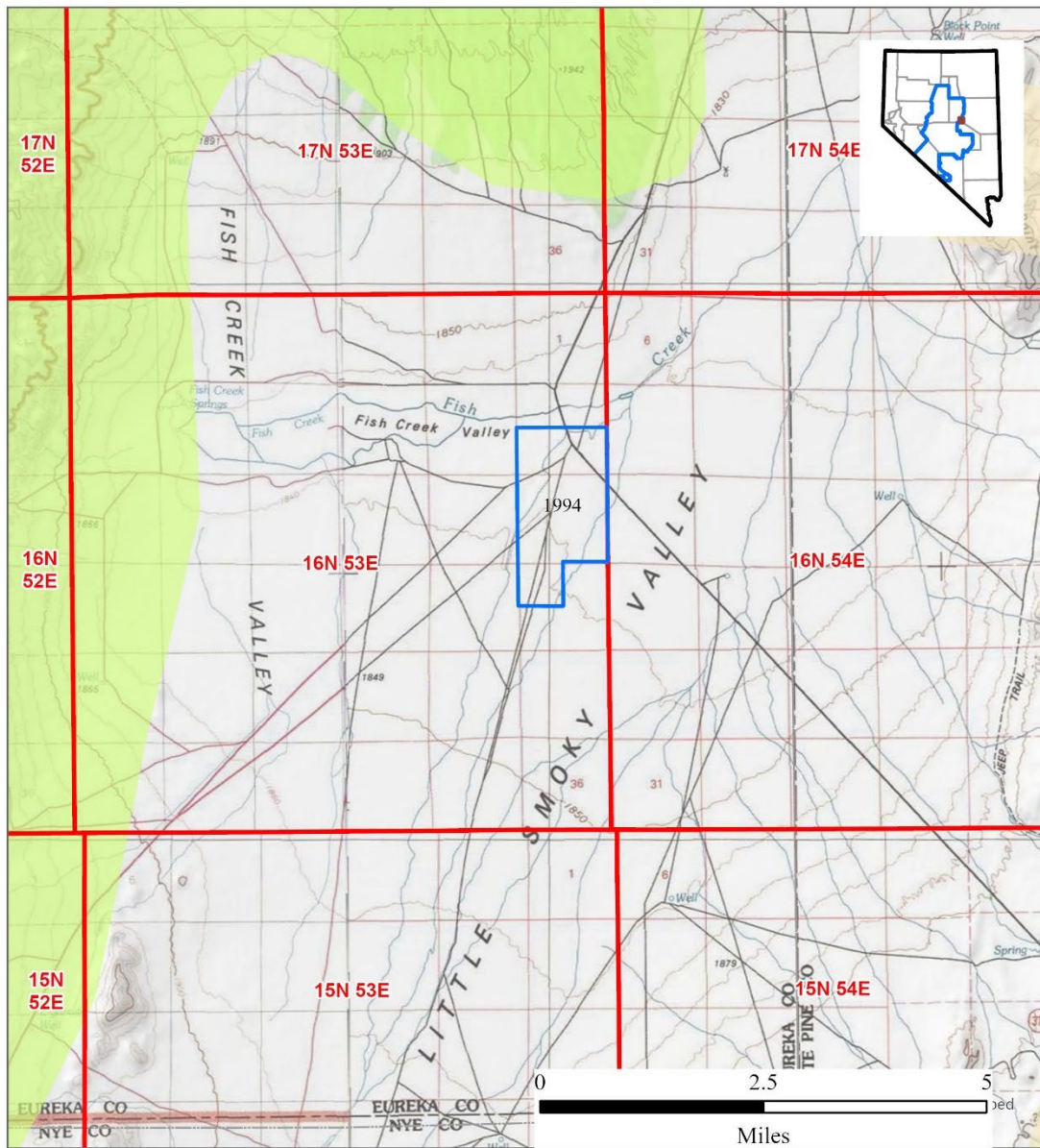
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Figure 19. Oil and Gas Lease Sale parcels near Sulphur Springs Range, Mount Lewis Field Office, and Mule Deer Habitat.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Township
- Mule Deer Winter Range
- Mule Deer Year-round



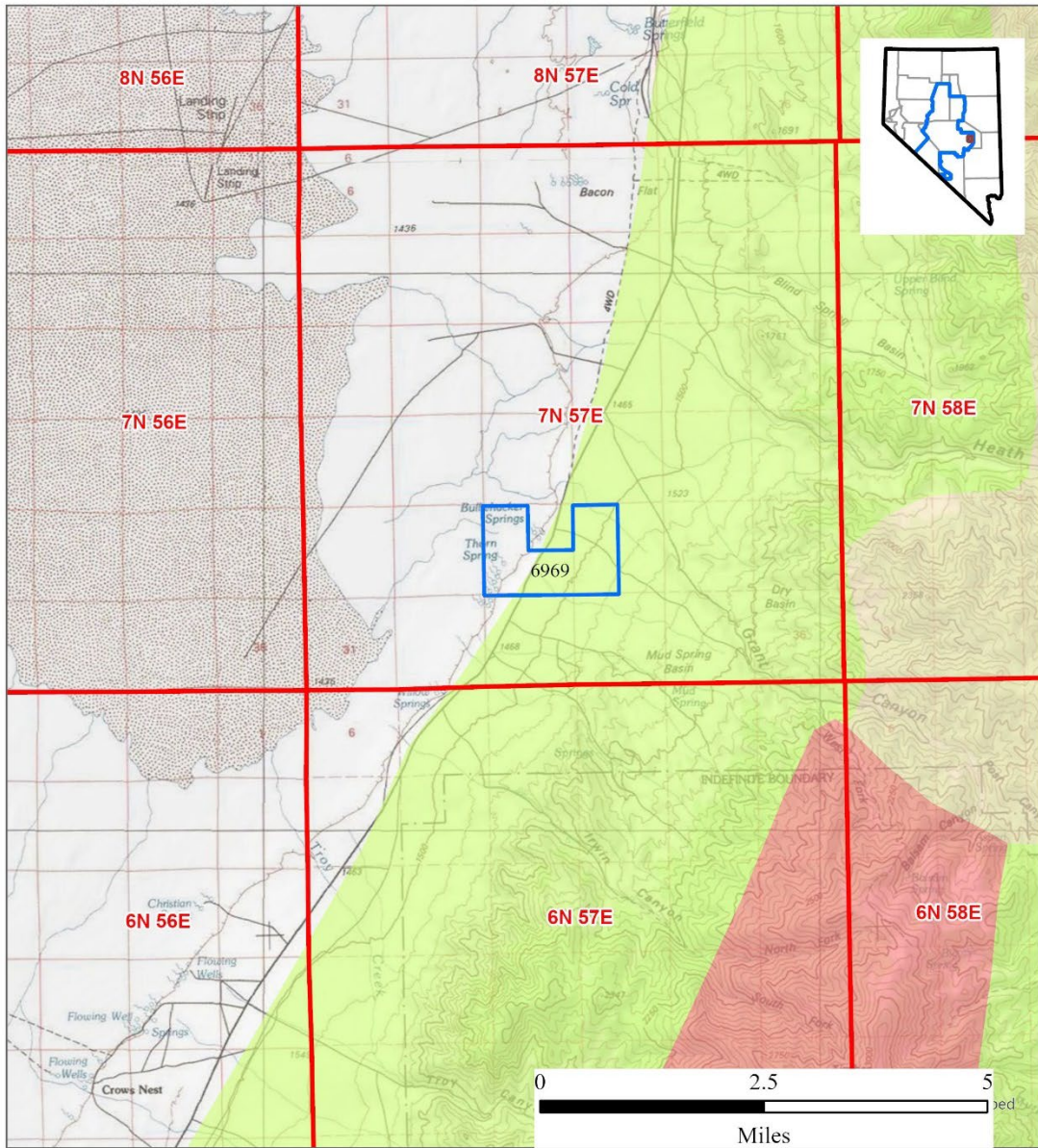
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50 Bastian Road
Battle Mountain, NV 89820

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Figure 20. Oil and Gas Lease Sale parcels near Fish Creek, Mount Lewis Field Office, and Mule Deer Habitat.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Tonopah Field Office



- | | |
|---------------------|----------------|
| 2023_BMDO_OGParcels | Mule Deer |
| County Boundary | Crucial Winter |
| Township | Summer Range |
| | Winter Range |
| | Year-round |

