United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Battle Mountain Field Office
50 Bastian Road
Battle Mountain, Nevada 89820
http://www.nv.blm.gov

TAKE PRIDE IN AMERICA

In Reply Refer To:
3200
NV063-EA06-092

OCT 6 2006

Dear Interested Public:

The Bureau of Land Management (BLM) Battle Mountain Field Office (BMFO) is seeking public input on a Environmental Assessment (EA) for Oil & Gas Leasing. The BMFO prepared an EA that will be available for a 30-day public comment period beginning Oct. 11 and closing Nov. 13. This EA was prepared to analyze approximately 2.8 million acres of public lands in portions of Lander, Eureka, and Nye Counties, within the Shoshone-Eureka Planning Area. These lands will be offered for future competitive and non-competitive oil and gas lease sales. Pursuant to the National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations on implementing NEPA, the EA identifies, describes and evaluates resource protection measures that would mitigate the possible impacts of oil and gas development. A reasonable foreseeable development scenario (RFD) was also be included in the EA that outlines future oil and gas exploration and development within the Assessment Area. BLM is currently coordinating with the Fish and Wildlife Service (FWS) in the analysis of the EA.

The BLM is seeking public input on the EA by initiating a 30-day period of public comment beginning October 11, 2006. As part of the EA process, the BLM will host a public meeting in Eureka at the Eureka Opera House on October 25th from 7:00-9:00 p.m. The BLM requests public participation to help identify potential environmental impacts, issues and concerns. Written comments on this EA will be accepted at the above address until 4:30 pm, November 13, 2006.

If you have questions or comments regarding this EA, please contact Sheila Mallory or Christopher Worthington at the above address or at (775) 635-4000.

Sincerely,

Charles A. Lane
(acting)

Thomas J. Seley
Assistant Field Manager
Non-Renewable Resources

Enclosure
1 - EA NV063-EA06-092

United States Department of the Interior
Bureau of Land Management

Battle Mountain Field Office October 2006

Battle Mountain Field Office
Bureau of Land Management
50 Bastian Road
Battle Mountain, Nevada 89820

Environmental Assessment NV063-EA06-092

Oil and Gas Leasing within Portions of the Shoshone-Eureka Planning Area Battle Mountain District

MISSION STATEMENT

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times. Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, and scenic, scientific and cultural values.

Environmental Assessment NV063-EA06-092

Cover Photo taken from Simpson Park Mountains looking northeast toward Pine Valley

ENVIRONMENTAL ASSESSMENT

FOR

OIL AND GAS LEASING WITHIN PORTIONS OF THE SHOSHONE-EUREKA PLANNING AREA

October 2006

Bureau of Land Management
Battle Mountain Field Office
50 Bastian Road
Battle Mountain, Nevada 89820-2332

BUREAU OF LAND MANAGEMENT
BATTLE MOUNTAIN FIELD OFFICE
OIL AND GAS LEASING WITHIN PORTIONS OF THE
SHOSHONE-EUREKA PLANNING AREA
ENVIRONMENTAL ASSESSMENT

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ACRONYMS

AML	Appropriate Management Level
amsl	above mean sea level
APCR	Air Pollution Control Regions
ATF	Alcohol, Tobacco and Firearms
APD	Application Permit to Drill
AUM	Animal Unit Month
BAPC	Bureau of Air Pollution Control
BLM	Bureau of Land Management
BMP	Best Management Practices
BMFO	Battle Mountain Field Office
CAA	Clean Air Act
CAAA	Federal Clean Air Act Amendments
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
CO	Carbon Monoxide
COA	Conditions of Approval
dB	Decibels
ET	Evapotranspiration
EPA	Environmental Protection Agency
EA	Environmental Assessment
EPCRA	Emergency Planning and Community Right-To-Know Act
FLPMA	Federal Land Policy and Management Act
HMAs	Herd Management Areas
H_2S	Hydrogen Sulfide
LUP	Land Use Planning
MBTA	Migratory Bird Treaty Act
MLA	Mineral Leasing Act
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Department of Environmental Protection
NEPA	National Environmental Policy Act
NHT	National Historic Trail (Pony Express Trail)
NO_2	Nitrogen Dioxide
NRS	Nevada Revised Statute
NSAAQS	Nevada State Ambient Air Quality Standards
NSPS	New Source Performance Standards
O_3	Ozone
PM_{10}	Particulate Matter less than Ten Microns
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RFD	Reasonably Foreseeable Development
RFFAs	Reasonably Foreseeable Future Activities
RMP	Resource Management Plan

ROW	Right-of-Way
SEPA	Shoshone-Eureka Planning Area
SOP	Standard Operating Procedure
TCP	Traditional Cultural Properties
TNEB	Thriving Natural Ecologic Balance
USGS	United States Geological Survey
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management
WHT	Wild Horse Territory
WSA	Wilderness Study Area

1 INTRODUCTION / PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The Bureau of Land Management (BLM), Battle Mountain Field Office (BMFO) is proposing the preparation of an Environmental Assessment (EA) for quarterly oil and gas lease sales within portions (Assessment Area) of the Shoshone-Eureka Planning Area (SEPA). The Assessment Area represents lands, with oil and gas potential, which the United States Geologic Survey (USGS) identified and assessed in May 2005. The Assessment Area comprises approximately 2.8 million acres within portions of Lander, Eureka, and Nye Counties, Nevada (Figure 1.1.1). Numerous nominations of interest have been received by the BLM to lease lands in the SEPA in order to explore for oil and gas resources. A lease authorizes the lessee to enter upon the leased land to conduct drilling and related operations. However, these later stage exploration and development operations require site-specific environmental analysis. In addition, operations are also subject to mitigation measures and conditions of approval identified by this site specific analysis. This EA will analyze the environmental consequences of oil and gas leasing and determine resource protection measures that need to be included as lease stipulations to mitigate the possible future impacts of oil and gas development (Proposed Action).

1.2 Purpose of and Need for Action

This EA is being initiated to facilitate the BLM BMFO's implementation of the requirements in Executive Order 13212 (2001) and the National Energy Policy Act (2005) within the Assessment Area. This administrative determination and law call for the expedited review and approval of energy-related projects in order to reduce U.S. dependency on imported supplies. In addition to the need to provide for timely exploration and development of energy resources on public lands, the existing EA produced by the BLM in 1976 (*Regional Environmental Analysis on Oil and Gas Leasing in the Battle Mountain District*) is no longer adequate. The 1976 EA does not contain analysis of cumulative impacts for three of the required critical elements: threatened and endangered species; invasive, nonnative species; and Native American religious concerns. The BLM is required to complete a new EA before oil and gas lease parcels may be offered to the public. This EA is to be used as the primary environmental document for the leasing of oil and gas resources in the Assessment Area of the SEPA.

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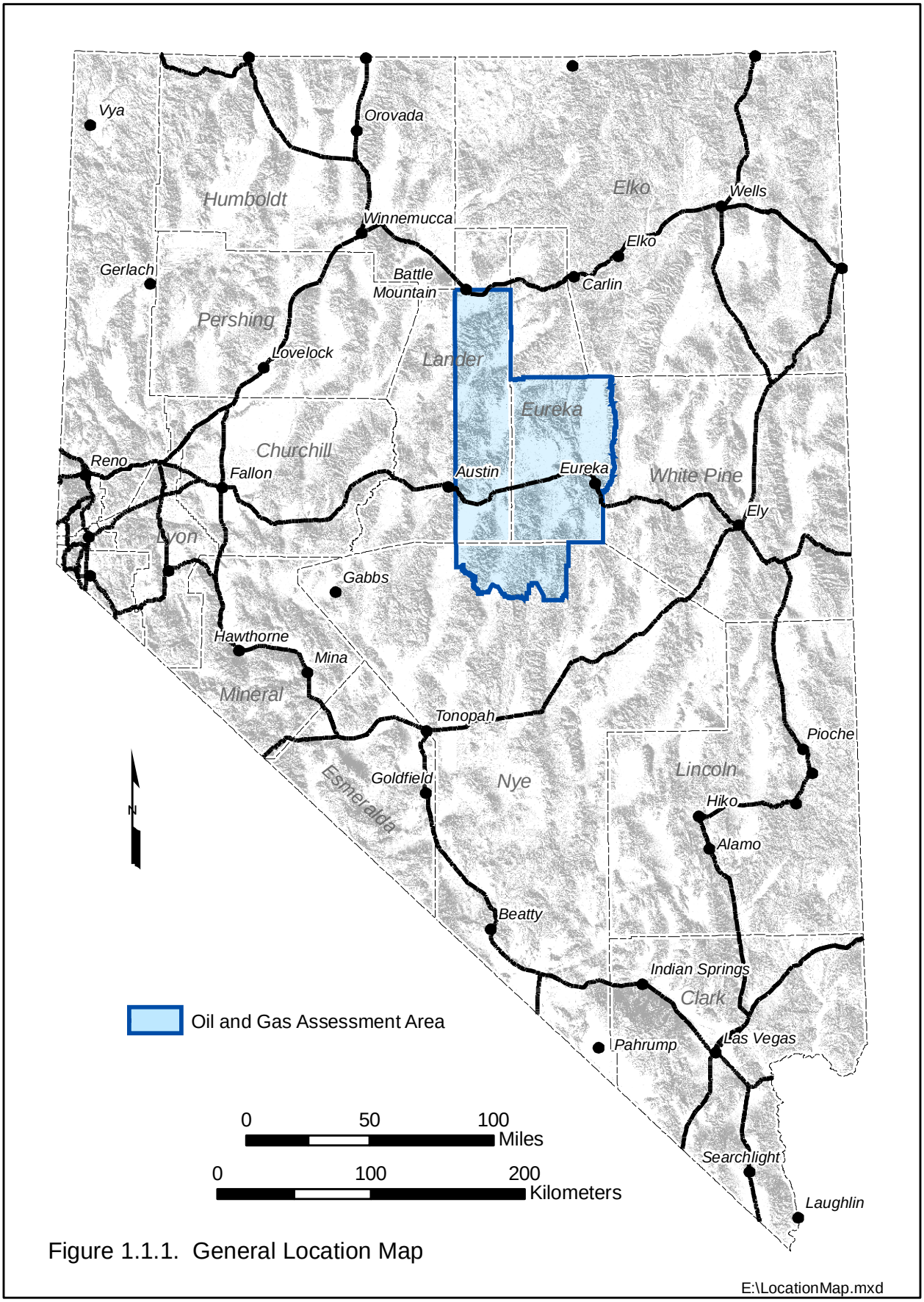

Figure 1.1.1. General Location Map

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1.3 Land Use Conformance Statement

The Proposed Action is in conformance with the Shoshone-Eureka Resource Management Plan (RMP). Part II, Section E of the RMP, Management Actions Not Expressly Addressed by the Resource Management Plan, 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 lead to Management Decisions 1 through 5 for leasable minerals (oil and gas). The objectives are as follows:

Objective 1: Make available and encourage development of mineral resources to meet national, regional, and local needs consistent with national objectives for an adequate supply of minerals.

Objective 2: Assure that mineral exploration, development, and extraction are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands.

Objective 3: Develop detailed mineral resource data in areas where different resources conflict so that informed decisions may be made that result in optimum use of the lands.

Management Decision #4, which specifically addresses oil and gas leasing, 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."

1.4 Relationship to Laws, Regulations, and other Plans

The Proposed Action and alternatives would be in conformance with the National Environmental Policy Act (NEPA)] of 1969 (P.L. 91-190 as amended (42 USC §4321 et seq.); Mineral Leasing Act (MLA) of 1920 as amended and supplemented (30 USC 181 et seq.); the Federal Oil and Gas Leasing Reform Act of 1987, which includes the regulatory authority under 43 Code of Federal Regulation (CFR) 3100, Onshore Oil and Gas Leasing; General, and Title V of the Federal Land Policy and Management Act of 1976 (FLPMA) Right-of-Way (ROW) under regulatory authority under 43 CFR 2800 for ROWs.

The Proposed Action described and analyzed in this EA are consistent with federal, state and local laws, regulations, and plans, to the maximum extent possible.

1.5 Scoping

Internal scoping meetings for the BLM were initiated on April 12, 2006, and continued through the end of June, 2006. Tribal scoping was initiated on March 27, 2006 with a letter being sent detailing the content of the EA. On July 10, 2006, a second letter was sent that further defined the Assessment Area.

1.6 Issues

BLM personnel identified the following issues and concerns regarding the Proposed Action that need to be addressed in this EA:

- Cultural Resources;
- Invasive, Nonnative Species (Noxious Weeds);
- Ground Water;
- Special Status Species;
- Migratory Birds; and
- Native American Religious Concerns.

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

This Chapter describes the Proposed Action and alternatives, which responds to the Purpose and Need criteria identified in Chapter 1. This chapter also includes a summary of alternatives considered but eliminated from detailed analysis.

2.2 Proposed Action

The Proposed Action is to consider leasing federal mineral estate that has been assessed by the USGS as having oil and gas potential within the Assessment Area. These lands would be determined open to leasing, subject to standard lease terms and applicable special stipulations in a quarterly oil and gas lease sale. The offered areas of federal mineral estate may lie beneath surface lands administered by the BLM or under split estate (i.e., surface owned or administered by an individual or nonfederal government agency). An oil and gas lease conveys the right to explore and develop oil and gas resources on BLM lands for a ten year period. However, oil and gas exploration and development activities require a separate site-specific environmental analysis. Appendix A provides a detailed description of the BLM leasing process.

2.2.1 Resource Protection Stipulations

Lease stipulations would be developed to minimize any adverse impacts identified from the analysis of the Proposed Action. A lease stipulation is a provision that modifies standard lease rights; stipulations are in addition to restrictions applied to field operations by federal regulations and become part of the lease, superseding any inconsistent provisions of the standard lease form (See Appendix B for a copy of the standard lease form and the types of stipulations that may be applied to oil and gas leasing). Any party filing for competitive or non competitive leases would be deemed to have agreed to stipulations applicable to a specified parcel (43 CFR §3101.1-3). Leasing stipulations provided in Appendix B of this EA are not necessarily applicable to existing leases. As existing leases expire and new leases are issued, the leasing stipulations in this EA would be implemented. An operator may request that the authorized officer grant an exception, waiver, or modification to a lease stipulation as explained in 43 CFR 3101.1-4 (BLM) and 36 CFR 228.104 (FS) (See also Appendix B).

2.3 Alternative to the Proposed Action

2.3.1 No Action Alternative

The No Action Alternative is inconsistent with the President's National Energy Policy and Executive Order 13212. The No Action Alternative is brought forth in the analysis to provide a baseline of comparison with the Proposed Action. The No Action Alternative represents no change to current management direction, which currently allows noncompetitive leasing until September 2007, for those lands nominated and analyzed by the BLM (BLM 1976). A No Action Alternative would mean that no new leases would be issued on 2.8 million acres of BLM-administered land within the Assessment Area without additional NEPA analysis on each nominated parcel. Noncompetitive leases are subject to the same regulations as competitive leases. Issuing noncompetitive leases does

not directly authorize exploration or development, and additional site-specific analysis would be required.

2.3.2 Alternatives Considered but Eliminated from Detailed Analysis

2.3.2.1 Limited Open Leasing Alternative

Under this alternative, only those lands where no resource impacts were demonstrated would be available for leasing for oil and gas resources under standard terms and conditions of the leasing agreement. Lands where conflicts with resources existed would be closed to leasing. This alternative does not comply with public policy expressed in the MLA and the BLM's mandate for multiple use of public lands as described in the FLMPA, which provides that public lands are generally available for oil and gas leasing. In addition, Manual 1624 SPG, which forms the basis of this EA, provides the guidance that indicates whether a closure or other major operating constraint is discretionary by the agency. The supporting record must show that less restrictive measures were considered but found to be inadequate to provide the appropriate protection of resource values which were incompatible with a land use of oil and gas development. Since less restrictive measures can be placed on leasing to mitigate impacts and provide appropriate protection of resources, this alternative was not analyzed in detail.

2.3.2.2 Leasing Under Standard Terms and Conditions Alternative

Under this alternative, oil and gas leasing within the Assessment Area would be subject to the standard terms and conditions of the lease only. Standard terms of leasing can be found in Appendix B. There would be no lease stipulations developed through the EA process under this alternative and natural resources would be protected only through 43 CFR § 3101.1-2 (surface use rights). This alternative was eliminated because not all resources within the Assessment Area would be protected sufficiently under standard terms and conditions.

2.4 Reasonably Foreseeable Development Scenario

A Reasonably Foreseeable Development Scenario (RFD) for oil and gas is a long-term projection (scenario) of oil and gas exploration, development, production, and reclamation activity. The RFD covers oil and gas activity in a defined area for a specified period of time. The RFD projects a baseline scenario of activity assuming all potentially productive areas can be open under standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation, or executive order. The baseline RFD provides the mechanism to analyze the effects that discretionary management decisions have on oil and gas activity. The RFD also provides the basic information that is analyzed in the NEPA document under various alternatives. The RFD discloses indirect future or potential impacts that could occur once the lands are leased. Prior to any future development, the BLM would require a site-specific environmental analysis at the exploration and development stages in order to comply with NEPA.

The Proposed Action does not include exploration, development, production, or final reclamation of oil and gas resources; however, authorization of oil and gas leasing does convey a right to subsequent exploration and production activities. These later activities are associated with oil and gas leasing; therefore, they would be analyzed as part of the Proposed Action. Oil and gas

exploration and development activities progress through four separate phases: 1) preliminary exploration; 2) exploratory drilling; 3) field development and production; and 4) field abandonment. These phases are described in detail in Appendix C. Each phase is implemented sequentially but may overlap in time, and the probable implementation of each phase and degree of environmental impact would be contingent upon the success or failure of each preceding phase.

Appendix C provides a description of the Standard Operating Procedures (SOPs) followed by the BLM during the administration of a permit. Exploration within the Assessment Area may experience development similar to the following RFD scenario described below.

2.4.1 General Assumptions for the Reasonably Foreseeable Development Scenario

The RFD provides the basis for the analysis of the environmental consequences in Chapter 4 of this document. The RFD for the Assessment Area is based on the geology, oil and gas development history, and oil and gas potential within the Assessment Area (discussed in Sections 2.4.3 and 2.4.4), BLM well data, EAs for oil and gas leases in eastern Nevada, and personal communications with various BLM, State of Nevada and Industry personnel (Jamie Drayton, Office Manager, Makoil Field, April 27, 2006; Nancy Army, Natural Resource Specialist, Bureau of Land Management, Tonopah Field Station, April 12, 2006; John Menghini, Petroleum Engineer, Bureau of Land Management, Nevada State Office, April 21 and 25, 2006; Bill Wilson, Natural Resource Specialist, Bureau of Land Management, Ely District Office, April 27, 2006; Larry Garside, Research Geologist, Nevada Bureau of Mines and Geology, March 23, 2006; Christy Morris, Oil, Gas, and Geothermal Program Manager, Nevada Division of Minerals, April 14, 2006). In addition, the Bacon Flat oil field located in the BLM Ely District Field Office has been used as a basis for the hypothetical scenario for production disturbance for a small oil field. It is likely that any oil field found in the Assessment Area would have characteristics similar to those of Bacon Flat.

2.4.2 Shoshone-Eureka Planning Area Geology

Many of the rock formations found within the Assessment Area are indicative of a continental plate margin converging with an oceanic plate. A combination of depositional and orogenic (mountain building) events along this margin have resulted in the Assessment Area, particularly the eastern portion of the Assessment Area, being generally prospective for hydrocarbon production. In a conventional geologic model, the development of petroleum reservoirs depends on three things:

1. Source rocks: Organic-rich source rocks are required to produce liquid or gaseous hydrocarbons. These are typically black shale or organic mudstones.

2. Thermal maturation: The source rocks need to be buried and remain within a range of pressure and temperatures long enough to convert the organic materials to hydrocarbons. This range of conditions is termed a window. The oil window is generally a lower temperature than the gas window, which may extend up to 200 degrees Celsius.

3. Trap: Once generated, the hydrocarbons tend to move upward because they are less dense than basin waters that fill the pore spaces and fractures in the rock. In order to form a reservoir, the hydrocarbons must collect in a geographically confined volume. Generally this requires that the upward migration of hydrocarbons be interrupted by some type of seal (such

as an impermeable layer) forcing the hydrocarbons to migrate to a geographic high point beneath the sealing layer. An example of this would be a domal uplift with alternating permeable and impermeable rock layers.

Table 2.4-1 briefly describes the timescale of geologic events in Nevada. The development of the Antler Orogeny in the Late Devonian to Early Mississippian allowed the deposition of the organic-rich source rocks necessary for hydrocarbon development. The Antler Orogeny (Roberts et al. 1958) resulted in east-directed compressional faulting, which placed oceanic sediments over
organic-rich source rocks necessary for hydrocarbon development. The Antler Orogeny (Roberts et al. 1958) resulted in east-directed compressional faulting, which placed oceanic sediments over continental margin carbonates. A topographic high developed to the west, and sediments were shed eastward into the Antler foreland basin (Stewart 1980).

The organic-rich, fine clastic material that collected near the center of the basin developed into the Mississippian Chainman Shale (Figure 2.4.1). All petroleum produced in Nevada to date can be geochemically linked to these Mississippian source rocks of the Antler foreland basin (Chamberlain 2004). Therefore, the presence of these sedimentary rocks in the eastern portion of the Assessment Area suggests that the area remains prospective for hydrocarbons. The Mississippian source rocks were likely not deposited in the western portion of the Assessment Area. There are less well studied candidate source rock units there, but there are minimal data with which to evaluate their hydrocarbon generation potential.

Additional events that created geologic impacts in the Assessment Area followed the Antler Orogeny. The event with the greatest impact on petroleum generation was the Sevier Orogeny in the Late Cretaceous. A series of laterally persistent, deep seated thrust faults developed in the Assessment Area during the Sevier Orogeny. The orogeny created a stacked set of thrust sheets, termed the Eureka fold and thrust belt described by Carpenter et al. (1993), which buried the Chainman Shale and associated mid-Paleozoic organic sediments beneath a thickened crust where they could pass into the oil and gas-generating temperature and pressure windows. The Sevier Orogeny also placed locally prospective reservoir rocks above the Mississippian source rocks in potential oil and gas traps. In geologic time following the Sevier Orogeny, the Assessment Area experienced varying amounts of volcanism and the development of the present-day basin and range topography. Volcanic rocks and younger basin fill deposits form additional possibilities for the development of petroleum reservoirs beneath the modern valleys.

2.4.3 History of Oil and Gas Exploration in the Shoshone-Eureka Planning Area

As shown in Figure 1.1.1, the Assessment Area includes lands in portions of Lander, Eureka, and Nye Counties. Although two of the major oil and gas production areas in Nevada, Pine Valley and Railroad Valley, are located in Eureka and Nye Counties, respectively, these production areas are not within the Assessment Area (Figure 2.4.2). According to the Nevada Bureau of Mines and Geology Bulletin 104, historic interest in oil and gas exploration within the Assessment Area has been limited (Garside et al. 1988). Between 1946 and 2004, 39 exploration wells were drilled (Figure 2.4.2) (http://www.nbmg.unr.edu 2006). None of these wells resulted in production.

2.4.3.1 Lander County

All exploration drilling within the Assessment Area in Lander County was conducted prior to 1979, and none resulted in production.

Table 2.4-1: Generalized Geologic Timescale of Nevada

Era	Period	Ma	Event
CENOZOIC	Quaternary	1.66	Modern earthquakes, mountain building, volcanism, and geothermal activity resulting from Basin and Range extension that began in the Tertiary
	Tertiary	66	Basin and Range extension began about 30 to 40 million years ago. Igneous activity during the Tertiary was caused by the subduction of oceanic crust beneath the North American Plate. Numerous ore deposits, including most gold silver, and copper deposits near Battle Mountain formed.
MESOZOIC	Cretaceous	144	Numerous granite intrusions scattered throughout Nevada originated from subduction along the west coast of North America. The igneous activity resulted in the formation of many metallic minerals deposits to form.
	Jurassic	208	A subduction zone to the west caused igneous intrusions, volcanism, and associated ore deposits.
	Triassic	245	The general geography of Nevada during the Triassic was similar to the Jurassic; igneous activity in the west and deposition of sedimentary rocks in continental to shallow marine environments to the east. The Sonoma Orogeny ends in the early Triassic.
PALEOZOIC	Permian	286	Volcanism to the west and deposition of thick limestones to the east throughout much of the Paleozoic.
	Pennsylvanian	320	The Antler highland, formed earlier, was eroded and shed sediments into the basins to the east. Carbonated rocks were deposited in Eastern Nevada.
	Mississippian	360	During the Antler Orogeny, from Late Devonian to Early Mississippian, rocks were folded and thrust from the west to the east. The Roberts Mountains Thrust, below which many of the gold deposits of north-central Nevada occur, formed at this time. Sedimentary rocks, including conglomerates, sandstone, siltstone, and shale were deposited basins derived from the Antler highland, and carbonate rocks were deposited further east.
	Devonian	408	Deposition of limestones in Eastern Nevada, and shale, chert and barite were deposited in the northeastern and central portions of Nevada. The quiet, shallow-marine tectonic setting of the earlier Paleozoic began to change, as small land masses from the Pacific Ocean collided with western North America
	Silurian	438	Carbonate rocks in the eastern part of the state and silica-rich rocks in the central part record similar deposition to the middle and lower Paleozoic
	Ordovician	505	Marine deposition with basalt (metamorphosed to greenstone) locally interbedded with sedimentary rocks found today in central Nevada. Some sedimentary barite and copper-zinc-silver ores formed in sea-floor sediments.
	Cambrian	570	Middle and Upper Cambrian deposition similar to that of the Paleozoic, with carbonate rocks to the east and shale and sandstone to the west. Lower Cambrian and uppermost Precambrian rocks are characterized by quartzite and metamorphosed siltstone throughout most of Nevada.
PRECAMBRIAN			The oldest rocks in Nevada are metamorphic rocks. Precambrian rocks also include granites and sedimentary rocks. Beginning about 1,100 million years ago, Antarctica and Australia may have moved away from North America setting the stage for the development of a western continental margin that is similar to the Atlantic coast of today. A shallow marine, tectonically quiet setting continued in eastern Nevada for the next 700 million years.

Note: Mega-annum, usually abbreviated as Ma, is a unit of time equal to one million years.

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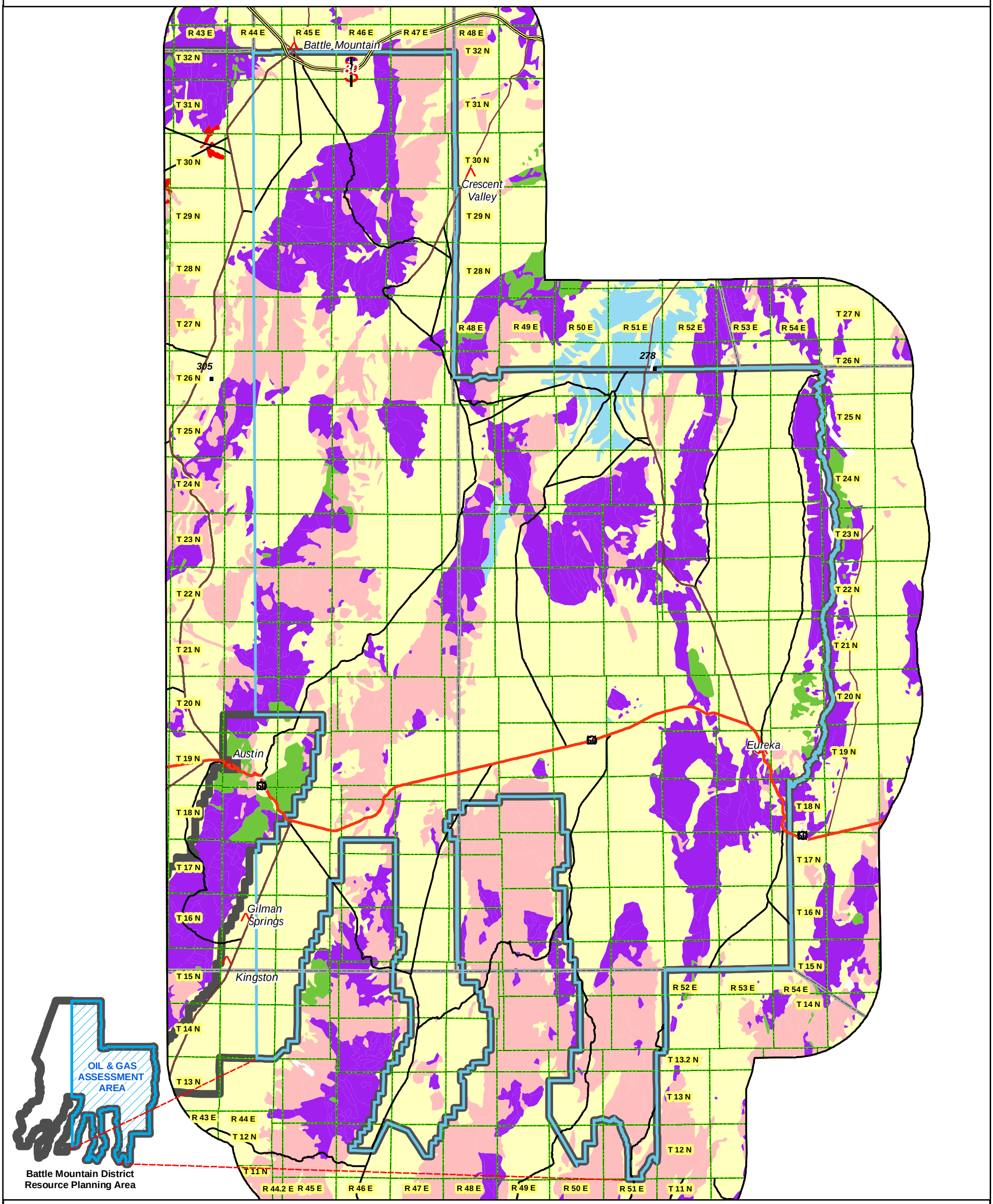
Geologic Map
within the Oil and Gas Leasing Assessment Area

Figure 2.4.1



O&G Assessment Area
Resource Planning Area
County Boundary
Township/ Range
Town/City
Interstate Freeway
US Highway
State Route

Roads
Quaternary alluvial and playa deposits
Quaternary volcanic rocks
Quaternary sedimentary deposits
Tertiary volcanic rocks
Mesozoic and Tertiary Intrusive rocks
Paleozoic sedimentary and volcanic rocks

4 2 0 4 8 12 Miles

United States Department of the Interior
Bureau of Land Management
Battle Mountain Field Office
50 Bastian Road.
Battle Mountain, NV 89820

Data is published in the North American Datum 1983 (NAD83) UTM, Zone 11, Meters - 10/2/06

2.4.3.2 Eureka County

The discovery of oil in Blackburn Field in Pine Valley in 1982 led to exploration interest in Eureka County, which had not been seen prior to 1982. Four oil fields, located in Pine Valley, have been developed. All four of these oil fields are located within the area of Eureka County administered by the Elko BLM. Figure 2.4.2 shows the exploration wells drilled in the Eureka County portion of the Assessment Area. No production wells have been developed within the Assessment Area portions of Eureka County.

2.4.3.3 Nye County

Nye County was the location of the first producing oil well in Nevada and is now home to ten producing oil fields, all in the Railroad Valley area. The Railroad Valley oil fields include Grant Canyon and Trap Springs, which produced 20,799,688 and 13,419,159 barrels of oil, respectively, between 1954 and 2004 (Nevada Division of Minerals 2006). However, exploration interest resulted in only one exploration well in the Nye County portion of the Assessment Area, which did not have any oil or gas show.

2.4.4 Oil and Gas Development Potential within the Shoshone-Eureka Planning Area

As described in the RFD scenario below, the overall potential for oil and gas exploration and development within the Assessment Area is low. However, the western portion of the Assessment Area has a lower potential when compared to that of the eastern portion (Figure 2.4.2). The eastern portion of the Assessment Area is considered to have moderate to high potential because it is on strike between the Pine Valley and Railroad Valley production wells. In addition, the geologic setting is similar to that of the two major production areas. Oil and gas interest has been increasing in the Assessment Area; an average of one exploration well was drilled per year between the years of 1980 and 2004 versus a total of 13 exploration wells drilled in the 33 years prior (Figure 2.4.2). Exploration interest since 1980 has focused on the eastern portion of the Assessment Area, specifically in Eureka County, which is consistent with the geologic potential displayed in Figure 2.4.1.

Exploration and production potential may also be influenced by developments in exploration and drilling technology leading to development of previously unexplored resources. Increased economic incentive may also lead to an increase in exploration and development as oil prices continue to rise.

2.4.5 Assumptions for Exploration

The following assumptions would be used for analysis in this EA:

1. Exploration under this EA is expected to occur over ten years.
2. There would be up to approximately 24 miles of seismic line at a width of ten feet surveyed per year for an overall anticipated total of 290 acres of disturbance over the life of the EA. Each year, 100 percent of the disturbance would be reclaimed (earthwork and reseeding would be completed). Other geophysical surveys (see Appendix C) are also expected; however, the surveys would be minimal with little or no surface disturbance.
3. The Assessment Area is considered a high risk (wildcat) exploration region. This means that there is low potential for oil and gas discoveries

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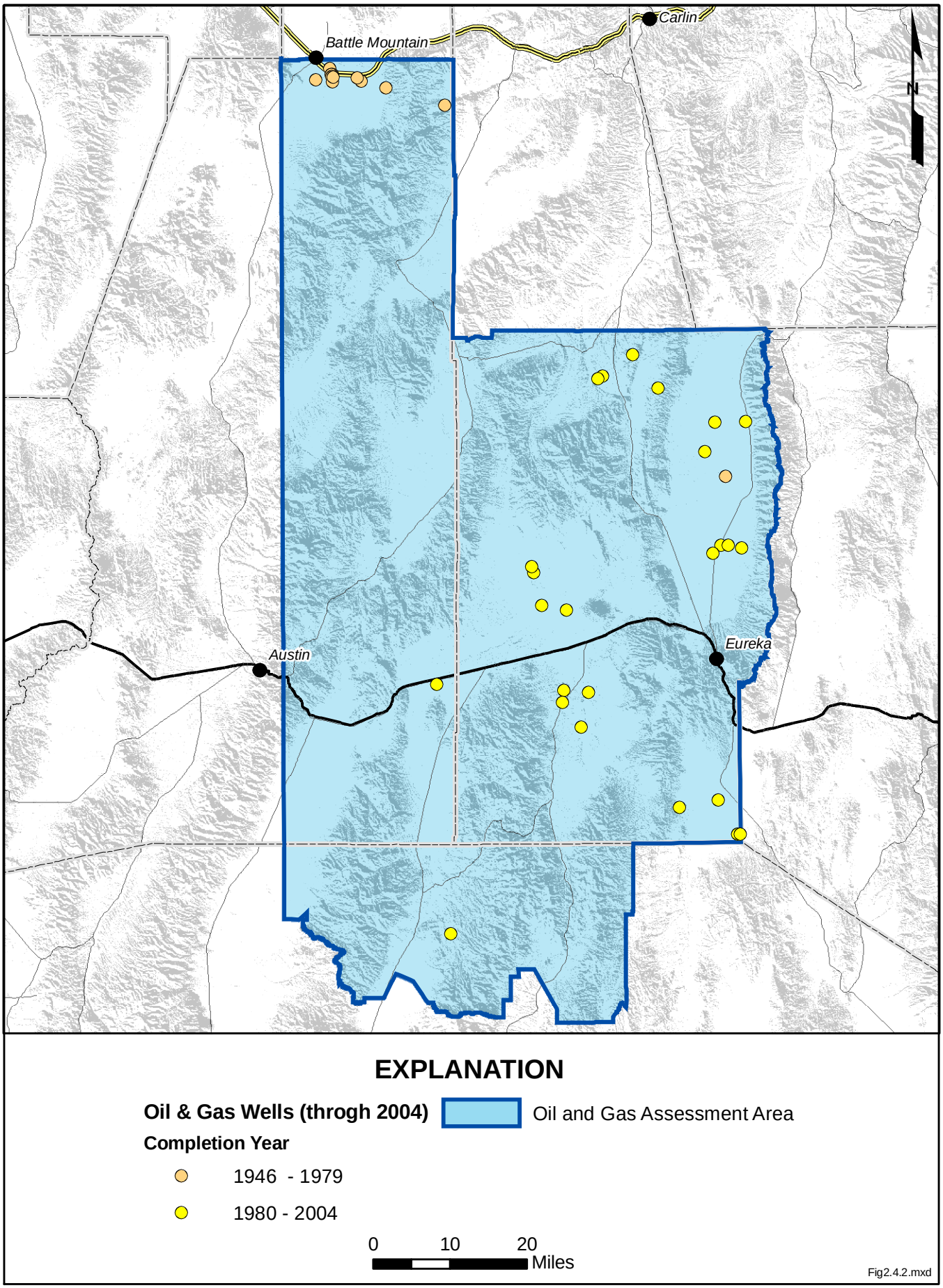

Figure 2.4.2. Oil and Gas Potential in the Assessment Area.

4. An estimated two wells per year would be drilled, which is the equivalent of 20 total wells drilled.
5. Approximately one out of the 20 total wells drilled would be potentially viable for production.
6. An estimated 19 wells would be reclaimed. It is expected that the wells and associated access disturbance would be reclaimed the following year after drilling.
7. Drilling time would average four to eight weeks per well.
8. The average pad size for each well would be two acres. Therefore, the total disturbance area would be up to four acres per year, for an expected maximum of 40 acres.
9. The average access road would be 20 feet wide by five miles long (the average width also accounts for turnouts) and would be surfaced with six inches of gravel. Therefore, the disturbance from road construction would be approximately 12 acres (5 miles x 5,280 feet/mile x 20 feet ÷ 43,560 ft² /acre [x 2 wells/year] = 24 acres) per year, for an expected maximum of 240 acres.
10. Gravel for roads would be obtained locally from existing gravel pits. Expansion of gravel pits associated with oil and gas exploration would be 2.5 acres.

Based on the above assumptions, the total surface disturbance from seismic activity is estimated at 290 acres; exploratory well pad construction is estimated at 40 acres; disturbance from development of access roads is estimated at 240 acres; and gravel pit expansion associated with exploration is estimated at 2.5 acres. Surface disturbance from oil and gas exploration could total a maximum of 572.5 acres, of which 16.5 acres would not be reclaimed within the ten year RFD scenario.

As shown in Table 2.4-2, reclamation (earthwork and reseeding) of the above disturbance would result in 290 acres of seismic line, 38 acres in well pads, and 228 acres in access roads being reclaimed. Reclamation for oil and gas exploration would total 556 acres.

Table 2.4-2: Oil and Gas Exploration Associated Disturbance and Reclamation Acreage for the Ten-Year Land Use Planning Period

Activity	Disturbance (acres)	Reclamation (acres)
Seismic Line	290	290
20 Exploration Wells	40	38
Exploration Access Roads	240	228
Gravel Pit Expansion	2.5	0
Total	572.5	556

2.4.6 Assumptions for Production

The average size of a producing oil and gas field is 640 acres. Generally, for wells less than 5,000 feet in depth, there would be one well per 40 acres, while wells greater than 5,000 feet in depth would require 160 acres per well. Typical drilling depths in the Assessment Area and adjacent areas are greater than 5,000 feet; therefore, most of the well spacing can be expected to average 160 acres per well. Inherent risk factors would usually limit drilling to depths of 8,000 feet, although some

operators speculate that larger reservoirs would be encountered at greater depths (10,000 to 15,000 feet).