1:100,000



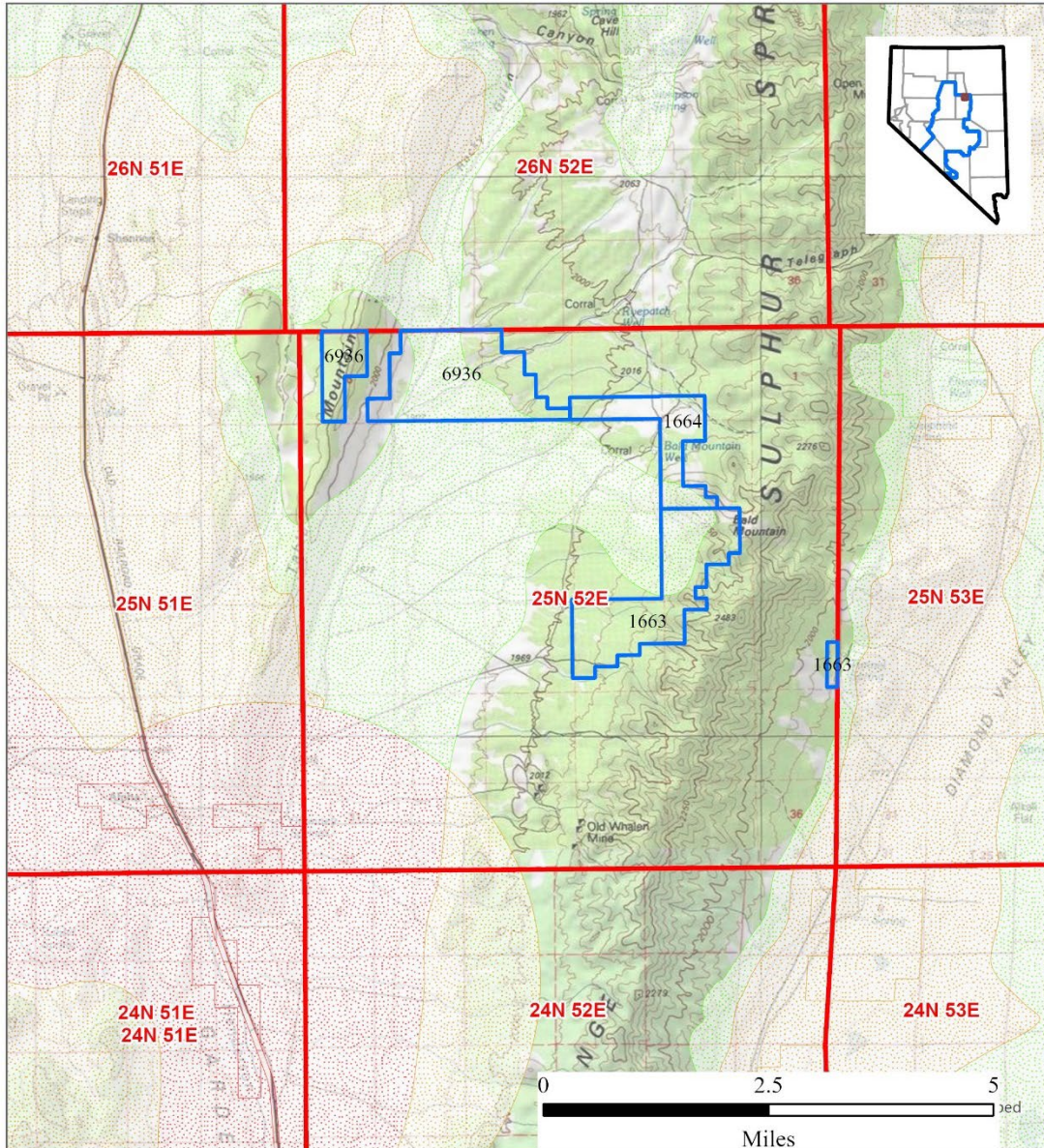
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Figure 21. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Mule Deer Habitat.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office



- | | |
|---|--|
| 2023_BMDO_OGParcels | BLM_Managm |
| County Boundary | GHMA |
| Township | OHMA |
| | PHMA |

1:100,000



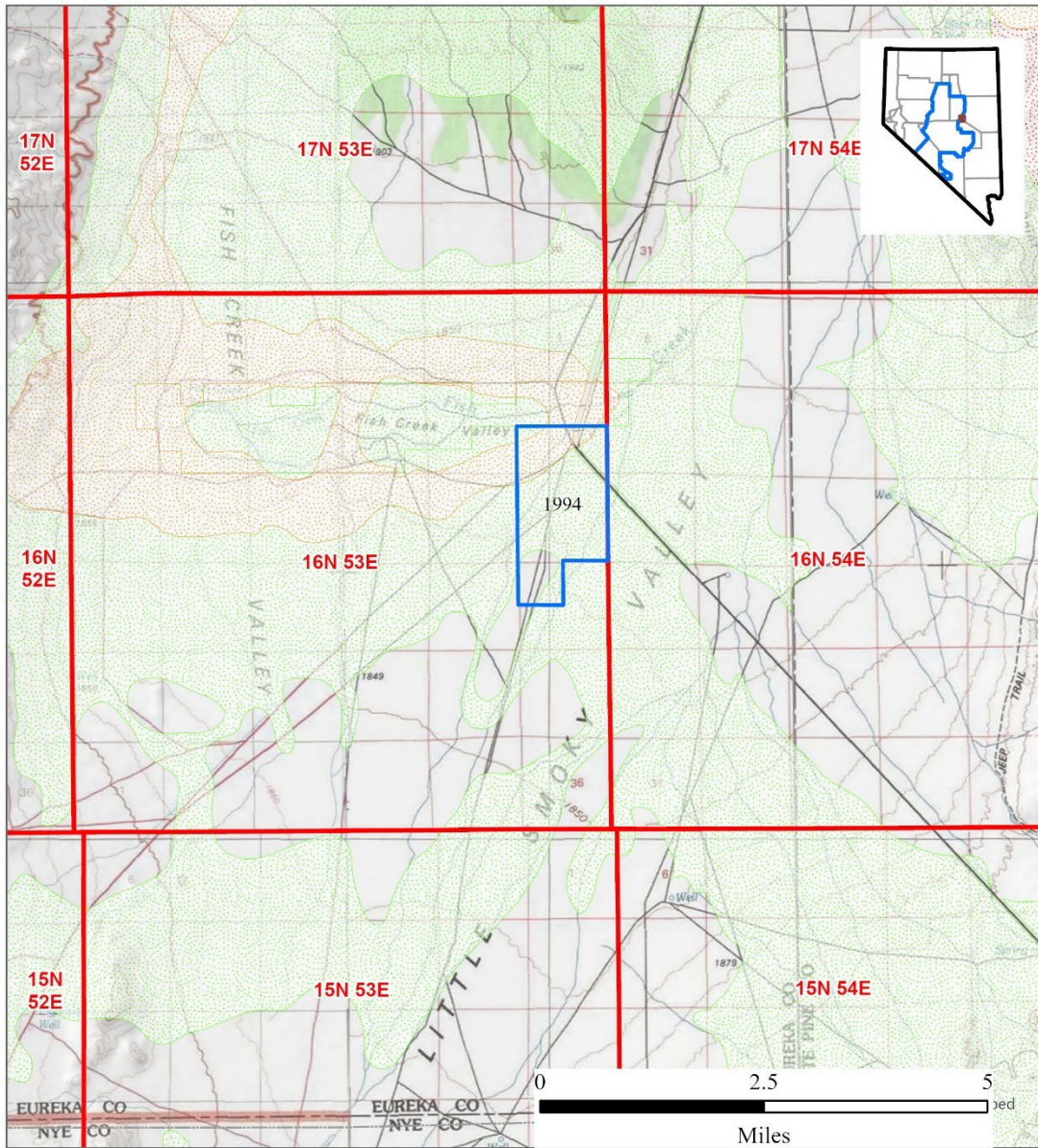
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Battle Mountain District Office
50 Bastian Road
Battle Mountain, NV 89820

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Figure 22. Oil and Gas Lease Sale parcels near Sulphur Springs Range, Mount Lewis Field Office, and Greater Sage-grouse Habitat Management Areas.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office



- | | |
|---------------------|------------|
| 2023_BMDO_OGParcels | BLM_Managm |
| County Boundary | GHMA |
| Township | OHMA |
| | PHMA |

1:100,000



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Bureau of Land Management
Battle Mountain District Office
50 Bastian Road
Battle Mountain, NV 89820

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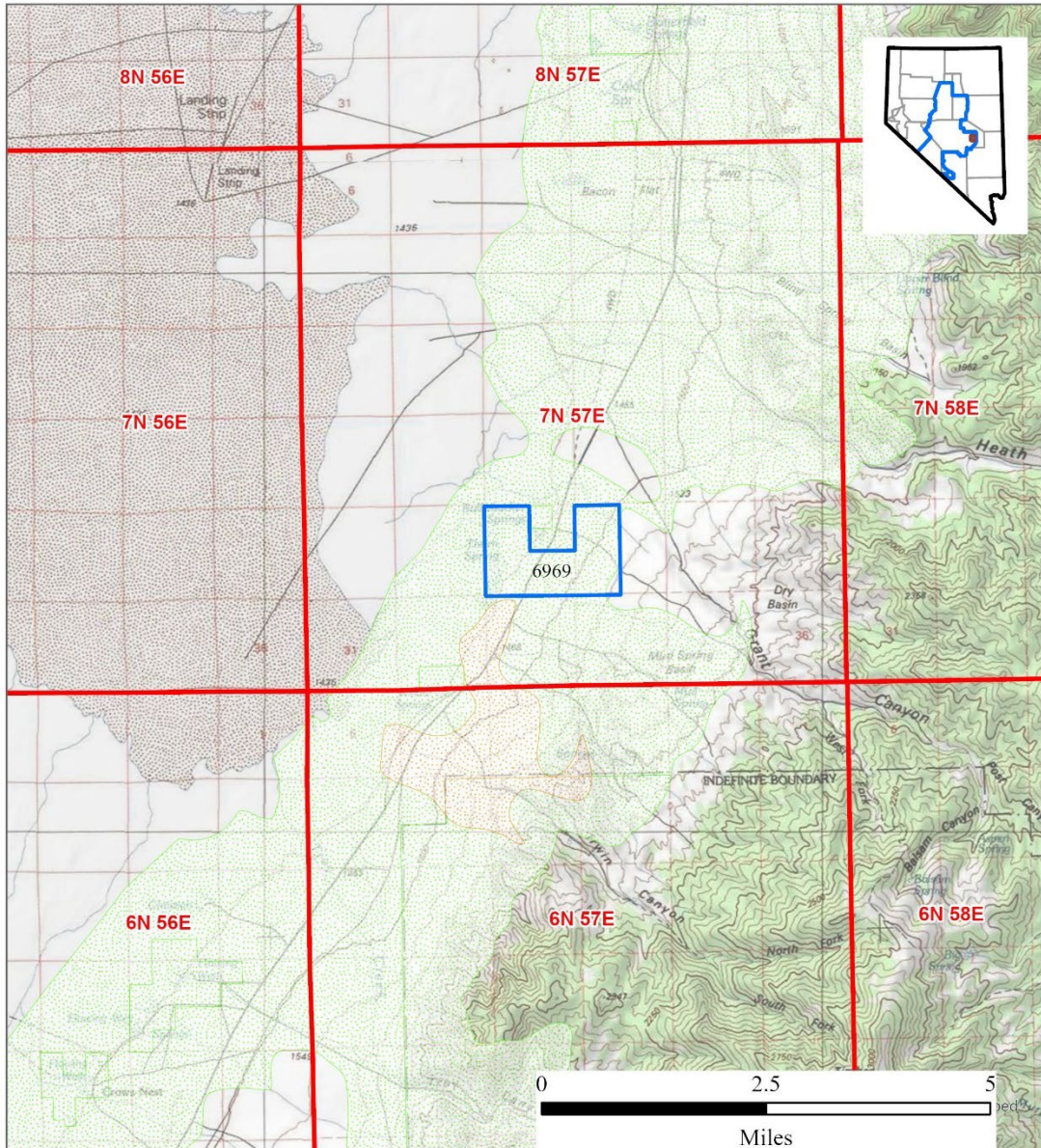
Figure 23. Oil and Gas Lease Sale parcels near Fish Creek, Mount Lewis Field Office, and Greater Sage-grouse Habitat Management Areas.



2023 Oil&Gas Lease Sale Parcels

Battle Mountain District

Tonopah Field Office



- | | |
|---------------------|------------|
| 2023_BMDO_OGParcels | BLM_Managm |
| County Boundary | GHMA |
| Township | OHMA |

1:100,000



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 Bureau of Land Management
 Battle Mountain District Office
 50 Bastian Road
 Battle Mountain, NV 89820

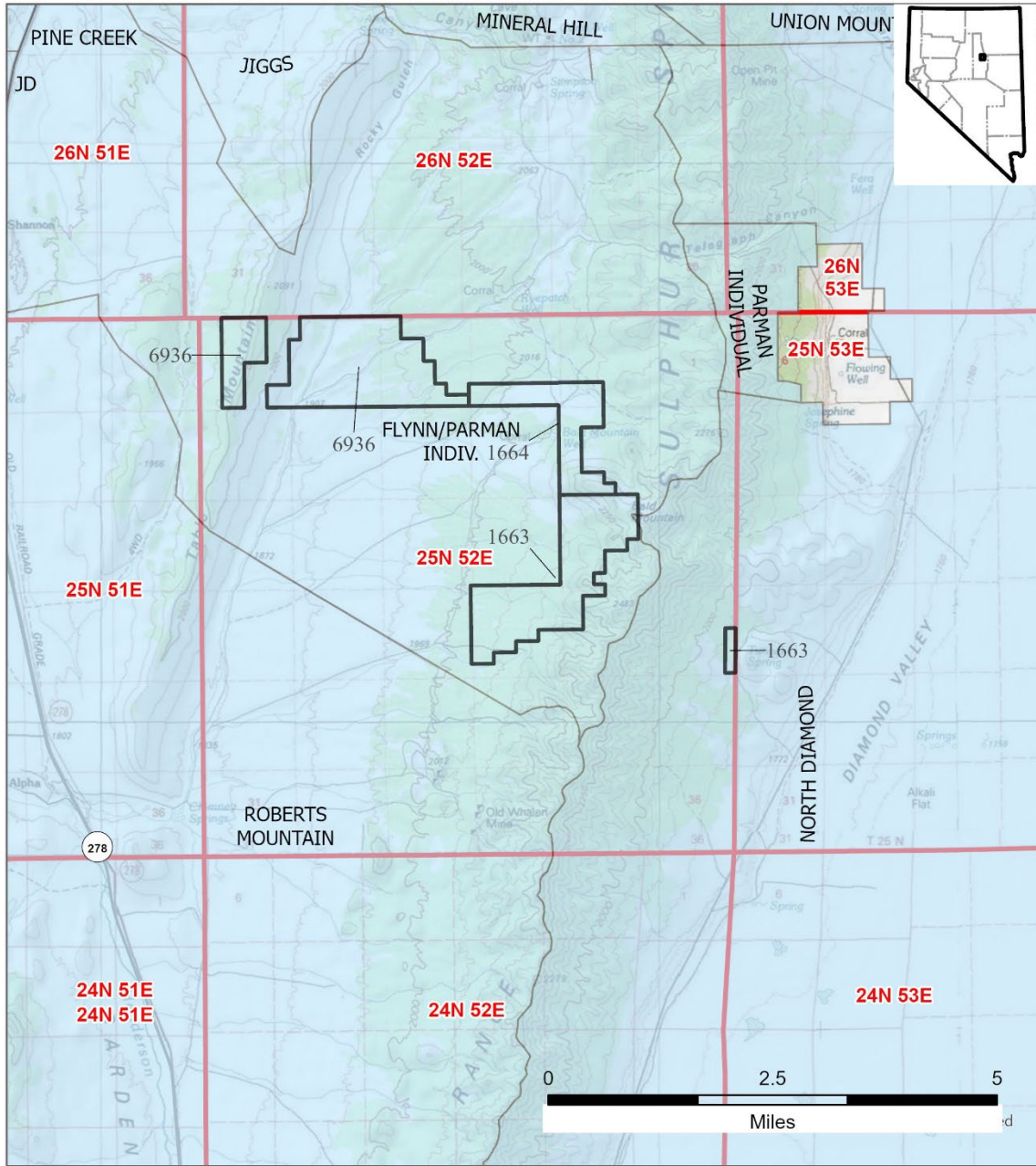
No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual use or aggregate use with other data.

Figure 24. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Greater Sage-grouse Habitat Management Areas.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



2023_BMDO_OGParcels
 Township

MLFO_Grazing_Allotment

1:100,000



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 Bureau of Land Management
 Battle Mountain District Office
 50 Bastian Road
 Battle Mountain, NV 89820

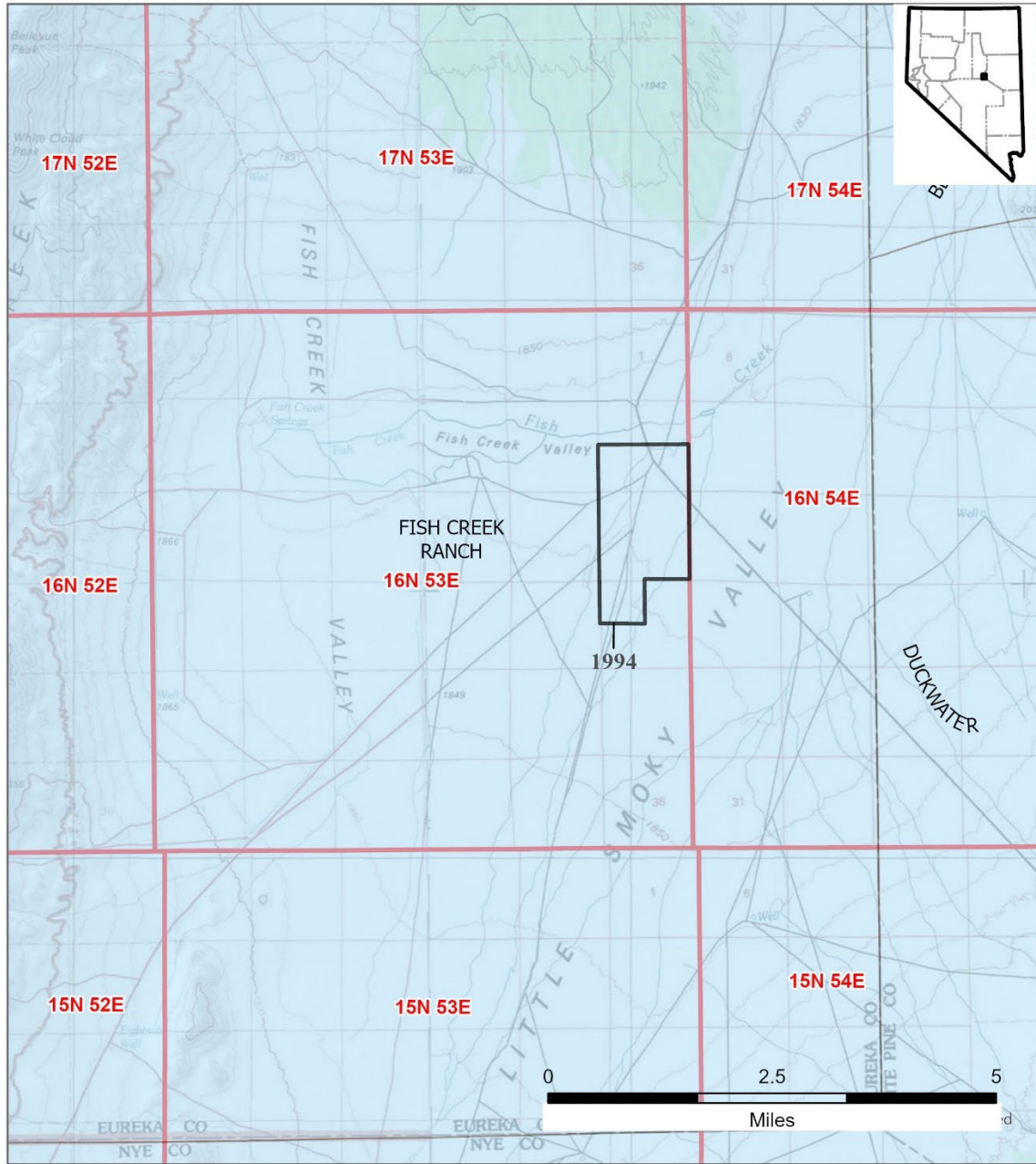
No warranty is made by the Bureau of Land Management
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Figure 25. Oil and Gas Lease Sale parcels near Sulphur Springs Range, Mount Lewis Field Office, and Grazing Allotments.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