One small producing field may be discovered within the Assessment Area during the ten year planning period. No more than one drill rig would be in operation in the field at a given time. Only interim reclamation work would occur until the producing field is abandoned. The production life of the field would last from 18 months to 35 years.

The following oil field development assumptions are based on estimated mineral potential, ground conditions within the Assessment Area, road availability and existing development of the Bacon Flat Oil Field:

1. There would be one producing oil well discovered during the exploration phase; nine additional wells would be drilled within the field to determine the boundaries of the oil and gas reservoir for a total of 18 acres of disturbance over the ten-year life of the RFD. No additional oil would be discovered, and one of the wells would be converted to an injection well. The remaining eight wells would be plugged and abandoned; reclamation of the eight additional drill sites and interim reclamation of the drill site converted to an injection well would bring the total disturbance to 17.8 acres.
2. A tank battery would be placed on the existing drill pad of the producing well and no additional surface disturbance would be required.
3. To define the oil and gas reservoir boundaries, an additional 14 miles of 20-foot wide roads would be constructed for the nine drill pads. These roads would be surfaced with one-foot of gravel (includes gravel needed for road maintenance) for a maximum of 34 acres of disturbance. Approximately ten miles, or 24 acres, of these roads would be reclaimed.
4. Gravel would be obtained locally from existing gravel pits. Expansion of gravel pits associated with oil and gas production would be 2.5 acres.
5. Based on the above assumptions, the total surface disturbance from the nine production well pads is estimated at 18 acres; disturbance from the construction of production roads is estimated at 34 acres; and gravel pit expansion for oil and gas production is estimated at 2.5 acres. Surface disturbance from oil and gas production over the ten-year planning period could total a maximum of 54.5 acres.

As shown in Table 2.4-3, reclamation (earthwork and reseeding) of the above disturbance would result in 17.8 acres of well pads and 24 acres of production associated roads. Reclamation for oil and gas production would total 41.8 acres.

Table 2.4-3: Oil and Gas Production Associated Disturbance and Reclamation Acreage for the Ten-Year Land Use Planning Period

Activity	Disturbance (acres)	Reclamation (acres)
Production Wells	18	17.8
Production Access Roads	34	24
Gravel Pit Expansion	2.5	0
Total	54.5	41.8

2.4.7 Exploration and Production Summary

The total surface disturbance associated with the RFD for oil and gas exploration and development activities for the ten-year planning period is summarized in Table 2.4-4.

In summary, there would be a total surface disturbance of 627 acres from oil and gas exploration and development, of which 597.8 acres would be reclaimed (earthwork and reseeding) by the end of the ten-year land use planning period. No reclamation is expected on the developed oil field by the end of the land use planning period. Surface disturbance from oil and gas activities would result in 29.2 unreclaimed acres by the end of the land use planning period.

Table 2.4-4: Summary of Total Oil and Gas Exploration and Development Disturbance

Activity	Disturbance (acres)	Reclamation (acres)
Seismic Line	290	290
20 Exploration Wells	40	38
Exploration Access Roads	240	228
Gravel Pit Expansion (Exploration)	2.5	0
Production Wells	18	17.8
Production Access Roads	34	24
Gravel Pit Expansion (Production)	2.5	0
Total	627	597.8

2.5 Cumulative Impacts

For the purposes of this EA, the cumulative impacts are the sum of all past and present actions, the Proposed Action, and reasonably foreseeable future actions (RFFAs) resulting primarily from public uses. The purpose of the cumulative analysis in the EA is to evaluate the significance of the Proposed Action's contributions to cumulative impacts. A cumulative impact is defined under federal regulations as follows:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

As required under the NEPA and the regulations implementing NEPA, cumulative impacts are addressed in Chapter 4, Environmental Consequences, following the impact analysis of each resource. These cumulative effects to the resources within the Cumulative Effects Study Area (CESA) (the Assessment Area) are addressed. Cumulative effects could result from the implementation of the Proposed Action; past actions; present actions; and RFFAs. The extent of the impacts will vary with each resource, based on the geographic or biologic limits of that resource. As a result, the list of described activities considered under the cumulative analysis may vary

according to the resource being considered. In addition, the length of time for cumulative effects analysis will vary according to the duration of impacts from the Proposed Action on the particular resource.

For the purposes of this analysis and under federal regulations, "impacts" and "effects" are assumed to have the same meaning and are interchangeable. The cumulative impacts analysis was accomplished through the following three steps:

- Step 1: Identify, determine, and describe the CESA (Assessment Area);
- Step 2: Define time frames, scenarios, and acreage estimates for cumulative impact analysis; and
- Step 3: Identify and quantify the location of possible specific impacts from the Proposed Action and judge these contributions to the overall impacts.

2.5.1 Introduction

Environmental consequences of the Proposed Action and the No Action Alternative are analyzed in Chapter 4 for the various environmental resources. The cumulative analysis follows each resource analyzed in Chapter 4. The CESA has been determined to be the Assessment Area, which is defined on all of the figures included in this EA.

The cumulative impacts analysis for this EA uses a time frame based on the estimated potential future duration of the impacts from the Proposed Action. Based on the approval of the Proposed Action in early 2007, the time frames over which the cumulative analysis were completed is ten years or through 2017.

2.5.2 Past Actions

Past actions within the Assessment Area include oil and gas exploration, livestock grazing, off-highway vehicle use, mineral exploration, mining, recreation (hunting, mountain biking, geo-caching), geothermal exploration, withdrawal of water for irrigation (agriculture) and mining, gravel pit development and production, communication site construction, road building, powerline construction, wild horse gathers, noxious weed treatment, fire suppression and rehabilitation, greater sage grouse habitat improvement projects, construction of wildlife guzzlers, realty actions, and fence construction.

2.5.3 Present Actions

Present actions include livestock grazing, oil and gas exploration, off-highway vehicle use, mineral exploration, mining, recreation (hunting, mountain biking, geo-caching), geothermal exploration, withdrawal of water for irrigation (agriculture) and mining, gravel pit development and production, communication site construction, road building, powerline construction, wild horse gathers, noxious weed treatment, fire suppression and rehabilitation, greater sage grouse habitat improvement projects, construction of wildlife guzzlers, realty actions, and fence construction.

2.5.4 Reasonably Foreseeable Future Actions

RFFAs would include activities such as oil and gas exploration, oil and gas production, geothermal exploration, geothermal development, wind power construction, livestock grazing, off-highway vehicle use, mineral exploration, mining, recreation (hunting, mountain biking, geo-caching), withdrawal of water for irrigation (agriculture) and mining, gravel pit development and production, communication site construction, road building, powerline construction, wild horse gathers, noxious weed treatment, fire suppression and rehabilitation, greater sage grouse habitat improvement projects, construction of wildlife guzzlers, realty actions, and fence construction.

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3 AFFECTED ENVIRONMENT

3.1 Introduction

This Chapter describes the environment that would be affected by the development of the Proposed Action and No Action Alternative. The baseline information summarized in this chapter was obtained from published and unpublished materials; interviews with local, state and federal agencies; and from field and laboratory studies conducted in the Assessment Area. The affected environment for individual resources was delineated based on the area of potential direct and indirect environmental impacts, as determined by the RFD.

Fifteen critical elements of the human environment are specifically required by statute, regulation, executive order, or state guidelines and must be considered in the analysis of the alternatives of all EAs. These required critical elements, whether they are present and/or potentially affected, are outlined in Table3.1-1. Those critical elements not affected include Environmental Justice, Farmlands (prime or unique), Areas of Critical Environmental Concern, Floodplains, and Wild and Scenic Rivers. The BLM identified 11 additional resources of concern that may be affected by the Proposed Action and No Action Alternative. These resources are also shown on Table 3.1-1 and will be analyzed in the following sections.

Table 3.1-1: Critical Elements of the Human Environment

Critical Element	Present Yes/No	Potentially Affected Yes/No	Other Resources	Present Yes/No	Potentially Affected Yes/No
Air Quality	Yes	Yes	Geology & Minerals	Yes	Yes
Areas of Critical Environmental Concern	No	No	Soils	Yes	Yes
Cultural Resources	Yes	Yes	Vegetation	Yes	Yes
Environmental Justice	No	No	Wild Horses & Burros	Yes	Yes
Farmlands, Prime/Unique	No	No	Wildlife	Yes	Yes
Floodplains	No	No	Range Resources	Yes	Yes
Wastes, Hazardous/Solid	Yes	Yes	Lands & Realty	Yes	Yes
Invasive, Nonnative Species	Yes	Yes	Visual Resources	Yes	Yes
Migratory Birds	Yes	Yes	Recreation	Yes	Yes
Threatened & Endangered Species	Yes	Yes	Auditory Resources	Yes	Yes
Native American Religious Concerns	Yes	Yes	Socioeconomics	Yes	Yes
Water Quality, Surface & Ground	Yes	Yes			
Wetlands/Riparian Zones	Yes	Yes			
Wild & Scenic Rivers	No	No			
Wilderness	Yes	No			

3.2 Air Quality

3.2.1 Air Quality Regulations

Ambient air quality and the emission of air pollutants are regulated under both federal and State of Nevada laws and regulations. The following is a discussion of these requirements.

Federal Clean Air Act

The Federal Clean Air Act (CAA), and the subsequent Federal Clean Air Act Amendments of 1990 (CAAA), require the Environmental Protection Agency (EPA) to identify national ambient air quality standards (NAAQSs) to protect public health and welfare. The CAA and the CAAA established NAAQSs for seven pollutants, known as "criteria" pollutants because the ambient standards set for these pollutants satisfy "criteria" specified in the CAA. A list of the criteria pollutants regulated by the CAA, and their currently applicable NAAQSs set by the EPA for each, are listed in Table 3.2-1.

Table 3.2-1: Federal and State Ambient Air Quality Standards for Criteria Pollutants.

Criteria Pollutant	Averaging Period	Nevada Standards	Federal Standards	
		Concentration[a]	Primary[a]	Secondary[a]
Ozone (O_3)	1-Hour	120 ppbv (235 µg/m^3)	120 ppbv (235 µg/m^3)	Same as Primary Standards
	8-Hour	---	80 ppbv (157 µg/m^3)	
Carbon Monoxide (CO)	8-Hour (<5,000') [b]	9 ppmv (10 mg/m^3)	9 ppmv (10 mg/m^3)	---
	8-Hour (≥5,000') [b]	6 ppmv (6.67 mg/m^3)	9 ppmv (10 mg/m^3)	
	1-Hour [b]	35 ppmv (23 mg/m^3)	35 ppmv (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual	100 µg/m^3 (53 ppbv)	100 µg/m^3 (53 ppbv)	Same as Primary Standards
Sulfur Dioxide (SO_2)	Annual	80 µg/m^3 (30 ppbv)	80 µg/m^3 (30 ppbv)	---
	24-Hour [b]	365 µg/m^3 (140 ppbv)	365 µg/m^3 (140 ppbv)	---
	3-Hour [b]	1,300 µg/m^3 (500 ppbv)	---	1,300 µg/m^3 (500 ppbv)
Particulate Matter ≤ 10 Microns in Aerodynamic Diameter (PM_{10})	24-Hour [b]	150 µg/m^3	150 µg/m^3	Same as Primary Standards
	24-Hour (Based on the 99th Percentile Averaged over Three Years)	---	150 µg/m^3	
	Annual Arithmetic Mean	50 µg/m^3	50 µg/m^3	
Particulate Matter ≤ 2.5 Microns in Aerodynamic Diameter ($PM_{2.5}$)	24-Hour (Based on the 98th Percentile Averaged over Three Years)	---	65 µg/m^3	
	Annual Arithmetic Mean Averaged Over Three Years	---	15 µg/m^3	
Lead (Pb)	Calendar Quarter	1.5 µg/m^3	1.5 µg/m^3	Same as Primary Standards

[a] Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm mercury. Measurements of air quality are corrected to a reference temperature of 25°C and a reference pressure of 760 mm

mercury (1,013.2 millibar); ppmv and ppbv in this table refer to parts per million by volume and parts per billion by volume, respectively, or micro-moles of pollutant per mole of gas. $\mu g/m^3$ ≡ micrograms per cubic meter.

[b] A violation of the federal standard occurs on the second exceedence during a calendar year; a violation of the State of Nevada standard occurs on the first exceedence during a calendar year.

The list of criteria pollutants was amended by the EPA on July 18, 1997 to include two new standards for particulate matter of aerodynamic diameter less than 2.5 micrometers ($PM_{2.5}$), and to revise the standards for PM_{10} and O_3 (see 62 *Federal Register* 38652-38760 [$PM_{2.5}$ and PM_{10}]; 62 *Federal Register* 38856-38896 [O_3]). In April 2005, EPA published a final list of $PM_{2.5}$ nonattainment areas (*70 Federal Register 19844*). Local regulatory agencies were allowed three years to submit an implementation plan for those areas designated as nonattainment of the $PM_{2.5}$ standard (*70 Federal Register 65983-66067*). No areas in Nevada were designated as nonattainment of the $PM_{2.5}$ standard. Currently, EPA is considering revising the particulate standards *(71 Federal Register 2620*).

Pursuant to the CAA, the EPA has developed classifications for distinct geographic regions known as Air Pollution Control Regions (APCRs). In Nevada, the APCRs are largely coincident with hydrographic basins. Under these classifications, for each federal criteria pollutant, an area (an APCR or portion there of) is classified as in "attainment," if the area has "attained" compliance with (that is, not exceeded) the adopted NAAQS for that pollutant, is classified as "non-attainment" if the levels of ambient air pollution exceed the NAAQS for that pollutant, or is classified as “maintenance” if the monitored pollutants have fallen from non-attainment levels to attainment levels. Areas for which sufficient ambient monitoring data are not available are designated as "unclassified" for those particular pollutants and assumed to be in attainment.

In addition to the designations relative to attainment of conformance with the NAAQS, the CAA requires the EPA to place selected areas within the United States into one of three classes, which are designed to limit the deterioration of air quality when it is “better than” the NAAQS. “Class I” is the most restrictive air quality category, and was created by Congress to prevent further deterioration of air quality in National Parks and Wilderness Areas of a given size, which were in existence prior to 1977, or those additional areas that have since been designated Class I under federal regulations (40 CFR 52.21). All remaining areas outside of the designated Class I boundaries were designated Class II areas, which allow a relatively greater deterioration of air quality, although still below NAAQSs. No Class III areas, which allow for the degradation of air quality below NAAQS, have been designated.

3.2.2 Climate and Meteorology

The Assessment Area is a high-desert environment characterized by arid-to-semiarid conditions, with bright sunshine, low annual precipitation, and large daily ranges in temperatures. The climate is controlled primarily by the rugged and varied topography to the west, in particular, the Sierra Nevada Range. Prevailing westerly winds move warm, moist Pacific air over the western slopes of the Sierra Nevada Range where the air cools, condensation takes place, and most of the moisture falls as precipitation. As the air descends the eastern slope, compressional warming takes place resulting in minimal rainfall. Annual average precipitation in Eureka is 12.09 inches per year (BLM 1997). Average annual precipitation in Austin is 14.33 inches per year (Lander County Website 2002).

Due to the high elevation and proximity of the mountains, there is a wide temperature range, with cool nights predominating even in the summer months. Data from the Eureka meteorological monitoring station indicate that the annual temperature averaged 46.4 degrees Fahrenheit (°F), with average temperatures ranging from 85.6°F in July to 17.2°F in January. The average relative humidity ranges from a low of 17 percent in the summer during the day to a high of 77 percent in the spring during the night (BLM 1997). Data from the Austin meteorological monitoring station indicate that the average annual temperature is 47°F, with temperatures ranging from 85°F in July to 19°F in January (Lander County Website 2002). Approximately 35 miles southeast of Battle Mountain, Cortez Gold Mines monitors meteorological data at the Cortez Station. Based on meteorological monitoring data collected from the Cortez Station over the period 1997 through 2001, the average temperature was 52.8°F, with temperatures ranging from 104°F to minus 8°F. Annual precipitation ranged from 6.34 to 10.84 inches (BLM 2006).

Atmospheric dispersion is influenced by several parameters, including wind speed, temperature inversions (mixing heights), and atmospheric stability. Prevailing winds at the Ruby Hill Mine, located approximately one mile northwest of Eureka, based on 1994-1995 meteorological data, were from the south with average annual wind speeds at 5.5 miles per hour (mph). These wind speeds tend to promote mixing, and generally transport locally generated air emissions away from the area. Inversions restrict vertical movement of the air in the lower atmosphere, thereby preventing atmospheric pollutants from mixing with the air above the inversion layer. Lower mixing heights can be expected to produce high pollutant concentrations since the volume of air with which the pollutants can mix is limited.

As is typical of "cold night/hot day" weather patterns, mixing heights can be quite high in the afternoon. Conversely, mixing heights can be quite low at night and early morning due to night time cooling. Mixing heights in the Assessment Area are estimated at 250 feet (annual average) in the morning and approximately 2,400 feet (annual average) in the late afternoon.

Another factor that can be used to assess the ability of the atmosphere to disperse pollutants is atmospheric stability. Atmospheric stability is expressed in terms of Pasquill-Gifford categories ranging from Class A (very unstable) to Class F (very stable), and is a measure of the degree of atmospheric turbulence, which results in different levels of atmospheric mixing and resulting in dispersion of pollutants. The greater the instability, the greater the tendency to disperse. Meteorological data from the Cortez Station indicate that good dispersion conditions (Classes A-D) occurred 70 percent of the time during the year 1997, and are representative of on-site conditions.

Nevada State Air Quality Program

The Bureau of Air Pollution Control (BAPC) is the agency in the State of Nevada that has been delegated the responsibility for implementing the CAAA (excluding Washoe and Clark Counties, which have their own state implementation plan). This includes the State of Nevada air quality permit programs (NAC 445B.001 through 445B.3689, inclusive) and the Nevada State Ambient Air Quality Standards (NSAAQSs). The NSAAQSs are generally identical to the NAAQSs, with the exception of the following: (a) an additional standard for carbon monoxide (CO) in areas with an elevation in excess of 5,000 feet above sea level; (b) the recently promulgated NAAQSs for $PM_{2.5}$ (Nevada has yet to adopt the new standards); (c) the revised NAAQS for particulate matter of

aerodynamic diameter less than ten microns (PM_{10}); (d) ozone (O_3) (Nevada has yet to adopt the new and revised standards); and (e) a violation of a state standard occurs with the first annual exceedance of an ambient standard, while federal standards are generally not violated until the second annual exceedance. In addition to establishing the NSAAQSs, the BAPC is responsible for permit and enforcement activities throughout the State of Nevada.

3.2.3 Air Quality

Air quality in the Assessment Area is governed by pollutant emissions and meteorological conditions. As discussed above, wind speeds, mixing heights, and stability all affect the circulation and dilution of emissions in the area.

The Assessment Area is located within the Clovers Area (Basin No. 64), Boulder Flat (Basin No. 61), Lower Reese River Valley (Basin No. 59), Whirlwind Valley (Basin No. 60), Pine Valley (Basin No. 53), Huntington Valley (Basin No. 47), Crescent Valley (Basin No. 54), Carico Lake Valley (Basin No. 55), Middle Reese River Valley (Basin No. 58), Diamond Valley (Basin No. 153), Grass Valley (Basin No. 138), Upper Reese River Valley (Basin No. 56), Newark Valley (Basin No. 154), Kobeh Valley (Basin No. 139), Big Smoky Valley (Basin No. 137B), Stevens Basin (Basin No. 152), Antelope Valley (Basin No. 151), Little Smoky Valley (Basin No. 155A), Monitor Valley (Basin No. 140A), Little Fish Lake Valley (Basin No. 150), Monitor Valley (Basin No. 140B), and Hot Creek (Basin No. 156) Air Basins, which are currently unclassified for all pollutants having an air quality standard (40 CFR 81.329).

Current emissions within the Assessment Area include vehicle combustion emissions, fugitive dust from travel on unimproved roads and agricultural cultivation, industrial and commercial activities, and wildland fires. Emissions of all pollutants are generally expected to be low due to the limited number of sources in the Assessment Area.

3.3 Cultural Resources

Central Nevada, including the Assessment Area, has been occupied by humans for at least 11,000 years. The first inhabitants occupied the area when many of the Pleistocene pluvial lakes still contained water; therefore, sites of this period are frequently found on the lower pluvial lake beach terraces. As the lakes dried up, subsistence became increasingly focused on other resources not related to those found in a lake or marsh environment. By the end of the prehistoric period, most central Great Basin groups centered much of their subsistence on the piñon pine. Prehistoric cultural sites can be found throughout the Assessment Area.

The Assessment Area was inhabited by bands of the Western Shoshone at the time of Euroamerican contact. For the most part, Western Shoshone lived in family bands during much of the year, spreading out to hunt and gather seasonal plant resources. Larger groups would cluster together in winter camps near caches of piñon nuts in years of a good harvest. However, this traditional life style was quickly disrupted by the influx of Euroamericans starting in the 1840s.

Euroamerican explorers were entering the area as early as 1829 (Peter Skene Ogden) and Joseph Walker (1833). These two explorers determined that the Humboldt River route was the most direct

to California. The Bidwell Bartelson party crossed in 1841(Bowers, Martha H. and Hans Muessig 1982). After the discovery of gold in California in 1848, numerous emigrants followed what would become known as the California Trail. During this migration, domestic livestock decimated traditional food plants along the trail and following the discovery of silver at Austin in 1862 more Euroamerican miners' and settlers' with livestock settled in Nevada, resulting in increased impacts to the native vegetation and the livelihood of the Western Shoshone. In addition, piñon pine trees were cut for the manufacture of charcoal, fire wood and other uses.

The first government expedition into the region was led by John C. Fremont in 1848. This military reconnaissance team traversed the Assessment Area through Diamond Valley, Kobeh Valley and Big Smoky Valley. In 1859 James Simpson explored a route that later became the Pony Express Trail and then the Overland Stage Route (Bowers, Martha H. and Hans Muessig 1982 p. 19). These routes cross Diamond, Kobeh, Big Smoky, Reese River and Smith Creek Valleys.

There have been a total of 4,781 archaeological sites recorded within the entire Assessment Area. Of these, 2,922 are prehistoric, 1,495 are historic and 364 contain both prehistoric and historic components. Table 3.3-1 summarizes these data by hydrographic basin.

Table 3.3-1: Archaeological Sites Recorded in the Assessment Area by Hydrographic Basin

Hydrographic Basin	Prehistoric Sites			Historic Sites			Prehistoric & Historic			Total Sites
	Eligible	Not Eligible	Unevaluated	Eligible	Not Eligible	Unevaluated	Eligible	Not Eligible	Unevaluated	
Antelope Valley (La)	3	34	130	0	13	20	1	2	20	223
Antelope Valley (Eu/Ny)	3	27	13	1	17	18	1	3	1	84
Big Smokey Valley - N	7	30	30	2	10	2	1	0	1	83
Buffalo Valley	24	35	40	8	21	11	0	1	3	143
Carico Lake Valley	4	18	24	1	4	2	0	1	0	54
Clovers Area	1	1	0	0	0	0	0	0	0	2
Crescent Valley	29	109	23	34	147	30	10	6	7	395
Diamond Valley	46	172	93	43	156	92	33	47	13	695
Grass Valley	21	108	198	39	78	39	7	10	18	518
Jersey Valley	0	5	20	1	0	2	0	1	2	31
Kobeh Valley	42	140	59	90	43	24	22	8	4	432
Little Fish Lake Valley	2	21	2	3	20	2	2	1	2	55
Little Smoky Valley - N	25	34	34	30	16	45	18	6	2	210
Monitor Valley - N	11	36	23	0	5	6	0	3	0	84
Monitor Valley - S	1	0	8	0	0	5	0	0	0	14
Pine Valley	37	90	76	19	29	46	11	7	6	321
Lower Reese River Valley	37	186	63	36	94	37	10	12	11	486
Middle Reese River Valley	5	24	45	1	5	4	1	2	3	90

Hydrographic Basin	Prehistoric Sites			Historic Sites			Prehistoric & Historic			Total Sites
	Eligible	Not Eligible	Unevaluated	Eligible	Not Eligible	Unevaluated	Eligible	Not Eligible	Unevaluated	
Upper Reese River Valley	13	114	80	12	83	31	6	9	6	354
Smith Creek Valley	9	65	25	3	6	5	8	2	1	124
Stephens Basin	0	0	3	0	1	1	0	0	0	5
Whirlwind Valley	75	240	49	0	2	0	5	3	4	378
Totals	**395**	**1,489**	**1,038**	**323**	**750**	**422**	**136**	**124**	**104**	**4,781**

* Sites recorded over ten years ago may require re-evaluation of eligibility for the National Register based on appropriate criteria (a through d).

The following discussion is based on data from the entire SEPA because of the difficulty of breaking out survey data for the Assessment Area. Approximately 6.15 percent of the SEPA has been surveyed (Table 3.3-2) yielding an estimate of approximately one site per 54 acres. However, these sites would not be evenly distributed; some ecological zones are more productive than others and contain more sites than less productive areas. Water also plays a crucial role in site distribution; most substantial prehistoric sites would be found within one half to one mile of water. Mining-related historic sites are determined by the presence of economic minerals; ranching/farming sites are more dependent upon surface water, but because of well drilling technology, may also be located throughout the area.

Table 3.3-2: Archaeological Sites Recorded in the Shoshone-Eureka Planning Area

Acres Public Land in the Planning Area	4,365,816
Acres Surveyed	268,703.9
Percent Surveyed	6.15%
Acres/Site	54.2

Sixty-seven percent of the recorded sites have undergone formal National Register of Historic Places eligibility evaluations. Thirty-three percent remain unevaluated as shown in Table 3.3-3.

Table 3.3-3: Evaluation of Sites in the Shoshone-Eureka Planning Area

	Number	Percent
Eligible Sites	866	17
Not Eligible Sites	2,464	50
Unevaluated Sites	1,629	33

Using the data from tables 3.3-1 through 3.3-3, there are an estimated 80,572 sites in the SEPA. Of these 26 percent, or 20,949, would be National Register eligible and 74 percent, or 59,623, would be not eligible as shown on Table 3.3-4.

Table 3.3-4: Estimated Archaeological Sites in the Shoshone-Eureka Planning Area

Total Estimated Sites		Estimated Percent
Total # Sites	80,572	
Total Eligible	20,949	26
Total Not Eligible	59,623	74

3.4 Native American Religious Concerns

Oil and gas leasing is authorized under the Mineral Leasing Act of 1920 (as amended and modified by subsequent legislation) and 43CFR3100. Oil and gas leasing and development is recognized as an acceptable use of lands administered by the BLM under the FLPMA. However, in accordance with the National Historic Preservation Act (P.L. 89-665), the NEPA (P.L. 91-190), the FLPMA (P. L.94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L. 101-601) and Executive Order 13007, the BLM must also provide affected Tribes an opportunity to comment and consult on the Proposed Action. The BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional, cultural, or spiritual sites, activities, and resources.

Traditional territory of the Western Shoshone, located within the BLM BMFO administrative boundary (and specifically in the Assessment Area), contains spiritual, traditional, cultural resources, sites, and social practices that aid in maintaining and strengthening social, cultural, and spiritual integrity. Known recognized Tribes with interests within the BLM Battle Mountain Field Office administrative boundary include the Te-Moak Tribe of Western Shoshone (Elko, South Fork, Wells, and Battle Mountain Bands), Duck Valley Sho-Pai Tribes of Idaho and Nevada, Duckwater Shoshone Tribe, Ely Shoshone Tribe, Yomba Shoshone, Ibapah Goshute of Utah and Nevada, Timbisha Shoshone Tribe, Fallon Paiute-Shoshone Tribe, Winnemucca Colony, and various other community members and individuals. The original consultation, initiation, notification letter for the Proposed Action was mailed from the BMFO on March 27, 2006. On July 10, 2006 an additional letter was mailed, which addressed modifications to the original proposal. This series of mailings along with other communications/coordination measures produced the scheduling of an August 26, 2006 meeting at the Austin Town hall in Austin, Nevada between the BLM, Yomba, Duckwater, and Battle Mountain Bands. Yomba was the sole participant at this meeting. To date, the BLM and the active participating tribes (Yomba, Duckwater, and Battle Mountain Bands) are attempting to conduct field visits to areas of concern within the Assessment Area.

Although there is some debate associated with contemporary Western Shoshone claims that they have lived in the SEPA (a part of the Great Basin) since "time immemorial", linguistic and archaeological data, and other theories indicate that the Western Shoshone (Newe) began to inhabit the Great Basin anywhere from approximately 6,000 to 600 years ago. Social activities that defined the culture took place throughout the Great Basin. Pine nut gathering, edible and medical plant gathering, hunting and fishing, spiritual or ceremonial practices, and trade occurred as the Native Americans practiced a hunting and gathering lifestyle. As with the delicate and sensitive nature of the fragile resources of the Great Basin, the native cultures appeared to be heavily impacted by social, cultural, and environmental change, which rapidly accompanied the nonnative migration

from east to west. Confined to reservations and encouraged to participate in a more sedentary lifestyle (farming and cattle ranching), the Western Shoshone and other Great Basin Tribes continued to practice certain cultural, spiritual, or traditional activities, visited their sacred sites, and hunted and gathered the available game, medicinal, and edible plants. Through oral history and the practice of handing down knowledge from the elders to the younger generations, many Western Shoshone continue to maintain a world view not unlike that of their ancestors.

These sites of importance include, but are not limited to: Existing antelope traps; certain mountain tops used for prayer, healing, and enlightenment; medicinal and edible plant gathering locations; prehistoric and historic village sites, and gravesites; sites associated with creation stories; hot and cold springs; material used for basketry and cradle board making; locations of stone tools such as points and grinding stones (mano and matate); chert and obsidian quarries; hunting sites; sweat lodge locations; locations of pine nut ceremonies, traditional gathering, and camping; rocks used for offerings and medicine gathering; tribal-identified Traditional Cultural Properties (TCPs); TCPs found eligible to the National Register of Historic Places; rock shelters; "rock art" locations; lands that are near, within, or bordering current reservation boundaries; lands that conflict with tribal land acquisition efforts that involve the Nevada Congressional Delegation; water sources in general that appear to be considered the "life blood of the Earth and all who dwell upon it."

The majority of lands within the Battle Mountain BLM administrative boundary, including the Assessment Area of the SEPA, identified as having potential for oil and gas leasing, exploration, or development, have not been analyzed for cultural resources or Native American Religious Concerns. Therefore, the BLM contacted the Ely Shoshone Tribe, Yomba Shoshone Tribe (located in Austin), Timbisha Shoshone Tribe (located in Bishop) Duckwater Shoshone Tribe, Te-Moak Tribe of Western Shoshone, the Battle Mountain Band, the Wells Band, The Elko Band, and the South Fork Band to identify areas of concern, mitigation measures, operating procedures or alternatives that may eliminate or reduce impacts to any existing tribal resources. These detailed efforts of communication (fax, phone, email, and meeting notes) are considered confidential and are on file at the BLM BMFO.

3.5 Wastes, Hazardous and Solid

Laws, Acts, and authorities pertaining to oil and gas wastes include the following: Clean Air Act, Federal Water Pollution Control Act, U.S. Bureau of Alcohol, Tobacco and Firearms (ATF), Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Emergency Planning and Community Right-To-Know Act (EPCRA), and the NAC.

Oil and gas development, which can include exploration drilling, extraction, production facilities, pipeline transport and tanker loading and unloading, affect the environment through production of waste fluids, emissions, and site impacts resulting from field development and related infrastructure. Hazards that may be encountered include the following: oil spills, produced waters, drill cuttings and fluids, hydrogen sulfide (H_2S), explosives, and hazardous materials.

Oil Spills

Oil-based waste disposal is inherent to oil production operations and may pose manageable risks to the environment. Storage tank bottoms, incidental spills, and oil transport operations result in onsite waste oil accumulation and spills onto well pad soils and roads. Waste oil and oil spills contained onsite are generally less than five barrels and occur over long periods of time. The procedure for the remediation of spills and waste oil involves coordination with many agencies. Cleanup following an emergency release/spill is usually performed by the operator or a response contractor. The cleanup standard at this stage is usually established by state or federal regulatory agencies. The current BLM threshold for reporting oil and gas related spills is 100 Barrels. For the State of Nevada The reportable quantity for petroleum products such as gasoline, diesel, and hydraulic fluid is 25 gallons or three cubic yards of contaminated material, or the presence on or in ground water.

Produced Water

The discharges of produced waters would be in greater abundance than all other wastes created from oil and gas exploration and development. Produced waters include formation water, brine, and injection water. Formation water and brine are extracted along with oil and gas. Injection water may be pumped into injection wells at high pressure for maintaining the pressure in the system and pushing the hydrocarbons toward the producing wells. Produced waters may include dissolved salts and organic compounds, oil hydrocarbons, trace metals, suspensions, and many other substances that are components of formation water from the reservoir or are used during drilling and other production operations.

Drill Cuttings and Fluids

The volume of drilling wastes usually ranges from 1,000 to 5,000 cubic meters (m^3) for each well. Drill cuttings are usually separated from drilling mud and have a complex composition. This composition depends on the type of rock, drilling regime, formulation of the drilling fluid, technology to separate and clean cuttings, and other factors. At present, two main types of drilling fluids are used in drilling operations; those with a hydrocarbon base utilizing either crude oil, oil products, and other mixtures of organic substances (diesel, paraffin oils, and so on) or on water mixed with bentonite, barite, and other components. Preference is given to those using the less-toxic water-based drilling fluids. The discharges of spent drilling mud and cuttings coated by these muds contain considerable amounts of relatively stable and toxic hydrocarbon compounds and a wide spectrum of many other substances. Disposal of drill hole cuttings is usually accomplished by burial onsite in lined pits. The reportable quantity for hazardous waste is based on the Federal EPA guidelines established under Title III List of Lists (40 C.F.R. Part 302). Recycling or reclamation of waste materials is encouraged where possible.

Hydrogen Sulfide

Crude oil with associated gas containing more than 30 milligrams per cubic meter (mg/M^3) of hydrogen sulfide are normally classified as "Sour Crude." Many activities in oil or gas fields have the potential of exposing employees to H_2S. The risk of exposure is related directly to the proximity of the employees to the oil and gas operation. All employees who would be working on the site of oil and gas wells, facilities, pipelines, or enclosed structures known or suspected of containing H_2S may be required to carry H_2S monitoring devices and protective breathing apparatus. Based on past oil and gas production in Nevada, there has been little H_2S generation.

Explosives

The use of explosives and explosive devises is fundamental to hydrocarbon exploration and production. Shot hole prospecting is accomplished by drilling small diameter holes to depths of 80 to 200 feet with four to twelve holes drilled per mile of line. Usually a 20 pound charge of explosive is placed in the hole covered and then detonated simultaneously to generate a seismic shock wave which is then collected with geophones and later analyzed. Other procedures utilizing explosives in producing wells include well perforation, which is used to establish communication between the bore hole and hydrocarbon reservoir. Typically a shaped charge is detonated in the well at production depth causing the surrounding formation to fracture thereby increasing flow through the resulting cracks.

Hazardous Materials

Hazardous chemicals associated with oil and gas exploration and production may include solvents, additives and other substances. Acidizing is a technique that pumps a form of hydrochloric acid down the well hole to enlarge the pore space in oil bearing rocks in order to increase oil flow and recovery. Scale inhibitors are used in production wells to stop scaling in the rock formation and/or in the production lines down hole and at the surface. Regulations for the reporting of the release of hazardous materials are defined in 40 CFR, part 117. Regulations for developing spill prevention, control and countermeasure plans are found in 40 CFR, part 112. These plans would include accidental discharge reporting procedures, spill responses and cleanup procedures. Materials safety data sheets (MSDS) must also be provided onsite for all chemicals.

3.6 Invasive, Nonnative Species

Forty-seven species of invasive plants and noxious weeds are known to occur or are threatening to invade public, state, and private land in the Assessment Area. Additionally, two species of crickets and nine species of grasshoppers are known to occur on public, state, and private land within the Assessment Area. Of these species, 25 species of invasive plants and noxious weeds and two species of crickets and grasshoppers of known concern exist in the Assessment Area. Inventory, treatment/re-treatment, and evaluation/monitoring for all 27 species of invasive plants, noxious weeds, and pests are completed, ongoing, or have been scheduled for the near future. These species include Russian knapweed (*Acroptilon repens*), perennial pepperweed (*Lepidium latifolium*), hoary cress (*Cardaria draba*), musk thistle (*Carduus nutans*), Scotch thistle *(Onopordum acanthium*), Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), puncturevine (*Tribulus terrestris*), saltcedar (*Tamarix ramosissima*), juniper (*Juniperus* spp.), larkspur (*Delphinium* spp.), cheatgrass (*Bromus tectorum*), poison hemlock (*Conium maculatum*), halogeton (*Halogeton glomeratus*), common cocklebur (*Xanthium strumarium*), Russian thistle *(Solsola iberica*), locoweed (*Oxytropis sericea*), broom snakeweed (*Gutierrezia sarothrae*), Russian olive (*Elaeagnus angustifolia*), curly dock (r*umex crispus*), black henbane (*Hyoscyamus niger*), dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*), squarrose knapweed (*Centaurea virgata* var. *squarrosa*), tree of heaven (*Ailanthus altissima*), poverty weed (*Iva axillaris*), Mormon crickets (*Anabrus simplex*), and clear-winged grasshoppers (*Camnula pellucida*). Additional species are listed in Appendix D.

The spread and increase of invasive plants, noxious weeds, and pests in the Assessment Area are contributing factors in the decrease in the quantity and/or quality of many of the other renewable resources in the affected environment. Air quality is affected by an increase in pollen which is a

primary mechanism for invasive plant and noxious weed fertilization. Riparian and wetland zones are affected by the spread and increase of invasive plants and noxious weeds due to their highly competitive nature and due to the often extreme predation of riparian and wetland vegetation by pests. Soils are exposed to erosion as plant communities are lost to pests or converted to the less protective cover of typically shallow rooted and unstable invasive plants and noxious weeds. Rangeland grazing potential is reduced as less palatable invasive plants and noxious weeds increase and pests reduce the available forage through predation. Wildlife lose condition, forage, cover, and habitat as invasive plants, noxious weeds, and pests spread and increase. The protection of threatened and endangered as well as special status plant and animal species and their habitat becomes increasingly more difficult as invasive plants, noxious weeds, and pests spread and increase. Natural and productive vegetation in the form of interactive and interdependent plant communities is lost or converted to less desirable species or communities as invasive plants, noxious weeds, and pests spread and increase.

3.7 Wildlife

The SEPA, which includes the Assessment Area, provides habitat for a wide variety of birds, mammals, reptiles, amphibians, and fish species. There are approximately 230 vertebrate wildlife species identified as occurring in the SEPA (71 mammals, 120 birds, six amphibians, 23 reptiles, ten fish species) See Appendix F for a listing of vertebrate species. Most of these species inhabit the Assessment Area.

Many of the invertebrates located in the Planning Area have yet to be inventoried or identified to species. Some species may be indigenous to very small unique or isolated habitats, for example springsnail species, where the total population for that species may exist in only one spring.

3.7.1 Migratory Birds

Migratory bird means any bird listed in 50 CFR 10.13. All native birds found commonly in the United States, with the exception of native resident game birds, are protected under the Migratory Bird Treaty Act (MBTA). A variety of migratory birds use the habitat types within the Assessment Area for breeding and foraging. Migratory bird species utilize almost all of the Assessment Area during some time of the year. Very common shrub nesting species include the sage thrasher, sage sparrow, Brewer's sparrow, horned lark, and meadowlark. The loggerhead shrike, common nighthawk, various wrens, warblers, larks, and swallows are all common. See Appendix E for a complete list of migratory birds.

Many migratory birds 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). Riparian under-story, mid-story, and canopy cover are requisite for a diverse migratory bird community. Woody components of the riparian systems, such as willows, aspen, and cottonwoods are important habitat features. As with most areas of Great Basin, the Assessment Area has very limited riparian habitat, which makes this scarce habitat type extremely valuable.

3.7.2 Threatened, Endangered, and Special Status Species

Special status species are those species for which state or federal agencies afford additional level of protection by law, regulation, or policy. Included in this category are species which are protected by the Endangered Species Act of 1973, as amended (ESA) or by Nevada Revised Statute (NRS) 527.270-.300, species of concern as identified by the U.S. Fish and Wildlife Service (USFWS), and species designated as state sensitive species designated by the BLM. In addition, the BLM has incorporated, in part, a Nevada State Protected Animal List (NAC 501.100 - 503.104) into the BLM sensitive species list.

As defined by the ESA of 1973, an endangered species is any species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Proposed species are those that are proposed in the Federal Register by the USFWS to be listed as threatened or endangered.

Species of concern are taxa for which existing information indicates that listing may be warranted, but for which substantial biological information to support a proposed rule is lacking. Species of concern are not specifically afforded the same protection under the ESA as threatened or endangered species, but federal agencies are required to afford them consideration in their planning and decision making processes. The BLM maintains a list of plant and animal species that are designated as sensitive for which population viability is a concern, as warranted by a downward trend in population numbers, density, or habitat conditions that would reduce a species' existing distribution. BLM policy requires that actions authorized, funded, or carried out by the agency do not contribute to the listing of any sensitive species as threatened or endangered under the ESA.

A lease or exploration area may currently or in the future contain threatened, endangered, or proposed plants or animal species. The BLM is required by the ESA to ensure that no action on public lands jeopardizes a threatened, endangered, or proposed species. Threatened, endangered, proposed, and candidate species of the Assessment Area are listed in Table 3.8-1. Two federally listed species, the threatened bald eagle and threatened Lahontan Cutthroat trout (LCT), occur in the Assessment Area. In addition, the spotted frog, a federal candidate species, inhabits the upper Reese River drainage, and yellow-billed cuckoo, a federal candidate species, has been sighted very infrequently in Eureka County.

Bald Eagle

Although bald eagles (*Haliaeetus leucocephalus*) do not commonly nest in Nevada, low densities of bald eagles winter in, and migrate through, the state during November through March (Herron et al. 1985). Twenty-six bald eagles were sighted, for example, in Eureka, Lander, Elko, and White Pine Counties during a recent National Triennial Mid-Winter Bald Eagle Count and Wintering Birds of Prey Survey (Bradley 2004).

Bald eagles roost opportunistically in the cottonwood trees that are common on ranches and at water sources throughout the west. The birds are also known to roost in piñon and juniper trees, though communal roosts are most commonly found in limber pine at high elevations. Bald eagles scavenge

and hunt black-tailed jackrabbits over widespread areas and are especially attracted to carrion in the form of road-killed wildlife and dead livestock.

Lahontan Cutthroat Trout

The LCT is one of 14 recognized subspecies of cutthroat trout in the western United States. Cutthroat trout have the most extensive range of any inland trout species of western North America. Subspeciation of cutthroat trout occurred during the gradual desiccation of the Great Basin and Intermountain Region since the end of the Pleistocene. LCT historically occurred in most of the cold waters of the physiographic Lahontan basin of northern Nevada, eastern California, and southern Oregon, including the Truckee, Carson, Walker, Humboldt, and Quinn River drainages. LCT have limited distribution in the Assessment Area. Currently, within the Assessment Area, LCT inhabit two streams in the Roberts Mountains and several tributaries of the upper Reese River.

Table 3.7-1: Threatened, Endangered, Proposed, and Candidate Species in the Assessment Area

Species	Scientific Name	Present	Status
Mammals		No	
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Yes	Threatened
Yellow-billed cuckoo	*Coccyzus americanus*	Yes	Candidate
Fish			
Lahontan Cutthroat Trout	*Oncorhynchus clarki henshawi*	Yes	Threatened
Reptiles		No	
Amphibians			
Columbia Spotted Frog	*Rana luteiventris*	Yes	Candidate
Invertebrates		No	
Plants		No	

3.7.3 Special Status Species

Special status species that are known or thought to occur in the Assessment Area and potentially in the Assessment Area are listed in Table 3.7-2. Special status species that are relatively common in the Assessment Area are discussed below.

Golden Eagle

The golden eagle is Nevada's largest resident bird of prey and can weigh over twelve pounds and have a wingspan that may exceed seven feet. This bird is highly adaptable, has world-wide distribution, and is a common year-long resident of the Assessment Area. Golden eagles feed primarily on small mammals such as jackrabbits, cottontails, and ground squirrels, although they are capable of taking larger prey.

Ferruginous Hawk

The ferruginous hawk is a nesting-summer resident of the Assessment Area. A number of nests have been recorded over the years. Juniper trees are the preferred nesting sites of the ferruginous hawk, and nests are often constructed in juniper "stringers" which overlook large open areas on alluvial fans. Prey consists primarily of ground squirrels in the spring and early summer and jackrabbits in late summer and fall. Ferruginous hawks are more sensitive to nest disturbance than most raptors. The Assessment Area standard procedure is to avoid active ferruginous nest sites, which are easily detected, by one half mile, until the young are fledged.

Western Burrowing Owl

Lower elevations of the Assessment Area provide nesting and hunting habitat for this relatively common species. Preferred nesting habitat for burrowing owls are areas previously dominated by dense stands of big sagebrush that have been burned and converted to grass species, with a few sagebrush trunks remaining for perches. Nesting normally takes place in abandoned badger or squirrel burrows. Prey consists of rodents and insects, primarily beetles, during the breeding season.

Table 3.7-2: Special Status Species in the Assessment Area

Common Name	Scientific Name
Mammals	
Pallid Bat	*Antrozous pallidus*
Pygmy Rabbit	*Brachylagus idahoensis*
Townsend's Big-eared Bat	*Corynorhinus townsendii*
Big Brown Bat	*Eptesicus fuscus*
Silver-haired Bat	*Lasionycteris noctivagans*
Small-footed Myotis	*Myotis ciliolabrum*
Long-eared Myotis	*Myotis evotis*
Fringed Myotis	*Myotis thysanodes*
Long-legged Myotis	*Myotis volans*
Desert Bighorn Sheep	*Ovis canadensis nelsoni*
Western Pipistrelle	*Pipistrellus hesperus*
Birds	
Northern Goshawk	*Accipiter gentilis*
Golden Eagle	*Aquila chrysaetos*
Short-eared Owl	*Asio flammeus*
Long-eared Owl	*Asio otus*
Burrowing Owl	*Athene cunicularia*
Juniper Titmouse	*Baeolophus griseus*
Ferruginous Hawk	*Buteo regalis*
Swainson's Hawk	*Buteo swainsoni*
Greater Sage Grouse	*Centrocercus urophasianus*

Common Name	Scientific Name
Snowy Plover	*Charadrius alexandrinus*
Prairie Falcon	*Falco mexicanus*
Piñon Jay	*Gymnorhinus cyanocephalus*
Yellow-breasted Chat	*Icteria virens*
Least Bittern	*Ixobrychus exilis*
Loggerhead Shrike	*Lanius ludovicianus*
Black Rosy-Finch	*Leucosticte atrata*
Lewis's Woodpecker	*Melanerpes lewis*
Long-billed Curlew	*Numenius americanus*
Mountain Quail	*Oreortyx pictus*
Flammulated Owl	*Otus flammeolus*
Vesper Sparrow	*Pooecetes gramineus*
Red-naped Sapsucker	*Sphyrapicus nuchalis*
Crissal Thrasher	*Toxostoma crissale*
LeConte's Thrasher	*Toxostoma lecontei*
Lucy's Warbler	*Vermivora luciae*
Gray Vireo	*Vireo vicinior*
Amphibians (none)	
Fish	
Fish Creek Springs Tui Chub	*Gila bicolor euchila*
Big Smoky Valley Tui Chub	*Gila bicolor* ssp. 8
Big Smoky Valley Speckled Dace	*Rhinichthys osculus lariversi*
Snails	
Elongate Cain Spring Pyrg	*Pyrgulopsis augusta*e
Large-gland Carico Pyrg	*Pyrgulopsis basiglans*
Ovate Cain Spring Pyrg	*Pyrgulopsis pictilis*
Butterflies	
Big Smokey Wood Nymph	*Cercyonis oetus alkalorum*
Plants	
Elko Rockcress	*Arabis falcifructa*
Eastwood Milkweed	*Asclepias eastwoodiana*
Nevada Willowherb	*Epilobium nevadense*
Windloving Buckwheat	*Eriogonum anemophilum*
Ligulate Feverfew	*Parthenium ligulatum*
Tiehm Beardtongue	*Penstemon tiehmii*

Burrowing owls are not particularly sensitive to human activity; however, any active burrowing owl nest should be avoided.

Sage Grouse

Sage grouse inhabit most of the Assessment Area, utilizing various, sometimes widely separated, habitats seasonally for breeding, nesting, brood-rearing, and wintering. Sage grouse are a concern across the West. Sage grouse populations in 11 of 13 states and provinces experienced significant long-term declines between 1965 and 2003 (Connelly et. al. 2004). The list of suspected causes in sage grouse population decline is a long one and includes drought, wildland fires, spread of annual weeds, proliferation of roads, fences, housing developments and powerlines, mining and mineral exploration, overgrazing, predation, over-harvesting, suburban sprawl, and off-highway vehicle use. Sage grouse have been the focus of western conservation planning in recent years and remain a management and conservation priority in the Assessment Area.

Pygmy Rabbit

Pygmy rabbits are North America's smallest rabbits, and the only rabbits that commonly construct their own burrows, usually in stands of tall, dense sagebrush in locations with deep, loose soils. Pygmy rabbits are distributed patchily throughout most of the Great Basin. Though locally common, these animals have apparently never been generally abundant during historical times, and may have undergone serious population declines, habitat and population fragmentation, and local extinction in recent decades. Pygmy rabbits are sagebrush obligates and their decline is probably closely related to loss and degradation of sagebrush habitats.

3.8 Hydrology and Water Quality

The Assessment Area is located within the Great Basin section of the Basin and Range physiographic province. Physiographic features are typical of the Basin and Range province. Generally north-trending mountain ranges bound intervening basins partly filled with deposits eroded from adjacent mountain ranges. The mountain ranges are typically five to 15 miles wide and commonly closed valleys are slightly wider at ten to 20 miles (Plume 1996). Surface water originates in the mountains and typically flows along drainages to playa lakes in the valley floor or contributes to the ground water system through infiltration. Streams and playa lakes are typically ephemeral.

Water resources in the Assessment Area are typically managed in units defined by the hydrographic basin. The hydrographic basin is the basic management unit used by the Nevada Division of Water Resources. Generally, a hydrographic basin is defined by the topographic divide, or ridgeline that separates adjacent basins. Most basins in the Basin and Range physiographic province are closed; surface waters in the basin originate in adjacent mountains and terminate in the valleys. Some basins contribute to a larger drainage area but all hydrographic basins within the Great Basin are closed. Table 3.8-1 lists and Figure 3.8.1 shows the hydrographic basins that comprise the Assessment Area.

3.8.1 Surface Water

Precipitation within the Assessment Area is topographically controlled and elevation dependent. Precipitation within the Assessment Area varies from approximately five to 25 inches annually

Table 3.8-1: Hydrographic Basins, Perennial Yields and Committed Resources within the Assessment Area

Hydrographic Basin	Basin No.	Perennial Yield (ac-ft/yr)	Committed Resources (ac-ft/yr)
Antelope Valley	151	4,000	1,746
Big Smokey Valley	137B	65,000	47,718
Boulder Flat	61	NA	NA
Carico Lake Valley	55	4,000	1,761
Clovers Area	64	NA	NA
Crescent Valley	54	16,000	66,971
Diamond Valley	153	30,000	133,451
Grass Valley	138	13,000	6,112
Hot Creek	156	5,500	4,220
Huntington Valley	47	NA	NA
Kobeh Valley	139	16,000	18,052
Little Fish Lake Valley	150	10,000	25
Little Smoky Valley - N	155A	5,000	5,056
Lower Reese River Valley	59	20,000	27,408
Middle Reese River Valley	58	14,000	49,313
Monitor Valley - N	140A	8,000	281
Monitor Valley - S	140B	10,000	556
Newark Valley	154	18,000	20,092
Pine Valley	53	20,000	15,693
Stephens Basin	152	100	19
Upper Reese River Valley	56	37,000	32,018
Whirlwind Valley	60	Basin 59 & 60 Combined	36,884

Source: Nevada Division of Water Resources. Water Rights Database.

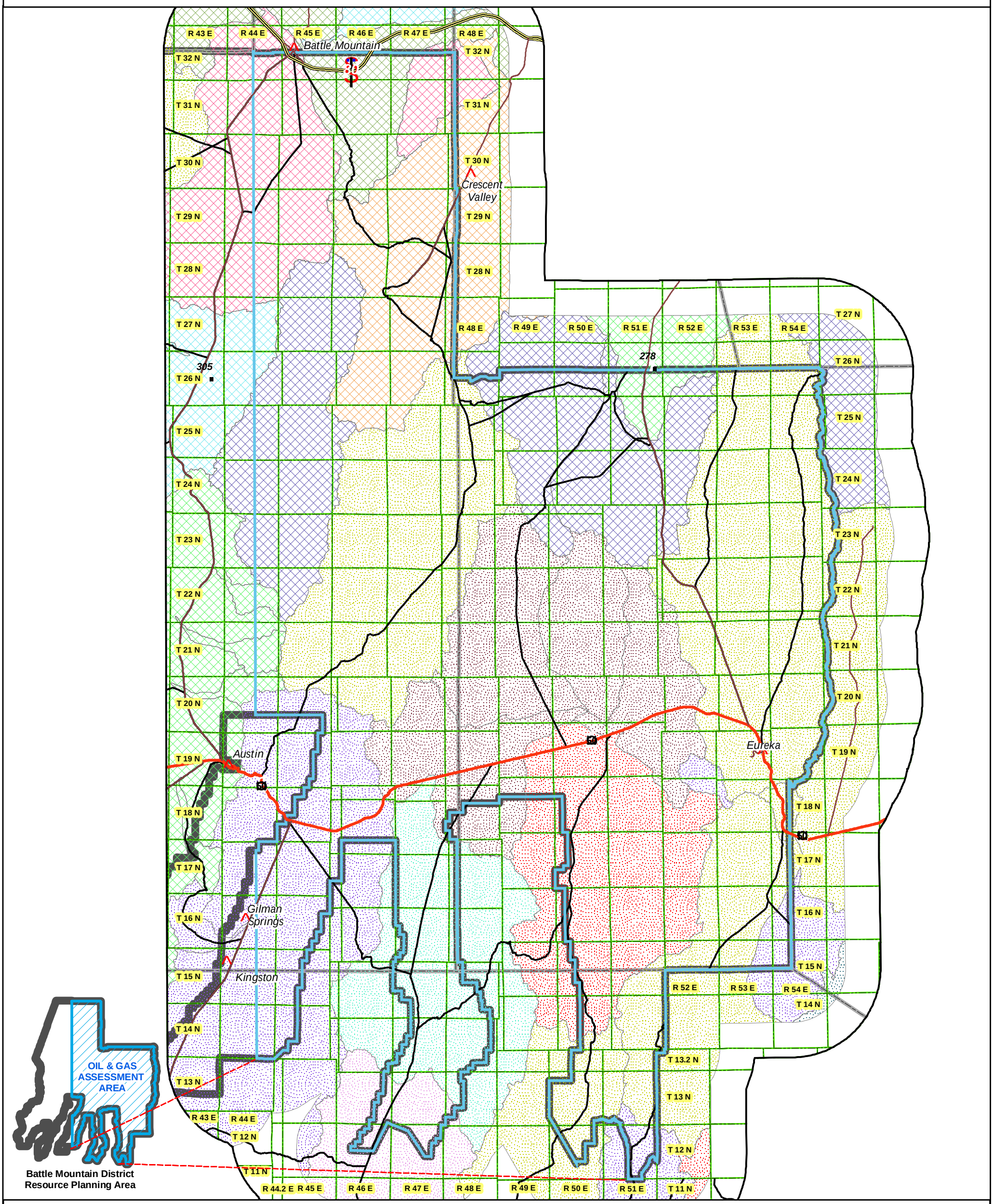
(PRISM precipitation map of Nevada, Oregon State University Spatial Climate Analysis Service 2002), with the majority of the precipitation occurring as snow during the months of November through March. Surface water sources in the form of springs and streams respond accordingly with higher flows in the late winter and spring. Riparian areas exist mainly along streams in the mountainous areas where water is available throughout the year.

The limited surface water available on public lands, with respect to the size of the Assessment Area, is confined to a number of small springs and streams with localized surface runoff and minimal water flows. As with the majority of Nevada, the primary source of water for agricultural, municipal, industrial and all other major users in the Assessment Area is derived from the pumping of ground water from subsurface aquifers.

The administration of the Clean Water Act requires that the state of Nevada (specifically Nevada Division of Environmental Protection [NDEP]) sets water quality standards, monitors these

Hydrologic Map (Watersheds) within the Oil and Gas Leasing Assessment Area

Figure 3.8.1



O&G Assessment Area
Resource Planning Area
County Boundary
Township/ Range
Town/City
Interstate Freeway
US Highway
State Route
Roads

Region, Subregion, Watershed

16, 04, 010
16, 04, 015
16, 04, 020
16, 04, 030
16, 04, 040
16, 04, 060
16, 06, 010
16, 06, 020
16, 06, 030
16, 06, 040
16, 06, 041
16, 06, 050
16, 06, 060

4 2 0 4 8 12 Miles

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.

United States Department of the Interior
Bureau of Land Management
Battle Mountain Field Office
50 Bastian Road.
Battle Mountain, NV 89820

Data is published in the North American Datum 1983 (NAD83) UTM, Zone 11, Meters - 10/2/06

parameters, and if necessary, takes legal enforcement action. The state has established water quality standards for many of the surface water sources including the Humboldt River and some of its major tributaries. However, in more remote areas such as the Assessment Area, very few standards have been enacted and most of these are specifically for larger tributaries such as the Reese River. Most of the surface water sources in the Assessment Area are comprised of springs, seeps and attendant wetlands and none of these have established standards. The Humboldt River is a regional sink for a drainage area nearly 17,000 square miles. The river flows in a slow meandering pattern eventually ending at the Humboldt Sink. The water in the river is typically calcium bicarbonate in the upper basin but tends to be modified toward sodium bicarbonate water downstream.

The Clean Water Act requires states to administer provisions (CFR, Parts 122-124) which require the issuance of National Pollutant Discharge Elimination System Permits for any construction project or action in, or near natural surface water sources. These permits are issued by the NDEP.

Sections 401 and 404 of the Clean Water Act require states to supervise the protection of wetlands and floodplains. Wetlands are defined as areas that are inundated or saturated by surface or groundwater for periods of time necessary to support hydric soils and aquatic/wetland vegetation such as cattails, sedges, rushes, etc. Floodplains are defined as benches or terraces adjacent to tributaries and drainages which are periodically inundated with high water from streams, rivers and washes. Section 401 requires the NDEP to administer and issue Water Quality Certification and Stormwater Discharge Permits. These are designed to minimize the introduction of pollutants into wetland and floodplain ecosystems.

404 compliance is under the jurisdiction of the U.S. Army Corps of Engineers and the U. S. Fish and Wildlife Service (USFWS). 404 permitting and administration is intended to mitigate problems directly or indirectly associated with projects or actions within or near designated wetlands.

In addition to the above regulations, proposed actions or projects have to meet compliance with two other federal executive orders: 1) Executive Order 11988- Floodplain Management requires federal agencies to prepare floodplain assessments for any actions or projects within or affecting floodplains; and 2) Executive Order 11990-Protection of Wetlands mandates federal agencies to support policies to minimize or prevent the "destruction, loss, or degradation of wetlands".

The state, through the NDEP, administers the Nevada Water Pollution Control Law. This legislation authorizes the protection of water quality for public use, wildlife, existing industry, agriculture and the beneficial economic development of the state. It is applicable to any proposed action or project within the state. Drinking water protection is administered by the EPA through the Safe Drinking Water Act. The enforcement of the act is mandated to the Nevada Division of Health.

3.8.2 Ground Water

Ground water in the Assessment Area is typical of the Basin and Range Province. Aquifers are not continuous and are limited regionally because of the complex faulting of the mountain ranges which also underlie the intermontane basins at depth. Three principal aquifers comprise the ground water flow system in the Assessment Area, Tertiary volcanic-rock aquifers of tuff, rhyolite, or basalt; Mezozoic and Paleozoic carbonate-rock aquifers of limestone and dolomite; and Quaternary and

Tertiary basin fill aquifers, of consolidated and unconsolidated sand and gravel (Planert and Williams 1995). All three aquifer types exist throughout the Assessment Area. Basin fill aquifers are the primary water bearing aquifers that occur in the valleys or other low-lying areas for consumptive uses such as agricultural or municipal.

Annual precipitation in the Great Basin is greatest in the mountains and least in the valleys. The higher elevations (above 8,000 feet above mean sea level [amsl]) may receive up to 25 inches of precipitation annually and the lower elevations (below 6,000 feet amsl) can receive less than ten inches annually (PRISM precipitation map of Nevada, Oregon State University Spatial Climate Analysis Service 2002). The natural recharge to the ground water flow system is derived from infiltration of precipitation. The areas of highest precipitation have limited infiltration capacity and produce runoff to the alluvial fans which are areas of significant recharge (Stone et al. 2001).

Ground water discharge in the Assessment Area is primarily through evapotranspiration (ET). ET varies throughout the Assessment Area and is dependent on several factors such as the depth to the water table, elevation, soil type, plant type, or plant density. The USGS conducted studies that estimated the total ET from bare soil and phreatophytes in the Great Basin. The average ET rates in those studies ranged from 0.13 to 1.60 feet per year for phreatophyte areas with less than 20 percent plant cover (Berger 2000). Twenty percent or less plant cover can be considered representative of phreatophytic plant density within the Assessment Area. Other discharge of ground water is for consumptive use that includes domestic, municipal, agriculture, and mining. The largest concentrated consumptive use of ground water is for agricultural use in Diamond Valley and mining and milling in Crescent Valley.

3.9 Wetlands/Riparian Zones

Riparian-wetland areas are the most productive and valuable resources found on public land in the arid west. Although these areas consist of less than 0.1 percent of the overall landscape in the Assessment Area, a disproportionately large percentage of all desert, shrub, and grassland plants and animals (~70-80 percent) depend on them. These areas play an important role in restoring and maintaining the chemical, physical, and biological integrity of the waters located in the Assessment Area.

Riparian areas are distinguished by vegetation, which is a direct result of having access to available water. Riparian areas are defined by a band of green vegetation immediately adjacent to a source of water and are commonly classified into two categories: Lotic riparian areas are those associated with flowing waters (streams and rivers) and lentic riparian areas are related to areas of standing water or moisture (meadows, seeps, or shoreline), also referred to as wetlands. Riparian areas and wetlands are closely related in appearance, function, and attributes. The one distinction between the two classifications is the presence of hydric soils.

Wetlands are further defined as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soils. Wetlands include swamps, marshes, bogs and similar areas (40 CFR §230.3(t); 33 CFR §328.3(b)). To determine if an area is a wetland, the

following three conditions must be met by the: 1) presence of wetland hydrology; 2) the presence of hydrophilic vegetation; and 3) the presence of hydric soil.

Riparian-wetland systems provide key services for all ecosystems, but are especially important in dry regions, where they provide the main source of moisture for plants and wildlife, and the main source of water for downstream plant, animal, and human communities (Thurow 1991). These systems are highly dependent on streambanks and flood plains being in a vegetated and relatively undisturbed state. Rooted streamside plants retard streambank erosion, filter sediments out of the water, build up and stabilize streambanks and streambeds, and provide shade, food, and nutrients for aquatic and riparian species (Kauffman and Krueger 1984). Healthy riparian areas also act as giant sponges during flood events, raising water tables and maintaining a source of stream water during dry seasons. The result is a more stable streamflow throughout the year (US-GAO 1988).

Wildlife use riparian-wetland areas disproportionately more than any other type of habitats. Where site potential allows, multi-canopy riparian areas with trees, shrubs, grasses, forbs, sedges, and rush are extremely valuable as habitat for a wide array of wildlife species. Riparian-wetland areas, dominated by woody and/or herbaceous plant communities, are important water, cover, and food source for wildlife. The structure, food, and water provided in riparian areas make them the single most diverse and productive habitat for terrestrial as well as for aquatic wildlife. Consequently, riparian ecosystems are important repositories for biodiversity throughout the West (Belsky et al., 1999). In addition, riparian-wetland areas are highly prized for economic values (municipal water, livestock production, mining, irrigation of crops, etc.) and other uses such as recreation (fishing, swimming, etc).

The entire SEPA contains approximately 500 miles of stream and 1,200 acres of lentic habitat. There is a substantial variation in riparian habitat types and condition throughout the SEPA and, therefore, throughout the Assessment Area.

Lotic systems with streamside riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows. Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for ground water recharge and release are determined by the following measurements as appropriate to the site characteristics:

> *Width/Depth ratio; Channel roughness; Sinuosity of stream channel; Bank stability; Vegetative cover (amount, spacing, life form); and other cover (large woody debris, rock).*

Lentic systems (i.e., natural spring, seeps, and marsh areas) are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.

The chemical, physical, and biological water constituents of both lotic and lentic systems are required to meet or exceed state water-quality standards.

3.10 Wilderness

Wilderness Study Area (WSA) is a designation given to lands managed by the BLM that are under investigation to determine if the lands are suitable as wilderness areas. All or parts of four WSAs are within the Assessment Area as shown on Figure 3.10.1 and in Table 3.11-1. Oil and gas leasing is not permitted within WSAs.

Table 3.10-1: Wilderness Study Areas within the Assessment Area

Wilderness Study Area	Acres in Assessment Area	WSA Number
Antelope Range	41,887	NV-060-2331/241
Park Range	6,215	NV-040-154
Roberts Mountain	15,090	NV-060-541
Simpson Park	49,670	NV-060-428

Antelope Range WSA
The Antelope Range WSA totals 87,400 acres of which 43,700 acres are on National Forest Lands. The WSA consists of a ridgeline that is approximately twenty-five miles long and eight miles wide with an average range in elevation of about two thousand feet. Piñon pine and juniper are the predominant vegetation within the WSA with scattered areas of aspen and mahogany.

Park Range WSA
The Park Range WSA totals 47,268 acres consisting of numerous high elevation spring-fed meadows surrounded by volcanic towers that are scattered throughout the range.

Roberts Mountain WSA
The Roberts Mountain WSA totals 15,090 acres and consists of a rugged mountainous area with three prominent peaks surrounded by major valley systems. Vegetation consists of willow, cottonwood, aspen, birch, and dogwood trees in deep narrow canyons. Mountain mahogany trees and limber pine are found in isolated stands on the barren rock ridges. The Roberts Mountains are the geologic model or Type Locality of the Roberts Mountain Thrust, a major geologic fault structure in North America.

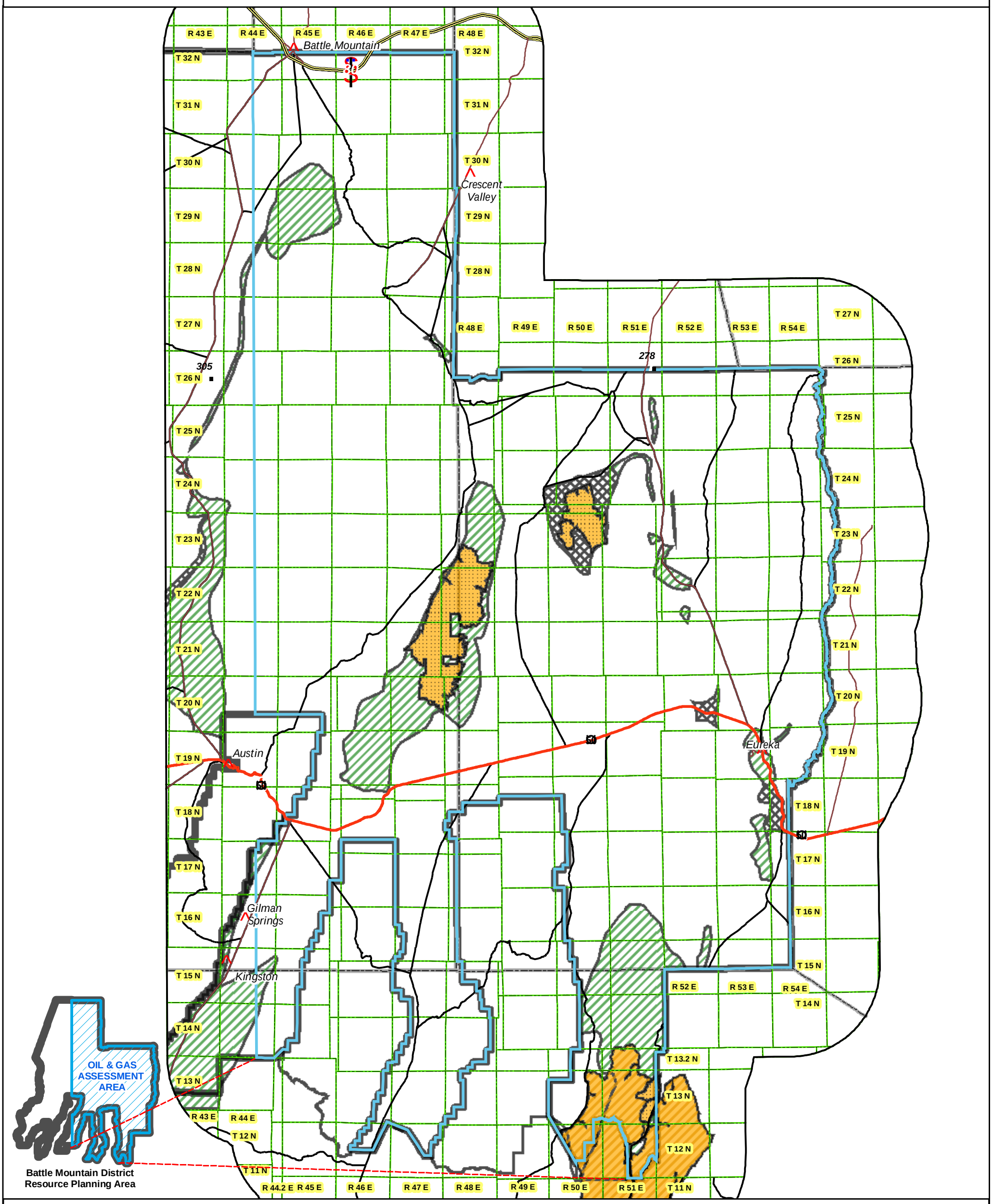
Simpson Park WSA
The Simpson Park WSA totals 49,670 acres consisting of a portion of the Simpson Park Range, a long but narrow range that trends to the northeast. The northern and eastern portions of the WSA are characterized by desert shrub vegetation with scattered stands of piñon pine and juniper on the west facing slopes. Scattered stands of aspen and cottonwood occur in the wet areas and mountain mahogany occurs on the rocky ridges. The southern and southwestern portions of the WSA consists of piñon pine and juniper.

3.11 Geology and Minerals

The Oil and Gas Leasing EA Assessment Area is located in the Basin and Range province. The Basin and Range province is comprised of north-south oriented mountain ranges approximately ten

Wilderness Study and Visual Resource Management Areas within the Oil and Gas Leasing Assessment Area

Figure 3.10.1



O&G Assessment Area
Resource Planning Area
County Boundary
Township/ Range
Town/City
Interstate Freeway
US Highway
State Route
Roads

WSA SUITABILITY
Not Suitable
Suitable

VRM CLASS
I
II
III
IV

4 2 0 4 8 12 Miles

United States Department of the Interior
Bureau of Land Management
Battle Mountain Field Office
50 Bastian Road.
Battle Mountain, NV 89820

Data is published in the North American Datum 1983 (NAD83) UTM, Zone 11, Meters - 10/2/06

miles wide and approximately 80 miles in length, separated by broad valleys (Price 2002). These mountains were formed by crustal blocks that moved relatively upward along parallel normal faults. Basins, or valleys, were formed by fault-bounded crustal blocks that moved relatively downward (Wicander 1989). Many of these faults are still active and earthquakes can occur. As discussed in 2.4.2 Shoshone-Eureka Resource Area Geology, rocks in the Assessment Area (and elsewhere in Nevada) have been deformed by successive mountain building events, and extensive volcanic activity has occurred (Table 2.4-1).

A variety of rocks types can be found within the Assessment Area (Figure 2.4.1). These rock types include: Lower Paleozoic sedimentary and volcanic rocks, Tertiary volcanic rocks, Upper Tertiary volcanic rocks, and Quaternary alluvial and playa deposits.

Paleozoic Sedimentary and Volcanic Rocks

Paleozoic sedimentary and volcanic rocks represent the oldest sedimentary and volcanic rock outcrops in the district. These rocks consist primarily of carbonates (limestone and dolomite) and metamorphosed basalts and are primarily found in Reese River Valley. In the remainder of the district, the Paleozoic and Mesozoic sedimentary rocks are composed of carbonate rocks interbedded with silica-rich rocks, cherts, shales and volcanic rocks.

Mesozoic and Tertiary Intrusive Rocks

The majority of intrusive rocks are Mesozoic in age with a lesser amount of intrusive rocks emplaced during the Tertiary time. These rocks are predominantly granitic in composition.

Tertiary Volcanic Rocks

These volcanic rocks are composed primarily of rhyolitic ash flows, lava flows and welded tuffs.

Quaternary Rocks

Quaternary rocks consist of unconsolidated valley fill material (i.e., material eroded off of mountains), sand gravel, and alluvium. Also included are Quaternary basalt flows and Pleistocene lake beds with intercalated volcanic tuffs.

The combination of rock types and complex geologic events has resulted in the Assessment Area encompassing a variety of locatable, saleable, and leasable minerals.

Locatable Minerals

Locatable minerals are mostly metallic, nonmetallic, semi-precious and precious gemstones, and rare earth elements. Metallic minerals include precious metals such as gold and silver and base minerals such as zinc, molybdenum, bentonite, nickel, cinnabar, lead, tin, and copper. Some of the nonmetallic minerals are borax, feldspar, fluorspar, and gypsum. One of the rare earth elements mined as a locatable mineral is uranium.

Within the Assessment Area, gold is the most commonly explored for and mined commodity. In 2003, 1,887,027 ounces of gold were produced within the Battle Mountain District. In addition, 767,677 ounces of silver and 465,000 tons of barite were produced in 2003 (Battle Mountain Field Office 2004 Mineral Facts). Notable mining operations within the Assessment Area include the following: the Cortez mine, located about five miles south of the town of Crescent Valley; the Ruby

Hill mine, located two miles northwest of Eureka; and the Phoenix Project located 12 miles southwest of Battle Mountain. With the increase in mineral prices, there has been an increased interest in mineral exploration throughout the Assessment Area. In addition to gold, exploration activities have focused on barite, molybdenum and copper.

Saleable Minerals

These minerals can only be acquired by purchase and include, but are not limited to the following: petrified wood and common varieties of sand, stone, gravel, pumice, pumicite, cinder, clay, and rock. There are several types of saleable minerals in the Assessment Area. The most common are sand and gravel deposits. Gravel deposits are associated with colluvium, which was deposited off the mountain ranges. Other types of deposits include topsoil and sand. These types of salable minerals are widely distributed throughout the Assessment Area. Currently, there is no ongoing major exploration for saleable minerals.

Leasable Minerals

Leasable minerals are those that may be extracted from leases on public lands and are subdivided into solid and fluid leasable mineral groups. Solid minerals include the following: coal, sodium, potassium, and phosphate (and under certain conditions, sand and gravel, and locatable minerals). Fluid minerals include oil and gas, and geothermal resources. Currently the Assessment Area has only fluid leasable minerals.

Oil and Gas

As discussed in 2.4.3 History of Oil and Gas Exploration in the Shoshone-Eureka Assessment Area, there has been no oil and gas production within the Assessment Area. However, interest in oil and gas leasing and exploration continues; for each quarterly BLM oil and gas leasing sale, the Assessment Area has received numerous parcel nominations. Recent interest has been focused primarily on the southeastern portion of the Assessment Area, in Antelope, Little Smokey, Diamond and Kobeh Valleys. The last Application for Permit to Drill (APD) for oil and gas was received in 2003.

Geothermal

There are many thermal springs distributed throughout the Assessment Area; however, the only developed geothermal resource is the Beowawe Electrical Generation Facility. The facility is located approximately 40 miles east of Battle Mountain, in the northeastern portion of the Assessment Area. The Beowawe Electrical Generation Facility is managed by the BLM Elko Field office. Although no other known geothermal resource areas have been identified within the Assessment Area, interest in geothermal exploration on current geothermal leases has increased. Currently, in 2006, the BMFO has receive three notices of intent to conduct geothermal resource exploration operations within the Assessment Area.

3.12 Soils

Soils within the Assessment Area are variable due to differences in combinations of environmental factors responsible for soil formation. Soils are divided into gravelly, sandy, clayey, and loamy on the basis of texture, and into alkali and non-alkaline soils on the basis of chemical composition. Soil texture is a result of the mechanical sorting of sediments at the time they were deposited. The

presence of large accumulations of alkali salts is due to the concentration of these salts by evaporation of surface and/or ground waters. Saline soils are almost never found where soil are well drained. Gravely soils are generally found on lower slopes of mountains and alluvial fans. Their extension into the valley is dependent upon the streams that built the alluvial fans. Soils in the lower part of the valleys are composed largely of clay and fine silt that has been deposited by slow-moving water or wind. Due to the high content of clay, these soils have a tendency to bake when they become dry. Where these soils are found, the water table is usually only a short distance below the surface and alkali salts have been accumulated on the soil surface from evaporating ground water.

The following soils are encountered in the Assessment Area:

Entisols
Entisols are found on recent landscapes. These are mineral soils that are very young and have not yet developed appreciable accumulations of soluble salts and lime. These occur in both the valley bottoms as well as the mountains.

Aridisols
Aridisols are found on light-colored surface horizons and one or more properties characteristic to soils of arid regions. These soils are low in organic matter and may have accumulations of soluble salts and lime. Found mainly in the valley bottoms, these soils do not have water continuously available to them during the plant-growing season.

Mollisols
Mollisols are found on dark-colored fertile surface horizons that have been formed under semi-arid to sub-humid climate. These soils are rich in organic matter and are very fertile. In the resource area, these soils mainly form in the mountains with grass communities.

Playas
Playas are areas that are essentially barren, flat, generally dry, undrained basins, and are often salty. They may be inundated for short, periods of time.

Microbiotic Crusts
Microbiotic crusts are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria that are found throughout the Great Basin and the Assessment Area. Cyanobacterial and microfungal 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 grazing, off-road vehicles, human foot-traffic, wildland fire or any surface disturbance. The greater the disturbance the greater the impact and time associated for recovery. 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).

3.13 Vegetation

The type of vegetation that grows in a particular area depends largely on soil types. Soil surveys have been completed for the Assessment Area. The information obtained from these surveys is used for evaluating land-use potential, potential natural plant communities, and developing reclamation and rehabilitation plans. Ecological site descriptions are available as a part of these soil surveys. These documents provide detailed information regarding vegetative communities for each soil type. Ten basic vegetative communities have been identified as those affected by the Proposed Action and are discussed in detail below.