- 2023_BMDO_OGParcels
- Township

MLFO_Grazing_Allotment

1:100,000



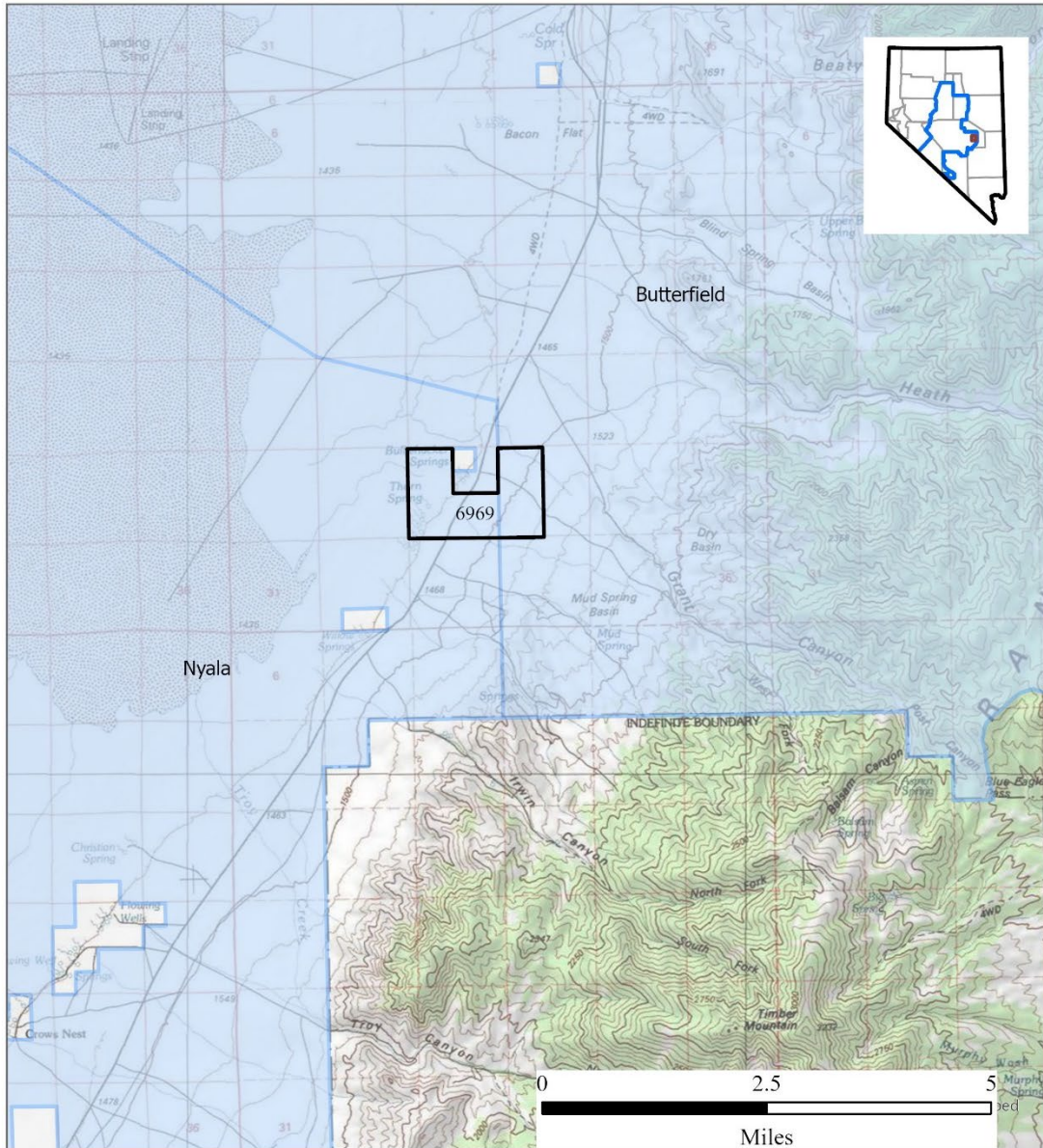
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Bureau of Land Management
Battle Mountain District Office
50 Bastian Road
Battle Mountain, NV 89820

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Figure 26. Oil and Gas Lease Sale parcels near Fish Creek, Mount Lewis Field Office, and Grazing Allotments.



2023 Oil & Gas Lease Sale Parcels Battle Mountain District Tonopah Field Office



2023_BMDO_OGParcels GrazingAllotments
 County Boundary

1:100,000



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Battle Mountain District Office
50 Bastian Road
Battle Mountain, NV 89820

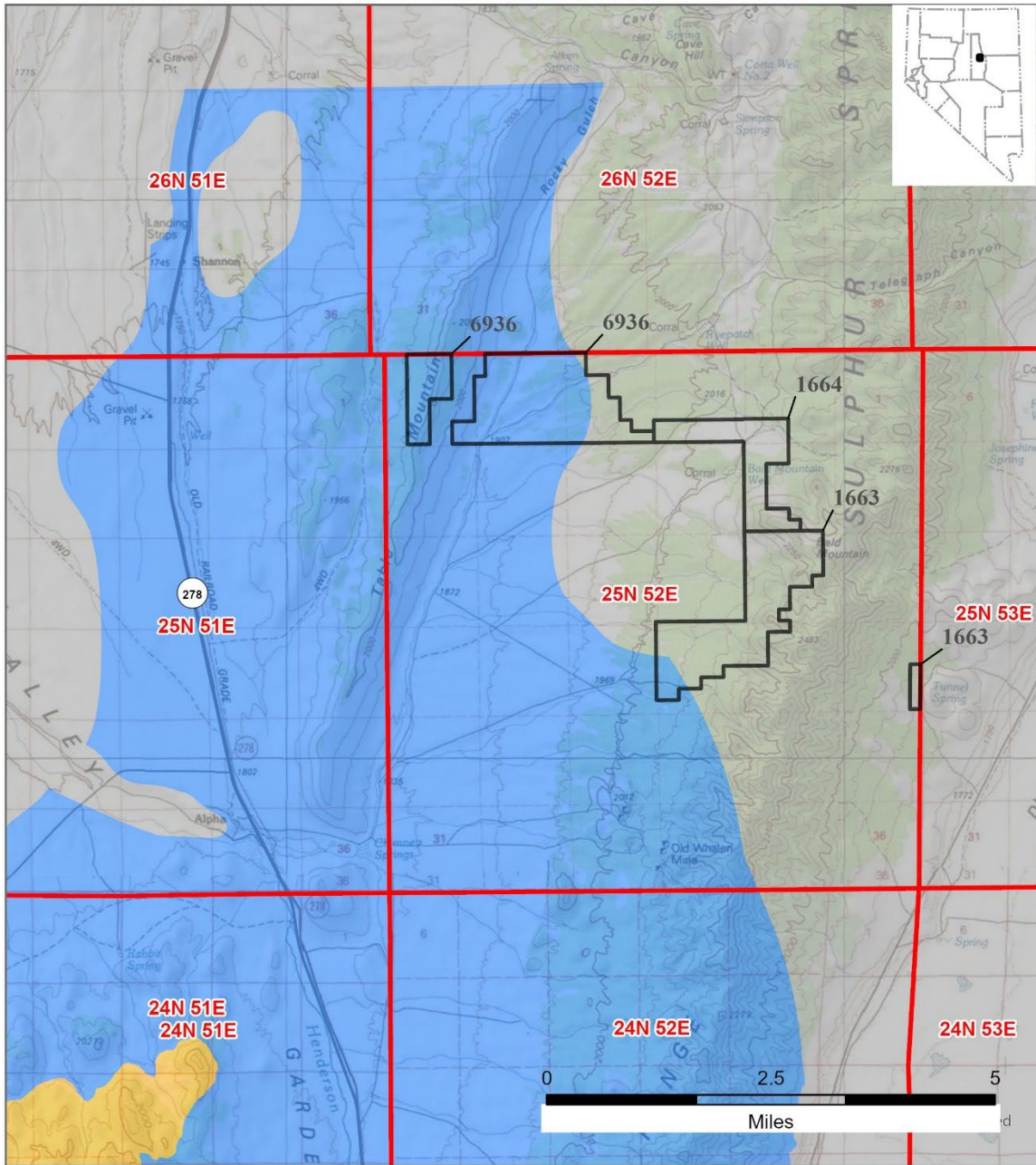
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Figure 27. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Grazing Allotments.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



2023_BMDO_OGParcels
 Township

Visual Resource Inventory Class
 VRI Class II
 VRI Class III
 VRI Class IV

1:100,000



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 Battle Mountain District Office
 50 Bastian Road
 Battle Mountain, NV 89820

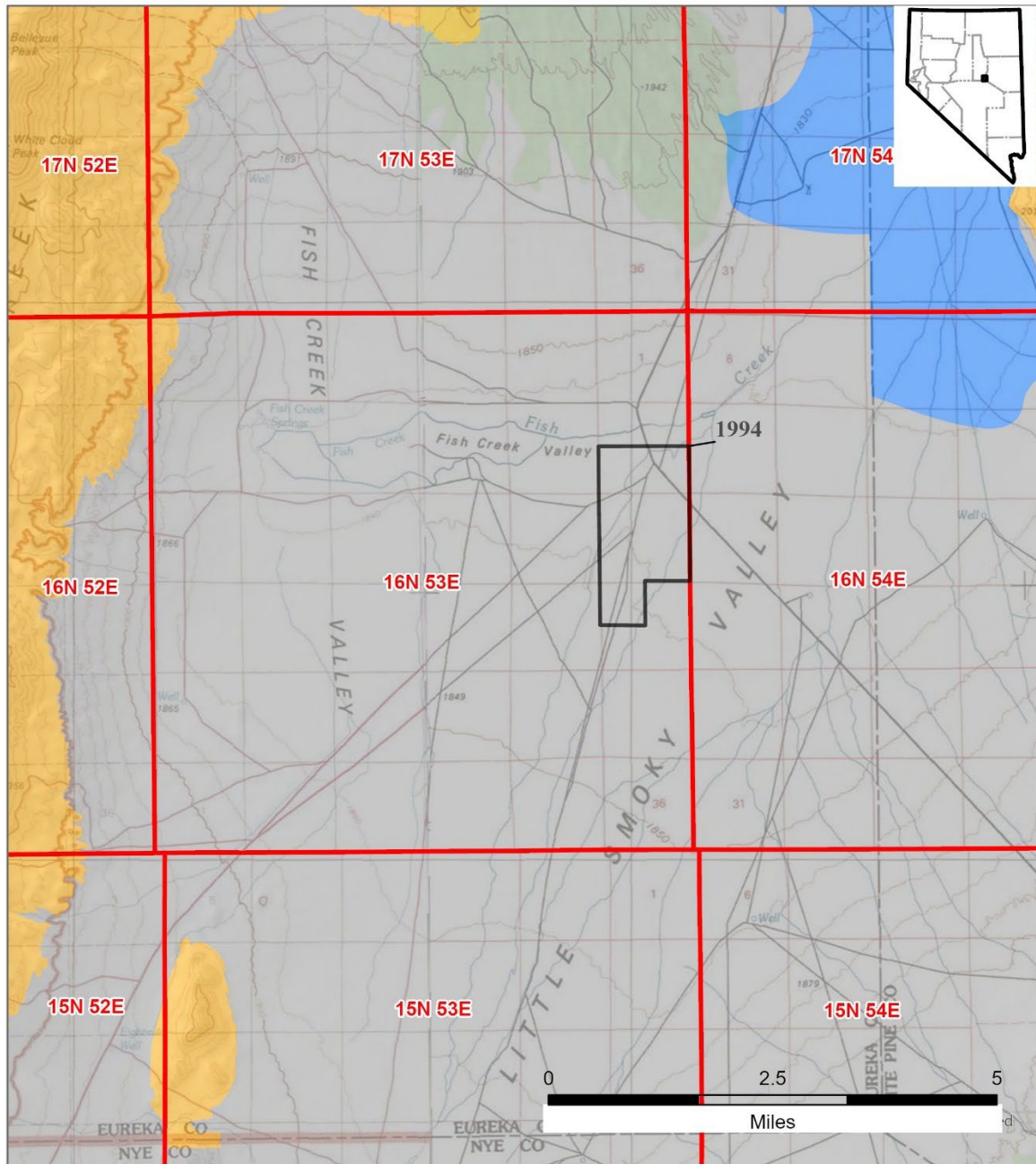
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Figure 28. Oil and Gas Lease Sale parcels near Sulphur Springs Range, Mount Lewis Field Office, and Visual Resource Inventory Class.