Greasewood

This community occurs on floodplains and closed-basin bottomlands adjacent to playas. Greasewood is located on slopes that range from zero to two percent with an elevation between 4,500 and 5,000 feet above mean sea level (amsl) and occur in precipitation zones of three to eight inches.

This plant community is characterized by black greasewood (*Sarcobatus vermiculatus*). Vegetation in this type is normally restricted to mounded areas that are surrounded by playa-like depressions or nearly level, usually barren, interspaces. Basin wildrye (*Leymus cinereus*), inland saltgrass *(Distichlis spicata*), and alkali sacaton (*spordoolus airoides*) are the most prevalent herbaceous species associated with this community. Saltgrass may extend into the interspace in some areas.

Salt Desert Shrub

This is the most dominant vegetative community within the Assessment Area and occurs on alluvial terraces, fans, and foothills on all aspects. Salt desert shrubs are located on slopes that range from zero to 30 percent, with zero to eight percent slopes the most typical. Salt Desert Shrub occurs at elevations between 4,500 to 6,000 feet amsl and within precipitation zones of three to eight 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.

Big Sagebrush

This is the second most extensive community within the Assessment Area, which occurs on terraces, alluvial fans, and low rolling hills on all exposures. Big sagebrush occurs on slopes that range from two to 50 percent with elevations ranging from 4,500 to 6,000 feet amsl and within the eight to12 inch precipitation zone.

This plant community is characterized by Wyoming and Basin big sagebrush (*Artemisia tridentata* ssp. *wyomingensis; Artemisia tridentata* ssp. *tridentata*), Thurber's needlegrass (*Achnatherum thurberianum*), , Indian ricegrass, Basin wildrye, bottlebrush squirreltail, and Sandberg's bluegrass (*Poa secunda*). Arrowleaf balsamroot (*Balsamorhiza sagittata*) and Tapertip hawksbeard (*Crepis acuminata*) are important forb species associated with this vegetation type.

Black Sagebrush

This vegetative community occurs on low arid foothills, mountain side slopes and plateaus. Black sagebrush occurs on slopes that range from four to 50 percent with elevations ranging from 5,000 to 7,000 feet and are associated with the four to eight inch precipitation zone. Soils are often shallow over a calcareous pan, which limits effective water holding capacity and seeding success.

Vegetation that characterizes this community consists of black sagebrush (*Artemisia nova*), bottlebrush squirreltail, and Sandberg's bluegrass. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is characteristic for communities that occur in the higher elevations.

Low sagebrush

This vegetative community occurs on mountain side slopes and plateaus. Low sagebrush occurs on slopes that range from four to 75 percent with elevations ranging from 5,000 to 9,000 feet amsl and are associated with the eight to 12 inch precipitation zone. Soils are often shallow over a calcareous pan, which limits effective water holding capacity and seeding success.

This vegetative community is characterized by low sagebrush (*Artemisia arbuscula*), bottlebrush squirreltail, Sandberg's bluegrass, and bluebunch wheatgrass.

Mountain Brush

This community occurs on upland terraces and inset mountain valleys on all slope aspects. Mountain brush occurs on slopes that range from four to 50 percent with elevations ranging from 6,000 to 9,000 feet amsl. These communities generally occur within the 12 inch precipitation zone.

The vegetative community is characterized by Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass, snowberry (*Symphoricarpos albus*), antelope bitterbrush (*Purshia tridentata*), and serviceberry (*Amelanchier utahensis*). Mountain brome (*Bromus carinatus*), mountain spray (*Holodiscus discolor*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) are other species associated with this community.

Piñon-Juniper Woodlands

This community occurs on upper alluvial fans and in the higher mountainous regions with slopes ranging from 30 to 50 percent. Elevations range from 5,500 to 9,000 feet amsl. This community occurs within the ten to 22 inch precipitation zone. Lower elevations (5,000 to 6,500 feet amsl) communities are dominated by juniper, mid elevations (6,500 to 7,500 feet amsl) by both piñon and juniper, and elevations above 7,500 feet amsl are predominately piñon pine.

These plant communities are characterized by single-leaf piñon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*). There are localized ecosystems which support other juniper species such as common juniper (*Juniperus communis*) and Rocky Mountain juniper *(Juniperus scopulorum*). The understory, although sparse, consists of bluebunch wheatgrass, Sandberg's bluegrass, Thurber's needlegrass, basin wildrye, and needleandthread grass (*Hesperostipa comata*). Juniper and piñon trees dominate these areas; however, mountain big sagebrush, antelope bitterbrush, and curl-leaf mountain mahogany can be found within the community. Heavily wooded areas provide little forage and have a large amount of bare ground.

Riparian
Riparian communities occur throughout the Assessment Area and are associated with streams, springs, and seeps where water is at or near the surface for the majority of the year. Species associated with this community include willow (*Salix* spp.), quaking aspen (*Populus tremuloides*), cottonwoods (*Populus fremontii, P. Balsamifera* ssp. *Trichocarpa trichocarpa, augustifolia*), water birch (*Betula occidentalis*), red-osier dogwood (*Cornus sericea*), rushes (*juncas* ssp.) and sedges (*carex* ssp.), and cattail (*Typha latifolia*).

Annuals
Although this vegetation type is not considered an ecological type, it is a plant community that accounts for a large portion of the Assessment 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 kali*), clasping pepperweed (*Lepidium perfoliatum*), and tumble mustard (*Sisymbrium altissimum*).

High Mountain Alpine
This vegetative community occurs in elevations above 8,000 feet amsl. Dominant species include mountain mahogany, Limber pine (*Pinus flexilis*), bristlecone pine (*Pinus longaeva*), and Rocky Mountain juniper. There is little understory vegetation at the upper elevations because shallow soils are replaced by bedrock. These communities occur within the 20 to 30 inch precipitation zone.

3.13.1 Forestry and Woodland Products

The Assessment Area contains mountainous terrain, including a number of major north-south trending ranges. These mountains and their adjacent alluvial fans, foothills, and riparian zones support some of the Assessment Area's most unique varieties of woodland and forest tree species (Figure 3.13.1). These include quaking aspen, curlleaf mountain mahogany, bristlecone pine, single-leaf piñon pine, Utah juniper, Rocky Mountain juniper, limber pine, narrow-leaf cottonwood, black cottonwood, Fremont cottonwood, and willow (salix spp.).

Quaking Aspen
Quaking aspen is a rather short-lived (i.e., 100 to 150 years) deciduous, hardwood belonging to the Salicaceae (willow) family. It usually is found in monotypic stands with mature trees reaching heights of greater than 60 feet. Nationally, it has the widest distribution of any native tree species. Due to its unique biological characteristics and rarity, the harvesting of both live and dead aspen is prohibited in the current Assessment Area. Quaking aspen communities are represented in approximately 1,235 acres in the SEPA (Brieland and Tueller 2003). However, these vegetative communities are important since they comprise the highest ecological biodiversity of plants and animals found in the Assessment Area. They are also major indicators of upper watershed health since they naturally grow and thrive only in, or adjacent to riparian zones that contain adequate surface water and quality (streams and springs) or high water tables.

The largest concentration of aspen, within the Assessment Area, occurs in the Simpson Park Range where they are found in approximately 300 acres. In certain locations within the Assessment Area, aspen are in decline or populations are becoming no longer viable. Aspen regenerates primarily from clonal (i.e., root) sprouting and not seed.

New aspen sprouts (suckers) are especially attractive to foraging ungulates and cattle. Cattle and sheep have the potential to restrict aspen regeneration and recruitment by browsing the suckers. This can lead to interference with clone propagation, establishment and survival (Kay 2001).

During the 2000 field season, Dr. Kay conducted an extensive trend and analysis study for aspen in the northern part of the Assessment Area. As an integral component of the research, Dr. Kay established a number of sample plots, which represented a broad cross-section of aspen communities (including exclosures which were used as control units). The analysis conclusions were that the status and trend of the majority of aspen stands in the Assessment Area are in decline.

Curl-leaf Mountain Mahogany

Curl-leaf mountain mahogany is not extensive in the Assessment Area. However, some of the largest communities exist in the Mahogany Hills and the Fish Creek Range. Curl-leaf mountain mahogany is a long-lived (i.e., greater than 500 years) ever-green hardwood associated with other higher-elevation tree species such as limber and bristlecone pine. It can exist in pure stands and reach heights of greater than 25 feet. It grows best in a zone between 7,000 and 10,000 feet amsl and is an important browse species for mule deer, especially in the winter months. Since the tree is relatively rare throughout the district, only a limited number of deadwood only harvesting permits are allowed each year.

Bristlecone Pine

In the Assessment Area, the only known locations of bristlecone pine are in the Diamond and Fish Creek Ranges. Bristlecone communities are found on Hoosac Mountain and Prospect Peak in the Fish Creek Range. The Hoosac Mountain site is located on a north to northwest facing slope, intermixed with limber pine and mountain mahogany at elevations between 7,500 and 8,500 feet amsl. It is found in approximately 200 acres and is comprised of secondary-growth bristlecone with most of the specimens between 100 to 150 years of age.

The Prospect Peak site covers over 1,000 acres and is comprised of mixed limber and bristlecone, located primarily on north to northeast facing slopes above 8,500 feet amsl. As with the Hoosac location, the majority of ancient trees were cut in the late 19th century for charcoal production in gold/silver mill operations.

Piñon Pine and Juniper

Piñon pine is a relatively long-lived evergreen softwood (500 to 800 years), belonging to the Pineaceae family. The conifer grows best at elevations between 4,500 and 9,000 feet amsl, on higher alluvial fans, foothills, and mountain slopes. It's a comparatively short tree, reaching maximum heights of 40 feet. Rough estimates put piñon and mixed piñon/juniper communities at well over 400,000 acres in the SEPA.

Prehistorically, the pine nuts of the piñon were used as a major source of food by ancient native cultures such as the Anazasi. Today, the nuts are harvested by the general public and are spiritually revered by Native Americans such as the Paiute and Shoshone. Commercial harvests of piñon nuts have been conducted on the Assessment Area when production levels have been adequate (the last good year was 1998). Production is cyclical, depending on a number of complex factors such as moisture and temperature. Pine nuts are also a very important food source for smaller mammals, rodents, and birds such as the scrub jay and Clark's nutcracker.

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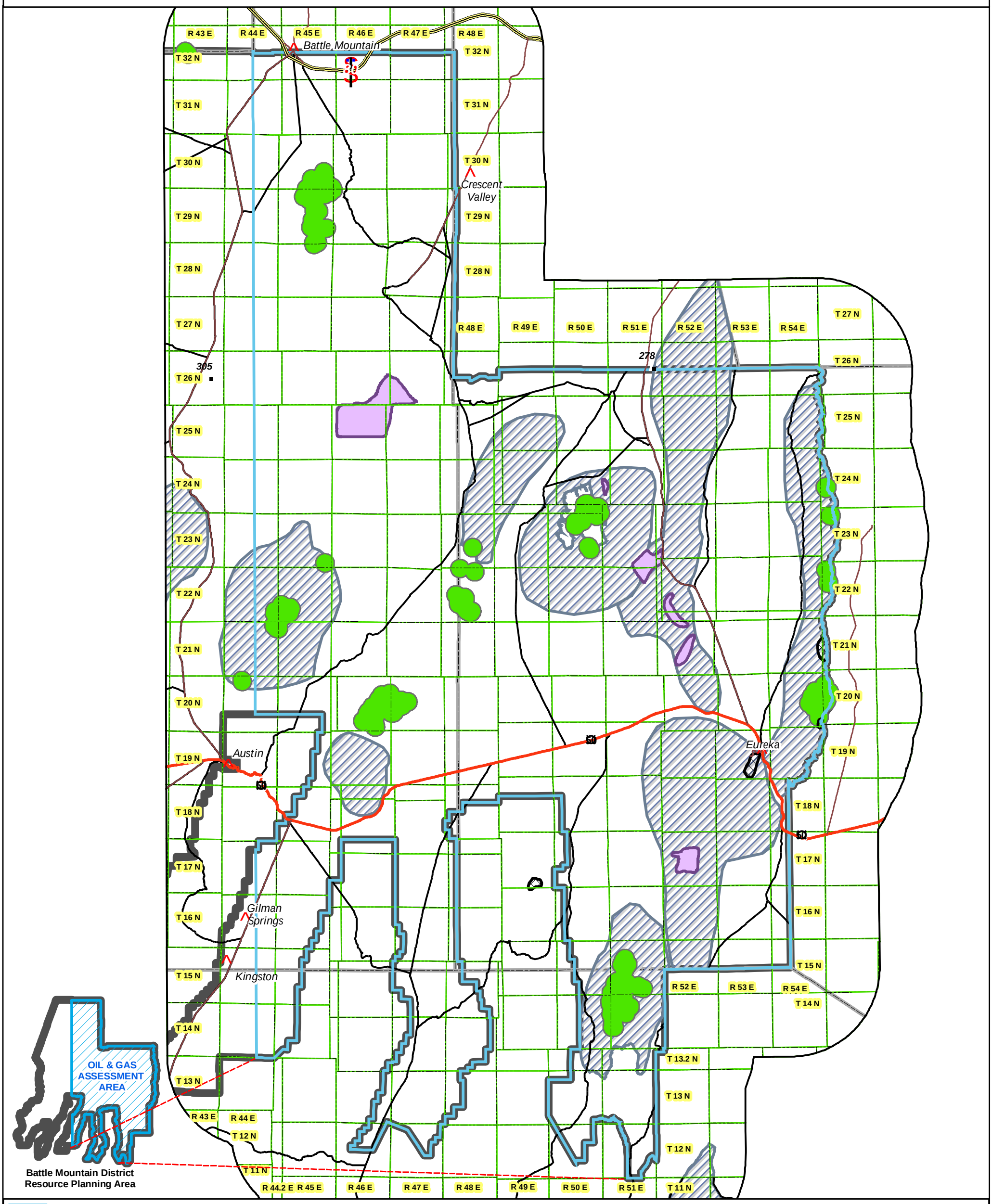
Forest and Woodland Resources within the Oil and Gas Leasing Assessment Area

Figure 3.13.1



O&G Assessment Area
Resource Planning Area
County Boundary
Township/ Range
Town/City
Interstate Freeway
US Highway
State Route
Roads
Bristlecone Pine Area
Quaking Aspen Area - Data area enlarged
Wood Cutting Area
Pine Nut Sale Area

United States Department of the Interior
Bureau of Land Management
Battle Mountain Field Office
50 Bastian Road.
Battle Mountain, NV 89820

4 2 0 4 8 12 Miles

Data is published in the North American Datum 1983 (NAD83) UTM, Zone 11, Meters - 10/2/06

The other current uses of piñon are for fuel wood and Christmas trees. The BMFO sells hundreds of permits every year, including commercial harvest contracts.

Juniper is a long-lived (greater than 2,000 years) evergreen softwood belonging to the Cupresseaceae family. The tree can be found in pure stands or mixed with piñon pine, at elevations ranging from as low as 4,000 feet amsl up to approximately 8,000 feet amsl. Like its associate, the piñon, juniper is a rather short tree reaching heights of approximately 30 feet. The tree is well distributed throughout the Great Basin and the Assessment Area on alluvial fans, foothills, and mountain slopes. During the settlement of the west, juniper was used extensively for building structures, fence posts, fuel wood for cooking and heating, and the production of charcoal for mining operations. In the Assessment Area, the wood is utilized only for fuel wood and fence posts. As with piñon pine, there are currently no accurate inventories of actual juniper acreages in the Assessment Area.

Field observations over the last few years have revealed widespread mortality in piñon/juniper stands. The majority of this mortality is associated with increases in bark beetle activity and is exacerbated by drought and resource competition.

Limber Pine

This species is an evergreen member of the pine family (softwood) and is considered an alpine or high elevation conifer. It grows best in pure or mixed stands with bristlecone and/or mountain mahogany between 7,500 amsl and 11,500 feet amsl. It is the tallest of all the forest/woodland species in the Assessment Area, reaching heights of greater than 75 feet under optimum conditions. Within the Assessment Area, limber pine is found widely scattered in relatively small remnant stands on high mountain slopes, ridges, and basins. No public or commercial use of the tree is currently allowed.

Cottonwood

Narrow-leaf, black, and Fremont cottonwood are deciduous, hardwood poplars belonging to the willow family and are found naturally in riparian areas along stream banks, on the periphery of springs and ponds, and planted in agricultural areas within the Assessment Area. These native cottonwoods rapidly grow to heights of greater than 80 feet, with girths up to five feet and are relatively short-lived (i.e., 150 years). Unlike their aspen cousins, they can regenerate both from sprouting and seed. These species' can also be propagated by transplanting suckers or small limbs. Currently, the District protects the trees from any type of harvesting, including deadwood.

Willow

Willows are hardwood members of the Salicaeceae family with deciduous foliage and affinities for riparian habitats with high water tables. Ranging in height from ten to 40 feet, there are more individual species of willow than any other hardwood found in the Assessment Area. Like their poplar relatives, they require relatively large, consistent amounts of water to thrive and regenerate. They are not legally harvested in the Battle Mountain District. In the Assessment Area, willows can

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

3.13.2 Fuels/Wildland Fires

In general, wildland fires burn in several basic fuel types across the Assessment Area. Fuels types include: 1) monocultures of cheat grass; 2) brush/grass fuels such as sage brush with perennial grass communities or cheat grass under stories; and 3) piñon pine or piñon pine/juniper communities.

In an average year, based on a ten-year average which includes the 1999 fire season, approximately 34,278 acres of the 10.1 million acres of the BMFO burns (through calendar year 2000). If one excludes the 1999 fire season, the ten year average acres burned is 5, 900 acres, with approximately 50 to 60 wildland fires responded to per year (Approved Resource Management Plan Amendment for Fire Management, September 2002).

3.14 Wild Horses and Burros

The BMFO administers 12 Herd Management Areas (HMAs) encompassing approximately 1.6 million acres of Public Lands . Two other HMAs within the Assessment Area are administered by adjoining BLM Field Offices. The BMFO also cooperatively manages several USFS Wild Horse Territories (WHTs). The 2006 estimated population size within the Assessment Area is 2,760 wild horses and 92 wild burros. Eleven HMAs are located within the Assessment Area and are shown on Figure 3.14.1 and described in detail below.

HMAs are areas identified in the RMP for long-term management of wild horses or burros, and are designated as "Special Management Areas." The BLM is mandated to manage wild horses and burros only within those areas where they were found at the time the Wild Free-Roaming Horse and Burro Act was passed in 1971. Therefore, wild horses and burros cannot be relocated elsewhere within the Assessment Area and a new HMA cannot be created for them. Nor is BLM allowed to expand the HMA beyond the 1971 Herd Area boundaries to replace lost habitat. Many HMAs encompass mountain ranges and include mountain browse, meadow, mahogany, and piñon and juniper vegetation types interspersed with perennial streams and springs. Wild horses and burros also use sparsely vegetated, rocky mountains with limited water sources. Winter habitat typically consists of valley bottoms at lower elevations that may support winterfat or other salt desert shrub vegetation. The primary vegetation types used by wild horses consist of Wyoming or mountain big sagebrush with an understory of perennial grass. Wild burros are able to thrive in more desert type conditions than wild horses. Wild horse and burro populations generally move throughout or between HMAs in response to a number of factors.

Wild horse and burro distribution throughout HMAs varies greatly throughout the year and is influenced by forage and water availability, precipitation, temperature, snowfall and other climatic factors, population size and resulting animal density, and human disturbance as a result of off-highway vehicle use, roads, mining, recreation, and other uses that occur on the public lands.

Water availability is a key influence to wild horses' use during summer months. Wild horses will generally travel much farther to water compared to livestock. In many HMAs, water sources are plentiful and supplied by perennial streams, springs, and human constructed water developments such as livestock water tanks and ponds. In other cases, water sources are limited, and in drought years, wild horses may have difficulty accessing sufficient water, especially if the population exceeds the Appropriate Management Level (AML). In these cases, wild horse distribution is closely tied to the location of the available waters, which are important to the health of the herd.

The average HMA population managed by the BMFO is approximately 220 wild horses, with the average HMA size consisting of 114,300 acres. The smallest wild horse or burro HMA is the Whistler Mountain HMA consisting of 43,000 acres in size, and the largest is the New Pass Ravenswood HMA consisting of 260,000 acres. In some cases, wild horses do not fully utilize the entire HMA due to the lack of forage, water shortages, or human disturbance. Movement of wild horses between HMAs occurs where HMA boundaries are contiguous or near each other, and when fences do not impede the migration.

Management of wild horses and burros involves periodic census activities, which typically use helicopters to inventory the HMAs, as well as on the ground monitoring of habitat, animal health, and distribution. The majority of wild horse foals are born between March 1 and July 1 annually. Throughout the Assessment Area, populations increase by ten to 22 percent annually. Burro populations may foal year round, and may not increase at the same levels as wild horses. AMLs have been established for all HMAs administered by the BMFO. When census and other data indicate that the AMLs have been exceeded, gathers are planned to reduce the populations within HMAs to the AML in order to prevent deterioration of the range associated with an overpopulation of wild horses.

The BLM is responsible for the protection, management, and control of wild horses and burros on public lands in accordance with the Wild Free-Roaming Horse and Burro Act of 1971, as amended (Public Law 92-195), which states that the BLM "shall manage wild free-roaming horses and burros in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands."

Refer to Figure 3.14.1, which displays the HMAs administered by the BMFO, and the 2006 estimated population by HMAs.

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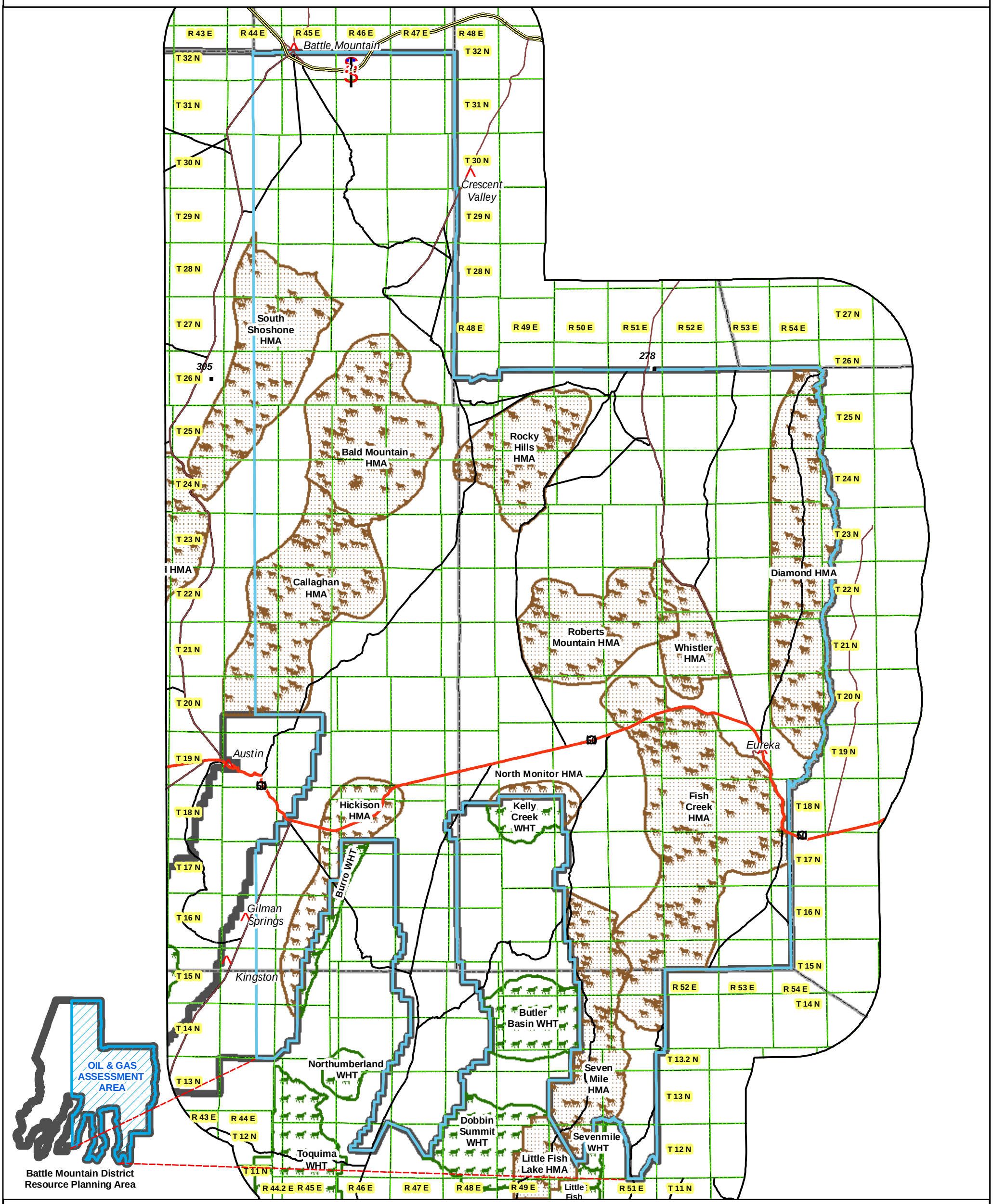
Wild Horse and Burro Map
within the Oil and Gas Leasing Assessment Area

Figure 3.14.1



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Bald Mountain HMA

The Bald Mountain HMA is located 40 miles southeast of Battle Mountain, Nevada, in Lander County. The HMA consists of 139,879 acres and is 14 miles wide by 20 miles long and shares a southern boundary with the Callaghan HMA. The HMA encompasses the northern end of the Toiyabe Range. The AML ranges from 129 to 215 wild horses. A large portion of the population congregates along the eastern edge of the Toiyabe range bordering the western edge of Grass Valley in the vicinity of Hot Springs Point and the boundary with the Callaghan HMA. Although many springs are located within the HMA, wild horse distribution remains concentrated in certain areas.

South Shoshone HMA

The South Shoshone HMA is located 30 miles south of Battle Mountain, Nevada, in Lander County along the east side of Highway 305. The majority of the HMA consists of the Shoshone Mountain Range. The HMA consists of 133,099 acres and is 28 miles long by 14 miles wide.

Aerial census indicates that the majority of horses are located in the southwestern portion of the HMA in the foothills along the western edge of the Shoshone Range. The wild horses in this HMA exhibit a wide range of color characteristics including paint (pinto). AML has been established as 60 to 100 wild horses. Water sources are somewhat limited, and wild horse distribution has been concentrated in the southern portion of the HMA. Vegetation communities are not considered highly diverse, and many are degraded and consist of annual grasses (e.g., cheatgrass).

Callaghan HMA

The Callaghan HMA is located six miles north of Austin, Nevada, in Lander County, consists of 156,230 acres, and is 16 miles wide by 28 miles long, sharing a northern boundary with Bald Mountain HMA. The HMA contains a portion of the Toiyabe Range. The highest elevation point is Mt. Callaghan, located at 10,200 feet amsl.

The AML for this HMA has been established as 147 to 237 wild horses. Although wild horses are scattered throughout the HMA, many congregate on the northeast side in the vicinity of Corral Canyon and the boundary with the Bald Mountain HMA. The mountain range provides many perennial springs and streams accessible by wild horses, as well as diverse vegetation communities.

Rocky Hills HMA

The Rocky Hills HMA is located 50 miles southwest of Carlin, Nevada, in Eureka County. The HMA consists of 83,998 acres, and is 15 miles wide by 13 miles long encompassing the Rocky Hills and Simpson Park Mountains. The northern boundary of the HMA runs along JD Ranch Road and the western boundary is along Grass Valley Road.

A wide variety of colors exist in the HMA including paint, buckskin, grulla, appaloosa, roan, and dun. Wild horses can often be seen in the northern end of the HMA. The AML for the Rocky Hills HMA has been established as 86 to 143 wild horses. Movement can occur and has likely occurred between the Callaghan, Bald Mountain, and Rocky Hills HMAs. Water in the HMA is somewhat

limited, and concentrated use occurs at Cadet Spring. Other available sources include a few springs and some perennial streams. Many water sources are located on private land and have been fenced.

Roberts Mountain HMA

The Roberts Mountain HMA is located 30 miles northwest of Eureka, Nevada, in Eureka County west of Highway 278. The HMA consists of 99,990 acres, and is 17 miles long by ten miles wide. The HMA shares the eastern boundary with the Whistler Mountain HMA.

The AML for this HMA is 150 wild horses. Many of the horses in this HMA are distributed into the lower elevations of Kobeh Valley during both summer and winter. Several water sources appear to be key in influencing movement patterns. Wild horses also move back and forth into the Whistler Mountain HMA and outside of HMA boundaries in Kobeh Valley.

Whistler Mountain HMA

The Whistler Mountain HMA is located ten miles north west of Eureka, Nevada, in Eureka County. The eastern boundary of the HMA lies along Highway 278. The HMA consists of 43,247 acres, and is 16 miles long and seven miles wide. The Whistler Mountain HMA shares a western boundary with the Roberts Mountain HMA. Wild horses frequently move between the Roberts Mountain HMA and the Whistler HMA. Wild Horses can often be seen off of Highway 278 south of Mount Hope. The AML for this HMA has been set as 14 to 24 wild horses. Exploration drilling is currently occurring in the Mount Hope and Kobeh Valley portions of this HMA. Whistler Mountain HMA is generally lacking adequate water sources, which probably limits the year round use of the HMA by wild horses.

Diamond HMA

The Diamond HMA is located northeast of Eureka, Nevada, in Eureka County, and is managed as a complex with other portions located in White Pine and Elko Counties. The HMA consists of 164,739 acres, and is 60 miles long by six to nine miles wide encompassing the Diamond Mountain Range. Newark Valley lies to the east of the mountain range and Diamond Valley is to the west.

Wild Horses can often be seen grazing in the foothills along the western boundary of the Diamond HMA. The AML has been established as 151 wild horses on the portion managed by the BMFO. Oil exploration activity, in recent years, has occurred throughout the mountain range. The Diamond Mountain range is incised by many canyons, many of which support perennial waters accessible to wild horses. Vegetation resources are degraded at lower elevations, but vegetation is diverse across the HMA.

Fish Creek HMA

The Fish Creek HMA is located just a few miles south of Eureka, Nevada, in Eureka County. The HMA consists of 97,480 acres comprised of a long narrow valley located between the Toiyabe National Forest Monitor Range to the west and the Antelope Range to the east, and is 31 miles long and eight miles wide.

The AML for the HMA is 107 to 180 wild horses; however, all but 57 horses were removed in 2005 and 2006, in the northern portion of the HMA where water is limited and forage resources degraded. Wild horses are often located in Antelope Valley and foothills, and may move to higher elevations in the vicinity of Ninemile Peak in the summer. Movement also occurs between the Fish Creek HMA, the Ely BLM Field Office, and the Sevenmile HMA. In recent months, exploration activity has increased in Antelope Valley.

Sevenmile HMA

The Sevenmile HMA is approximately 30 miles southwest of Eureka, Nevada, in Eureka County. The HMA is comprised of a long narrow valley located between the Toiyabe National Forest Monitor Range to the west, and the Antelope Range to the east. The HMA consists of 97,840 acres, and is 31 miles long and eight miles wide.

Wild horses within the Seven Mile HMA are often located within in the southern portion of the HMA in Fish Lake Valley during the winter, and many move into the Butler Basin Wild Horse Territory (WHT) administered by the USFS in the summer months.

North Monitor HMA

The North Monitor HMA is located approximately 30 miles west of Eureka and is managed in association with the Kelly Creek WHT located on USFS lands. The HMA is very small, with an AML of eight wild horses. The current population is estimated to be 14 wild horses, which may move onto the USFS portion in the summer months. Water sources in the HMA are limited.

Hickison HMA and Burro Territory

The Hickison HMA also includes the Wild Burro Territory located on the adjacent USFS lands. The BLM portion is approximately 70,000 acres in size; however, the U.S. Highway 50 right-of-way fence cuts the HMA in half, limiting the habitat used by the burros to the southern portion which is only around 52,000 acres in size. Currently, there are approximately 92 burros and one horse inhabiting the HMA. This small burro population is the only one administered by the BMFO.

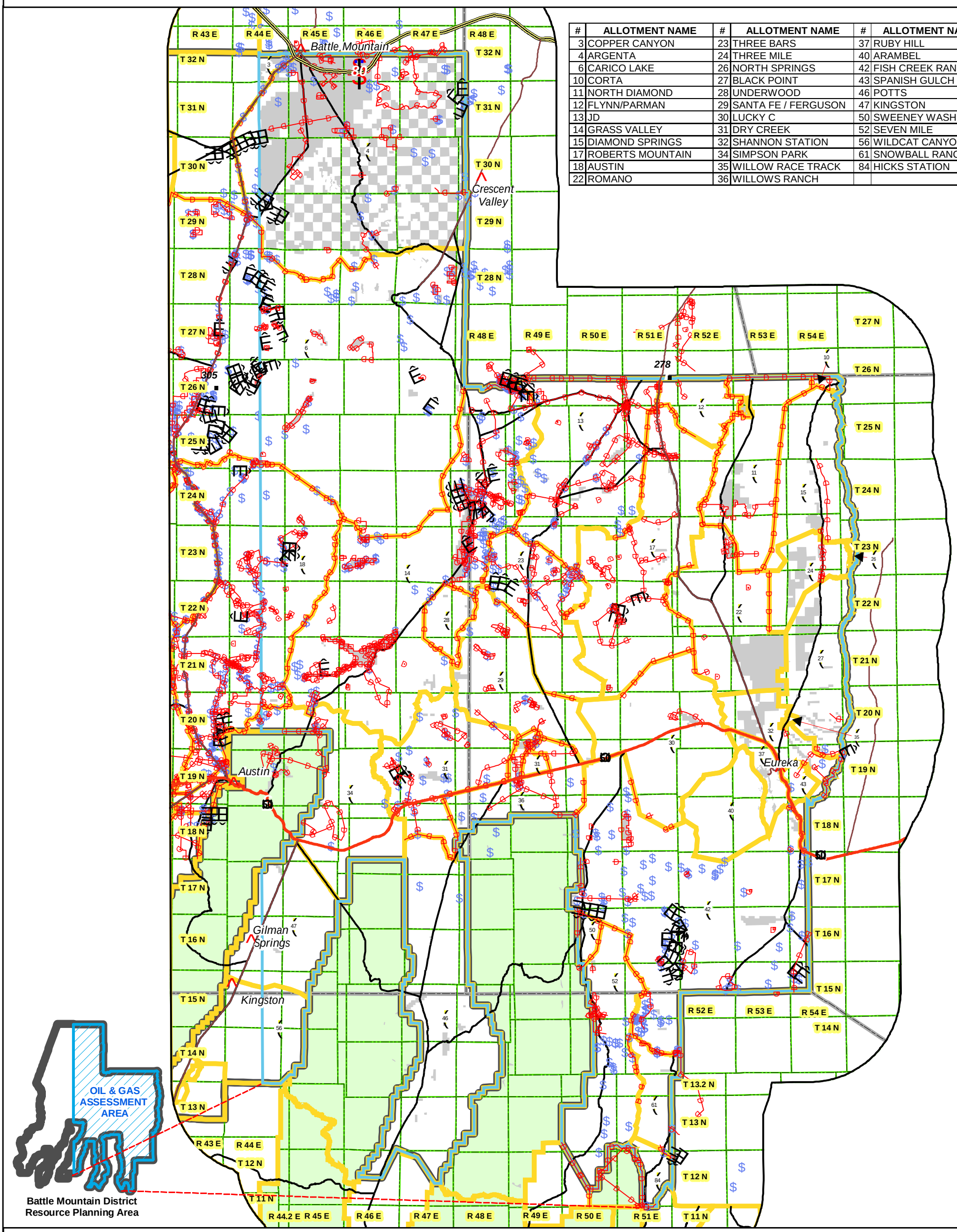
The habitat of this area is arid, with sparse vegetation and few water resources. The burros currently have three available water sources: Joe's Well, Burro Well, and Spencer Hot Springs. All three of the water sources are located within the same general area in close proximity to each other. The burros use the hot springs for water primarily during the winter when the other water sources are frozen.

The use of the area by burros occurs nearest the three water sources. Burros do not have the same reproductive or mating cycles of wild horses, nor is the social structure the same as wild horses. Wild burros are polyestrous and can breed and give birth throughout various times of the year. A jack burro (i.e., male) does not tend a harem of jennies (i.e., females) as stud horses do with mares. The social structure is relatively loose, and bonds usually exist between a jenny and her young. Jacks may remain alone or in small groups unless they locate a female in estrous at which times, large groups of animals may be observed for short periods of time.