2023 Oil & Gas Lease Sale Parcels

Battle Mountain District
Mount Lewis Field Office



- 2023_BMDO_OGParcels
- Township

- Visual Resource Inventory Class
- VRI Class II
 - VRI Class III
 - VRI Class IV

1:100,000



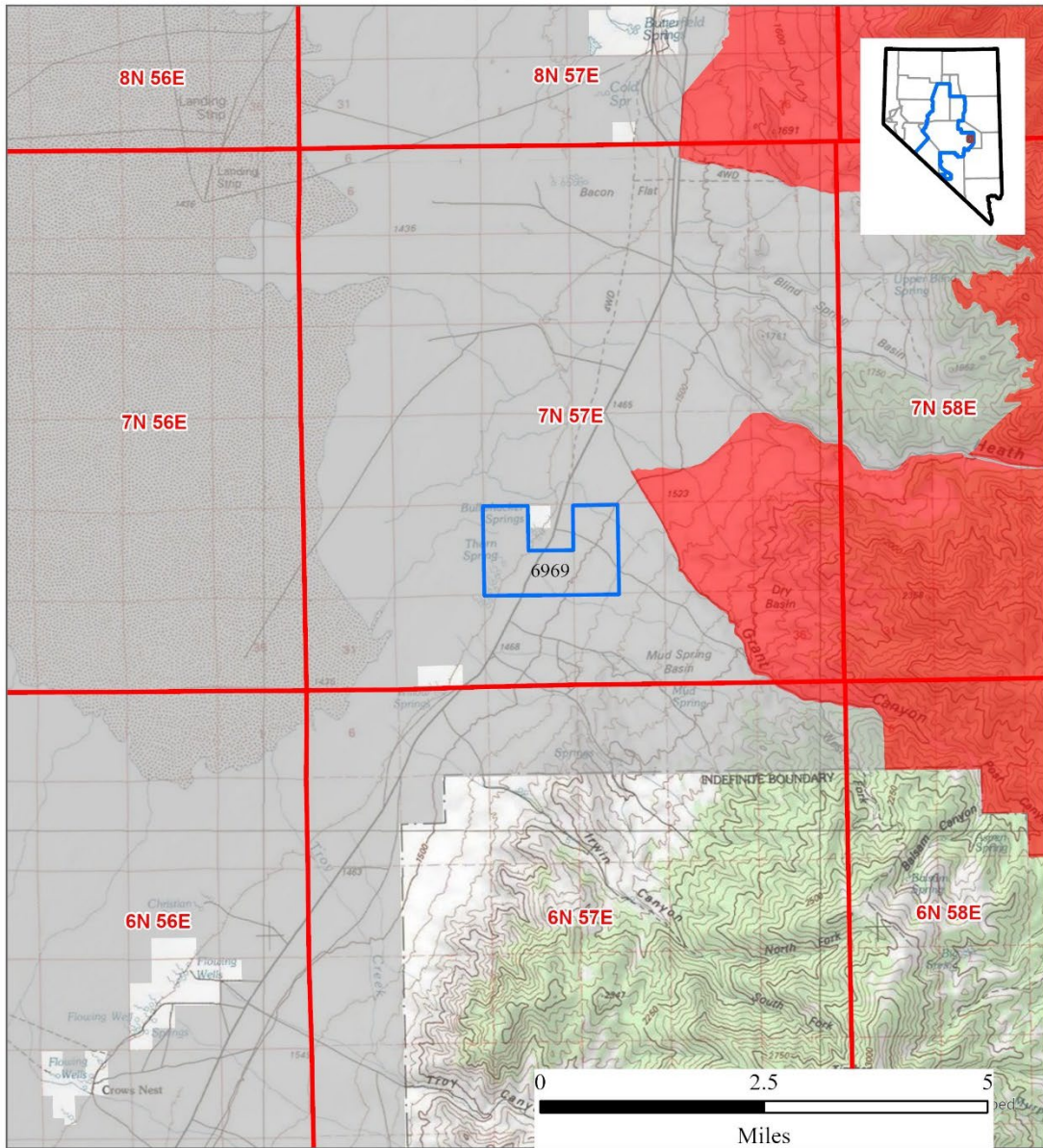
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Figure 29. Oil and Gas Lease Sale parcels near Fish Creek, Mount Lewis Field Office, and Visual Resource Inventory Class.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Tonopah Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Township
- Visual Resource Management (VRM) Class
- Class 1 Objective
- Class 4 Objective



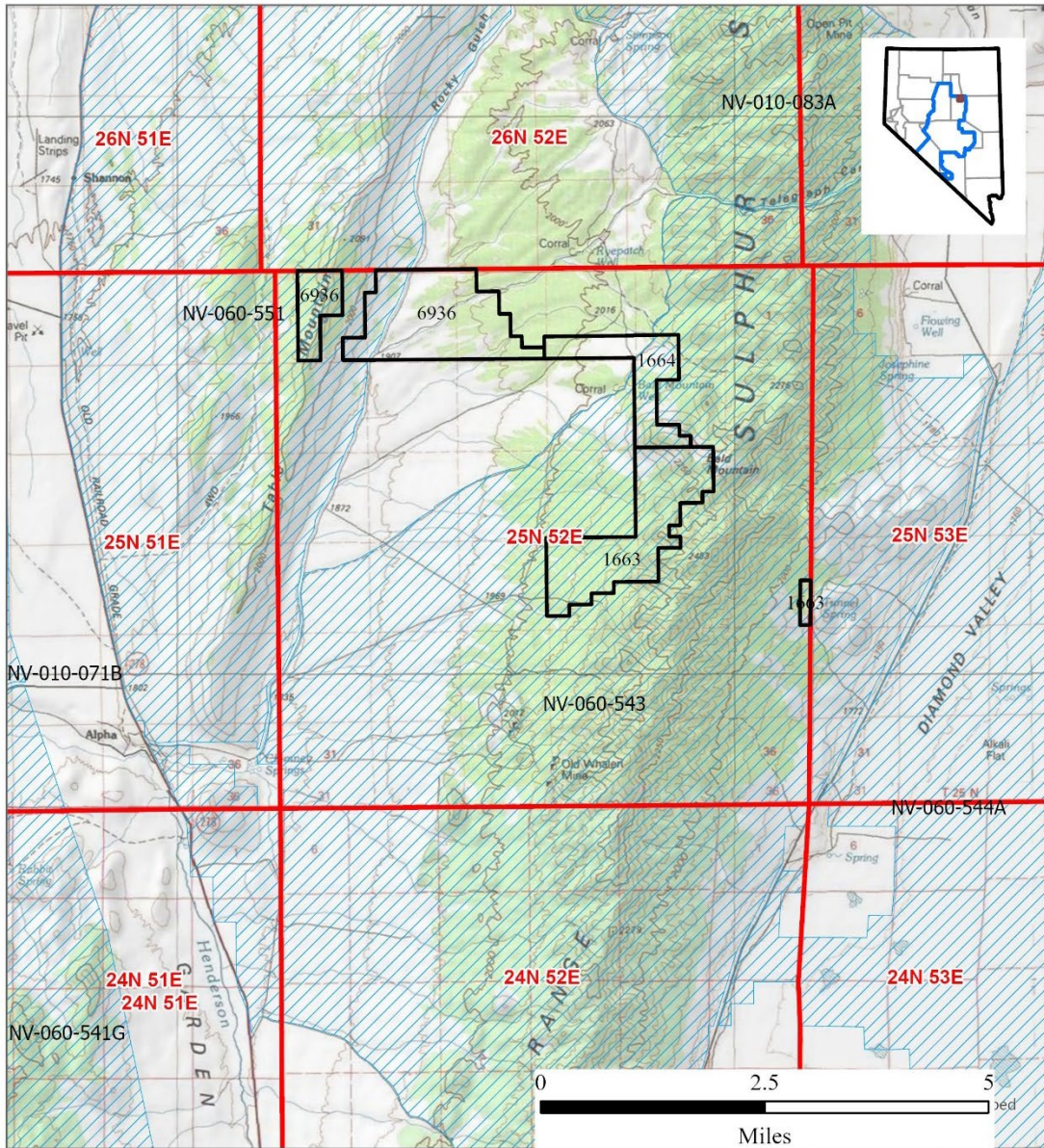
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Battle Mountain, NV 89820

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Figure 30. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Visual Resource Management Categories.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Mount Lewis Field Office



- 2023_BMDO_OGParcels
- ML_LWC_inventory2017
- County Boundary
- Township



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Bureau of Land Management
Battle Mountain District Office
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Battle Mountain, NV 89820

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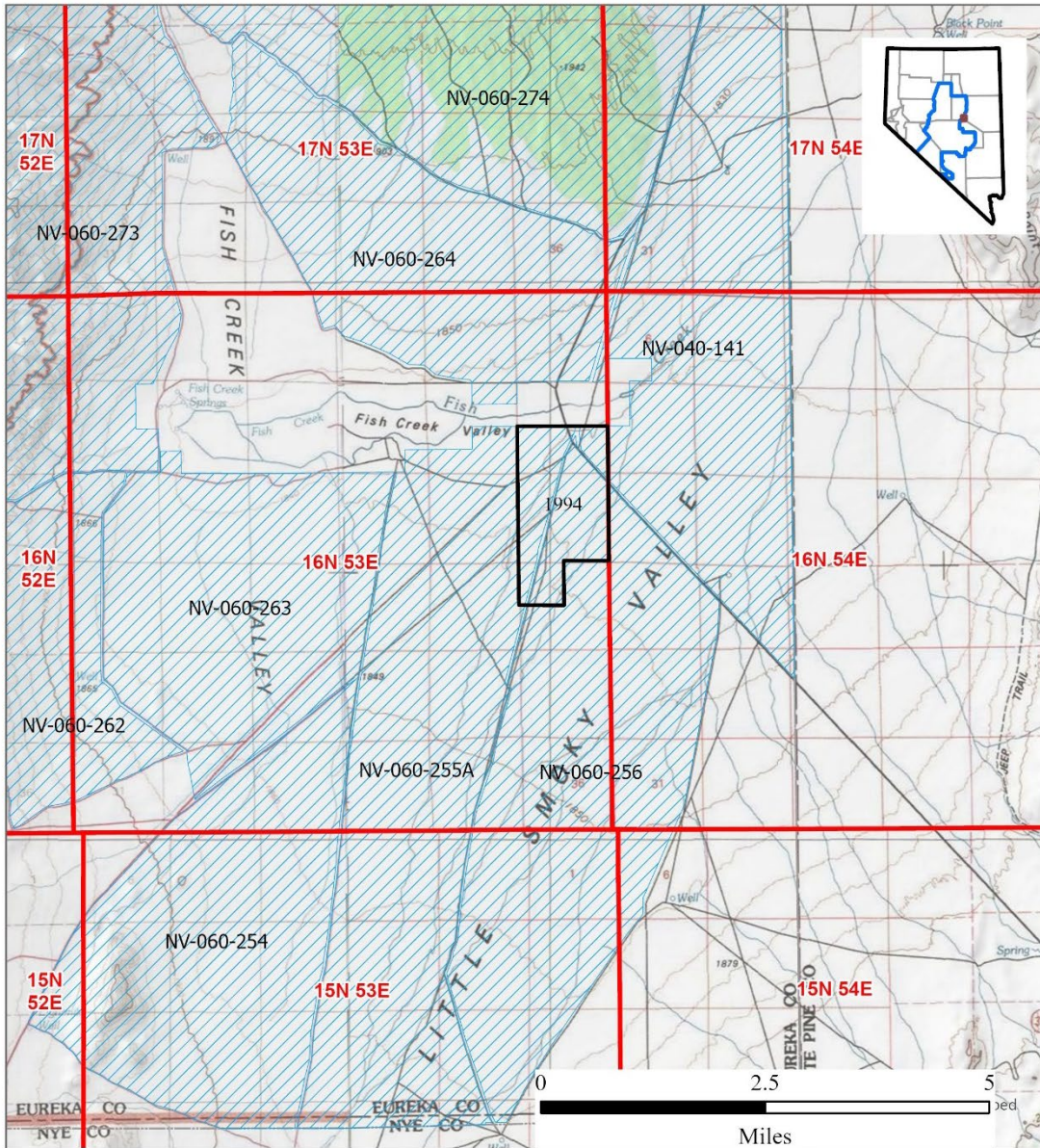
Figure 31. Oil and Gas Lease Sale parcels near Sulphur Springs Range, Mount Lewis Field Office, and Lands with Wilderness Characteristics.



2023 Oil&Gas Lease Sale Parcels

Battle Mountain District

Mount Lewis Field Office



- 2023_BMDO_OGParcels
- ML_LWC_inventory2017
- County Boundary
- Township



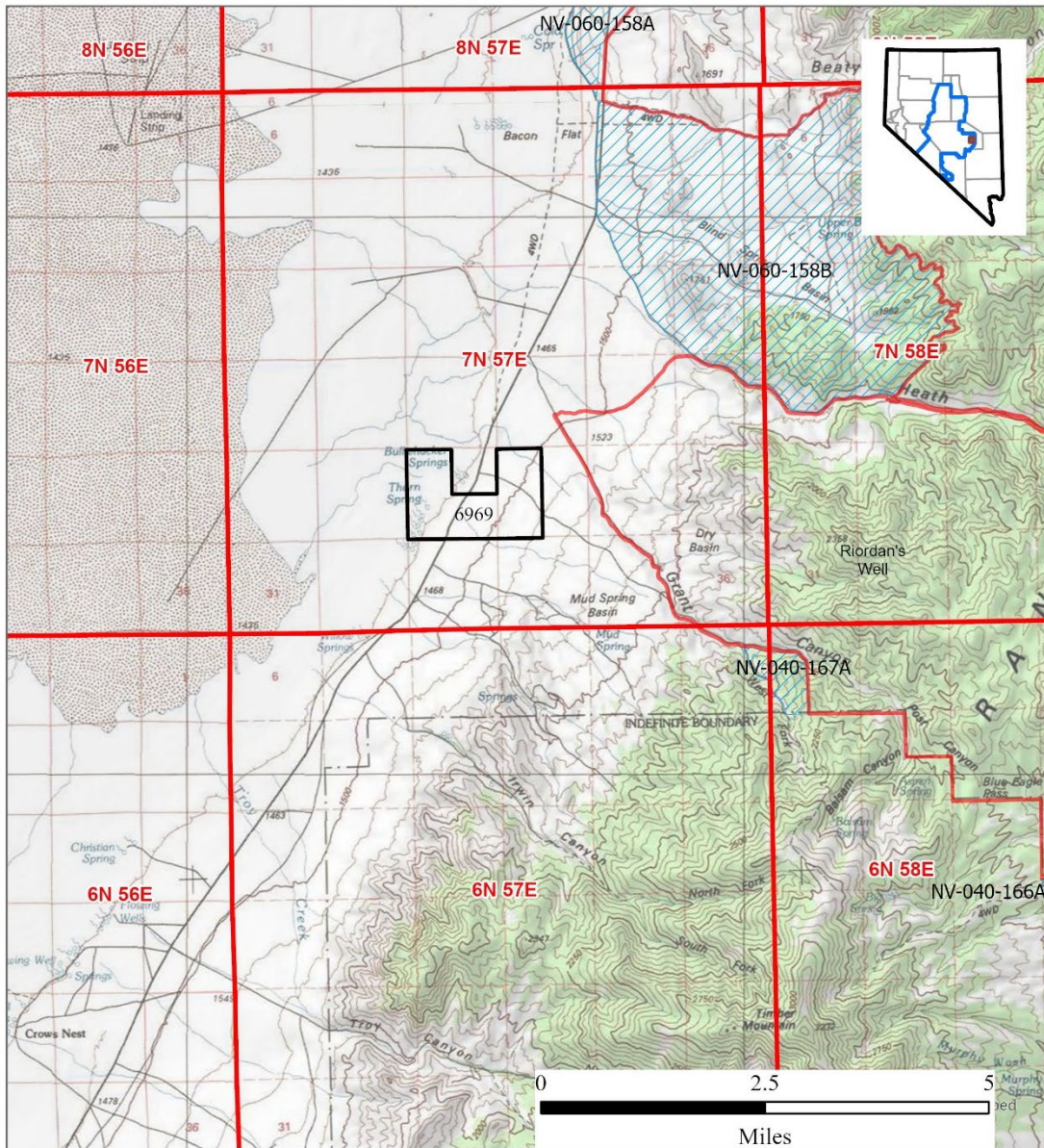
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Figure 32. Oil and Gas Lease Sale parcels near Fish Creek, Mount Lewis Field Office, and Lands with Wilderness Characteristics.



2023 Oil&Gas Lease Sale Parcels Battle Mountain District Tonopah Field Office



- 2023_BMDO_OGParcels
- County Boundary
- Township
- Tonopah FO Inventory_2017
- BLM Wilderness Study Area



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Figure 33. Oil and Gas Lease Sale parcels in Railroad Valley, Tonopah Field Office, and Lands with Wilderness Characteristics.

C: Soil Types and Plant Communities

Soil Types in the Analysis Area

Aridisols

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

Entisols

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

Inceptisols

Inceptisols, like Entisols, are new, poorly developed soils characteristic of recent landscapes. Well-defined soil horizons are mostly absent, though, unlike Entisols, Inceptisols often have the beginnings of B Horizon development apparent. This B Horizon is often cambic in nature, but may consist of duripans, fragipans, or calcic horizons.

Microbiotic Crusts

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

Plant Communities in the Analysis Area

Sodic Flats and 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 4,500-5,000 feet and occurs in precipitation zones of 3-5 and 5-8 inches. Vegetation in this type is normally restricted to mounded areas that are surrounded by playa-like depressions or nearly level, usually barren, interspaces. The soil moisture regime is aquic. This plant community is characterized by black greasewood (*Sarcobatus vermiculatus*), Basin wildrye (*Leymus cinereus*), inland saltgrass (*Distichlis spicata*) and alkali sacaton

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

Salt Desert Shrub

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

Annuals

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

Riparian Woodland Species in the Analysis Area

Cottonwoods

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

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

Migratory Bird Communities in the Analysis Area

Species commonly occurring in pinyon-juniper habitats and that are known to occur or have the potential to occur in the Analysis Area include the pinyon jay, western bluebird, Virginia's warbler, black-throated gray warbler and Scott's oriole. Sage thrasher, Brewer's sparrow and sage sparrow are sagebrush obligates, while loggerhead shrike and green-tailed towhee also have potential to occur in the sagebrush habitats. The Analysis Area includes riparian vegetation associated with wetlands, seeps and springs; these features are prominent in numerous proposed lease parcels. Many songbird species are heavily dependent on healthy riparian systems.