Range Allotments and Range Improvements within the Oil and Gas Leasing Assessment Area

Figure 3.15.1

#	ALLOTMENT NAME	#	ALLOTMENT NAME	#	ALLOTMENT NAME
3	COPPER CANYON	23	THREE BARS	37	RUBY HILL
4	ARGENTA	24	THREE MILE	40	ARAMBEL
6	CARICO LAKE	26	NORTH SPRINGS	42	FISH CREEK RANCH
10	CORTA	27	BLACK POINT	43	SPANISH GULCH
11	NORTH DIAMOND	28	UNDERWOOD	46	POTTS
12	FLYNN/PARMAN	29	SANTA FE / FERGUSON	47	KINGSTON
13	JD	30	LUCKY C	50	SWEENEY WASH
14	GRASS VALLEY	31	DRY CREEK	52	SEVEN MILE
15	DIAMOND SPRINGS	32	SHANNON STATION	56	WILDCAT CANYON
17	ROBERTS MOUNTAIN	34	SIMPSON PARK	61	SNOWBALL RANCH
18	AUSTIN	35	WILLOW RACE TRACK	84	HICKS STATION
22	ROMANO	36	WILLOWS RANCH		



O&G Assessment Area
Resource Planning Area
Grazing Allotments
County Boundary
Township/ Range
Private
USFS
Town/City

Interstate Freeway
US Highway
State Route
Roads
Fence
Ditch
Pipeline
$ Range Improvements

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Land Ownership
within the Oil and Gas Leasing Assessment Area

Figure 3.16.1

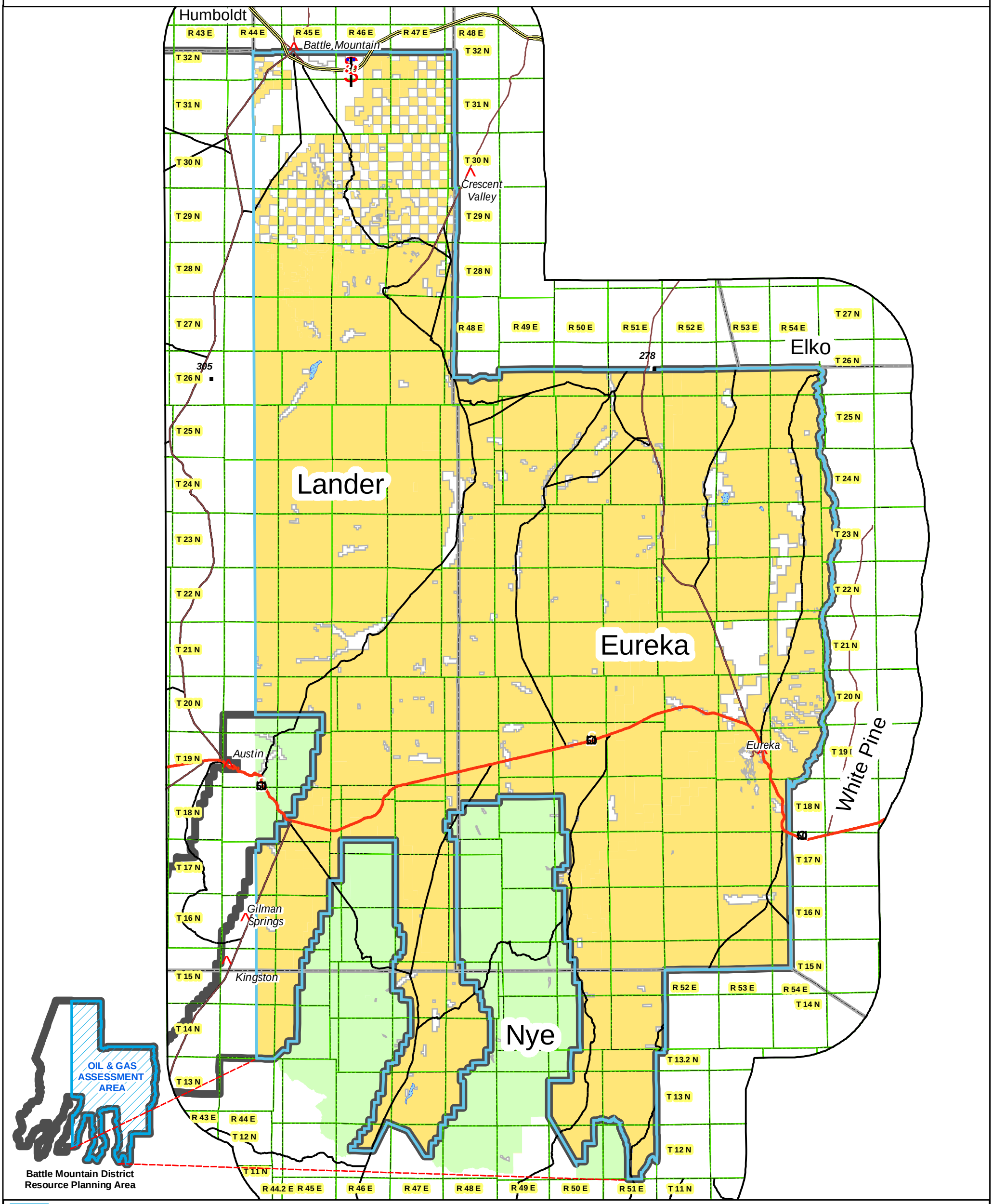

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Table 3.15-1: Allotments within the Assessment Area

Allotment Name	Public Acres of Allotment within Assessment Area*	Private Acres of Allotment within Assessment Area*	Total AUM for Entire Allotment
Arambel	47,021	149	1,349
Argenta	140,866	174,013	17,203
Austin	93,371	854	14,478
Black Point	61,344	11,174	4,312
Carico Lake	355,985	15,330	24,954
Copper Canyon	23,316	3,040	5,023
Corta	2,933	0	128
Diamond Springs	72,217	2,712	3,680
Dry Creek	95,083	2,632	5,702
Fish Creek Ranch	289,395	5,740	4,815
Flynn/Parman	28,827	20	1,372
Grass Valley	267,523	21,170	17,701
Hicks Station	12,606	33	117
JD	140,939	4,995	8,200
Kingston	63,812	1,007	2,720
Luck C	113,849	1,373	3,054
North Diamond	76,346	5,827	3,582
Potts	173,285	3,281	9,262
Roberts Mountain	164,227	2,532	9,624
Romano	76,180	20,154	2,887
Ruby Hill	13,974	2,539	1,286
Santa Fe/Ferguson	83,882	2,189	5,202
Seven Mile	89,541	879	5,573
Shannon Station	31,677	7,996	2,520
Simpson Park	94,044	488	3,446
Snow Ball Ranch	27,308	210	991
Spanish Gulch	7,092	32	647
Sweeney Wash	6,985	0	478
Three Bars	77,090	1,695	5,840
Three Mile	27,357	6,133	850
Underwood	19,795	157	vacant
Wildcat Canyon	28,170	219	2,057
Willow Race Track	740	193	252
Willows Ranch	51,298	2,007	3,621

* Total Acreages may be less than acreage total of assessment area due to exclusion of intermittent water data.

Split Estate

In a split estate, the surface rights and subsurface rights to a piece of land are owned by different parties. In many instances, the mineral rights in split estate cases are publicly held and managed by the federal government. In very rare cases, the surface may be public and the minerals are privately held. The federal laws and regulations that apply to split estate situations involving oil and gas resources are different from those that apply to coal or "locatable" minerals held by mining claims. According to the regulations found at 43 CFR 3814, which implement the Stockraising Homestead Act of 1916, mineral rights take precedence over other rights associated with a property; however the surface owner is entitled to reasonable compensation by the operator for damages or loss of income. The rights of surface owners to be compensated fairly for surface damage must be balanced with the right of the federal government to develop mineral or energy resources.

Surface Owner Protection

For BLM managed minerals, the regulations cited above require the operator to contact the private surface owner before entering the private surface to stake a well location and access road or to conduct any surveys required by the NEPA process.

The BLM would invite the surface owner to participate in the onsite and final reclamation inspections and would take into consideration the needs of the surface owner when reviewing the APD and approving final abandonment and reclamation. The BLM would require the operator to provide the surface owner the same, but no greater, level of surface protection as required on BLM managed land.

Prior to approval of the APD (or Sundry Notice to conduct new surface disturbing activities), the operator must certify as part of the complete application that a good faith effort has been made to reach an agreement with the private surface owner. Such an agreement in good faith provides a forum through which the operator and surface owner can discuss the preferences and needs of the surface owner. In addressing those needs, the operator may be able to modify the development proposal to minimize reclamation and surface damage or to provide a benefit to the surface owner.

The agreement between the surface owner and the operator is confidential, and neither party is required to divulge details of the agreement to the BLM or any other agency. The APD Surface Use Plan of Operations should contain sufficient detail about any aspects of the agreement necessary for NEPA documentation and to determine that the operations would be in compliance with laws, regulations, Onshore Orders, and agency policies.

If the surface owner and operator fail to reach an agreement, a bond must be posted by the operator with the BLM to compensate the surface owner for reasonable and foreseeable loss of crops and damages to tangible improvements.

3.17 Visual Resources

Visual Resource Management Classes

The BLM initiated visual resource management (VRM) by establishing VRM class designations during planning processes to manage the quality of the landscape and minimize potential impacts to visual resources resulting from development activities. In determining VRM class designations, the inventory process considers the scenic value of the landscape, viewer sensitivity to the scenery, and the distance of the viewer to the subject landscape. These management classes identify various permissible levels of landscape alteration, while protecting the overall visual quality of the region. Management classes are divided into four levels (Classes I, II, III, and IV), with Class I designated as most protective of the visual resources (see Table 3.17-1 and Figure 3.10.1). The objectives of these classes vary from very limited management activity to activity that allows major landscape modifications.

Table 3.17-1: Visual Resource Management Classes

Class	Description
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements.

Source: BLM Manual Handbook 8410-1 (United States Department of the Interior [USDI] 1986).

Management classes are utilized to identify minimum impact levels to the visual resource when a proposed development action is analyzed using the BLM's Visual Contrast Rating System outlined in BLM Visual Resource Management Inventory and Contrast Rating Manuals 8410-1 and 8432-1.1. By using this system, the impact magnitude to visual resources can be measured by separating the landscape into its major features (landform, vegetation and structures) and predicting the magnitude of change to each of the basic visual elements (line, form, color and texture) within each of the features. Visual analyses for proposed projects within the Assessment Area are conducted using Key Observation Points, which are locations from which a proposed project can be seen.

Once potential impacts to visual resources have been identified for each location, visual design considerations are incorporated into proposed surface-disturbing projects on a case-by-case basis. Mitigation measures, using the following design techniques, are developed for each site to minimize adverse impacts to visual resources and to maintain the appropriate VRM class:

- Site locations to minimize adverse affects.
- Minimize disturbance during construction.
- Repeat form, line, texture and color in the design elements.
- Utilize appropriate color selection for exterior building materials.
- Implement sensitive grading methods to minimize variations in natural topography.
- Apply appropriate reclamation and restoration methods during project closure.
- Emphasize linear alignment in design.

Visual Resources Within the Assessment Area

The Assessment Area visual resources are currently managed based on inventories completed in the 1980s. Table 3.19-2 shows the acreages associated with each VRM Management Class in the Assessment Area.

Table 3.17-2: Visual Resource Management Class Acres within the Assessment Area

Class I	Class II	Class III	Class IV
130358	31989	253118	3281944

Acreages are approximate and may extend beyond the Assessment Area boundaries.

The Assessment Area is located within the Basin and Range physiographic province. Basin and range landscapes in central Nevada are characterized by elongated, generally north-trending mountain ranges separated by broad, open basins. This type of landscape allows for long viewing distances.

The dominant natural features within the Assessment Area include steep rugged mountains; expansive valleys and playas; dune fields; hot and cold springs; streams and rivers; and associated floodplains and marshes. Human-made features include ranches, fences, irrigated and cultivated fields, power lines, utility corridors, several State and US highways, other gravel and native surface secondary roads, two-track jeep and off-highway vehicle trails, the Pony Express National Historic Trail, large open pit mines, gravel pits, small dams and reservoirs, telecommunication towers and associated buildings.

Portions of the Diamond and Crescent Valleys contain the highest concentrations of human-made features. There are numerous privately owned farms and ranches as well as numerous large open pit mines. Each of the valleys has a State or US highway passing through it. Both of the valleys are surrounded by large, rugged mountain ranges.

A large portion of the Assessment Area is located in relatively large expansive valleys away from populated areas. These areas all have scattered ranches and farms in large valleys surrounded by relatively steep mountains. Ranch settings typically include small dwellings, outbuildings, barns, fences, trees, corrals and fields. They are all situated on private lands, and only the larger features are visible from a distance. Newer buildings painted with light colors contrast with background landscapes. The ranches have been in existence for many years, and the majority of the structures tend to be weathered, blending in with the surroundings. Access roads are also present in the valleys.

3.18 Recreation

A wide variety of outdoor recreation activities occur on BLM-administered lands. Some of the more popular activities include sightseeing, pleasure driving, rock collecting, photography, water sports, winter sports, off-highway vehicle use, rock climbing, mountain biking, picnicking, camping, fishing, hunting, hiking, and bathing in hot springs. This wide range of opportunities is possible because virtually all of the public lands are accessible and offer a variety of settings suitable for different recreational activities. Some of these activities may occur on potential oil and gas lease areas.

Expanded leisure time and growing affluence among portions of the population, have led to increased visitation and use of public lands. The Assessment Area attracts thousands of visitors annually. The desert and mountains provide the resources for a variety of recreational experiences. Some of these resources supply natural beauty, solitude, and freedom from the structure and regulations of urban areas. Scenic values are often cited as an important element for the participant's recreational experience. Access is a key component for recreation activities within the Assessment Area. Visitors typically travel on a previously used or marked motorized vehicle route to reach a recreation site or trailhead. Recreational opportunities fall along a continuum of opportunities ranging from intensive vehicle-oriented activities to non-motorized activities undertaken in a primitive setting, although there is often overlap between the two.

The demand for different types of recreational events and locations varies. A list of recreational areas and annual visitation within the Assessment Area are outlined in Table 3.19-1.

Table 3.18-1: Recreational Use within the Assessment Area

Recreational Area or Use	Estimated Annual Visitors in 2005
Antelope Range	932
Dispersed - SEPA	64,751
Hickison Petroglyph Recreation Site	22,380
Roberts Mountain	1,447
Simpson Park	1,088
Spencer Hot Springs	943
The Point - XP Trail	828

Recreational Area or Use	Estimated Annual Visitors in 2005
Tonkin Spring	606
Pony Express National Historic Trail (NHT)	471
Permitted Activities	415

High Use Areas

Hickison Petroglyph Recreation Site

The Hickison Petroglyph Recreation Site is located about 24 miles east of Austin, Nevada along US Highway 50. The site is the most popular recreational destination in the Assessment Area with more than 22,000 visitors in 2005. The opportunities include petroglyph viewing, hiking, picnicking and camping. Originally developed in 1968, the site has 16 camp sites, four picnic sites, three restrooms and a 0.3 mile interpretive trail. Most visitors stay only 20 to 60 minutes; long enough to visit the petroglyphs. It is estimated that approximately 2,500 visitors a year spend at least one night in the campground. In 2005, 81 percent of the visitors who logged their name in the registration book at the site were from outside of Nevada and six percent were from outside of the United States. A large number of visitors have visited a particular site on more than one occasion. An increasing number of visitors consider Hickison their final destination rather than simply stopover. Many visitors are combining their visit to Hickison with a visit to the nearby Spencer Hot Springs, a popular natural hot spring site. Visitor feedback has shown a need for increased hiking/equestrian opportunities in the area. Plans are currently being formulated to develop a 30 to 50 mile hiker/equestrian trail system in the Simpson Park Range immediately north of the previously developed site. In addition, related trailhead and equestrian camping facilities are being considered for the area immediately adjacent to the existing campground.

Spencer Hot Springs

The Spencer Hot Springs site is a natural hot spring complex located approximately 18 miles east of Austin, Nevada several miles south of US Highway 50. The site has become increasingly popular in recent years and has been listed in guide books specializing in natural hot spring opportunities. It is estimated that the site receives in excess of 1,000 visitors per year, many of whom are from outside Nevada. Although there are no formal developments at the site, the public has made improvements to the springs by developing and maintaining several soaking tubs.

Tonkin Springs and Reservoir

The Tonkin Springs and Reservoir are located immediately west of the Roberts Mountains approximately 50 miles northwest of Eureka, Nevada and 25 miles north of US Highway 50. The site is a popular destination, primarily for local residents interested in fishing, picnicking and camping. There are no formal developments at the site.

3.19 Auditory Resources

Noise is generally defined as unwanted or annoying sounds, typically associated with human activity and which interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the primary human response to noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting (i.e., time of day and type of activity during which the noise occurs, and the sensitivity of the individual). Sound levels are usually measured and expressed in decibels (dB). Most of the sounds one hears in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency combine to generate sound.

There are currently no specific federal, state, or local regulations that provide quantitative requirements for land use compatibility with noise sources within the Assessment Area; however, all BLM actions and use authorizations must comply with the Noise Control Act of 1972 (PL 92-574). This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. To accomplish this, the Act establishes a means for the coordination of federal research and activities in noise control, authorizes the establishment of federal noise emissions standards for products distributed in commerce, and provides information to the public respecting the noise emission and noise reduction characteristics of such products (42 U.S.C. 4901). The Act authorizes and directs that federal agencies, to the fullest extent consistent with their authority under federal laws administered by them, carry out the programs within their control in such a manner as to further the policy declared in 42 U.S.C. 4901. Each department, agency, or instrumentality of the executive, legislative and judicial branches of the Federal Government having jurisdiction over any property or facility or engaged in any activity resulting, or which may result in, the emission of noise shall comply with federal, state, interstate, and local requirements respecting control and abatement of environmental noise. Each federal agency shall, upon request, furnish information to the EPA regarding the nature, scope, and results of the noise research and noise-control programs of that agency, and shall consult with EPA, as required, in prescribing standards or regulations respecting noise. Certified low-noise-emission products shall be acquired for use by the Federal Government in lieu of other products if the Administrator of General Services determines that reasonably priced, reliable substitutes exist (42 U.S.C. 4914). The Act includes provision for citizen suits (42 U.S.C. 4911(a)) whereby any person may commence civil action against the United States or any governmental instrumentality or agency who is alleged to be in violation of any noise control requirement.

The Assessment Area is primarily undeveloped. Land uses vary from sparsely populated rural regions to residential, commercial, and public uses in Lander, Eureka, and Nye Counties. The Assessment Area consists of recreational (hiking, camping, rockhounding, hunting, and off road vehicles) agricultural (livestock and crop production), and mining uses.

3.20 Socioeconomics

The Assessment Area encompasses portions of Lander, Eureka, and Nye counties. The potential exists for each of these counties to experience socioeconomic effects as a result of oil and gas leasing and subsequent exploration and development. The primary economic activities that contribute to the economic base for lands within the Assessment Area are mining, transportation, agriculture, and recreation.

Lander County

Lander County is located in north central Nevada and encompasses 5,494 square miles. Over 85 percent of the land in the County is administered by the federal government. Interstate 80 traverses the county in an east-west direction on the northern end, as does Highway 50 on the southern end. State Highway 305, which runs north-south, bisects the center of the county. This highway links the cities of Battle Mountain (County seat) and Austin. The town of Kingston is located in the southern part of Lander County on Highway 376.

The total population of Lander County in 2002 was estimated to be 5,691, which was approximately a 115 percent increase from 1970 (U.S. Census Bureau 2006a). The estimated population in 2005 was 5,114 (Nevada State Demographer 2006). The population density as of 2000 was relatively low at 1.1 persons per square mile (U.S. Census Bureau 2006b). Approximately 85 percent of residents live in the northern portion of the county and 65 percent of the residents live in urban settings. In recent years Lander County's economy has been dominated by mining. Agriculture also plays an important role in the local economy with production of high quality alfalfa hay and seed.

The median household income in Lander County in 2003 was $46,024 annually (U.S. Census Bureau 2006b). The majority of job-related income is derived from the mining sector (www.detr.state.nv.us/cgi/dataanalysis 2006). Fifty-two percent of farm income was from livestock production while 32 percent was derived from crop sales. Total net income from farming and ranching in Lander County dropped from $3.3 million in 1970 to $1 million in 2000 (U.S. Census Bureau 2006c).

The unemployment rate in Lander County was 4.7 percent in 2005, which was 0.6 percent higher than the State of Nevada as a whole (U.S. Census Bureau 2006c). According to the Nevada Department of Employment Training and Rehabilitation, job growth in Lander County has increased in the past three years due to an increase in mining and exploration activities (www.detr.state.nv.us/cgi/dataanalysis 2006).

Eureka County

Eureka County is located in east-central Nevada, with an area of approximately 4,200 square miles and a population of approximately 1,500 residents (Nevada State Demographer 2006) It is the second least populous county in the State of Nevada. The town of Eureka, the county seat and the largest of three communities in Eureka County, is located in the southern portion of the county. The towns of Beowawe and Crescent Valley are located in the northwestern portion of the county.

Mining and agriculture play important roles in Eureka County's economy. The mining sector has fluctuated over many years causing shifts in employment and incomes and affecting the overall economy. Employment in Eureka County increased from 935 in 1980 to 5,321 in 1997, which was an increase of nearly 67 percent (U.S. Census Bureau 2006c). Mining, along with other private sector and government employment have as a whole, increased since the mid 1990s. The agricultural sector has steadily declined over time.

Income in Eureka County has increased from a total of $31.9 million in 1985 to a total of $167.6 million in 1990 and peaked in 1995 with $274.8 million (U.S. Census Bureau 2006c). A high percentage of earnings flow out of the local economy because many workers commute to work in Eureka County from other counties such as Elko County. In 2002, a net outflow of $229 million occurred, which is the equivalent to 80 percent of the total wages and salaries paid in Eureka County. The average per capita income in Eureka County was $18,629 in 1999 with a median household income of $41,417 as compared to $50,849 for the State of Nevada (U.S. Census Bureau 2006c). The unemployment rate in Eureka County, in 2005, was 3.6 percent, 0.05 percent lower than unemployment rate for the State of Nevada (U.S. Census Bureau 2006c).

In 2000, approximately two-thirds of Eureka County residents lived in the town of Eureka and nearby outlying areas in the southern portion of the County.

Nye County

Nye County is the third largest county in the United States and totals 18,064 square miles. It is located in the south-central portion of the State of Nevada. Tonopah is the county seat and is located 239 miles southeast of Reno and 207 miles northwest of Las Vegas on US Highway 95, US Highway 6, and State Route 376.

Nye County has a population of nearly 40,000 and offers a rural lifestyle with a population density of 0.38 persons per square mile. Mining, service and government represent the largest economic sectors in the county. Industry in Nye County is supported by strong transportation links to California (Nye County borders California on the south). In addition, the area is in close proximity to Death Valley National Park, which provides recreational opportunities. Nye County is home to numerous golf courses and mining ghost towns, and the county hosts annual professional off-road competitions.

The total population of Nye County in 2000 was 32,485, which represents an increase of 83 percent since the 1990 census (Nevada State Demographer 2006). The fastest growing age group in the county is the group between 70 to 74 years of age (U.S. Census Bureau 2006b). Projections indicate that the county will grow to 40,334 persons by 2006 (Nevada State Demographer 2006). Between 1970 and 2000, Nye County's population grew at a faster rate than both the State of Nevada and the nation (U.S. Census Bureau 2006b). The majority of the population is white (89 percent) with about ten percent of Hispanic origin.

The majority of residents Nye County (60 percent) earn less than $30,000 annually, with approximately one percent earning more than $100,000 annually (U.S. Census Bureau 2006c). Per capita annual income is approximately $18,000 (U.S. Census 2006c). Average earnings per job in the county are lower than the State of Nevada and the nation (www.detr.state.nv.us/cgi/dataanalysis 2006).

4 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter describes the anticipated direct, indirect, and cumulative impacts of the Proposed Action and No Action Alternative. These impacts are described under each resource heading with the exception of the direct, indirect, and cumulative impacts under the No Action Alternative.

4.1.1 Direct, Indirect, and Cumulative Impacts under the No Action Alternative

The resources analyzed under the No Action Alternative include air quality, cultural resources, invasive, nonnative species, wildlife, Native American Religious Concerns, wastes (hazardous and solid), hydrology and water quality, wetlands/riparian zones, wilderness, geology and minerals, soils, vegetation, wild horses and burros, range resources, lands and realty, visual resources, recreation, auditory resources, and socioeconomics.

4.1.1.1 Direct Impacts

Under the No Action Alternative, there would be no change in current management direction. No new leases would be processed and processing of existing noncompetitive oil and gas leases would continue until September 2007. Noncompetitive leases are subject to the same regulations as competitive leases. Issuing noncompetitive leases does not directly authorize exploration or development, and additional site-specific analysis would be required. Therefore no direct impacts to the affected resources would occur from the No Action Alternative.

4.1.1.2 Indirect and Cumulative Impacts

Under the No Action Alternative, there would be no change in current management direction. No new leases would be processed and only existing noncompetitive oil and gas leases would continue to be issued until September 2007. Noncompetitive leases are subject to the same regulations as competitive leases. Indirect and cumulative impacts from potential future exploration and development activities on these noncompetitive leases would be similar to those described under the Proposed Action. However, as outlined in the RFD, past and current exploration and development activities on these lands are minimal. This low level of activity is expected to continue. Impacts to these resources would be further reduced through implementing mitigation measures, best management practices (BMPs), and conditions of approval (COAs). Additionally, as previously outlined, site-specific analysis would be required for all future oil and gas exploration and development activities. Therefore, the indirect and cumulative impacts of the No Action Alternative on the affected resources described would be negligible.

4.1.2 Mitigation and Monitoring

Mitigation and monitoring measures would be developed in response to anticipated impacts. Mitigation measures were recommended by the BLM for the following resources: Native American Religious Concerns, Invasive, Nonnative Species, Migratory Birds, Wildlife, Threatened,

Endangered, and Special Status Species, Wetlands/Riparian Zones, Forestry and Woodland Products, Fuels/Wildland Fires, and Wild Horses and Burros. The mitigation measures are found at the end of the above listed resource sections.

4.2 Air Quality

4.2.1 Proposed Action

4.2.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.2.1.2 Indirect Impacts

Indirect impacts would be the result of field investigations, exploration activities and the construction of oil and gas operational facilities. Off-highway vehicular travel and the use of unpaved roads would increase the release of fugitive dust particles. Impacts to air quality would be reduced through dust suppression efforts such as applying water to roads and construction sites. The use of internal combustion engines in vehicles and other equipment would result in the release of CO_2, CO, NO_x, saturated hydrocarbons, PM_{10}, and the production of photochemical air pollutants such as O_3. Exploration drilling and pumping of oil and natural gas could cause emissions of hydrocarbons and other volatile chemical components into the atmosphere. Inadvertent oil spills in and around pumping equipment, tank farms and trucks, and pipelines could result in the release of fumes of volatile gases into the atmosphere.

Based on the RFD, oil and gas exploration or production activities would be expected to disturb a total of 627 acres over a ten year period. Reclamation of disturbed acres would be ongoing, and a total of 597.2 acres would be reclaimed, leaving a total of 29.2 acres, or 4.6 percent, of the area unreclaimed after the ten year analysis period. Impacts to air quality would be localized and minimal. Impacts to air would be further reduced through implementing mitigation measures, BMPs, and COAs following site-specific analysis.

4.2.1.3 Cumulative Impacts

Cumulative impacts to air quality from past, present, and RFFAs would be minimized due to the limited amount of development relative to the Assessment Area and because the State of Nevada specifically regulates each project to ensure that there are no violations of the ambient air quality standards. Since the NDEP has the responsibility of monitoring projects that can affect air quality, they would insure that air quality monitoring stations would be installed in production areas as determined necessary. Other past, present, and RFFAs which may generate impacts to air quality would be located far enough away from oil and gas projects, are temporary in nature, or are required

to be permitted by the Nevada BAPC so that they would not create any appreciable cumulative impacts.

For oil and natural gas production, as more equipment goes into operation in more areas, there would be a proportional increase in the release of air and atmospheric contaminants. The cumulative impacts would be difficult to estimate at this time without air quality and pollutant monitoring and modeling programs; however, the projects must comply with BAPC requirements. If monitoring indicates that air contaminants are exceeding federal and state standards, then appropriate enforcement and remediation procedures would be required.

4.3 Cultural Resources

4.3.1 Proposed Action

4.3.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.3.1.2 Indirect Impacts

Sites can be indirectly impacted by increased access to previously inaccessible areas. Even when sites eligible under criteria a, b, and c (a. important in National, regional or local history; b. associated with an important individual; or c. a unique or representative type) are avoided, the view shed of the site may be impacted, resulting in impairing a site's integrity of setting and feeling. Most impacts can be avoided by site avoidance and reclamation; however, in rare cases, sites cannot be avoided. If a site is National Register eligible under criterion d (significant because of data content) the impacts can only be mitigated to "no adverse impact" by data collection. However, if a site is eligible under any of the other three criteria, the effects may only be partially mitigated and the project would have an "adverse effect" under Section 106 of the National Historic Preservation Act.

Impacts to the view shed that are temporary in nature (i.e., can be mitigated by complete rehabilitation of disturbance at the end of project life) can be mitigated to a "no adverse effect" through reclamation. Cultural resource surveys would be conducted for each site-specific exploration or development proposal, which would identify and avoid impacts to cultural resources.

4.3.1.3 Cumulative Impacts

Past impacts to cultural resources have occurred from unauthorized collection and excavation as well as mining, grazing, off-highway vehicle use, roads and other developments. Passage of the National Historic Preservation Act of 1966 and other laws have greatly reduced impacts to cultural resources from resource development and other activities on public lands. Presently, impacts to cultural

resources from activities on public land are minimal due to avoidance or development of mitigation measures. Projected cumulative impacts to cultural resources from the Proposed Action, based on the RFD, when combined with past, present, and RFFAs are expected to be insignificant. This is because the majority of sites in the Assessment Area are eligible under criterion d and can be completely avoided during lease development or mitigated.

4.4 Native American Religious Concerns

4.4.1 Proposed Action

4.4.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.4.1.2 Indirect Impacts

Oil and Gas Lease Sales

Although the act of selling oil and gas leases does not directly authorize exploration, development, or production, or any other related ground disturbance activities, there does exist the potential to impact Native American sites of a spiritual, cultural, or traditional nature. If a lease is sold, the lessee retains irrevocable rights and can foreclose the authorized officer's use of some mitigation measures. For example, according to 43 CFR § 3101.1-2, once a lease is issued to its owner, that owner has the "right to use as much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold" subject to specific nondiscretionary statutes and lease stipulations. However, impacts to cultural sites can be minimized and/or mitigated when affected Tribes provide input and actively and fully participate in the decision making process.

Not all sensitive traditional, cultural, or spiritual sites and activities are of a physical nature. Many tribal sacred sites may lack artifacts that would support a past and continued use of the area. The fact that such a site exists and retains its physical integrity and is attached to the continuation of sacred spiritual belief and/or use, such a site is not to be viewed by nonnatives as not important. Also, many tribal entities, groups, and individuals often withhold the release of sensitive cultural information until the site is in immediate danger of being impacted. The BLM can help to mitigate this issue by allowing the Tribes a reasonable review and comment period and allow staff and management to remain flexible in their schedules. Most tribal entities meet in a formal manner only once a month and this can often conflict with tight federal land management schedules. The Tribes, being given the opportunity to meet with BLM staff and management at the lease sale, exploration, and development stages, would allow for further tribal participation opportunities.

Exploration (Geophysical, Drilling, and Road Construction)

It is believe that Native American resources and sites of cultural, traditional, or spiritual use maintain their physical and thus their spiritual integrity due to their undisturbed and pristine locations. This in not to say that certain areas lose their importance and sacredness due to being physically impacted. Some areas within the BLM BMFO administrative boundary have experienced past and present ground disturbance; however, still maintain spiritual integrity. The fact that an important site has been disturbed in the past does not lessen its sacredness. However, ongoing disturbance can have an impact to cultural, traditional, or spiritual activities that currently take place in certain areas. For example, a once pristine and functioning hot spring may experience a decline in flow or temperature or dry up altogether, if the area experiences exploration drilling or development (see existing data on Beowawe Geysers). Although traditional Native Americans can no longer physically utilize the hot water in a spring that is declining or failing altogether (e.g., traditional healing), the area still maintains its importance due to its former attachment to, and use by, the ancestors.

Vehicles, equipment, and personnel used for exploration purposes can impact areas utilized by traditional Western Shoshone. Long- and short-term noise and visual impacts can have a detrimental impact to existing cultural, traditional, or spiritual activities that may occur in certain areas. Remote sacred sites such as prayer, sweat lodges, and vision quest sites, along with edible and/or medicinal plant gathering sites and activities, must remain quiet and undisturbed.

The physical remains of past cultural and subsistence practices and activities (e.g., antelope traps, points, flakes, stone tools, and grinding stones) are also considered to be extremely important and sacred due to such artifacts having been made by the ancestors and considered evidence of thousands of years of native inhabitancy. Exploration, associated drilling activities, and road construction can destroy such artifacts thus eliminating not only native physical evidence and sacred objects, but also archaeological data that can produce a better understanding of past and present cultures. Archaeological data combined with native oral history can reveal information pertaining to past cultural activities and associated social practices, trade routes, subsistence activities, and environmental changes.

Exploration roads leading to drilling locations, although often intended to be temporary and reclaimed, can experience continued use by members of the public to access formerly inaccessible locations. If members of the general public increasingly utilize former drill roads, the cultural, traditional, or spiritual integrity of any adjacent Native American use site, may be compromised.

Any potential adverse effects, due to exploration activities, must be determined through consultation between BLM staff and management and Tribal staff, leadership, and tradition practitioners. Early coordination with traditional practitioners and Tribal governing bodies may reduce or eliminate any potential adverse impacts to such sites and activities by avoidance of the site or through site-specific mitigation. Prior to approving oil and gas exploration activities on any lands within the Assessment Area boundary, the BLM would produce a site-specific EA, part of which would address Native American Religious Concerns for the specific project area. At that time, affected Native American

Tribes would have another opportunity to express concerns and offer alternatives and/or mitigating measures to the proposed exploration. This could include the lessee obtaining an agreement from surface landowners to monitor hot springs (if any exists in the project area). To ensure that Native American concerns are addressed and impacts avoided, or reduced, monitoring and mitigation measures have been developed (see Section 4.7.3).

Development

Exploration activities and any associated disturbance, temporary or reclaimed, that appear to have no initial adverse impact to tribal resources and sites of a cultural, traditional, or spiritual nature, may produce a long-term and adverse impact when a development plan is implemented, as a result of data gathered during exploration. Development of oil wells, would have similar impacts as that of exploratory activities. However, the potential to adversely impact known sites and activities in the area of development would increase as would any long-term effects.

If a development plan is submitted, communication, cooperation, and coordination with BLM and Tribal governing bodies, traditional practitioners, staff, and other knowledgeable community members should have identified any issues or concerns during the lease and exploration phase. By coordinating and communicating with the affected Tribes early and often, a data base for a specific area can be utilized if and when a development plan is submitted; however, this does not mean consultation is not necessary during the development stage. Tribal participation would be required at the lease, exploration, and development stages.

Depending on the specific location, introducing long-term facilities and associated activities (buildings, roads, increase human presence, traffic, noise, etc…) may cause impacts to sensitive cultural areas and activities. Such an impact would be detrimental to the continued use of a specific site by traditional practitioners. Anticipating impacts to specific cultural resources and cultural, traditional, or spiritual sites and activities is nearly impossible because this EA is not site specific. However, the BLM has on file (and continues to gather) a multitude of traditional, cultural, or spiritual use site data, submitted by knowledgeable tribal members and through ethnographic studies, that can be utilized if and when a proposal to develop oil and gas is submitted. Sensitive cultural use and site data are considered highly confidential. In addition, communication with affected Tribes would help to reduce or eliminate impacts through avoidance or through site-specific mitigation.

4.4.1.3 Cumulative Impacts

Over the last 20 to 30 years, the BLM and the Tribes have witnessed an increase in the use of BLM-administered lands, by various groups, organizations, and individuals. New ways to utilize the public lands are also on the rise. Grazing, pursuit of recreation opportunities, hunting and fishing, oil, gas, geothermal, and mining leasing, exploration and development, along with relatively newer uses such as off-highway vehicle use, interpretive trails, mountain biking, and Geo-caching are among many activities that are on the rise within the Assessment Area. In addition to all the existing

and developing uses of the public lands, fluid mineral leasing and exploration may contribute to the general decline in sites and associated activities of a cultural, traditional, and spiritual nature.

It is believed that cultural resources, including Tribal resources and sites of cultural, traditional, or spiritual use and associated activities are increasingly in danger of losing their physical and spiritual integrity. As populations increase, public interest in utilizing lands administered by the BLM, operating under a multiple use mandate, increases as does the potential for the decline of culturally sensitive areas . Different world views, methods of resource utilization, social and spiritual practices, and beliefs often conflict with each other. Traditional lands of the Western Shoshone encompass the majority of the State of Nevada; therefore, it is imperative that BLM BMFO and affected Tribes within the Assessment Area remain flexible and open to productive and proactive communication in order to assist each other in making decisions that may significantly reduce or eliminate any adverse affects to all party's interests, resources, and/or activities. Presently, impacts to many cultural, traditional, spiritual sites, and associated activities have been avoided through Native American consultation efforts.

Only the potential impacts to tribal resources were analyzed because this EA is not site specific.The BLM does have on file a multitude of confidential cultural information that can be referenced to when needed by authorized individuals. Without a specific proposed project location and description, identifying impacts to specific tribal resources is difficult. As noted previously, for any future development, the BLM would produce a site-specific EA, which would discuss alternatives or measures that may reduce or eliminate impacts to Native American Religious Concerns. Presently, many impacts to cultural, traditional, spiritual sites, and associated activities have been avoided through Native American consultation efforts. The BMFO is in the process of seeking guidance, recommendations, mitigation measures, avoidance areas, and ranges of alternatives from various recognized tribal governing bodies.

4.4.2 Mitigation Measures

1. Oil and gas leasing is authorized under the Mineral Leasing Act of 1920 (as amended and modified by subsequent legislation) and 43 CFR 3100. Oil and gas leasing and development are recognized and acceptable uses of lands administered by the BLM under the FLPMA. However, in accordance with the National Historic Preservation Act (P.L. 89-665), the NEPA (P.L. 91-190), the FLPMA (P.L. 94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L. 101-601) and Executive Order 13007, the BLM must also provide affected Tribes an opportunity to comment and consult on the proposed project. BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional, cultural, or spiritual sites, activities, and resources.

2. The BLM reserves the right to deny or alter proposed activities associated with any surface occupancy that results from oil and gas leasing. Maintaining physical and spiritual integrity of certain locations within the BLM BMFO administrative boundary is crucial to present and future cultural, traditional, or spiritual activities. In accordance with federal legislation and executive orders, federal agencies must consider the impacts their actions may have to

Native American Religious Concerns. Consequently, the BLM must take steps to identify locations with traditional, cultural, or religious values to Native Americans and insure that leasing or development actions do not unduly or unnecessarily burden the pursuit of traditional religion or traditional lifeways.

3. Depending on the location of a proposed lease sale, exploration, or development, the proponent may be responsible for costs leading to the successful completion of any needed ethnographic study, government-to-government Native American Consultation, and consultation with Tribal Cultural Resource Specialists or monitors. Tribal monitors and BLM Cultural Resource Specialists may periodically visit sensitive locations within or near any lease sale, exploration, or development areas. Native American Consultation and monitoring by the BLM and Tribal Cultural Resource Specialists can occur throughout the life of a project to ensure that any identified traditional cultural properties are not deteriorating.

4. If leasing, exploration, or development (with acceptable restrictions) occurs within an area deemed culturally sensitive, the BLM would be responsible for formally educating project participants of the importance of Native American Religious Freedom, which includes the unmolested existence of Native American historic and pre-historic physical remains (artifacts). During the project activities, if any cultural properties, items, or artifacts (stone tools, projectile points, etc…) are encountered, it must be stressed to those involved in the proposed project activities that such items are not to be collected. Cultural and archaeological resources are protected under the Archaeological Resources Protection Act (16 U.S.C. 470ii) and the FLPMA (43 U.S.C. 1701).

5. If an approved exploration or development plan is transferred from one operator to another, the new operator would consult early in the process and often with BLM Tribal Relations staff to ensure prior mitigation measures and activities, relating to Native American Religious Concerns, are maintained.

6. Though the probability of disturbing Native American gravesites within the Assessment Area is extremely low, inadvertent discovery procedures must be noted. Under the Native American Graves Protection and Repatriation Act, section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation.

7. If any traditional cultural properties, tribal resources, and sacred sites are identified in any lease, exploration, or development area, a protective buffer zone may be acceptable, where physical avoidance is an issue, if doing so satisfies the needs of the BLM, the proponent, and affected Tribe. The size of any "buffer zone would be determined through coordination and communication between all participating entities.

8. It must be stated that if the BLM is unable to deny or exclude (as per tribal request) an area from oil and gas leasing, exploration, or development, the BLM would utilize all available cultural information (internal and tribal) to alter any proposed action in order to limit or significantly reduce any adverse impact to tribal resources, sacred sites, or areas deemed detrimental to the continuation of cultural, traditional, or spiritual lifeways.

9. Detailed information, regarding cultural resource locations and activities, is filed at the BLM BMFO and is considered highly confidential. Proponents should consult early in the process and often with BLM cultural staff regarding any oil and gas related proposal. General summaries of certain sensitive cultural data, including maps, and especially confidential Native American spiritual documentation, can only be reviewed by physically visiting the BLM BMFO.

4.5 Wastes, Hazardous and Solid

4.5.1 Proposed Action

4.5.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.5.1.2 Indirect Impacts

Examples of environmental impacts from hazardous materials, hazardous waste and solid waste which might be encountered in the RFD are provided below.

Exploration

Impacts would include drilling fluid or hydrocarbon spills, leakage from improperly constructed sump ponds or waste water collection systems, improperly handled brine water from drilling and accumulations of solid waste, which could impact water quality or contaminate soils. Hydrocarbon spills could be hydraulic fluid, gasoline, oil, or grease from vehicles, generators and exploration drill rigs. Brine water from exploration drilling, if improperly disposed of could raise the pH of existing surface waters to unacceptable levels. Accumulations of nonhazardous solid waste could include trash, drill cuttings, wastewater, bentonite and cement generated during drilling operations.

Production / Development

Impacts would 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. Additionally stormwater runoff could contain elevated quantities of heavy metals and volatile organic compounds. Nonhazardous solid waste could be generated at this stage, which would increase the potential for contamination of water, soil and toxic impacts to wildlife.