Seventy-seven bird species have been identified as either riparian obligate or riparian dependent in the western United States (Rich 2002) and these communities are requisite for a diverse migratory bird community. A list of common migratory bird species known to occur in the vicinity of the project, compiled from review of various sources (Audubon, BLM, e-bird, NDOW, NHP, USFWS), includes Western meadowlark, sage sparrow, horned lark, barn swallow, mountain chickadee, Western tanager, spotted towhee, yellow warbler, Western wood peewee, killdeer, loggerhead shrike, Western kingbird, western bluebird and common raven. The Analysis Area also includes playas, which if consistently flooded during the breeding season may provide breeding habitat for snowy plover, a BLM Nevada Sensitive species; and even if only occasionally flooded, would then provide feeding and stopover habitat for migrating shorebirds and waterfowl.

Noxious and Invasive, Non-native plant definitions

Invasive plant

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

Noxious weed

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

Weed

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

D: Special Status Species List

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

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

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

Table 14. Battle Mountain District Endangered and Threatened Species List

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

Table 15. Battle Mountain District Special Status Plant Species List

Battle Mountain District Special Status Plant Species List (32)	
Common Name	Scientific Name
Eastwood milkweed	<i>Asclepias eastwoodiana</i>
Cima milkvetch	<i>Astragalus cimae var. cimae</i>
Tonopah milkvetch	<i>Astragalus pseudiodanthus</i>
Toquima milkvetch	<i>Astragalus toquimanus</i>
Currant milkvetch	<i>Astragalus uncialis</i>

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

Table 16. Battle Mountain District Special Status Animal Species List

Battle Mountain District Special Status Animal Species List	
Bird Common Name (26)	Scientific Name
Northern goshawk	<i>Accipiter gentilis</i>
Golden eagle	<i>Aquila chrysaetos</i>
Short-eared owl	<i>Asio flammeus</i>
Burrowing owl	<i>Athene cunicularia</i>
Ferruginous hawk	<i>Buteo regalis</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Greater sage-grouse	<i>Centrocercus urophasianus</i>

Battle Mountain District Special Status Animal Species List	
Western snowy plover (not protected Pacific Coast DPS)	<i>Charadrius nivosus nivosus</i>
Great Basin willow flycatcher	<i>Empidonax traillii odastus</i>
Peregrine falcon	<i>Falco peregrinus</i>
Sandhill crane	<i>Antigone canadensis</i>
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Least bittern	<i>Ixobrychus exilis</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Black rosy-finch	<i>Leucosticte atrata</i>
Gray-crowned rosy-finch	<i>Leucosticte tephrocotis</i>
Lewis' woodpecker	<i>Melanerpes lewis</i>
Long-billed curlew	<i>Numenius americanus</i>
Mountain quail	<i>Oreortyx pictus</i>
Sage thrasher	<i>Oreoscoptes montanus</i>
Phainopepla	<i>Phainopepla nitens</i>
Flammulated owl	<i>Psiloscoops flammeolus</i>
Brewer's sparrow	<i>Spizella breweri</i>
Crissal thrasher	<i>Toxostoma crissale</i>
LeConte's thrasher	<i>Toxostoma lecontei</i>
Fish Common Name (9)	Scientific Name
Big Smoky Valley speckled dace	<i>Rhinichthys osculus lariversi</i>
Monitor Valley speckled dace	<i>Rhinichthys osculus ssp. 5</i>
Oasis Valley speckled dace	<i>Rhinichthys osculus ssp. 6</i>
Fish Lake Valley tui chub	<i>Siphateles bicolor ssp. 4</i>
Hot Creek Valley tui chub	<i>Siphateles bicolor ssp. 5</i>
Little Fish Lake Valley tui chub	<i>Siphateles bicolor ssp. 6</i>
Railroad Valley tui chub	<i>Siphateles bicolor ssp. 7</i>
Big Smoky Valley tui chub	<i>Siphateles bicolor ssp. 8</i>
Charnock Ranch (Charnock Springs) tui chub	<i>Siphateles bicolor ssp. 10</i>
Mammals Common Name (31)	Scientific Name
Pallid bat	<i>Antrozous pallidus</i>
Pygmy rabbit	<i>Brachylagus idahoensis</i>
Desert pocket mouse	<i>Chaetodipus penicillatus</i>
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>
Big brown bat	<i>Eptesicus fuscus</i>
Spotted bat	<i>Euderma maculatum</i>
Greater western mastiff bat	<i>Eumops perotis</i>
Allen's big-eared (lappet-browed) bat	<i>Idionycteris phyllotis</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Western red bat	<i>Lasiurus blossevillii</i>
Hoary bat	<i>Lasiurus cinereus</i>
Dark kangaroo mouse (includes Desert Valley and Fletcher)	<i>Microdipodops megacephalus ssp.</i>
Pale kangaroo mouse	<i>Microdipodops pallidus</i>
Pahranagat Valley montane vole	<i>Microtus montanus fucosus</i>
California myotis	<i>Myotis californicus</i>
Western small-footed myotis	<i>Myotis ciliolabrum</i>

Battle Mountain District Special Status Animal Species List	
Long-eared myotis	<i>Myotis evotis</i>
Little brown bat	<i>Myotis lucifugus</i>
Fringed myotis	<i>Myotis thysanodes</i>
Cave myotis	<i>Myotis velifer</i>
Long-legged myotis	<i>Myotis volans</i>
Yuma myotis	<i>Myotis yumanensis</i>
Big free-tailed bat	<i>Nyctinomops macrotis</i>
Canyon bat (formerly western pipistrelle)	<i>Parastrellus hesperus</i>
Bighorn sheep	<i>Ovis canadensis ssp.</i>
Merriam's shrew	<i>Sorex merriami</i>
American water shrew	<i>Sorex pallustrus</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Botta's pocket gopher	<i>Thomomys bottae</i>
Fish Spring pocket gopher	<i>Thomomys bottae abstrusus</i>
San Antonio pocket gopher	<i>Thomomys bottae curatus</i>
Amphibian Common Name (4)	Scientific Name
Western toad	<i>Anaxyrus boreas</i>
Amargosa toad	<i>Anaxyrus nelsoni</i>
Northern leopard frog	<i>Lithobates pipiens</i>
Columbia spotted frog	<i>Rana luteiventris</i>
Reptile Common Name (6)	Scientific Name
Great Basin collared lizard	<i>Crotaphytus bicinctores</i>
Long-nosed leopard lizard	<i>Gambelia wislizenii</i>
Pygmy short-horned lizard	<i>Phrynosoma douglassii</i>
Greater short-horned lizard	<i>Phrynosoma hernandesi</i>
Desert horned lizard	<i>Phrynosoma platyrhinos</i>
Western red-tailed skink	<i>Plestiodon [Eumeces] gilberti rubricaudatus</i>
Mollusc Common Name (9)	Scientific Name
California floater	<i>Anodonta californiensis</i>
Western ridged mussel	<i>Gonidea angulata</i>
Duckwater pyrg	<i>Pyrgulopsis aloba</i>
Southern Duckwater pyrg	<i>Pyrgulopsis anatina</i>
Large-gland Carico pyrg	<i>Pyrgulopsis basiglans</i>
Carinate Duckwater pyrg	<i>Pyrgulopsis carinata</i>
Oasis Valley pyrg	<i>Pyrgulopsis micrococcus</i>
Ovate Cain Spring pyrg	<i>Pyrgulopsis pictilis</i>
Duckwater Warm Springs pyrg	<i>Pyrgulopsis villacampae</i>
Ant, Wasp, Bee Common Name (2)	Scientific Name
Mojave gypsum bee	<i>Andrena balsamorhizae</i>
Mojave poppy bee	<i>Perdita meconis</i>
True Bug Common Name (1)	Scientific Name
Pahrnagat naucorid bug	<i>Pelocoris shoshone shoshone</i>
Beetle Common Name (4)	Scientific Name
Crescent Dunes aegialian scarab	<i>Aegialia crescenta</i>
Aegialian scarab beetle	<i>Aegialia knighti</i>
Crescent Dunes aphodius scarab	<i>Aphodius ssp. 2</i>
Crescent Dunes serican scarab	<i>Serica ammomenisco</i>
Butterfly Common Name (7)	Scientific Name

Battle Mountain District Special Status Animal Species List	
Big Smoky wood nymph	<i>Cercyonis oetus alkalorum</i>
White River wood nymph	<i>Cercyonis pegala pluvialis</i>
Monarch butterfly	<i>Danaus plexippus plexippus</i>
White Mountains skipper	<i>Hesperia miriamae longaevicola</i>
Railroad Valley skipper	<i>Hesperia uncas fulvapalla</i>
White River Valley skipper	<i>Hesperia uncas grandiosa</i>
Great Basin small blue	<i>Philotiella speciosa septentrionalis</i>

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E: 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 (Tonopah and Mount Lewis Field Offices) and the Reasonably Foreseeable Future Development (RFFD) scenario used in the RMP.

Tonopah Field Office: RFD, past estimates

As part of the 1997 Tonopah RMP, the BLM developed an RFD scenario for oil and gas exploration and development through the next 20 years. This RFD was developed during the land use planning process for the Tonopah RMP in accordance with BLM Handbook H-1624-1, Planning for Fluid Mineral Resources. The RFD projected that 49 new wells would be drilled in existing well fields resulting in 131 acres of new disturbance (2.67 acres/well).

Table 17. Existing Field Development RFD Scenario for Tonopah Field Office

Existing Fields Disturbance Type	Number or Miles	Disturbance Factor	Disturbance (acres)
New Well Pads	49 wells	1.14 acres/well	56
New Roads	14 miles	3.64 acres/well	51
Gravel Pits	2 pits	10 acres/pit	20
Pipelines	2 miles	2 acres/mile	4
Total Disturbance, Drilling in Existing Fields			131

The RFD projected that 30 wildcat wells (exploratory wells outside of established oil fields) would be drilled in the next 15 years and these would lead to discovery of two additional oil fields. Disturbance for these 30 exploration wells from well pad, access road construction and material consumption would result in 296 acres of disturbance (9.87 acres/well).

Table 18. Exploration Development RFD Scenario for Tonopah Field Office

Exploration Disturbance Type	Number or Miles	Disturbance Factor	Disturbance (acres)
Exploratory Well Pads	30 wells	1.13 acres/well	34
Exploratory Well Access Roads	2 miles	3.63 acres/mile	218
Gravel Pits	4 pits	11 acres/pit	44
Total exploration well disturbance			296

The above two scenarios are most similar to the type of exploration and development work that have taken place in TFO over the last 20 years.

The RFD assumed that two additional oil fields could be discovered, and these would be equivalent to the Kate Spring (small) and Trap Spring (medium) fields. Additional wells from these fields would result in 102 new wells with 370 acres of disturbance for wells, roads, and infrastructure (3.63 acres/well).

Table 19. Small and moderate new field development RFD scenario for Tonopah Field Office

Small Field Development Disturbance Type	Number or Miles	Disturbance Factor	Disturbance (acres)
Wells drilled	22	5.13	
Active well pads w/ tank batteries	10 wells	1.14 acres/well	11.4
Abandoned well pads	12 wells	1.13 acres/well	13.6
Access Roads	6 miles	6.3 acres/mile	36
Service Roads	32 miles	4.8 acres/mile	29
Pipelines	2 miles	2 acres/mile	4
Gravel Pits	2 pits	9.5 acres/pit	19
Total Disturbance, Small Field Development			113
Large Field Development	Number or Miles	Disturbance Factor	Short-term Disturbance (acres)
New wells	80	3.21	
Active well pads w/ tank batteries	50 wells	1.15 acres/well	57.5
Abandoned well pads	30 wells	1.15 acres/well	34.5
Access Roads	6 miles	6.0 acres/mile	36.0
Service Roads	21.5 miles	3.63 acres/mile	78.0
Pipelines	5 miles	1.8 acres/mile	9
Gravel Pits	4 pits	10.5 acres/pit	42
Total Disturbance, Large Field Development			257.0

The above scenarios were a conservative approach to estimating future scenarios, 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 2018 a total of 68 exploration and production wells were authorized; 22 of these authorizations expired without an exploration well being drilled, 38 were drilled, then plugged and abandoned, six wells are shut in or producing, and two may be drilled in the future. The last well was drilled in 2018 but is not in a production status. No new oil fields have been developed in the District 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 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 December 2023 Competitive Oil and Gas Lease Sale. Conservatively, based on historic information and anticipated activity, over the next ten years, approximately 20 exploration wells with approximately 50-75 acres of associated surface disturbance could be expected to occur in the TFO, assuming approximately 3.3 acres per well (66 acres) and allowing for a range of variation.

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

According to the 2006 EA for Oil and Gas Leasing and the 2008 EA for Oil and Gas Leasing within the Western Portion of the Shoshone-Eureka Analysis Area, the overall potential for oil and gas exploration and development in this area has been previously determined to be low to moderate. The western portion of the Analysis Area was considered to have a lower potential when compared to that of the eastern portion. The eastern portion of the Shoshone-Eureka Analysis Area was considered to have moderate potential because it is located on a strike between Pine Valley and Railroad Valley, the two major production areas in the State; and the geologic setting is similar to those areas. The RFDs for these EAs estimated a total surface disturbance associated with oil and gas exploration/production of approximately 680 acres for the entire MLFO area, which constitutes 4.5 million acres.

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

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

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

F: Hydraulic Fracturing Technology

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

I. BACKGROUND

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

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

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

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

Generally, HF can be described as follows:

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

II. OPERATIONAL ISSUES

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

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

In general, approximately 25,000 to 500,000 gallons may be used to fracture shallow vertical wells in NV, while approximately 800,000 to 10 million gallons may be used to fracture deep horizontal or directionally drilled wells in NV.

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

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

Gas emissions associated with the HF process, such as methane, carbon dioxide, and volatile organic compounds (VOCs), are captured when the operator utilizes a green completion process. A "green

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

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

Disposal of the waste stream following establishment of “sale-quality” product, would be handled in accordance with 43 CFR Subpart 3171.8 and other state/federal rules and regulations.

Fracturing Fluids

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

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

Re-Fracturing

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

Water Availability and Consumption Estimates

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

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

M&I withdrawals currently account for about 13 percent of the water used in NV. About 77 percent of water withdrawals are currently for agricultural use. Annual M&I water use is projected to increase from 525,000 af in 1995 to 1,034,000 af in 2020 (24 percent of total water withdrawals) based upon existing

water use patterns and conservation measures. Approximately 6 to 7 percent of statewide water withdrawals occur in the mining industry (NDWP, March 1999).

Interest in obtaining the necessary water supplies for wildlife and environmental needs is increasing. Additionally, the popularity of water-based outdoor recreation continues to grow. It is anticipated that these trends will continue, resulting in increased water supply demands for wildlife, environmental and recreational purposes.

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

Comparison Figures:

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

Potential Sources of Water for Hydraulic Fracturing

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

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

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

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

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

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

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

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

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

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

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

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

III. Potential Impacts to Usable Water Zones

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

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

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

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

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

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

Improper casing and cementing.

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

Natural fractures, faults, and abandoned wells.

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

Fracture growth.

A number of studies and publications report that the risk of induced fractures extending out of the target formation into an aquifer allowing hydrocarbons or other fluids to contaminate the aquifer may depend, in part, on the formation thickness separating the targeted fractured formation and the aquifer. According to a 2012 Bipartisan Policy Center report, the fracturing process itself is unlikely to directly affect freshwater aquifers because in Nevada fracturing typically takes place at a depth of 6,000 to 10,000 feet, while drinking water aquifers are typically less than 1,000 feet deep. However, some areas of Nevada, the deep carbonate aquifer can extend to 6,000 feet below ground surface. Recent studies have shown that induced fractures created during HF growing more than 500 meters vertically is less than 1% (Lacazette and Geiser). If a parcel is sold and development is proposed in usable water zones, those operations would have to comply with federal and/or state water quality standards or receive a Class II designation from the NDEP.

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

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

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

Fluid leak and recovery (flowback) of HF fluids.

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

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

a total recovery rate of 41 percent to 59 percent of the initial volume of injected HF fluid. Ultimate recovery rate however, is dependent on the permeability of the rocks, fracture configuration, and the surface area of the fracture(s).

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

HF fluids can remain in the subsurface unrecovered, due to “leak off” into connected fractures and the pores of rocks. Fracturing fluids injected into the primary hydraulically induced fracture can intersect and flow (leak off) into preexisting smaller natural fractures. Some of the fluids lost in this way may occur very close to the well bore after traveling minimal distances in the hydraulically induced fracture before being diverted into other fractures and pores. Once “mixed” with the native water, local and regional vertical and horizontal gradients may influence where and if these fluids will come in contact with usable water zones, assuming that there is inadequate recovery either through the initial flowback or over the productive life of the well. Faults, folds, joints, etc., could also alter localized flow patterns as discussed below.

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

Check-Valve Effect

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

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

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

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

Adsorption and Chemical Reactions

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

Movement of Fluids outside the Capture Zone

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

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

Incomplete Mixing of Fracturing Fluids with Water

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

IV. Geologic Hazards (including seismic/landslides)

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

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

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

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

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

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

V. Spill Response and Reporting

Spill Prevention, Control, and Countermeasure (SPCC) Plans – EPA’s rules include requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires that operators of specific facilities prepare, amend, and implement SPCC Plans. The SPCC rule is part of the Oil Pollution Prevention regulation, which also includes the Facility Response Plan (FRP) rule. Originally published in 1973 under the authority of §311 of the Clean Water Act, the Oil Pollution Prevention regulation sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities. To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires the operator of these facilities to develop and implement SPCC Plans and establishes procedures, methods, and equipment requirements (Subparts A, B, and C). In 1990, the Oil Pollution Act amended the Clean Water Act to require some oil storage facilities to prepare FRPs. On February 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 43 CFR Subpart 3171.8 with their APD proposal. All spills and/or undesirable events are managed in accordance with Notice to Lessee (NTL) 3-A for responding to all spills and/or undesirable events related to HF operations.

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

VI. Public Health and Safety

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

VII. Hydraulic Frac Job Data for Nevada

Operator	Noble Energy	Noble Energy	Noble Energy	Makoil	Grant Canyon
Well	Humboldt M2C-M2-21	Huntington K1L-1V	Humboldt M10C-M10-11	Portugese Mountain 14A	Blackburn #16
Total Base Water Volume (gal)	250,057	300,537	343,919	29,949	209,600
2% KCL Water	88.5614	0	86.45119	0	0
Fresh Water	0	88.9968	0	53.90215	85.2039
Water	1.57645	0.61826	0.81892	0.78169	0.53504

Operator	Noble Energy	Noble Energy	Noble Energy	Makoil	Grant Canyon
2-bromo-2-nitro-1, 3-propanediol	0.00202	0.00213	0.00508	0.00129	0.00171
Crystalline Silica, quartz	0.65036	8.59936	10.49506	32.39228	14.4277
Ethylene glycol monobutyl ether	0.02379	0.00537	0.01688	0.09718	0.02695
Isopropanol	0.00311	0.00501	0.00221	0.04926	0.00503
Methanol	0.00311	0.00503	0.00226	0.05782	0.00361

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

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G: Leasing Preference Ratings for Nominated Lease Parcels

Table 20. Leasing Preference Table

Leasing Preference Rating Based on the Following Criteria								
Parcel Information		Preference Criteria					Preference for Leasing	
Office	Parcel	1 Proximity to Existing Development	2 Habitat	3 Cultural Resources	4 Recreation/Other Resources	5 Potential	High	Low
MLFO	NV-2023-12-1663	Low	High	High	High	Low	X	
MLFO	NV-2023-12-1664	Low	High	High	High	Low	X	
MLFO	NV-2023-12-1994	Low	Low	High	High	Low		X
MLFO	NV-2023-12-6936	Low	Low	High	High	Low	X	
TFO	NV-2023-12-6969	High	Low	High	High	High	X	

H: Summary of Comments and Responses

[Reserved]