Production

Impacts of the long-term production phase could include spills and leaks from routine plant operations. Examples of these substances could be hydraulic fluid, gasoline, oil, paint, antifreeze, cleaning solvents, transformer insulating fluid, and grease. These discharges could result in adverse impacts to water, soil, air, and wildlife. Accidental releases from sumps or waste water collection systems could include hazardous water treatment chemicals such as chlorine. Stormwater runoff containing heavy metals and volatile organic compounds could be problematical. There would also be nonhazardous solid waste generated (i.e., drilling muds).

Final Abandonment

The operator would identify, remove and properly dispose all hazardous materials hazardous waste and solid waste. Spills could occur during the removal operations. Based on meeting regulatory requirements and implementing leasing stipulations, adverse impacts from hazardous materials would be minor.

When the RFD for the BMFO is considered, impacts to natural resources would be negligible if the substances used for these operations, as described in the affected environment, are properly handled, stored and disposed of. Proper management of these substances as defined by federal and state regulations would ensure that no soil, ground water or surface water contamination would occur with any adverse effect on wildlife, worker health and safety, or surrounding communities. The Proposed Action would allow inclusion of updated mitigation measures, BMPs, COAs, and performance standards would be defined during site specific analysis for exploration, production and development.

4.5.1.3 Cumulative Impacts

Other major hazardous and solid waste generating activities include mineral exploration, mining and geothermal exploration. When these activities are combined with the small acreage of oil and gas disturbance identified in the RFD, and any mitigation developed during site-specific analysis for oil and gas exploration and development, the cumulative impacts would be negligible. Additionally, federal and state government specifically regulate each project to ensure that there are no releases of hazardous materials into the environment.

4.6 Invasive, Nonnative Species

4.6.1 Proposed Action

4.6.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.6.1.2 Indirect Impacts

The Proposed Action would authorize leasing, which in turn, through site-specific EAs would authorize roads and drill pad construction. This potential disturbance would be conducive to new infestations and have the potential to increase and spread existing populations of invasive plants, noxious weeds and pests within the Assessment Area. Oil and gas exploration and development may include staging, construction, maintenance, and the use of motorized vehicles for transportation of personnel and equipment, which may increase the potential for new and expanded infestations. Based on the RFD, 627 acres of oil and gas related disturbance may occur. New, continued, and enlarged infestations of invasive plants, noxious weeds, and pests that may occur as a result of oil and gas disturbance would be minimized by implementing mitigation measures identified below.

4.6.1.3 Cumulative Impacts

Continued ground disturbance from off-highway vehicles use, cattle grazing, mineral exploration and mining, and geothermal exploration has contributed to the infestation and spread of invasive plants, noxious weeds and, pests within the affected environment and cumulative study area. Overall, the Proposed Action would increase the potential for impacts to existing native plant communities, decrease competition between these native plant communities and invasive species, and thus heighten the potential for invasive species infestations and spread. However, measures taken in accordance with the Prevention Schedule and Best Management Practices included in the plans of operations for future oil and gas projects would prevent new, continued, and enlarged infestations and the spread of invasive species. By implementing these mitigation measures, the incremental effect from past, present and RFFAs, combined with the Proposed Action (RFD), would ensure that cumulative impacts to invasive plants, noxious weeds, and pests would be minimal.

4.6.1.4 Mitigation Measures

The operator/lessee would be required to implement the Prevention Schedule and BMPs (Appendix G).

4.7 Wildlife

4.7.1 Proposed Action

4.7.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.7.1.2 Indirect Impacts

For wildlife issues, the disturbance associated with production and exploration are essentially expected to be the same because the activities are similar. Oil and gas exploration and production activities have the potential to affect wildlife in the following ways:

- Temporary disturbance, displacement, or mortality of wildlife could result from exploration and activities from the human presence that is required; and

- Longer term habitat loss could result from exploration or development, as a result of disturbance to soils and vegetation that remains unreclaimed or unsuccessfully reclaimed. Reclamation, especially in low elevation and low precipitation sites is difficult even with the best techniques and equipment, and the potential for failure is high.

The acreage of disturbance associated with oil and gas exploration and production are expected to be minimal. Based on the RFD, oil and gas exploration or production activities are expected to disturb a total of 627 acres over a ten year period. Reclamation of disturbed acres would be ongoing, and a total of 597.2 acres are expected to be reclaimed, leaving a total of 29.2 unreclaimed acres after the ten year analysis period.

Successful reclamation of disturbance to vegetation and soils may require fencing to exclude livestock. Livestock fences can impact wildlife by impeding the movements of species such as mule deer and pronghorn antelope, and by posing a potential collision hazard, primarily to avian species. Fences also present the potential for increased predation of birds and small mammals by raptors as a result of the increased availability of raptor perching sites. This effect is expected to be minimal; however, because of the low height of such fences and because the use of steel posts and corner braces (rather than wood) reduces perching opportunities for raptors.
The Shoshone-Eureka RMP Record of Decision (BLM 1986) provides for time of day and/or time of year restrictions on exploration and development that are in the immediate vicinity or would cross crucial sage grouse, deer and pronghorn antelope winter habitat, antelope kidding areas, or raptor nesting areas.

Mule Deer and Pronghorn Antelope

Successful reclamation of disturbance to vegetation and soils may require fencing to exclude livestock. Livestock fences can impede the movements of species such as mule deer and pronghorn. To mitigate those impacts, fence construction would conform to BLM specifications, which minimize the entanglement risk for mule deer (which typically jump fences) and which also provide for clearance of pronghorn antelope (which typically crawl under the fence).

4.7.1.3 Cumulative Impacts

All wildlife species have a preferred habitat; man-caused disturbances, wildfire, deep snow, drought, or other climatic events may, however, singly or in combination cause wildlife species to move to areas that are less desirable as habitat or may already be at carrying capacity, which may result in a reduction of the population size and/or viability. In those cases where a species is indigenous to very small unique or isolated habitat and is not mobile, the entire species could be lost. A number of other ongoing projects and RFFAs in the area, such as mining, mineral exploration, off-highway vehicle use, and livestock grazing could cumulatively impact wildlife. These activities could result in loss of habitat, habitat fragmentation, and disruption of movement patterns.

Other cumulative impacts associated with the Proposed Action and other human activities, such as wildfire suppression/rehabilitation, greater sage grouse habitat improvement projects, construction of wildlife guzzlers, vegetation rehabilitation, and invasive weed treatments are inherently beneficial for wildlife and wildlife habitat. These activities are implemented to enhance rangeland condition, riparian/wetland health and functionality, and improve water quality, all of which benefit wildlife and associated habitat.

The cumulative effects of livestock fencing associated with many of these projects and activities can have impacts on wildlife as discussed in the Environmental Consequences section of this document including: impedance to movement, collision, increased predation as a result of the construction of new raptor perches. Fences in the Assessment Area include allotment boundary fences, highway ROW fences, private land fences, and numerous small riparian meadow fences.

It is expected that the Proposed Action may contribute to cumulative impacts, although the reasonably foreseeable role of oil and gas exploration and development in overall impacts within the Assessment Area is negligible (29.2 acres of overall surface disturbance over after a ten year period), especially if effectively minimized through site-specific COAs, BMPs, and mitigation measures.

4.7.1.4 Mitigation Measures

Successful reclamation of disturbance to vegetation and soils may require fencing to exclude livestock. Livestock fences can pose a potential collision hazard, primarily to avian species. To mitigate those impacts, dark green steel T-posts with white tips would be used to increase visibility of the fence, reducing the risk of collision with the fence by both birds and mammals.

4.7.2 Migratory Birds

4.7.2.1 Proposed Action

4.7.2.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.7.2.1.2 Indirect Impacts

For wildlife issues, the disturbance associated with production and exploration are essentially expected to be the same because the activities are similar. Oil and gas exploration and production activities have the potential to affect migratory birds in two primary ways:

- Temporary disturbance and displacement, or mortality, of migratory birds could result from exploration and development activities and from the human presence that is required; and

- Longer term habitat loss could result from exploration or development, as a result of disturbance to soils and vegetation that remains unreclaimed or unsuccessfully reclaimed. Reclamation, especially in low elevation and low precipitation sites is difficult even with the best techniques and equipment, and the potential for failure is high.

However, the acreage of disturbance associated with oil and gas exploration and production is expected to be minimal. Based on the RFD, oil and gas exploration or production activities are expected to disturb a total of 627 acres over a ten year period. Reclamation of disturbed acres would be ongoing, and a total of 597.2 acres are expected to be reclaimed, leaving a total of 29.2 unreclaimed acres after the ten year analysis period.

Successful reclamation of disturbance to vegetation and soils may require fencing to exclude livestock. Livestock fences could impact migratory birds by posing a potential collision hazard. Fences also present the potential for increased predation of birds by raptors as a result of the increased availability of raptor perching sites. This effect is expected to be minimal; however, because of the low height of such fences and because the use of steel posts and corner braces (rather than wood) reduces perching opportunities for raptors.

Ground clearing or other habitat disturbance activities (e.g., cross country access to exploration sites) associated with oil and gas exploration that are conducted during the migratory bird nesting season (i.e., March through July) have the potential to destroy eggs and young of migratory birds, thereby contributing to the potential to violate the Migratory Bird Treaty Act (MBTA). Species most

likely to be encountered include common shrub-nesting birds such as the sage thrasher, sage sparrow, Brewer's sparrow, horned lark, and meadow lark. Impacts would be reduced by site-specific COAs, BMPs, and mitigation measures described below.

4.7.2.1.3 Cumulative Impacts

A number of other ongoing and RFFAs in the area, such as mining, mineral exploration, off-highway vehicles use, and livestock grazing could cumulatively impact migratory birds. These activities could result in loss of habitat, habitat fragmentation, and disruption of movement patterns.

Other cumulative impacts associated with the Proposed Action and other human activities, such as wildfire suppression/rehabilitation, greater sage grouse habitat improvement projects, construction of wildlife guzzlers, vegetation rehabilitation, and invasive weed treatments are inherently beneficial for migratory birds and their habitat. These activities are implemented to enhance rangeland condition, riparian/wetland health and functionality, and improve water quality, all of which benefit migratory birds.

The cumulative impacts of livestock fencing associated with many of these projects and activities can have negative consequences for wildlife as discussed in the Environmental Consequences section of this document by impedance to movement, collision, and increased predation as a result of the construction of new raptor perches. Fences in the Assessment Area include allotment boundary fences, highway ROW fences, private land fences, and numerous small riparian meadow fences.

It is expected that the Proposed Action may contribute to cumulative impacts, though the reasonably foreseeable role of oil and gas exploration and development in overall impacts within the Assessment Area is negligible (29.2 acres of overall surface disturbance over a ten year period), especially if effectively mitigated.

4.7.2.1.4 Mitigation Measures

Any construction activity during the migratory bird nesting season (i.e., March through July) potentially risks violation of the MBTA by destroying the eggs or young of common shrub or ground-nesting species. Exploration and development proposals on the public lands would require a migratory bird review, and may require a field survey for the presence of migratory birds. Potential impacts to migratory birds would be analyzed on a case-by-case basis.Additional site-specific mitigation measures would be developed on an individual project basis depending upon the results of the survey.

To minimize the potential increase in predation of migratory birds by raptors due to the increase availability of raptor perching sites, the height of fences shall remain low and composed of steel, rather than wood, posts, and corner braces shall be used.

4.7.3 Threatened and Endangered Species Including Special Status Species

4.7.3.1 Proposed Action

4.7.3.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.7.3.1.2 Indirect Impacts

For threatened, endangered, and special status species, the disturbance associated with production and exploration are expected to be the same because the activities are similar. Oil and gas exploration and production activities have the potential to affect threatened, endangered, and special status species in the following ways:

- Temporary disturbance and displacement, or mortality, of wildlife could result from exploration and development activities and from the human presence that is required; and

- Longer term habitat loss might result from exploration or development, as a result of disturbance to soils and vegetation that remains unreclaimed or unsuccessfully reclaimed for a period of years. Reclamation, especially in low elevation and low precipitation sites, is difficult even with the best techniques and equipment, and the potential for specific site failure may be high.

The acreages of disturbance associated with oil and gas exploration and production are expected to be minimal. Based on the RFD, oil and gas exploration or production activities are expected to disturb a total of 627 acres over a ten year period. Reclamation of disturbed acres would be ongoing, and a total of 597.2 acres are expected to be reclaimed, leaving a total of 29.2 unreclaimed acres after the ten year analysis period. Additional impacts would be reduced by site-specific COAs, BMPs, and mitigation measures described below.

Successful reclamation of disturbance to vegetation and soils may require fencing to exclude livestock. Livestock fences could impact threatened, endangered, and special status species by impeding the movements of species and by posing a potential collision hazard, primarily to avian species. Fences also present the potential for increased predation of birds and small mammals by

raptors as a result of the increased availability of raptor perching sites. This effect is expected to be minimal; however, because of the low height of such fences and because the use of steel posts and corner braces (rather than wood) reduces perching opportunities for raptors.

4.7.3.1.3 Cumulative Impacts

A number of other ongoing and RFFAs in the area, such as mining, mineral exploration, off-highway vehicles use, and livestock grazing could cumulatively impact threatened, endangered, and special status species. These activities could result in loss of habitat, habitat fragmentation, and disruption of movement patterns.

Other cumulative impacts associated with the Proposed Action and other human activities, such as wildfire suppression/rehabilitation, greater sage grouse habitat improvement projects, construction of wildlife guzzlers, vegetation rehabilitation, and invasive weed treatments are inherently beneficial for threatened, endangered, and special status species and associated habitat. These activities are implemented to enhance rangeland condition, riparian/wetland health and functionality, and improve water quality.

The cumulative effects of livestock fencing associated with many of these projects and activities can have negative consequences for threatened, endangered, and special status species in the following ways: impedance to movement, collision, and increased predation as a result of the construction of new raptor perches. Fences in the Assessment Area include allotment boundary fences, highway ROW fences, private land fences, and numerous small riparian meadow fences.

It is expected that the Proposed Action may contribute to cumulative impacts, although the reasonably foreseeable role of oil and gas exploration and development in overall impacts within the Assessment Area is negligible (29.2 acres of overall surface disturbance over after a ten year period), especially if effectively mitigated.

4.7.3.1.4 Mitigation Measures

The Assessment Area may 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 the BLM conservation and management objective by avoiding activities that would contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activities that are 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 designated or proposed critical habitat. The BLM would not approve any ground disturbing activity that may affect any such species or critical habitat until the BLM completes 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.

Exploration or development activities with potential to affect threatened bald eagles or Lahontan cutthroat trout would require Section 7 consultation with the USFWS as required by the Endangered Species Act to ensure than no adverse effect occurs.

Exploration and development proposals on the public lands would require a special status species review, and may require a field survey for the presence of special status species. Potential impacts to special status species would be analyzed on a case-by-case basis. Additional site-specific mitigation measures would be developed on an individual project basis depending upon the results of the survey.

The BLM may require modifications to, or disapprove, a proposed activity that is likely to jeopardize any special status species or its habitat. The BLM may recommend modifications of exploration proposals to avoid the possibility that a BLM-approved activity might contribute to the listing of a special status species. The BLM would not approve any ground disturbing activity that may affect any such species or critical habitat until it meets the requirements of the ESA, including any required consultation.

The Shoshone-Eureka RMP Record of Decision (BLM 1986) provides for time of day and/or time of year restrictions on exploration and development that are in the immediate vicinity or would cross crucial sage grouse, deer and pronghorn antelope winter habitat, antelope kidding areas, or raptor nesting areas.

The BLM would require measures listed below for activities in habitat for the following special status species: greater sage-grouse, ferruginous hawk, and pygmy rabbit.

Greater Sage Grouse

Disturbance to vegetation in all known greater sage-grouse habitats shall be minimized. From March 1 through May 15, human activity shall be minimized within view (or by at least 0.5 miles) of known leks (i.e., strutting grounds) especially between midnight and 1000 hours (Pacific Daylight Time) (see Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada, BLM, October 2000). From April 1 through August 15, known nesting and brood rearing areas (especially riparian areas where broods concentrate beginning usually in June) shall be avoided by 0.5 miles. Identified greater sage grouse wintering areas would be avoided by 0.5 miles while occupied. Most known wintering grounds in the Assessment Area occur at high elevations and are not likely to be affected.

Ferruginous Hawks
Known ferruginous hawk nests would be avoided by at least 0.5 mile between March 15 and July 1.

Pygmy Rabbits
As per Instruction Memorandum NV-2003-064, May 2003, "all field offices should begin to survey for pygmy rabbits in relation to all proposed ground disturbance activities, including issuance of ROWs in suitable habitat . . . wherever practicable, field offices should avoid ground disturbing activities in pygmy rabbit habitat."

4.8 Hydrology and Water Quality

4.8.1 Proposed Action Hydrology and Water Quality

4.8.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.8.1.2 Indirect Impacts

Indirect impacts to water quantity from oil and gas development would be occur as a result of the following: 1) the extraction and disposal of any produced ground water; 2) disposal of produced ground water; and 3) any surface disturbing activities which have the potential to introduce sediment to waterways. Activities of the exploration phase would likely have minimum impact because the volumes of fluid concerned would be minimal. Development phase activities would have a somewhat greater impact, primarily related to the disposal of thermal fluids produced during reservoir testing. Impacts from these two phases would be of short duration and limited to a small area. Production would have the greatest potential for impacting water resources as a result of both changes to reservoir hydraulics and spent fluid disposal. Oil and gas development may require process water derived from local sources. In such instances, ground water is the most likely resource. Extraction of ground water may result in an impact to the hydraulic character of the ground water resource. These impacts could include: changes to the hydraulic head in the reservoir which could result in reduced spring discharge and lower water levels in wells; or consumptive use of the ground water, thereby limiting the resource available to other users.

Exploration
Oil and gas exploration activities could include drilling holes for collection of data such as subsurface temperature gradient data and core for lithology and permeability analysis or for setting explosive charges for seismic analysis. It is expected that this phase of activity would not produce large quantities of ground water or oil and gas fluids. However, small volumes of fluids may be

produced by drilling into the saturated zone. Fluids produced during drilling are generally incorporated into the drilling fluid. On completion of drilling, remaining drilling fluids are contained in a mud pit or sump and must be disposed.

Development

Development or testing of the oil and gas resource would be focused on evaluation of the hydraulic and production character of the oil and gas reservoir. Wells would be drilling into a potential oil and gas reservoir and production of oil and gas fluids would be necessary to evaluate the reservoir. The volume of resource produced would depend upon the duration of tests performed, which could last from tens of hours to tens of days. Fluid volumes produced during this phase of activity would be small relative to production. The production phase of activity would involve the production and disposal of large volumes of produced fluids. Removal of these fluids is not likely to have any discernable impacts, unless there is a hydrologic connection with the surface water resource. These instances are considered rare and would be addressed through site-specific mitigation measures, COAs, and BMPs. Disposal options may include reinjection to the source reservoir or release to the land surface. The selected action will be implemented in accordance with Onshore Oil and Gas Order number 7. Impacts from sedimentation would also occur during this phase, but impacts would be minimized through site-specific mitigation measures, COAs, and BMPs.

When considering the RFD, environmental impacts cannot be determined for individual leases or for exploration, and development of production activities. Existing data describing existing water systems, ground water reservoirs, oil and gas reservoirs, the interrelationships of these systems, or specific exploration, development and production activities are inadequate to determine specific effects of these activities within the Assessment Area. Potential impacts from these exploration and production activities would be minimized through updated site-specific mitigation measures, COAs, and BMPs, which may help ensure of the long-term health of the Assessment Areas hydrologic system and water quality.

4.8.1.3 Cumulative Impacts

In the past, livestock, agriculture, and mining have contributed to the degradation of water quality and in the form of discharges of process solutions or infiltration of low quality leachate from tailings, heaps, waste facilities, and underground working from mine operations or through non-point sources such as agriculture uses. These past impacts have been reduced by the initiation of the Clean Water Act and Safe Drinking Water Act. Past impacts to surface waters were also due to consumptive use by mining and agriculture, although these impacts were localized and of limited scale due to the fluctuation of precipitation in the Great Basin. Current development of surface water includes diversions at perennial stream and spring sources for agricultural uses. Surface water use is permitted by the Division of Water Resources for a valid beneficial use. Agriculture is the largest use of surface water primarily for irrigation of alfalfa. Livestock watering occurs throughout the Assessment Area depending on availability of water sources. Current measures to protect surface

water quality from authorized uses are now standard operating procedures. Mine facilities, for instance, now operate under zero discharge permits in accordance with NDEP and must prevent unnecessary or undue degradation of the environment in accordance with the FLPMA.

Reasonably foreseeable impacts to the surface water could come from the continuation of existing authorizations or future development of mineral resources, if approved. Surface water quality impacts from mining operations would not be expected because of regulations and mitigation measures implemented to prevent water quality degradation; however, there are existing areas with historic mining that are problematic, especially during times of heavy precipitation. Cumulative impacts to water quantity from future mining are site specific and unknown until a proposal is analyzed. Where dewatering is occurring at a high rate (e.g. open pit mining) (BLM 2004), impacts are occurring to surface water volumes. The impacts from the Proposed Action do not have an incremental effect on any area in the Assessment Area because the temporary use of water is minimal for a finite period. Livestock grazing could continue to be a non-point source of pollution where uncontained runoff from livestock operations degrades other surface water bodies. Based on the RFD and current protection measures outlined above, the potential for substantial cumulative surface water quality impacts from a producing oil well would be minimal.

4.9 Wetlands/Riparian Zones

4.9.1 Proposed Action

4.9.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.9.1.2 Indirect Impacts

Surface disturbance adjacent to wetlands/riparian zones and adjacent flood plains have the potential to adversely affect the functioning condition of riparian area's soil and watershed attributes. Additionally, active exploration adjacent to riparian areas would have the potential to disturb and displace wildlife, as discussed in Section 4.5. For example, riparian areas within sage grouse habitats are critical for early and late brood rearing hens.

Based on the RFD, it is expected that the Proposed Action's impact on riparian habitats would be relatively small, especially when site-specific mitigation, COAs, and BMPs are implemented.

4.9.1.3 Cumulative Impacts

A number of other ongoing and foreseeable human activities in the area, such as mining, mineral exploration, off-highway vehicle use, recreation, and livestock grazing could cumulatively affect wetland/riparian zones. The effects from these activities could result in an excess of erosional points at stream road crossings, road, and drill pad construction sites, and the additional off road use of existing ways and roads. When combined with past, present, and RFFAs, the Proposed Action may contribute to cumulative impacts, although the reasonably foreseeable role of oil and gas exploration and development in overall impact is relatively small, especially if effectively mitigated.

4.9.1.4 Mitigation Measures

Wetlands/riparian zones up to and including the 100-year flood plain would be avoided.If drilling or other surface disturbing activities were proposed within 0.25 mile of surface waters or wetlands/riparian zones, the environmental analysis and record of decision may require additional mitigation. Typical measures may include the following:

1. No surface disturbance within 0.25 mile of riparian-wetlands;
2. No fluids or soil from exploration or development activities would be allowed to enter surface waters or wetlands/riparian zones at any time;
3. No use of surface waters would be allowed for exploration and development without the appropriate permits issued by the Nevada Division of Water Resources;
4. Limitations on the type of equipment that may be used; and
5. Restrictions may be imposed on activities during certain times of the day or year.

All operations would be required to comply with all state and federal regulations concerning water quality and quantity, wetlands/riparian zones and flood plains. If the outflow of water from a spring was negatively impacted by oil and gas operations, the BLM would require the operator to take corrective action, or the BLM would terminate the operation and charge the lessee for the reclamation costs.

4.10 Wilderness

4.10.1 Proposed Action

It is BLM policy not to offer any lands for fluid mineral leasing within WSAs. It is Nevada BLM policy to offer and issue fluid mineral leases to within 0.25 mile of a WSA boundary. Any quarter-quarter section intersected by and including a portion of a WSA boundary would be excluded from the parcel nominated (IM No. NV-2004-093). The fact that activities or uses outside of a WSA can be seen or heard from areas within a WSA does not, of itself, preclude such activities or uses up to the boundary of a WSA. When oil and gas exploration, production, and development

activities on adjacent lands are proposed, the specific impacts of those activities upon the WSA resources and upon public use of the WSA must be addressed and assessed.

4.10.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.10.1.2 Indirect Impacts

When considering the RFD scenario, there would be no impacts to the WSAs under the Proposed Action. Site-specific environmental assessments would be required before any action were undertaken when leases were granted.

4.10.1.3 Cumulative Impacts

All of the past, present and RFFAs within the area of cumulative effect have slightly increased the potential for indirect impacts to the WSAs within or adjacent to the assessment area by reducing opportunities for solitude or primitive and unconfined recreation; however, none of the activities including the Proposed Action have or would take place within the WSAs. Therefore, the cumulative impacts from the proposed action on WSAs, when combined with past, present, and RFFAs, and incorporating site specific mitigation measures, would be negligible.

4.11 Geology and Minerals

4.11.1 Proposed Action

4.11.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.11.1.2 Indirect Impacts

Locatable Minerals

The potential exists that oil and gas interests may overlap with those of mineral exploration. However, based on the RFD, 597.8 of the 627 acres that may be used for oil and gas exploration and production would be reclaimed within ten years. The majority of oil and gas exploration and development would be short term (less than one year) and hence would not appreciably affect

mineral exploration and development. Agreements between oil and gas and mineral operators would help to mitigate those acres that would be used for oil and gas production on a more long-term basis.

Saleable Minerals

Based on the RFD, oil and gas exploration and development activities would require up to 2.5 acres in gravel pit expansion. This small acreage would not greatly increase the amount of gravel pits, nor would it burden the communities that utilize gravel.

Leasable Minerals

In Nevada, oil and gas wells are typically associated with elevated water temperatures (~ 160ºF), and conflicts may arise between geothermal and oil and gas exploration development. These potential impacts would be mitigated through negotiations between operators.

4.11.1.3 Cumulative Impacts

A number of other ongoing and RFFAs in the area, such as mining, mineral exploration, geothermal exploration and production, sand and gravel pit development, could cumulatively impact mineral resources within the Assessment Area. These impacts include conflicts between exploration and development of minerals resources and loss of access to mineral resources. However, based on the small scale of expected disturbance from oil and gas-related activities (29.2 acres after reclamation efforts), the cumulative impact to minerals and geology is expected to be negligible. Impacts that may exist would be mitigated by negotiations between operators.

4.12 Soils

4.12.1 Proposed Action

4.12.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.12.1.2 Indirect Impacts

Road and drill pad building and cross country travel would impact soil surfaces. These impacts include erosion of soils, disturbance to microbiotic crusts, and soil compaction. Based on the RFD, 627 acres may be disturbed over a ten year period. When compared to the acreage of the SEPA (4.3 million acres) and Assessment Area (2.8 million acres), the acreage of disturbance generated by oil and gas exploration and production is not high; therefore, the impacts to soil would be minimal.

4.12.1.3 Cumulative Impacts

A number of ongoing actions and RFFAs in the area, such as mining, mineral and geothermal exploration, off-highway vehicle use, and livestock grazing could cumulatively impact soils. These impacts include erosion of soils, disturbance of microbiotic crusts, and soil compaction.

It is expected that the Proposed Action may contribute to cumulative impacts, though the reasonably foreseeable role of oil and gas exploration and development in overall impacts within the Assessment Area is negligible (29.2 acres of overall surface disturbance over after a ten year period), especially if effectively mitigated.

4.13 Vegetation

4.13.1 Shrub and Grass Dominated Communities

4.13.1.1 Proposed Action

4.13.1.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.13.1.1.2 Indirect Impacts

The RFD predicts that within a ten year period, 572.5 acres would be disturbed by seismic lines, exploration wells, road construction, and gravel pit expansion, and 54.5 acres would be disturbed for oil and gas production. Only 29.2 acres would not be reclaimed; however, reclamation requires time to stabilize soils and for the vegetation to become established potentially leaving exposed soils for two to three years or longer depending on the response of reclamation efforts.

It is anticipated that the majority of the exploration is likely to occur in Saltbush Shrub or sagebrush type vegetation areas, rather than piñon-juniper woodlands. Removal of vegetation would increase the amount of bare ground increasing wind and water erosion, increase the potential for invasion by nonnative and noxious species, reduce the capability for water to infiltrate the ground, and increase runoff and sediment loading.

Sediment loads could impair waters affecting aquatic species and habitat. Decreased infiltration and increased runoff may reduce the amount of available water in the soil for vegetation to establish. Impacts to vegetation from exploration/development, based on the RFD, are expected to minor, relatively short term, and localized. In addition, site-specific mitigation measures, BMPs, and COAs would be implemented to reduce impacts.

4.13.1.1.3 Cumulative Impacts

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mining, and off-highway vehicles use. The creation of new roads, construction of drill pads, and the development of wells and mines removes vegetation, increasing the amount of bare ground and susceptibility to erosion and invasion by invasive plants and noxious weeds. Increased erosion removes critical, nutrient rich top soil which is needed for vegetation to survive. Sediment loading could inhibit the growth of aquatic vegetation impairing wildlife habitat. Further damage, in the form of compacting soils, crushing microbiotic crusts, and damaging understory grasses, shrubs, and forbs could have impacts on these ecosystems. However, the cumulative impacts of the Proposed Action, based on the RFD, on vegetation are expected to be minimal due to the relatively small area of disturbance, concurrent reclamation, and developed site-specific mitigation.

4.13.2 Forestry and Woodland Products

4.13.2.1 Proposed Action

4.13.2.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.13.2.1.2 Indirect Impacts

Indirect impacts associated with off-road exploration programs could have impacts on forest resources, including shrubs, trees, and riparian vegetation (e.g., aspen, cottonwoods, willows). Oil and gas exploration would utilize off-road vehicles and equipment for petroleum exploration. This equipment could include four-wheel drive trucks and larger and heavier wheeled vehicles called "thumpers." Damage to forest and woodland species such as piñon pine, juniper, bristlecone, limber pine, and riparian types such as quaking aspen, cottonwood, and willow could result from the contact of such equipment with the individual plants.

It is likely that the majority of exploration and development efforts would be focused on the lower elevation alluvial fans and playas. Based on the RFD and considering site-specific mitigation measures, BMPs, and COAs that would be developed for potential exploration and development, impacts to forest and woodland resources would be minimal.

Bristlecone Pine

The only known ancient bristlecone pine forests in the Assessment Area are located in Eureka County in the Fish Creek and Monitor Ranges (Charlet 1996) (Figure 3.13.1). It is highly probable that they

also inhabit some of the highest, inaccessible regions of the Diamond Range and the Roberts Mountains. However, in the event that oil and gas exploration and development were located in Bristlecone Pine forest, site-specific mitigation measures, BMPs, and COAs would be developed to minimize impacts.

Quaking Aspen/Cottonwood/Willow
There are scattered stands of quaking aspen, cottonwoods, and willows throughout the Assessment Area (Figure 3.13.1). Site-specific mitigation measures, BMPs, and COAs would be developed to impacts to quaking aspen, cottonwood, and willow trees.

Curl-leaf Mountain Mahogany/Limber Pine
Curl-leaf mountain mahogany and limber pine are relatively scarce in the Assessment Area. These are also USFS sensitive species, which are protected from cutting or removal in the district. The majority of mountain mahogany stands are located in the Fish Creek Ranges. Impacts to curl-leaf mahogany/limber pine would be reduced through site-specific mitigation measures, COAs, and BMPs.

Piñon-Juniper
These are the only woodland/forest species in the Assessment Area which can be cut for fuel wood and/or fenceposts. In the event that oil and gas exploration activities or production occurs in piñon-juniper vegetation communities, impacts could occur from damage or destruction incurred from off-road vehicles, road building, and construction of drilling sites and production facilities. These impacts could be reduced by site-specific mitigation measures, BMPs, and COAs developed during active oil and gas exploration and production.

4.13.2.1.3 Cumulative Impacts

A number of past, present, and RFFAs in the area, such as mining, mineral and geothermal exploration, off-highway vehicles use, and livestock grazing could contribute to cumulative impacts. Based on the RFD, foreseeable impacts could result in the construction of a number of drilling sites, production facilities, and transportation corridors. The long-term change in vegetation and associated potential loss of woodland productivity (piñon-juniper) would not result in substantial impacts since the Assessment Area contains abundant piñon-juniper woodlands. In addition, it is likely that the majority of exploration and development efforts would be focused on the lower elevational alluvial fans and playas. Based on the RDF and when considering site-specific mitigation measures that would be developed for potential exploration and development, cumulative impacts to forest and woodland resources would be minimal.

4.13.2.1.4 Mitigation Measures

Bristlecone Pine
In order to protect this resource, bristlecone pine stands would be avoided.

Quaking Aspen/Cottonwood/Willow
Mitigation measures would avoid impacts to quaking aspen, cottonwood, and willow trees.

Curl-leaf Mountain Mahogany/Limber Pine
Mitigation measures would avoid impacts to curl-leaf mountain mohagany and limber pine trees.

4.13.3 Fuels/Wildland Fires

4.13.3.1 Proposed Action

In general, wildland fires burn in several basic fuel types across the Assessment Area. Fuels types include the following: 1) monocultures of cheat grass; 2) brush/grass fuels such as sagebrush with perennial grass communities or cheat grass understories; and 3) piñon pine or piñon pine/juniper communities.

In an average year, based on a ten-year average, which includes the 1999 fire season (an above average fire season), approximately 34,278 acres of the 10.1 million acres of the BMFO burns (through calendar year 2000). If one excludes the 1999 fire season, the ten year average acres burned is 5, 900 acres, with approximately 50 to 60 wildland fires responded to per year (Approved Resource Management Plan Amendment for Fire Management, September 2002).

4.13.3.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.13.3.1.2 Indirect Impacts

Indirect impacts associated with off-road exploration programs could have impacts on wildland fires. Exploration activities could cause an ignition of a wildfire in the following ways: the use of explosives, either surface or sub-surface; overland travel by vehicles with catalytic converters; or careless use and discarding of smoking materials by crew members on the exploration crews.

4.13.3.1.3 Cumulative Impacts

The RFD indicates the likelihood that between one and ten additional fires over the next ten years could possibly be added to the 50 to 60 fires that the BMFO handles each year. It is likely that none of these fires would escape to become a large wildland fire that would add significantly to the total average burned acres (5,900 acres each year; ten year average) that the BMFO currently handles each year.

4.13.3.1.4 Mitigation Measures

Periodically, the BMFO, in cooperation with other agencies or entities, issues fire restrictions for the public lands managed within its jurisdictional boundaries. The issuance of fire restrictions may place additional restrictions on oil and gas exploration.

Mitigation measures apply to all types of activities related to oil and gas exploration and development and may be required by the Fire Management Officer during the period of onset of fire season through the fall. Ultimately, the weather and fuel parameters used by the BLM to determine fire danger rating would determine the start and ending dates for implementation of these stipulations:

1. Each activity must have an adequate amount of wildland fire fighting equipment (i.e, fire fighting tools such as shovels, McClouds, "swatters," or Pulaskis, a sufficient water supply and delivery system, five to ten pound ABC type fire extinguishers) to deal with initial starts of wildland fires to rapidly suppress any such start.

2. Notify the BLM's Central Nevada Interagency Dispatch Center at 775-623-1555 or 1-800-535-6076; or after hours at 775-623-3444 if a fire is detected in the Assessment Area. If the party is unable to contact the Dispatch Center, the BMFO should be contacted.
3. An exploration representative would have adequate communications while working on the Public Lands in order to contact the Dispatch Center or the BLM office. Adequate communications may be, but are not limited to: cell phone, satellite phone, or radio communications adequate to contact a base of operations that could contact one of the entities identified above.

4. The Fire Management Officer, in cooperation with the Assistant Field Manager, Non-Renewable Resources, would contact any approved on-going oil and gas field activities in order to provide notification of the implementation of the fire restrictions. Additional stipulations may be imposed upon certain activities, depending on the type of those activities.

5. Applicants for oil and gas activities should contact the Division of Fire and Aviation Management upon approval of their activities by the local BLM office and prior to implementation of those activities. The fire management officer, his deputy, or other designate would discuss current fire danger in the proposed project location and any special considerations the proponent should consider while activities are ongoing with respect to the level of fire danger. The proponent should contact the BMFO and request this information.

4.14 Wild Horses and Burros

4.14.1 Proposed Action

4.14.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.14.1.2 Indirect Impacts

Indirect impacts to wild horses and burrows could include influencing herd distribution and migration within and between the HMAs, and disturbance to the forage resource. The estimated surface disturbance acres associated with exploration identified in the RFD total 572.5 acres, with 556 of those acres being reclaimed within the ten year period of analysis. This would impact less than one percent of the 1.7 million acres of HMAs administered by the BMFO.

Mineral exploration activities are common throughout the Assessment Area and oil and gas exploration activities would produce similar disturbances (e.g., roads, drill pads, sumps) to wild horses and burros. Impacts to wild horses or burros may occur from minor disturbances due to an increase in human activity. These impacts would be short term (e.g., less than one year).

Localized and small scale vegetation disturbance could occur due to seismic exploration, road construction, overland travel, and drill pad construction. The estimated surface disturbance acreage associated with production identified in the RFD total 54.5 acres, with 41.8 of those acres being reclaimed within the ten year period of analysis. Similar to exploration, the number of acres associated with production would total less than less than one percent of the 1.7 million acres of HMAs administered by the BMFO; therefore, there would be minimal impacts to the forage available within the HMA.

The impacts of production and development would likely be minimal in larger HMAs, where water and vegetation resources are well distributed across the landscape. Wild horses in larger HMAs could utilize vegetation and water resources in multiple locations. Impact or disturbance to one portion of the larger HMAs would create minimal impact to wild horses and burros, although a change in distribution of horses may occur. Increased vehiclular traffic, road construction, and human presence associated with oil or gas production could cause the wild horses and burros to use the developed area less and increase usage other areas within the HMA. This could have impacts to the other areas within the HMA if increased use causes damage to the vegetation through utilization of forage resources and water sources.

Impacts would be greater to smaller HMAs with limited areas of forage and water availability. Smaller HMAs in the Assessment Area include the following: Hickison Burro HMA; Whistler Mountain; and Rocky Hills HMAs. Particular portions of other HMAs could be impacted if development occurred near critical water sources, or if many wells located near important winter habitat were developed. These impacts would be mitigated through project and site-specific NEPA analysis, which would be conducted for each production and exploration project. Impacts could occur to wild horses during the peak foaling season (i.e., March 1 through June 30). As a result, new foals could be orphaned or abandoned.

4.14.1.3 Cumulative Impacts

Cumulative impacts to wild horses and burros from oil and gas leasing would consist of the impacts occurring as a result of exploration and production. The CESA for wild horse and burro management would include the HMAs managed by the BMFO and those that overlap into adjoining districts, which include the Diamond HMA.

Past, present, and RFFAs that have and could continue to impact wild horses include mining exploration, geothermal exploration, oil and gas exploration, powerline construction, wildland-urban interface activities, off-highway vehicle use, wild horse gathers, communication site construction, wind power generation, noxious weed treatment, and fire rehabilitation. These activities result in isolated and usually limited soil and vegetation disturbance or loss.

Impacts that could occur from oil and gas exploration and development include the following: increased fragmentation of wild horse and burro habitat, and cumulative increases in vegetation; and soil disturbances, which result in incremental losses in availability of quality habitat used for wild horses and burros.

Oil and gas exploration could include overland travel, road construction, seismic testing, and drilling, which could cause additional surface disturbance of 572.5 acres, based on the RFD. Development and production could result in an additional 54.5 acres.

Mining activities, oil and gas production, geothermal development, gravel pit expansion, road building, fencing, wild horse gathers, off-highway vehicle use, and wind generation are all activities that can impact wild horse distribution and seasonal movement throughout and between HMAs. Each activity results in incremental restrictions on free roaming behavior and over time may influence utilization patterns, genetic interchange, and use of water sources.

The amount of surface disturbance that could impact wild horse habitat analyzed in the RFD constitutes a small percentage of the land area managed for wild horses and burros. Additionally, exploration and production activities would be analyzed on a site-specific basis. Effects of the Proposed Action on wild horse and burro populations would be analyzed and mitigation measures

developed to reduce impacts, or restrictions developed to protect wild horses and burros. Based on the small amount of expected disturbance from oil and gas-related activities (29.2 acres of overall surface disturbance after a ten year period), the cumulative impact to wild horse and burros is expected to be negligible.

4.14.1.4 Mitigation Measures

Impacts to wild horses during the peak foaling season would be mitigated by limiting human disturbance during peak foaling season in known foaling areas. Concurrent reclamation would help mitigate cumulative impacts that may include quality and quantity of habitat available to wild horses and increased risks for erosion and noxious weed invasion.

4.15 Range Resources

4.15.1 Proposed Action

4.15.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.15.1.2 Indirect Impacts

The RFD predicts that within a ten year period, 572.5 acres would be disturbed by seismic lines, exploration wells, road construction and gravel pit expansion, and 54.5 acres would be disturbed for oil and gas production. The removal of vegetation would temporarily decrease the amount of available forage for wildlife, wild horses, burros and livestock. This may reduce the AUM number, thus decreasing the amount of livestock that could forage within the allotment. The potential decrease in livestock would coincide with the area of disturbance. Exploration activities could also have a temporary affect on grazing patterns shifting and/or intensifying livestock grazing in other areas. All impacts are expected to be short term.

While in production, wells and other associated equipment would need to be fenced and/or require restricted access. When oil or gas is found, the effects of production would be analyzed in a site-specific environmental assessment and mitigation measures developed at that time. The impacts of the Proposed Action, based on the RFD, on range resources are expected to be minimal due to the relatively small area of disturbance, concurrent reclamation, and developed site-specific mitigation.

4.15.1.3 Cumulative Impacts

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mining and off-highway vehicle use. The creation of new roads, construction of drill pads and the development of wells and mines removes available forage for wildlife, wild horses, burros and livestock. Increased reductions of available forage could have an impact on ranching operations. However, the cumulative impacts of the Proposed Action, based on the RFD, on range resources are expected to be minimal due to the relatively small area of disturbance, concurrent reclamation, and developed site-specific mitigation.

4.16 Lands and Realty

4.16.1 Proposed Action

4.16.1.1 Direct Impacts

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

4.16.1.2 Indirect Impacts

The RFD scenario indicates that 274 acres may be required for roads for oil and gas exploration and production activities. It can be expected that an increase in off lease ROW applications and grants would be required to support any oil and gas developments. These off lease ROWs would be non-exclusive where possible, that is, they can be used by the general public for other purposes such as access to public lands and would be subject to the appropriate site-specific NEPA analysis.

Impacts to existing ROWs may occur as a result of disturbance activities such as road construction. These impacts may cause temporary disruptions to ROW holders, but the FLPMA requires that prior existing rights must be recognized. Any impacts to existing ROWs such as physical disturbances or disruptions in use may have to be mitigated by the lessee.

Exploration on split estate lands would require reasonable compensation to surface owners according to the regulations found at 43 CFR 3814, which implement the Stockraising Homestead Act of 1916. Such compensation may impact the economics of an exploration program to the point where exploration cannot occur.

Areas of intense oil and gas development and production create prior exiting rights for the lessees and could affect the direction or placement of future non oil and gas related ROWs.

4.16.1.3 Cumulative Impacts

There is little appreciable potential for the Proposed Action to have substantial cumulative impacts from past, present and RFFAs to realty actions within the Assessment Area. Based on the RFD, 22 acres of road would potentially remain after ten years. This small acreage, when combined with site-specific mitigation measures for exploration and development, indicate that the potential cumulative impacts from the Proposed Action are negligible.

4.17 Visual Resources

4.17.1 Proposed Action

4.17.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.17.1.2 Indirect Impacts

When considering the RFD scenario, indirect impacts would potentially not meet the management criteria of VRM Class I or II areas. The impacts in Class III areas would probably range from severe to light, depending on the amount of development and the proximity to high-use areas. Indirect impacts in Class IV areas would be relatively minor. Potential impacts to visual resources from long-term developments and facilities, such as access roads and well pads would be characterized in a site-specific environmental assessment and mitigated on a case-by-case basis to minimize impacts to visual resources. Mitigation measures would beneficially impact all landscapes and serve to protect the expansive scenic vistas.

The following are the potential environmental impacts on visual resources when analyzing the RFD scenario:

Exploration

Direct impacts to the landform, vegetation and structural features of the characteristic landscape could occur during the exploration phase; however, these effects would usually be of short duration and localized to a small area. Drilling would temporarily impact the landscape by introducing new line, color, form and texture elements into the landscape. Brightly colored drill rigs and supporting facilities would be visible to visitors. Disturbances to vegetation from drilling and seismic operations could be seen for longer periods of time.

Production/Development

During the development phase, construction of roads, drill pads, pipelines and power lines would result in long-term modifications to the line, form, color and texture of the characteristic landscape. Roads, drill pads and pipelines create strong horizontal linear contrasts. Vegetation and soil removal create color, textural and linear contrasts with adjacent areas that could be highly visible long after the drilling and development facilities were removed. Constructed features would have strong geometric and linear shapes, and solid colors, all contrasting with the natural landscapes and continuing throughout the life of the project.

Final Abandonment

If the project is completely shut down and reclaimed, modified landscapes would be rehabilitated, and the visual impacts would diminish with time. It can take many years for disturbed areas to return to a natural appearance. If the project is not completely shut down the impacts could continue indefinitely.

4.17.1.3 Cumulative Impacts

The cumulative impacts from past, present and RFFAs, as previously outlined, remain low to moderate for visual resources due to the likelihood of large distances between actions and limited (627 total acres disturbed, with 29.2 unreclaimed) surface disturbance. Most of the RFFAs would be on valley floors and alluvial fans. Visual resources are mitigated on a case-by-case basis and many of the activities would be temporary in nature.

Principal existing human-made visual features within the Assessment Area include several State and US highways, gravel and native surface secondary roads, several towns, ranches, open pit mines, farms, and electrical transmission lines. None of the RFFAs would create any visual impact inconsistent with the applicable VRM Class ratings for the Assessment Area, thus the overall cumulative impact would also be low to moderate.

4.18 Recreation

4.18.1 Proposed Action

4.18.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.18.1.2 Indirect Impacts

When considering the RFD scenario, impacts to recreation activities in the Assessment Area are likely to be minimal. Loss of surface water quantity and quality could keep the public from bathing in hot springs. The following are potential environmental impacts on recreation when analyzing the RFD scenario.

Exploration

During the exploration phase, survey and drilling crews are likely to use available access roads and trails in the area that are also used for recreation access. Due to increased use, temporary delays could result. The survey activities conducted during the exploration phase are likely to minimally impact recreation, if at all, due to the short duration, small crew size, and temporal nature of the surveys and drilling wells.

Production/Development

The development stage includes intense construction activities. At this time, access roads and well pads are constructed. Increased truck traffic during this phase could affect recreation due to increased noise and dust levels and could cause temporary delays or closures on access roads. Construction sites are likely to have limited access to the public which could, in turn, slightly decrease access to the area for recreation.

The production stage includes operation and maintenance of the constructed facilities. These activities require a small number of employees who would utilize access roads in the area but are not likely to limit the recreational use of these roads. The oil and gas facilities are likely to have limited access to the public, therefore slightly decreasing access to the area for recreation.

Final Abandonment

The final abandonment stage involves abandonment of the site after production has ceased. Final abandonment activities would require a small crew to remove equipment, cap wells and rehabilitate the disturbed area. This crew would require use of access roads in the area but are not likely to limit the recreational use of these roads. Due to the short duration of activities and small crew size, final abandonment activities are not likely to affect recreation.

4.18.1.3 Cumulative Impacts

Increased commercial developments (e.g., mining, geothermal exploration and development, etc.) would increase the population of the area, which would in turn create an increase in all recreational activities such as windsailing, visits to WSAs, hunting, and off-highway vehicle use in the Assessment Area. Given that many recreational activities are dependent upon a high quality visual/aesthetic environment, commercial developments, including fluid mineral development, has the potential to lower the quality of recreational experiences in the Assessment Area. However, given the RFD

scenario for fluid minerals along with other existing and foreseeable commercial developments and any mitigation measures developed during site specific analysis in the Assessment Area, it is not anticipated that the quality of recreational experiences would be significantly reduced.

4.19 Auditory Resources

4.19.1 Proposed Action

4.19.1.1 Direct Impacts

There would be no direct impacts from issuing new oil and gas leases alone because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

4.19.1.2 Indirect Impacts

Indirect auditory impacts associated with fluid minerals exploration and development vary according to the activities and processes used in exploration, development, and production phase. Construction phase noise levels would be associated with access roads and well pad construction, drilling, and rigging down. Production phase noise levels would be associated with well completion and dewatering and diesel pumping units. Other production noise would be associated with well workovers and maintenance operations involving a variety of equipment and vehicles.

The RFD indicates that two exploration wells would be drilled per year, and the duration of drilling would be four to six weeks. A total of 20 wells would be drilled over a ten year period, and only one well would go into production. This small amount of oil and gas exploration and production would not create any significant impacts from noise generation in the Assessment Area. Most of the noise generated would be short term in nature.

4.19.1.3 Cumulative Impacts

Other noise generating activities within the Assessment Area include off-highway vehicle use, mineral exploration and mining, geothermal exploration, and sand and gravel extraction. When combined with acreage of oil and gas related disturbance identified in the RFD, the cumulative impacts to auditory resources would be minimal, especially because these activities are temporary in nature and are spread out over 2.7 million acres. In addition, site-specific mitigation measures generated for exploration and development indicate that the potential cumulative impacts to auditory resources from the Proposed Action are negligible.

4.20 Socioeconomics

4.20.1 Proposed Action

4.20.1.1 Direct Impacts

The direct effects of issuing new oil and gas leases on socioeconomics within the Assessment Area would be the generation of revenue from the sale of the leases as the State of Nevada retains 50 percent of the proceeds from lease sales.

4.20.1.2 Indirect Impacts

Oil and gas exploration, development , and production, as described in the RFD scenario could create impacts to the county economies in terms of jobs, income, and tax revenues. The impacts from the Proposed Action, based on the RFD, on socioeconomic resources are described below.

Exploration

During the exploration phase, oil and gas companies typically provide in-house scientists and technicians to do the majority of this work. After initial surveys have been completed, road building and drill pad construction could occur as a result of oil and gas exploration and development activities. Road and drill pad construction could be contracted to local contractors. The RFD hypothesizes there would be 20 exploration wells drilled in the Assessment Area. These wells would be drilled over a period of time and not at the same time. Industry sources (White Pine and Grant-Quinn O & G Leasing Project EIS 2005) and BLM specialists estimate that, based on the RFD, exploration crews, which ranges in size from 20 to 30 people, would spend approximately $200-$250 per person per day in the local community for the duration of the project (four to eight weeks). Based on these estimates derived from the RFD, the indirect impacts to socioeconomics within the Assessment Area from the Proposed Action would be minimal.

Development/Production

During this phase, the potential for socioeconomic impacts within the Assessment Area would be greater. More permanent roads and drill pads would be constructed, along with associated support facilities and transmission lines. Typically, the majority of this work is supplied by local contractors. Additionally, local businesses may realize increased revenue from the purchase of supplies, meals, rooms, etc. Local trucking and delivery companies may also benefit economically by transporting supplies, building materials, and oil products. Oil production from federal lands is subject to a 12.5 percent royalty payment to the federal government. Fifty percent of that amount is provided to the state government with another portion distributed back to the counties for use in the county. Taxes are paid to government in a variety of forms including income and property taxes by both oil production operators and their employees.

4.20.1.3 Cumulative Impacts

Present and historic activities within the socioeconomic cumulative effects study area (CESA) (ranching, mining exploration, development, and reclamation, realty actions, recreation and off-highway vehicle use, fire suppression and rehabilitation) have contributed to the development of existing rural, resource based communities in northern Nevada. Most socioeconomic impacts consisted of the generation of economic activity during agricultural development, mining, and associated commercial activities. The Proposed Action represents a continuation of these types of activities. It is reasonable to assume that these activities would continue within the Assessment Area.

Specific information regarding the timing, duration, and level of employment is not available for other RFFAs, which may occur within the CESA, precluding a comprehensive analysis of potential cumulative socioeconomic impacts. As stated earlier, site-specific analysis for exploration and development would be required prior to implementation and a more thorough examination of socioeconomics would be done at that time. However, based on the RFD scenario, the Proposed Action does 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. In the volatile economy of the foreseeable future, it is expected that the cumulative and incremental socioeconomic effects of the Proposed Action, based on the RFD, would be beneficial and not significant.

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5 CONSULTATION AND COORDINATION

5.1 List of Preparers

Bureau of Land Management

Roberta McGonagle	Cultural Resources
Gerald Dixon	Native American Religious Concerns
Charles Lane	Lands and Realty
Rob Perrin	Recreation, Visual Resource Management and Wilderness
Sheila Mallory	Geology and Minerals
John Ames	Hazardous or Solid Wastes
Steve Drummond	Hazardous or Solid Wastes
Dave Davis	Fire Management
Jason Spence	Range Resources
Richard Kurtz	Invasive, Nonnative Species
Joe Ratliff	Forestry, Vegetation, Soils, Air Quality and Water Quality
John Menghini	Noise
Jon Sherve	Hydrology
Duane Crimmins	Floodplains, Wetlands and Riparian Zones
Mike Stamm	Migratory Birds, Special Status Species
Shawna Richardson	Wild Horse and Burros
Chris Worthington	NEPA Compliance, Socioeconomics
Kathy Graham	GIS Specialist

Enviroscientists, Inc.

Richard DeLong	Project Principal
Opal Adams	Project Manager
Jennifer Thies	Senior Environmental Specialist
Michele Lefebvre	Senior Environmental Specialist

5.2 Persons, Groups and Agencies Consulted

The following individuals, organizations, and agency representatives were contacted during the preparation of this EA.

State Agencies

Department of Conservation and Natural Resources, Allen Biaggi
Nevada Division of Minerals
Nevada Division of Wildlife

Federal Agencies

Humboldt-Toiyabe National Forest, Ely Ranger District
Humboldt-Toiyabe National Forest, Austin Ranger District
U.S. Fish and Wildlife Service

Local Government

Eureka County Commissioners
Eureka County Cooperative Extension, William Riggs, Extension Agent
Eureka County Department of Public Works, Diamond Valley Weed District
Eureka County Department of Natural Resources, Jon Hutchins
Lander County Commissioners
Nye County Commissioners
Nye County Department of Natural Resources, James Marble, Ph.D., Supervisor

Native American Tribes

Ely Shoshone Tribe
Yomba Shoshone Tribe
Battle Mountain Band Council
Wells Band Council
Elko Band Council
Te-Moak Tribe of Western Shoshone
Duckwater Shoshone Tribe
South Fork Band Council

Individual Tribal Members

Aurora Aboite
Kristi Begay
Dennis Bill
Diana Buckner
Maurice Frank Churchill
Annette George
Gregory Holley
Joseph Holley
Alfreda Jake
Cindy Marques
Brandon Reynolds
Ruby Sam

Kenny Smith
Hugh Stevens
Ronnie Woods

Individuals

Wilfred R. Bailey
Jim Baumann
Brian Beffort
Chad Bliss
Jock Broughton
Vickie Buchannon
Kenneth Buckingham
Rachel Buzzetti
Steven Carter
John Colby
Ken and Russell Conley
Tom and Volina Connolly
Leo Glen Damale
Peter J. Damele
Carrie Dann
Eric Dille
Jim Etcheverry
Martin Etcheverry
Vince Ferreira
Dan Filippini
Henry Filippini, Jr.
John Filippini
Katie Fite
Russell Fitzwater
Art Gale
Thomas and Ellen Gardner
Bill Hall
Paul Inchauspe
Tommie G. Lancaster
Dawn Lappin
Cindy MacDonald
Martin Larralde
Mark Lundahl
Robert Martin
Mike Marvel
Richard McKay

John Overton
Charles W. Parsons
Mike Podborne
Joe and Ellen Rand
Roy and Mary Risi
Pam Scutt
Ryan Shane
Gary Snow
Pete Tomera
Steve Venturacci
Barbara Warner
David and Linda Woolfolk
Luke Wise
Howard and Barbara Wolf
Ralph Young

Industries/Businesses

Doby George, LLC
Truckee River Ranch, LLC

Organizations

American Horse Protection Association
Great Basin Mine Watch
National Mustang Association
Western Watershed Project
Wild Horse Commission

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6.2 Glossary

Appropriate Management Level: A level of use by wild horses which results in a thriving natural ecological balance (TNEB) and avoids a deterioration of the range, even through it falls below the optimum number of wild horses which may be supported on the public range. The BLM interprets the term AML to mean that an "optimum number" of wild horses results in a TNEB and avoids a deterioration of the range." 109 IBLA 118 API 1989.

Authorized officer: Any employee of the Bureau of Land Management whom has been delegated the authority to perform the duties described herein (43 CFR 4700.0-5).

Best Management Practices (BMPs): Best management practices are innovative, dynamic, and improve environmental protection practices applied to oil and natural gas drilling and production to help ensure that energy development is conducted in an environmentally responsible manner (http://www.BLM.gov/BMP/).

Carbonate: A compound containing carbon and oxygen; an example is calcium carbonate (limestone).

Clastic: Pertaining to a rock or sediment composed primarily of fragments derived from pre-existing rocks or minerals and transported some distance from their places of origin.

Commercial exploitation: Using a wild horse or burro because of its characteristics of wildness for direct or indirect financial gain. Characteristics of wildness include the rebellious and feisty nature of such animals and their defiance of man as exhibited in their undomesticated and untamed state. Use as saddle or pack stock and other uses that require domestication of the animal are not commercial exploitation of the animals because of their characteristics of wildness (43 CFR 4700.0-5).

Condition of Approval (COA): A site-specific requirement included in an approved APD or Sundry Notice that may limit or amend the specific actions proposed by operator. Conditions of Approval minimize, mitigate, or prevent impacts to public lands or other resources.

Dolomite: A sedimentary rock composed largely of calcium magnesium carbonate; commonly associated with marine deposits.

Edaphic: A soil related term. Ecology used to describe the effect of soil characteristics, especially chemical or physical properties, on plants and animals.

Evapotranspiration: The loss of water to the atmosphere from the earth's surface by evaporation and by transpiration through plants.

Foreland Basin: A foreland basin is a depressed area of the Earth's crust landward of a young

mountain chain, and parallel to it. Created by the same downwarping of the lithosphere that is concurrent with orogenesis, they are quickly filled with sediment eroded from the nearby mountains.

Fuels: Vegetation available to a heat source that may propagate a wildland fire.

Greenstone: Greenstone, also known as greenschist, is a non layered metamorphic rock derived from basalt, gabbro or similar rocks containing sodium-rich plagioclase feldspar, chlorite, epidote and quartz. Chlorite and epidote give the green color.

Ground Water: Ground water is water located beneath the ground surface in soil pore spaces and in the fractures of geologic formations. A formation of rock/soil is called an aquifer when it can yield a useable quantity of water. The depth at which soil pore spaces become saturated with water is called the water table. Ground water is recharged from, and eventually flows to, the surface naturally; natural discharge often occurs at springs and seeps and can form oases or wetlands.

Herd Area: The geographic area identified as having been used by a herd as its habitat in 1971. [43 CFR 4700.0-5(d)] Herd areas are limited to areas of the public lands identified as being habitat used by wild horses and burros at the time of the passage of the Wild Horse Burro Act of 1971. Herd area boundaries may only be adjusted if it can be shown, based on historical information, that the boundaries were incorrectly identified. If herd area boundaries are adjusted, both old and new maps would be maintained together with an explanation of the reason for each change (Draft 4710 handbook).

Herd Area Designations (Invalid): Herd areas are limited to those areas where wild horses and burros existed in 1971 in accordance with the WH&B Act. For that reason, herd area boundaries may only be changed when one fo the following is determined: (1) areas once listed as herd areas are later found to be used only by privately owned horses or burros; or (2) the herd area boundary does not correctly portray where wild horses and burros were found in 1971. Maintenance of this information will permit a factual response to concerns expressed by the interested public (Draft 4710 handbook).

Herd Areas Not Managed as Herd Management Areas; Under circumstances where private land owners or other agencies determine that lands or essential habitat components under their control are not available for wild horse or burro use, it is appropriate for the RMP to include a decision removing wild horses and burros from all or part of a herd area. While these areas retain their status as herd areas, wild horses and or burros would be reintroduced to the herd area only when the situation changes (Draft 4710 handbook).

Herd Management Area: Herd Areas become Herd Management Areas (HMA's) when the decision has been made that wild horses and/or burros can be managed for the long term within their habitat. This decision is accomplished through the RMP process by designating the area as a HMA. Activities would be carried out with a goal of limiting the distribution of wild horses and burros to within the

boundaries of the HMA. HMAs should encompass an entire and self-sustaining population to the extent practical (Draft 4710 handbook).

Herd Management Area Plans: The Authorized Officer would prepare a Herd Management Area Plan (HMAP) or some other type of activity plan after a decision has been made to initiate long-term management of wild horses or burros within a herd area (43 CFR 4710.3-1). Where two or more related activities occur within an area containing a herd management area, a single coordinated plan can be prepared. See BLM Manual section 1619- Activity Plan Coordination for guidance and the required components of the HMAP. Where HMAs are adjacent to other HMAs, the Authorized Officer would assure that the actions proposed in the HMAP's are consistent and complementary. Where multiple jurisdictions exist over a single herd (population) which is using several HMAs as its habitat, BLM would designate one field office with the lead responsibility for managing that herd (Draft 4710 handbook).

Hydrocarbon: Any organic compound, gaseous, liquid, or solid, consisting solely of carbon and hydrogen.

Igneous Rock; Igneous rocks are formed when molten rock (magma) cools and solidifies, with or without crystallization, either below the surface as intrusive (plutonic) rocks or on the surface as extrusive (volcanic) rocks. This magma can be derived from either the Earth's mantle or pre-existing rocks made molten by extreme temperature and pressure changes.

Intrusion: An intrusion is a body of igneous rock that has crystallized from a molten magma below the surface of the Earth. Bodies of magma that solidify underground before they reach the surface of the earth are called plutons. Correspondingly, rocks of this kind are also referred to as igneous plutonic rocks or igneous intrusive rocks

Leachate: Leachate is the liquid produced when water percolates through any permeable material.

Mantle: Earth's mantle is the thick shell of rock surrounding the Earth's outer core, and lies directly beneath the Earth's thin crust. Earth's mantle lies roughly between 30 and 2,900 km below the surface, and occupies about 70 percent of Earth's volume.

Metamorphic rocks: Metamorphic rocks have been changed, usually by heat and pressure, from their original condition into rock with new minerals and/or structures. Texture, structure, and mineral content of metamorphic rock depend both on its protolith (parent material) and metamorphic conditions. Presence of some specific minerals in a metamorphic rock can indicate the degree of heat and pressure it endured. Some metamorphic processes (e.g., tectonic collisions) distort large regions of the earth's crust.

Minimum Feasible Level of Management: To further the purposes of the Wild Horse and Burro Act, the Authorized Officer would manage wild horses and burros with the least amount of herd and

habitat manipulation necessary to achieve objectives stated in approved RMPs. Activities to implement RMP decisions would be designed with objectives of providing an ecological balance and the basic habitat needs (e.g., forage, water, cover, and space), providing and maintaining characteristics that assure the herd's survivability within the confines of the herd areas, and reducing stress to the animals on the range by minimizing disturbances to natural herd movements (e.g., additional fencing or other artificial barriers and excess handling for unnecessary population manipulation). Hauling forage or water to wild horses or burros is not consistent with managing at the minimum feasible level and should not generally be considered a management option. However, it is an option that may be used in certain case by case situations (Draft 4710 handbook).

National Fire Plan (NFP): A National initiative of which the intent is actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. The NFP addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability.

Orogeny: The process of mountain formation, especially by a folding and faulting of the earth's crust.

Overthrust Sheet: If the angle of the fault plane is low (generally less than 20 degrees from the horizontal) and the displacement of the overlying block is large (often in the kilometer range) the fault is called an overthrust. Erosion can remove part of the overlying block, creating a fenster (or window) when the underlying block is only exposed in a relatively small area. When erosion removes most of the overlying block, leaving only island-like remnants resting on the lower block, the remnants are called klippen.

Phreatophyte: A deep-rooted plant that obtains water from a permanent ground supply or from the water table.

Plate Tectonics: Plate tectonics is a theory of geology developed to explain the phenomenon of continental drift, as one where the cooler and more solid surface parts of the Earth's rock crust ("plates") move slowly over time across the hotter, weaker, underlying asthenosphere. The lithosphere essentially floats on the asthenosphere. The lithosphere is broken up into what are called tectonic plates - in the case of Earth, there are ten major and many minor plates. These plates move in relation to one another at one of three types of plate boundaries: convergent, divergent, and transform. Earthquakes, volcanic activity, mountain-building, and oceanic trench formation occur along plate boundaries.

Reservoir Rock: Any porous and permeable rock that yields oil or gas. Sandstone, limestone and dolomite are the most common types.

Rhyolite: Volcanic rock that characteristically is light in color, contains 69 percent silica or more, and is rich in potassium and sodium.

Sedimentary Rock: One of the three main rock groups (along with igneous and metamorphic rocks) that is formed in three main ways—by the deposition of the weathered remains of other rocks (known as 'clastic' sedimentary rocks); by the deposition of the results of biogenic activity; and by precipitation from solution. Sedimentary rocks include common types such as chalk, limestone, sandstone, clay and shale. Sedimentary rocks cover 75 percent of the Earth's surface. Four basic processes are involved in the formation of a clastic sedimentary rock: weathering (erosion), transportation, deposition and compaction.

Shale: A fine-grained detrital sedimentary rock, formed by the compaction of clay, silt, or mud. It has a finely laminated structure which enables the rock to split readily, especially on weathered surfaces.

Subduction Zone: A subduction zone is an area on Earth where two tectonic plates meet and move toward one another, with one sliding underneath the other and moving down into the mantle, at a speed of several inches per year. Typically, an oceanic plate slides underneath a continental plate, and this often creates a zone with many volcanoes and earthquakes.

Thriving Natural Ecological Balance (Ecological Balance): An ecological balance requires that wild horses and burros and other associated animals be in good health and reproducing at a rate that sustains the population, the key vegetative species are able to maintain their composition, production, and reproduction, the soil resources are being protected, maintained or improved, and a sufficient amount of good quality water is available to the animals (Draft 4710 handbook).

Thrust Fault: A particular type of fault, or break in the fabric of the Earth's crust with resulting movement of each side against the other, in which a lower stratigraphic position is pushed up and over another. This is the result of compressional forces. A thrust usually occurs within or at a low angle to lithological units.

Tuff: Tuff is a type of rock consisting of consolidated volcanic ash ejected from vents during a volcanic eruption.

Wild Horse and Burro Ranges: An HMA may be considered for designation as a wild horse or burro range when there is a significant public value present, such as unique characteristics in a herd or an outstanding opportunity for public viewing. The Authorized Officer may only establish a wild horse or burro range after a full assessment of the impact on other resources and the degree of public acceptance (43 CFR 4710.3-2).

Wildland Fire: A wildfire, also known as a forest fire, vegetation fire, grass fire, brush fire, or hill fire, is an uncontrolled fire often occurring in wildland areas, but which can also consume houses or agricultural resources. Common causes include lightning, human carelessness, and arson.

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Appendix A

DESCRIPTION OF THE BLM LEASING PROCESS

APPENDIX A

Description of BLM Leasing Process

Lessee Qualifications and Limitations

Individuals, associations of citizens, and corporations organized under the laws of the United States or any state are entitled to lease federal lands for these purposes under the authority of the Mineral Leasing Act of 1920, as amended, and by the Mineral Leasing Act for Acquired Lands of 1947, unless the lands have been specifically withdrawn by the Department of Interior. No lease may be acquired by a minor, but a lease may be issued to a legal guardian or trustee on behalf of a minor. Aliens, whose country of origin does not deny similar privileges to United States citizens, may hold interests in leases, but only through stock ownership of U.S. corporations that hold leases. Aliens may not hold interest in federal oil and gas leases through units in publicly traded limited partnerships.

The issuance of a lease grants the lessee the exclusive right to use so much of the leased lands as is necessary to explore for, drill for, mine, extract, remove, and dispose of all the oil and gas (except helium) in the leasehold subject to: stipulations attached to the lease; restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the authorized officer to minimize adverse impacts to other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed. To the extent consistent with lease rights granted, such reasonable measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. At a minimum, measures shall be deemed consistent with the lease rights granted, provided that they do not: require relations of a proposed operations by more than 200 meters (656 feet); require that operations be sited off the leasehold; or prohibit new surface disturbing operations for a period in excess of 60 days in a lease year (43 CFR 3101.1-2).

Competitive and Noncompetitive Leasing

Competitive and noncompetitive leases may be obtained for oil and gas exploration and development on lands owned or controlled by the federal government. The Leasing Reform Act of 1987 requires all public lands available for oil and gas leasing to be offered first by competitive leasing at an oral auction. Noncompetitive leases may be issued only if the competitive process results in no bids. Competitive and noncompetitive leases are issued for a ten year period. Both are extended for the duration that they are producing oil and gas in paying quantities. The maximum competitive lease size is 2,560 acres in the lower 48 states and 5,760 acres in Alaska. The maximum noncompetitive lease size is 10,000 acres in all states.

Competitive Leases

The BLM conducts oral auctions for oil and gas leases on at least a quarterly basis, when there are available parcels of land. A Notice of Competitive Lease Sale lists lease parcels to be offered at auction. The Sale Notice is published at least 45 days before the date of the auction. The Sale Notice identifies any lease stipulations to uses or restrictions on surface occupancy. There are three sources for federal lands available for lease: (1) existing leases that have expired, and leases that have been terminated, canceled or relinquished; (2) parcels identified by informal expressions of interest from either the public or BLM for management reasons, and; (3) lands included in offers filed for noncompetitive leases (effective January 3, 1989).

Noncompetitive leases

Noncompetitive leases may be issued only for parcels that have been offered competitively and failed to receive a bid. Lands in expired, terminated, cancelled, or relinquished leases are not available for noncompetitive leasing until they have been offered competitively. After an auction, all lands that were offered competitively without receiving a bid are available for issuance of noncompetitive leases for a period of two years.

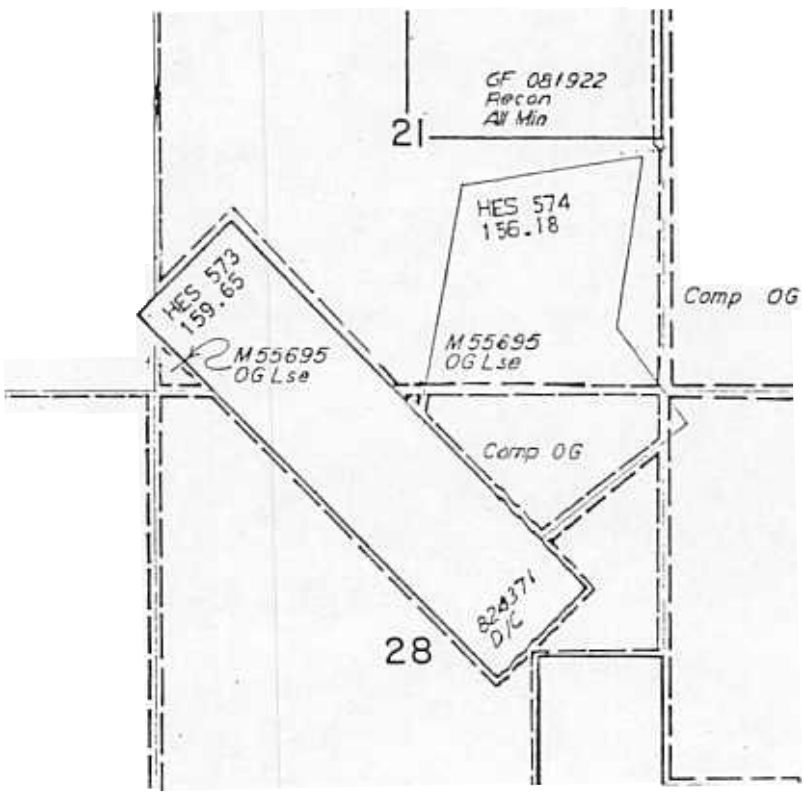
Lease Terms and Conditions

A lease does not convey an unlimited right to explore or to develop any oil and gas resources discovered. Leases are subject to terms and conditions. These restrictions, or stipulations, are derived from legal statutes and measures to minimize adverse impacts to other resources and are generally characterized in a lease as stipulations. Appendix B discusses stipulations in detail.

Appendix B

LEASE STIPULATIONS AND STANDARD LEASE TERMS (BLM FORM 3100-11)

UNIFORM FORMAT
FOR
OIL AND GAS LEASE
STIPULATIONS



Final Recommendations Prepared By:

Rocky Mountain Regional Coordinating Committee

March 1989

ROCKY MOUNTAIN REGIONAL COORDINATING COMMITTEE
STIPULATION SUBCOMMITTEE
STANDARDIZATION OF STIPULATION FORMAT

March 1989

CONTENTS

GENERAL GUIDANCE

Introduction

Federal land managers and the oil and gas industry have noted inconsistency and variation in the application of lease stipulations and notices between the various offices of Federal land management agencies throughout the Rocky Mountain States. The Coordinating Committee has been requested to determine if the number of apparently similar stipulations could be reduced, their wording standardized, and guidelines developed for consistent usage. This document provides guidance for the standardization of Federal oil and gas lease stipulations, uniform definitions, format, and wording. These guidelines were developed by the Bureau of Land Management and Forest Service but may be adopted and used by other surface management agencies.

In consolidating existing stipulations to a minimum number and expressing them in a standardized format, emphasis was placed on providing a system for accommodating all necessary lease conditions recognized by Federal land managers. Stipulations are to be part of a lease only when the environmental and planning record demonstrates the necessity for the stipulations. Stipulations, as such, are neither "standard" nor "special" but rather a necessary modification of the terms of the lease.

These forms, given on Pages 14-16, provide for standardized structure, wording, and usage. In order to accommodate the variety of resources encountered on Federal lands, these stipulations are categorized as to how the stipulation modifies the lease rights, not by the resource(s) to be protected. What, why, and how this mitigation/protection is to be accomplished is determined by the land manager through the land use planning and National Environmental Policy Act (NEPA) analysis.

Implementation

If upon weighing the relative resource values, there are values, uses, and/or users identified that conflict with oil and gas operations and cannot be adequately managed and/or accommodated on other lands, a lease stipulation is necessary. Land use plans serve as the primary vehicle for determining the necessity for lease stipulations (BLM Manual 1624). Documentation of the necessity for a stipulation is disclosed in planning documents or through site-specific analysis. Land use plans and/or NEPA documents also establish the guidelines by which future waivers, exceptions, or modifications may be granted. Substantial modification or waiver subsequent to lease issuance is subject to public review for at least a 30-day period in accordance with Section 5102.f of the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (FOOGLRA).

Stipulations may be necessary if the authority to control the activity on the lease does not already exist under laws, regulations, or orders. It is important to recognize that the authorized officer has the authority to modify the siting and design of facilities, control the rate of development and timing of activities as well as require other mitigation under Sections 2 and 6 of the standard lease terms (BLM Form 3100-11) and 43 CFR 3101.1-2.

The necessity for individual lease stipulations is documented in the lease-file record with reference to the appropriate land use plan or other leasing analysis document. The necessity for exceptions, waivers, or modifications will also be documented in the lease-file record through reference to the appropriate plan or other analysis. The uniform format for stipulations should be implemented when amendments or revisions of land use plans are prepared or by other appropriate means.

The uniform format for stipulations is designed to accommodate most existing stipulations by providing space to record the local mitigation objectives. The stipulations have been developed for the categories of: (1) no surface occupancy, (2) timing or seasonal restriction, and (3) controlled surface use. This guidance also includes the use of lease notices. There is also provision for special or unique stipulations, such as those required by prior agreements between agencies when the standardized forms are not appropriate. In all cases, use of the uniform forms for stipulations will require identification of specific resource values to be protected and description of the specific geographical area covered. Stipulations attached to noncompetitive leases will require the applicant's acceptance and signature.

DEFINITIONS

Condition of Approval (COA): Conditions or provisions (requirements) under which an Application for a Permit to Drill or a Sundry Notice is approved.

Controlled Surface Use (CSU): Use and occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights. CSU is used for operating guidance, not as a substitute for the NSO or Timing stipulations.

Exception: Case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites within the leasehold to which the restrictive criteria applies.

Lease Notice: Provides more detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A Lease Notice also addresses special items the lessee should consider when planning operations, but does not impose new or additional restrictions. Lease Notices attached to leases should not be confused with NTLs--Notices to Lessees. (See 43 CFR 3160.0-5)

Modification: Fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites within the leasehold to which the restrictive criteria applied.

No Surface Occupancy (NSO): Use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values. The NSO stipulation includes stipulations which may have been worded as "No Surface Use/ Occupancy," "No Surface Disturbance," "Conditional NSO," *and* "Surface Disturb-

ance or Surface Occupancy Restriction (by location)."

Notice to Lessees (NTL): The NTL is a written notice issued by the authorized officer. NTLs implement regulations and operating orders, and serve as instructions on specific item(s) of importance within a State, District, or Area.

Stipulation: A provision that modifies standard lease rights and is attached to and made a part of the lease.

Timing Limitation (Seasonal Restriction): Prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

Waiver: Permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold.

NO SURFACE OCCUPANCY STIPULATION GUIDANCE

The No Surface Occupancy (NSO) stipulation is intended for use only when other stipulations are determined insufficient to adequately protect the public interest. The land use plan/NEPA document prepared for leasing must show that less restrictive stipulations were considered and determined by the authorized officer to be insufficient. The planning/NEPA record must also show that consideration was given to a no-lease alternative when applying a NSO stipulation. A No Surface Occupancy Stipulation is not needed if the desired protection would not require relocation of proposed operations by more than 200 meters (43 CFR 3101.1-2). 656'

The legal subdivision, distance, location, or geographic feature, and resource value of concern must be identified in the stipulation and be tied to a land use plan and/or NEPA document. Land description may be stated as: the "Entire Lease", Distance from resources and facilities such as rivers, trails, campgrounds, etc.; legal description; geographic feature such as the 100-year floodplain, municipal watershed, percent of slope, etc.; Special Areas with identified boundaries--area of critical environmental concern, Wild and Scenic River, etc., or other description that specifies the boundaries of the lands affected. The estimated percent of the total lease area affected by the restriction must be given if no legal or geographic description of the location of the restriction is given. In other cases the estimated percent is optional. (See Example: Figure 1).

Land use plans and/or NEPA documents should identify the specific conditions for providing waivers, exceptions, or modifications to lease stipulations. Waivers, exceptions, or modifications must be supported by appropriate environmental analysis and documentation, and subject to the same test used to initially justify the imposition of this stipulation. Language may be added to the NSO stipulation form to provide the lessee with information or circumstances under which waivers, exceptions, or modifications would be considered. A waiver, exception, or modification may be approved if the record shows that circumstances or relative resource values have changed or that the lessee can demonstrate that operations can be conducted without causing unacceptable impacts, and that less restrictive stipulations will protect the public interest. Waivers, exceptions or modifications can only be granted by the authorized officer. If the waiver, exception, or modification is inconsistent with the land use planning document, that document must be amended as necessary, or the change disallowed.

If the authorized officer determines, prior to lease issuance, that a stipulation involves an issue of major concern, modification or waiver of the stipulation will be subject to public review (43 CFR 3101.1-4). The land use plan may also identify other cases when a public review is required for waiver, exception, or modification. In such cases, wording such as the following should be added to the stipulation form to inform the lessee of the required public review: "A 30-day public notice period is required prior to modification or waiver of this stipulation."

EXAMPLE

Serial No._____

NO SURFACE OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

a. T. 147 N., R. 103 W., 5th P.M.
Sec. 29: N1/2NW1/4, SW1/4NW1/4

b. 1,320 feet from scenic and recreational segments of Flathead Wild and Scenic River.

T. 31 N., R. 17 W., PMM
Sec. 28: E1/2SE1/4

For the purpose of:

a. Avoidance of steep slopes exceeding 40 percent to avoid mass slope-failure (Management D, Custer Forest Plan, page 55).

b. Protection of visual and recreational qualities as discussed in Flathead Forest Plan (p. 89) and EIS (p.171).

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

FIGURE 1

TIMING LIMITATION STIPULATION GUIDANCE

The Timing Limitation (often called seasonal) Stipulation prohibits fluid mineral exploration and development activities for time periods less than yearlong. When using this stipulation, assure that date(s) and location(s) are as specific as possible. A timing stipulation is not necessary if the time limitation involves the prohibition of new surface disturbing operations for periods of less than 60 days (43 CFR 3101.1-2).

The land use plan/NEPA document prepared for leasing must show that less restrictive stipulations were considered and determined to be insufficient. The environmental effects of exploration, development, and production activities may differ markedly from each other in scope and intensity. If the effects of reasonably foreseeable production activities necessitate timing limitation requirements, this need should be clearly documented in the record. The record should also show that less stringent, project-specific mitigation may be insufficient. In such cases the stipulation language should be modified on a case-by-case basis to clearly document that the timing limitation applies to all stages of activity.

The legal subdivision, distance, location, or geographic feature, and resource value of concern must be identified in the stipulation and be tied to a land use planning and/or NEPA document. The timing limitations for separate purposes may be written on separate forms or as one combined stipulation. (See Example: Figure 2.) During the review and decisionmaking process for APD's and Sundry Notices, the date(s) and location(s) should be refined based on current information.

Land use plans and/or NEPA documents should identify the specific conditions for providing waivers, exceptions, or modifications to lease stipulations. Waivers, exceptions, or modifications of this stipulation such as continuing drilling operations into a restricted time period, must be supported with appropriate environmental analysis and documentation, and will be subject to the same test used to initially justify the imposition of this stipulation. Language may be added to the stipulation form to provide the lessee with information or circumstances under which waiver, exception, or modification would be considered. The need for one-time, case-by-case exceptions of timing limitation stipulations may arise from complications or emergencies during the drilling program. The need for timely review and decisionmaking is great in such cases. For this reason, it is desirable that land use plans/NEPA documents clarify what review procedures and other requirements, if any, will apply in such cases.

A waiver, exception, or modification may be approved if the record shows that circumstances or relative resource values have changed or that the lessee can demonstrate that operations can be conducted without causing unacceptable impacts, and that less restrictive stipulations will protect the public interest. Waivers, exceptions or modifications can only be granted by the authorized officer. If the waiver, exception, or modification is inconsistent with the land use planning document, and that document does not disclose the conditions under which such changes will be allowed, the plan or NEPA document must be amended as necessary, or the change disallowed.

If the authorized officer determines, prior to lease issuance, that a stipulation involves an issue of major concern, modification or waiver of the stipulation will be subject to public review (e.g., 43 CFR 3101.1-4). The land use plan may also identify other cases when a public review is required for waiver, exception, or modification. In such cases, wording such as the following should be added to the stipulation form to inform the lessee of the required public review: "A 30-day public notice period is required prior to modification or waiver of this stipulation."

EXAMPLE

Serial No._____

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

a. May 1 to June 15.

b. During periods when soils are water saturated.

On the lands described below:

a. Section 21, T. 22 N., R.12 E.

b. Entire Lease.

For the purpose of (reasons):

a. Protect elk calving area; North Fork Forest Plan (p. 62) and EIS (p. A-34).

b. Prevent excessive soil erosion and stream sedimentation resulting from construction activities during periods when soils are saturated. This does not apply to operation and maintenance of production facilities; Broad Draw Resource Management Plan (p. 61).

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

FIGURE 2

CONTROLLED SURFACE USE STIPULATION GUIDANCE

The Controlled Surface Use (CSU) Stipulation is intended to be used when fluid mineral occupancy and use are generally allowed on all or portions of the lease area year-round, but because of special values, or resource concerns, lease activities must be strictly controlled. This stipulation replaces stipulations commonly referred to as Limited Surface Use Stipulations. The CSU Stipulation is used to identify constraints on surface use or operations which may otherwise exceed the mitigation provided by Section 6 of the standard lease terms and the regulations and operating orders. The CSU Stipulation is less restrictive than the NSO (No Surface Occupancy) or Timing Limitation stipulations, which prohibit all occupancy and use on all or portions of a lease for all or portions of a year. The CSU Stipulation should not be used in lieu of an NSO or Timing Limitation Stipulation. The use of this stipulation should be limited to areas where restrictions or controls are necessary for specific types of activities rather than all activity.

The stipulation should explicitly describe what activity is to be restricted or controlled, or what operation constraints are required, and must identify the applicable area and the reason for the requirement. The record must show that less restrictive stipulations were considered and determined to be insufficient. The legal subdivision, distance, location, or geographic feature, and resource value of concern must be identified in the stipulation and be tied to a land use plan and/or NEPA document. (See Example: Figure 3)

Land use plans and/or NEPA documents should identify the specific conditions for providing waivers, exceptions, or modifications to lease stipulations. Waivers, exceptions, or modifications of this stipulation must be supported with appropriate environmental analysis and documentation, and will be subject to the same test used to initially justify the imposition of this stipulation. Language may be added to the stipulation form to provide the lessee with information or circumstances under which waiver, exception, or modification would be considered. A waiver, exception, or modification may be approved if the record shows that circumstances or relative resource values have changed or that the lessee can demonstrate that operations can be conducted without causing unacceptable impacts, and that less restrictive stipulations will protect the public interest. Waivers, exceptions or modifications can only be granted by the authorized officer. If the waiver, exception, or modification is inconsistent with the land use planning document, that document must be amended as necessary, or the change disallowed.

If the authorized officer determines, prior to lease issuance, that a stipulation involves an issue of major concern, modification, or waiver of the stipulation will be subject to public review (43 CFR 3101.1-4). The land use plan may also identify when a public review is required for waiver, exception, or modification. In such cases, wording such as the following should be added to the stipulation form to inform the lessee of the required public review: "A 30-day public notice period is required prior to modification or waiver of this stipulation."

EXAMPLE

Serial No._____

CONTROLLED SURFACE USE STIPULATION

Surface occupancy or use is subject to the following special operating constraints.

Unless otherwise authorized, access to this leasehold will be limited to the established roadway.

On the lands described below:

Entire lease

For the purpose of:

To meet visual quality objectives and to protect semiprimitive recreation values; Grand Junction Resource Management Plan (p. 89).

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

FIGURE 3

SPECIAL ADMINISTRATION STIPULATION GUIDANCE

There is no required or suggested uniform format for these stipulations. They are usually provided by another agency or organization. However, other agencies are to be encouraged to use the uniform stipulation format.

Special Administration Stipulations are used in situations where the three uniform stipulation forms or Lease Notices do not adequately address the concern. Special Administration Stipulations should be used only when special external conditions, such as pre-existing agreements with other agencies, require use of a one-of-a-kind stipulation that is not used in any other area or situation. The resource use or value, location, and specific restrictions must be clearly identified. In addition, the external agency, agreement or pre-existing use that dictates the special restrictions must be identified. The stipulation should state if and under what circumstances a waiver, exception, or modification may be allowed

EXAMPLES OF SPECIAL ADMINISTRATION STIPULATIONS ARE:

1. Stipulation for Lands of the National Forest System Under Jurisdiction of Department of Agriculture (Bureau of Land Management IM 84-415).

2. Stipulation for leases subject to a Highway Material Site Right-of-Way (Bureau of Land Management, New Mexico; Agreement with New Mexico Highway Department).

3. New Mexico Potash Stipulation for Oil and Gas Leases (Department of Interior, Federal Register Notice, November 5, 1975).

4. Jackson Hole Area Oil and Gas Lease Stipulation (Department of the Interior, Federal Register Notice, August 30, 1947).

5. White Sands Missile Range Stipulation (Bureau of Land Management, New Mexico; Agreement with Army Corps of Engineers).

6. Lease Stipulation, Bureau of Reclamation, Form 3109-1, (Bureau of Land Management, Utah; Agreement with Bureau of Reclamation).

7. Special State of Idaho Stipulations; Bureau of Aeronautics and Public Transportation (Bureau of Land Management, Idaho; Agreement with State of Idaho).

LEASE NOTICE GUIDANCE

Lease Notices are attached to leases to transmit information at the time of lease issuance to assist the lessee in submitting acceptable plans of operation, or to assist in administration of leases. Lease Notices are attached to leases in the same manner as stipulations, however, there is an important distinction between Lease Notices and Stipulations. Lease Notices do not involve new restrictions or requirements. Any requirements contained in a Lease Notice must be fully supported in either a law, regulations, standard lease terms, or onshore oil and gas orders. A Lease Notice is not signed by the lessee. Guidance in the use of Lease Notices is found in BLM Manual 3101 and 43 CFR 3101.1-3.

A lease notice should contain the following elements: (1) the resource/use/value; the lands affected, if applicable; (2) the reason(s); (3) the effect on lease operations or what may be required; and (4) a reference to the lease term, regulation, law or order from which enforcement authority is derived.

If a situation or condition is known to exist that could affect lease operations, there should be full disclosure at the time of lease issuance via a Lease Notice. If a lessee may be prevented from extracting oil and gas through a prohibition mandated by a specific nondiscretionary statute, such as the Endangered Species Act, then a stipulation may be used even though a Lease Notice would be sufficient. It is at the discretion of the authorized officer whether a situation is sufficiently sensitive to warrant the use of a lease stipulation. An examples of a Lease Notice is found in Figure 4.

EXAMPLE

Serial No._____

LEASE NOTICE

A 5-acre graveyard is located in the NW1/4NW1/4, Section 6, T. 5 N., R. 31 W., 6PM. In accordance with Section 6 of the lease terms and 43 CFR 3101.1-2, exploration and development activities must occur outside the graveyard.

Form #/Date

Figure 4

STIPULATION

FORMS

Serial No._____

NO SURFACE OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

For the purpose of:

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

Serial No._____

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

On the lands described below:

For the purpose of (reasons):

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

Serial No._____

CONTROLLED SURFACE USE STIPULATION

Surface occupancy or use is subject to the following special operating constraints.

On the lands described below:

For the purpose of:

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

Form 3100-11
(January 2006)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OFFER TO LEASE AND LEASE FOR OIL AND GAS

FORM APPROVED
OMB NO. 1004-0185
Expires: 6/30/2006

Serial Number

The undersigned (page 2) offers to lease all or any of the lands in Item 2 that are available for lease pursuant to the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351-359), the Attorney General's Opinion of April 2, 1941 (40 Op. Atty. Gen. 41), or the Combined Hydrocarbon Leasing Act of 1981 (95 Stat 1070).

READ INSTRUCTIONS BEFORE COMPLETING

1. Name
   Street
   City, State, Zip

2. This application/offer/lease is for: *(Check Only One)* PUBLIC DOMAIN LANDS ACQUIRED LANDS (percent U.S. interest _____)

Surface managing agency if other than Bureau of Land Management (BLM): _____ Unit/Project _____

Legal description of land requested: *Parcel No.: _____ *Sale Date (mm/dd/yyyy): _____

***See Item 2 in Instructions below prior to completing Parcel Number and Sale Date.**

T.	R.	Meridian	State	County

Total acres applied for _____

Amount remitted: Filing fee $ _____ Rental fee $ _____ Total $ _____

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T.	R.	Meridian	State	County

Total acres in lease _____

Rental retained $ _____

This lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas (except helium) in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

NOTE: This lease is issued to the high bidder pursuant to his/her duly executed bid or nomination form submitted under 43 CFR 3120 and is subject to the provisions of that bid or nomination and those specified on this form.

Type and primary term:

Noncompetitive lease (ten years)

Competitive lease (ten years)

Other _____

THE UNITED STATES OF AMERICA

by _____
(BLM)

_____
(Title) (Date)

EFFECTIVE DATE OF LEASE _____

(Continued on page 2)

4. (a) Undersigned certifies that (1) offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or Territory thereof, (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect, in each public domain and acquired lands separately in the same State, do not exceed 246,080 acres in oil and gas leases (of which up to 200,000 acres may be in oil and gas options or 300,000 acres in leases in each leasing District in Alaska of which up to 200,000 acres may be in options, (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located; (5) offeror is in compliance with qualifications concerning Federal coal lease holdings provided in sec. 2(a)2(A) of the Mineral Leasing Act; (6) offeror is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (7) offeror is not in violation of sec. 41 of the Act. (b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or in part unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments.

Duly executed this _____ day of _____ , 20 ____ _____

(Signature of Lessee or Attorney-in-fact)

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212 make it a crime for any person knowingly and willfully to make to any department or Agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

LEASE TERMS

Sec. 1. Rentals--Rentals must be paid to proper office of lessor in advance of each lease year. Annual rental rates per acre or fraction thereof are:

(a) Noncompetitive lease, $1.50 for the first 5 years; thereafter $2.00;

(b) Competitive lease, $1.50; for the first 5 years; thereafter $2.00;

(c) Other, see attachment, or

as specified in regulations at the time this lease is issued.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties must be paid on the production allocated to this lease. However, annual rentals must continue to be due at the rate specified in (a), (b), or (c) rentals for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) must automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

See. 2. Royalties--Royalties must be paid to proper office of lessor. Royalties must be computed in accordance with regulations on production removed or sold. Royalty rates are:

(a) Noncompetitive lease, 12 1/2%;

(b) Competitive lease, 12 1/2 %;

(c) Other, see attachment; or

as specified in regulations at the time this lease is issued.

Lessor reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and an opportunity to be heard. When paid in value, royalties must be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production must be delivered, unless otherwise agreed to by lessor, in merchantable condition on the premises where produced without cost to lessor. Lessee must not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor must lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty in lieu of rental of not less than the rental which otherwise would be required for that lease year must be payable at the end of each lease year beginning on or after a discovery in paying quantities. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge will be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA) (30 U.S.C. 1701). Lessee must be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to the failure to comply with any rule, regulation, order, or citation issued under FOGRMA or the leasing authority.

(Continued on page 3)

Sec. 3. Bonds-A bond must be filed and maintained for lease operations as required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage-Lessee must exercise reasonable diligence in developing and producing, and must prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee must drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection-Lessee must file with proper office of lessor, not later than 30 days after effective date thereof, any contract or evidence of other arrangement for sale or disposal of production. At such times and in such form as lessor may prescribe, lessee must furnish detailed statements showing amounts and quality of all products removed and sold, proceeds there from, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessor, lessee must keep a daily drilling record, a log, information on well surveys and tests, and a record of subsurface investigations and furnish copies to lessor when required. Lessee must keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee must maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that supports costs claimed as manufacturing, preparation, and/or transportation costs. All such records must be maintained in lessee's accounting offices for future audit by lessor. Lessee must maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section will be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations-Lessee must conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee must take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses must be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee must contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary.

Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest or substantial unanticipated environmental effects are observed, lessee must immediately contact lessor. Lessee must cease any operations that would result in the destruction of such species or objects.

See. 7. Mining operations-To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 8. Extraction of helium-Lessor reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessor at no expense or loss to lessee or owner of the gas. Lessee must include in any contract of sale of gas the provisions of this section.

Sec. 9. Damages to property-Lessee must pay lessor for damage to lessor's improvements, and must save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 10. Protection of diverse interests and equal opportunity-Lessee must: pay when due all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public.

Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated accessible to oil derived from these leased lands, lessee must comply with section 28 of the Mineral Leasing Act of 1920.

Lessee must comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors must maintain segregated facilities.

Sec. I 1. Transfer of lease interests and relinquishment of lease-As required by regulations, lessee must file with lessor any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which will be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. Delivery of premises-At such time as all or portions of this lease are returned to lessor, lessee must place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

Sec. 13. Proceedings in case of default-If lessee fails to comply with any provisions of this

lease, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to cancellation unless or until the leasehold contains a well capable of production of oil or gas in paying quantities, or the lease is committed to an approved cooperative or unit plan or communitization agreement which contains a well capable of production of unitized substances in paying quantities. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver will not prevent later cancellation for the same default occurring at any other time. Lessee must be subject to applicable provisions and penalties of FOGRMA (30 U.S. C. 170 1).

Sec. 14. Heirs and successors-in-interest-Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to the heirs, executors, administrators, successors, beneficiaries, or assignees of the respective parties hereto.

(Continued on page 4)

INSTRUCTIONS

A. General

1. Page 1 of this form is to be completed only by parities filing for a noncompetitive lease. The BLM will complete page 1 of the form for all other types of leases.
2. Entries must be typed or printed plainly in ink. Offeror must sign Item 4 in ink.
3. An original and two copies of this offer must he prepared and filed in the proper BLM State Office. See regulations at 43 CFR 1821.2-1 for office locations.
4. If more space is needed, additional sheets must be attached to each copy of the form submitted.

B. Special

Item 1-Enter offeror's name and billing address.

Item 2-Identify the mineral status and, if acquired lands, percentage of Federal ownership of applied for minerals. Indicate the agency controlling the surface of the land and the name of the unit or Project which the land is a part. The same offer may not include both Public Domain and Acquired lands. Offeror also may provide other information that will assist in establishing title for minerals. The description of land must conform to 43 CFR 31 10. A single parcel number and Sale Date will be the only acceptable description during the period from the first day following the end of a competitive process until the end of that same month, using the parcel number on the List of Lands Available for Competitive Nominations or the Notice of Competitive Lease Sale, whichever is appropriate.

Payments: The amount remitted must include the filing fee and the first year's rental at the rate of $1.50 per acre or fraction thereof. The full rental based on the total acreage applied for must accompany an offer even if the mineral interest of the United States is less than 100 percent. The filing fee will be retained as a service charge even if the offer is completely rejected or withdrawn. To protect priority, it is important that the rental submitted be sufficient to cover all the land requested. If the land requested includes lots or irregular quarter-quarter sections, the exact area of which is not known to the offeror, rental should be submitted on the basis of each such lot or quarter-quarter section containing 40 acres. If the offer is withdrawn or rejected in whole or in part before a lease issues, the rental remitted for the parts withdrawn or rejected will be returned.

Item 3-This space will be completed by the United States.

NOTICES

The Privacy Act of 1974 and the regulations in 43 CFR 2.48(d) provide that you be furnished with the following information in connection with information required by this oil and gas lease offer.

AUTHORITY: 30 U.S.C. 181 et seq.; 30 U.S.C 351-359

PRINCIPAL PURPOSE: The information is to be used to process oil and gas offers and leases.

ROUTINE USES: (1) The adjudication of the lessee's rights to the land or resources. (2) Documentation for public information in support of notations made on land status records for the management, disposal, and use of public lands and resources. (3) Transfer to appropriate Federal agencies when consent or concurrence is required prior to granting a right in public lands or resources. (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: If all the information is not provided, the offer may be rejected. See regulations at 43 CFR 3100.

The Paperwork Reduction Act of 1995 requires us to inform you that:

This information is being collected pursuant to the law.

This information will be used to create and maintain a record of oil and gas lease activity.

Response to this request is required to obtain a benefit.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 1 hour per response including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0145), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop, 401LS, Washington, D.C. 20240

Appendix C

OIL AND GAS EXPLORATION AND DEVELOPMENT PHASES

APPENDIX C

OIL AND GAS EXPLORATION AND DEVELOPMENT

Introduction

Oil and gas exploration and development activities progress through four phases that are typically sequential but may overlap in time. The four phases are: preliminary exploration; exploratory drilling; field development and production; and field abandonment. Oil and gas leases are obtained prior to the exploratory drilling phase.

I. Preliminary Exploration Phase

Thumper Truck

Petroleum exploration occurs in unexplored portions of areas where petroleum is known or projected to occur in commercial quantities. An area where petroleum is projected to occur in commercial quantities is known as a frontier or rank wildcat area. With declining known oil and gas reserves, it has become profitable to explore for oil and gas in less promising geological provinces and in areas where the climate, terrain, depth of deposits, and other obstacles have discouraged previous efforts. Increasingly sophisticated exploration techniques, improved oil and gas drilling, and transportation technologies have also enhanced prospects for locating, extracting, and marketing petroleum resources. Regardless of where or why, the goal of exploration is always to find where oil and gas resources are likely to occur, how much may be present, and how deep it is located; specifically, the goal is to detect probable traps, define the quality and type of reservoir, identify source rocks, and determine the thickness and age of the sedimentary rocks in the area. Geological and geophysical exploration occurs during the preliminary exploration phase of an area.

Geological Exploration

Where the bedrock geology of an area is well exposed, it is often possible to predict where oil might concentrate. The potential traps (anticlines, faults or formations with varying porosity) can sometimes be located with the aid of published geological maps, aerial photos, and landsat imagery. Occasionally, additional data will be gathered by aircraft. Low

altitude reconnaissance flights, frequently at elevations of 100 to 500 feet, help identify rock outcrops that can be studied later on the ground.

Once potential target areas are identified, one or more geologists may examine and sample the rock outcrops in the area and map the surface geology. Geological exploration can be performed with little surface disturbance. Four-wheel drive pickups, motorcycles or all-terrain vehicles are commonly used to access the area.

Geophysical Exploration

Surface geology is not always accurately identified by surface outcroppings. In such cases, geophysical prospecting is used. Three subsurface characteristics are measured by geophysical methods: gravitational field; magnetic field; and seismic characteristics.

Geophysical (Seismic) Surveys

Seismic surveys are the most popular of the geophysical methods and seem to give the most reliable results. A seismic survey is a method of gathering subsurface geological information by recording impulses from an artificially-generated shock wave. The common procedure used in seismic surveys on land consists of creating shock waves and recording, as a function of time, the resultant seismic energy as it arrives at groups of vibration detectors (one-half to five-pound seismometers ["geophones" or "jugs"] arrayed on the ground at spaced intervals). These arrays of seismometers are connected to a recorder truck that receives and records the reflected seismic energy.

The seismic sensors and energy source are located along lines on a one to two mile grid. Surveys may be laid out in excess of 40 miles in a series of grid patterns or in a single line.

Where possible, existing roads are used to conduct seismic operations. Some lines may require clearing of vegetation and loose rock to improve vehicle access. Each mile of line, cleared to a width of eight to 14 feet, represents disturbance of about one acre; however, completely clearing a seismic line is unusual. The majority of lines in remote and roadless areas are not bladed, except as required to cross drainages or washes. Support and operating vehicles primarily travel overland. In extreme cases, a bulldozer may be used to tow the vehicles through rough spots or in sandy areas.

In remote areas where there are little known subsurface data, a series of short seismic lines may be required to determine the characteristics of the subsurface formations. Following this exercise, seismic lines would be aligned to make seismic interpretations more accurate. Although alignment may be fairly critical, spacing of the lines can often be changed up to a quarter of a mile on a one mile grid before the results will affect the investigation program. This allows some adjustment for existing or alternate access of lines.

Seismic methods are usually defined by the various methods of generating the shock wave. The following are some of the more common methods.

Vibroseis
The vibrator (or vibroseis) method is widely used and is replacing the explosive method in accessible areas. A typical operation would use three or four large trucks or tractors, each equipped with a vibrator mounted between the front and back wheels, four or five support vehicles, and a crew of ten to 15 people.

The vibrator pads (about four feet square) are lowered to the ground and vibrators on all trucks are triggered electronically from a recording truck. After the information is recorded, the trucks move forward a short distance and the process is repeated.

The above referenced method has similar surface-disturbing factors in common. Generally, the methods involve travel either on existing roads or off-road with four to five energy source trucks (usually weighing ten to 20 tons) plus the recording truck and cable trucks or pickups. The vehicles may travel off-road along a single two-lane trail made by the trucks as the survey progresses. The vehicles may make several parallel trails in an attempt to distribute travel loads over a broader area. Travel along the line or seismic "trail" usually consists of one or two passes by the vehicle since the energy source is mobile and recording is accomplished as the vehicles move down the line.

Explosives
Historically, explosives have been the most widely used way to generate seismic shock waves. Subsurface and surface explosives are used.

Subsurface Explosives
In the subsurface explosive method, five to 50 pounds of explosive charge are detonated at the bottom of a 25 to 200-foot drill hole. The hole is usually two to six inches in diameter and drilled with a truck-mounted drill. Access suitable to the travel of drill and recording trucks across the surface is desirable. Detonation of the charge usually results in no surface disturbance; however, depending on the nature of the soils or valley fill, a small shallow depression up to six feet in diameter may result.

Cuttings from the well are normally hauled to a suitable disposal site, scattered by hand near the "shot hole," or put back into the shot hole afterwards. Bentonite mud is often used to plug the shot hole. The same hole may be reloaded and shot several times to find the depth and charge returning the best signal.

Shot hole operations are similar to vibroseis operations since the drill is transported by truck. As with other truck transported operations, existing roads may be used or trails may be blazed by the drill vehicles and/or a bulldozer. A truck-mounted drill and shot operation generally takes longer to complete and requires more trips by vehicles along a line (drill service equipment) than does vibroseis operations.

Where access limitations, topography, or other restraints prevent use of truck-mounted drill rigs or recording trucks, light weight, portable drill equipment can be used. Various kinds of portable drills can be backpacked or delivered by helicopter to the area. These portable operations use a pattern of holes drilled to a depth of about 25 feet. The holes are loaded with explosives and detonated simultaneously.

Surface Explosives

The surface explosives charge method (Poulter method) involves placing explosives directly on ground, on snow, or on a variety of stakes and platforms. Paper cones, survey stakes, lathes, or two by fours up to eight feet in length have been used with varying success in different areas. The use of explosives on tall stakes or explosives placed on the surface of deep snow results in good seismic data in some areas while creating little or no visible surface disturbance.

Surface explosive methods are very mobile. Generally, four wheel drive vehicles are used for transportation, although the method is adaptable to airborne and pack teams.

One particular area may be explored repeatedly by the same or different companies over a long period of time. Multiple exploration programs may be undertaken because first attempts were unsuccessful, another company wants its own information or new, different techniques, and/or equipment are available.

Other Geophysical Methods

Other geophysical methods used to explore for oil and gas resources include gravitational, magnetic, induced polarization (IP), soil-gas probes, and controlled source audio-frequency magnotelluric (CSAMT) surveys. These methods utilize small portable units that are easily transported via light ground vehicles such as four-wheel drive off-highway vehicles or aircraft. Off-highway vehicle traffic is common with these types of surveys. Data acquisition along the test lines or grids for these methods sometimes require small holes to be hand dug for instrument placement.

II. Exploratory Drilling Phase

Oil and Gas Drill Rig in Railroad Valley

Drilling does not begin until a lease has been acquired by the operator. When preliminary investigations are favorable and warrant further exploration, exploratory drilling may be justified. Stratigraphic tests and wildcat tests are the two types of exploratory drill holes.

Stratigraphic Tests

Stratigraphic ("strat") tests involve drilling relatively shallow holes to supplement seismic data. These tests aid in revealing the nature of near-surface structural features. The holes are usually from 100 to several thousand feet deep and are drilled primarily by rotary drill rigs. As the hole rock is drilled, the resulting rock chips are brought to the surface by a high-pressure airflow or circulating drilling mud. Samples of these chips are collected, bagged, and identified as to depth of origin. The chips are then studied by a geologist to determine composition, age, and possible rock formation.

Truck-mounted drilling equipment for strat tests is fairly mobile; therefore, roads and trails to test locations on level solid ground are temporary and involve minimal construction. Generally, access roads are bladed to a width of 12 to 14 feet and are not crowned or ditched. Some roads may simply be surface scraped; i.e., vegetation is clipped off next to the soil surface. In hilly or mountainous areas, additional road building and pad construction may be necessary that requires cuts in excess of 20 feet and fills exceeding ten feet. Strat tests that require a large amount of construction and several acres of cut and fill are unusual since construction costs may outweigh the information gained.

An area of about one-half acre or less is leveled and cleared of vegetation for the average drill site. If high pressure air is used to remove rock cuttings, rock dust may be emitted to the air. If mud is used as a drilling fluid, mud pits may be excavated; more commonly, portable mud tanks are used. Usually one to three days are required to drill the test holes depending on depth to and hardness of the bedrock. In areas with shallow, high pressure water zones, casing may be required to keep water out of the hole.

Exploration ("Wildcat") Wells

After the surface geological and subsurface geological studies, and geophysical studies are completed, the prospect is evaluated. Only by drilling a wildcat well (a well drilled in unproved territory) will the oil company know if the prospective rocks contain oil or gas. Nationally, about one in sixteen wildcat wells produces commercial amounts of oil or gas. Locally, success ratios may be as high as one in ten.

Deeper wells may require several months or more to complete; shallow wells up to a few thousand feet deep may be completed in a few weeks of drilling. As a general rule, the deeper the test, the larger the drilling rig and facilities required.

The position of a particular well is determined by the lessee and/or operator followed by a proposal to drill submitted to the BLM by either a Notice of Staking (NOS) or an Application for Permit to Drill (APD). In all cases, an on-site inspection of the proposed drilling location is made by representatives of the BLM, the lessee/operator, and other interested parties. During this on-site inspection, the site location and access route most advantageous from an environmental, geologic, and engineering standpoint is selected. In addition, surface use and reclamation requirements are developed for inclusion in the APD.

The drilling program provided in the APD is reviewed by the BLM for technical adequacy and protection of subsurface resources. This review ensures the adequacy of all downhole

operations associated with the drilling of the well. The APD is also reviewed for surface resource concerns, and an environmental assessment (EA) is completed. Approval of the APD incorporates all requirements for surface use and drilling, which were identified at the on-site and during the technical review.

After completing the necessary permitting procedures, construction of the access road and well site can begin. Initially, construction will involve the development of an access route to the well site, which usually requires a road with a 12- to 14-foot wide travel surface with a two to three-foot borrow ditch, for a total road surface disturbance of 18 feet. Bulldozers, graders, and other types of heavy equipment are used to construct and maintain the temporary roads and the well site.

A drill "pad" (well site) is generally from one (200 by 200 feet) to three (400 by 425 feet) acres in size. The pad is cleared of all vegetation, and leveled for the drill rig, mud pumps, mud (or reserve) pit, generators, pipe rack, and tool house. Topsoil is usually removed and stockpiled for use in reclamation of the well pad area. The mud pit may be lined with plastic or bentonite to prevent fluid loss or prevent contamination of water resources. Other facilities, such as storage tanks for water and fuel, are located on the pad or are positioned nearby on a separate, cleared area. If the well site is not large enough for the equipment required to rig-up (prepare the drilling rig for operation), a separate staging area may be constructed. Staging areas are usually no larger than 200 x 200 feet (approximately one acre) and may simply be a wide flat spot along the access road on which vehicles and equipment are stored.

The start of a well is called "spudding in." A short piece of tubing called a conductor pipe is set into the ground (sometimes with a pile-driver) and cemented in place. This keeps surface sand and dirt from sloughing into the well hole. Next, the regular drill bit and drill string (the column of drill pipe) take over. The bit and string pass vertically through a heavy steel turntable (the rotary table) on the derrick floor and the conductor pipe. The rotary table is geared to one or more engines and rotates the drill string and bit. As the bit bores deeper into the earth, the drill string is lengthened by adding more pipe to the upper end.

Once the bore hole reaches a depth of several hundred feet, another string of pipe (the surface casing) is set inside the conductor pipe and cemented in place by pumping cement between the casing and hole wall. Surface casing acts as a safety device to protect fresh water zones (aquifers) from drilling fluid contamination. To prevent the well from "blowing out" in the event the drill bit hits a high pressure zone, "blowout preventers" (large metal rams) are attached to the surface casing and are tested to a higher subsurface pressure than is expected to be encountered. These rams will close around the drill string or open hole, which will seal the well bore and confine the pressure to the well bore thus preventing a blowout.

After setting the surface casing, drilling resumes using a smaller diameter bit. Depending on well conditions, additional strings of casings (intermediate casing) may be run (installed) before the well reaches the objective depth (total depth or "TD").

During drilling, a mixture of water, clay, barite, and chemical additives known as "mud" are constantly pumped down the drill pipe. The mud exits through holes in the bit and returns to the surface outside the drill pipe. As the mud circulates, it cleans and cools the bit and carries the rock chips (cuttings) to the surface. This also helps to seal off the sides of the hole, thus preventing cave-ins, and to control the pressure of any water, gas or oil encountered by the drill bit. The mud is the first line of defense against a possible blowout since it is used to control pressure. For this reason, the pit containing "reserve" mud (the reserve pit) is maintained on location. The reserve mud is used in emergencies to restore the proper drilling environment when radical, unforeseen changes in down hole pressure are encountered. The cuttings are separated from the mud and sampled so that geologists can note and analyze (log) the various strata through which the bit is passing. The rest of the cuttings pass into the reserve pit as waste. Some holes are drilled at least partially with compressed air, which serves the same purpose as drilling mud of cooling and cleaning the bit and evacuating the cuttings from the hole.

Water usage of 5,000 to 15,000 gallons a day may be needed for mixing drilling mud, cleaning equipment, cooling engines, etc. Water may be trucked to the site from water wells in the area, or a water well may be developed on-site for these purposes.

During or at completion of drilling activity, the well is "logged". Logging means utilizing geophysical instruments to measure the physical characteristics of the rock formations and associated fluids through which the borehole passes. These instruments are lowered to the bottom of the well and slowly raised to the surface while recording data. Other measuring procedures include the drill stem test in which pressures are recorded and fluid samples taken from zones of geologic interest. After studying the data from those logs and tests, the geologist and/or petroleum engineer decide if the well will produce petroleum.

If the well does not encounter oil and gas, it is plugged with cement and abandoned. The well pad and access road are recontoured and reseeded to establish vegetation. If a water well has been developed onsite, the well may be turned over to the land-managing agency for resource enhancement uses such as wildlife or livestock waters. If the well will produce, casing is run to the producing zone and cemented in place. The drill rig is usually replaced by a smaller rig that is used for the final phase of completing the well.

III. Field Development and Production Phase

Pumping Oil Well in Railroad Valley

Field Development

If a wildcat well becomes a discovery well (a well that yields commercial quantities of oil or gas), additional (development) wells will be drilled to confirm the discovery, establish the extent of the field, and to efficiently drain the reservoir. The procedures for drilling development wells are about the same as for wildcat wells except there is usually less subsurface sampling, testing, and evaluation. If formation pressure can raise oil to the surface, the well will be completed as a flowing well. Several downhole acid or fracture treatments to enhance the formation porosity and permeability may be necessary for the well to produce in commercial quantities. A free-flowing well is simply closed off with an assembly of valves, pipes, and fittings (called a "christmas tree") to control the flow of oil and gas to other production facilities. A gas well may be flared for a short period of time to measure the amount of gas per day the well can produce, after which it may then be shut-in or connected to a gas pipeline.

If the well is not free-flowing, it will be necessary to use artificial lift (pump) methods. These are explained, along with well production equipment and procedures, in the following section on production. After a pump is installed, the well may be tested for days or months to see if it is economically justifiable to produce the well and to drill additional development wells. During this phase, more detailed seismic work may be run to assist in precisely locating the petroleum reservoir and to improve upon previous seismic work.

As with wildcat wells, field development well locations are cadastrally surveyed to establish legal location. The State of Nevada has regulations regarding the location and density (well spacing) of producing oil and gas wells. This well spacing pattern was established by the Nevada State Minerals Commission. Exceptions to state spacing regulations may be granted for pool or field conditions after a public hearing by the Minerals Commission. The BLM has the authority to waive state spacing regulations in the interest of conservation but normally abides by the state spacing regulations.

Oil well spacing for production from federal leases in Nevada is a minimum of 40 acres for wells with depths 5,000 feet or less and 160 acres with wells with depths greater than 5,000 feet. The majority of gas well spacing for production from federal leases in Nevada employ units of 160 and 640 acres per well. Spacing for both oil and gas wells is based on the characteristics of the producing formation. If a field is producing from more than one formation, the surface location of the wells may be much closer than one per 40 acres. The State of Nevada revised regulations adopted spacing requirements, where federal oil and gas units are exempt from state spacing requirements. Most of the producing fields in Nevada have been discovered as unit wells. Although federal units are exempt from state spacing regulations, all of the producing oil wells in federal units in Nevada conform to these regulations.

During the development stage, the road system of the area is greatly expanded. Once it is known which wells produce and their potential productive life, a permanent road system can be designed and built. The permanent road system is usually built in segments because it often takes several years to develop a field and determine field boundaries. Since the roads in an expanding and developing field are built in segments, many temporary roads (built initially for wildcats or development) end up as long term (in excess of 15 years)

primary access or transportation roads. Planning of temporary roads for wildcat wells and development wells is completed with road conversion for the long term in mind.

Since development wells have longer life spans than wildcat wells, access roads for development wells are better planned, designed and constructed. Access roads are normally limited to one main route to serve the lease areas with a maintained side road to each well. Upgrading of temporary roads may include ditching, draining, installing culverts, graveling, crowning, or capping the roadbed. The amount of surface area needed for roads would be similar to that for temporary roads and would also be dependent on topography and weight loads to be transported over it. Generally, main access roads are constructed with travel surfaces 20 to 24 feet wide and side roads 14 to 18 feet wide.

When an oil field is developed on the current minimum spacing pattern of 40 acres per well, the wells are 1,320 feet apart in both north-south and east-west directions. Development over one section of land (one square-mile) with 16 wells usually requires construction of at least four miles of access roads. In mountainous terrain, the length of access roads may be increased since steep slopes, deep canyons, and unstable soil areas must often be circumvented in order to construct stable access to the wells.

Surface disturbance for a gas field may be similar to an oil field even though the spacing of wells is usually at 160 acres. Although a 160-acre spacing allows only four wells per section of land, associated pipeline systems often result in similar amounts of surface disturbance as a well field with 40-acre spacing.

In addition to roads, other surface uses for development drilling may include flowlines, storage tank batteries, facilities to separate oil, gas and water (separators and treaters), and injection wells for water disposal. Some of the facilities may be installed at each producing well site, and others at places situated to serve several wells. These facilities are discussed further in the following section on Production.

The rate of development well drilling depends on a combination of several factors: whether the field is operated on an individual lease basis or unitized; the probability of profitable production; availability of drilling equipment; protective drilling requirements (drilling requirements to protect federal land from subsurface petroleum drainage by off-setting non-federal wells) and the degree to which limits of the field are known. The most important development rate factor may be the quantity of production. If the discovery well has a high rate of production and substantial reserves, development drilling usually proceeds at a fairly rapid pace. If there is some question whether reserves are sufficient to warrant additional wells, development drilling may occur at a much slower pace. An evaluation period to observe production performance may follow between the drilling of successive wells.

As previously mentioned, drilling in an undeveloped part of a lease to prevent drainage of petroleum to an offset well on an adjoining lease (protective drilling) is frequently required in areas where fields and lease holdings are on intermingled federal and privately owned land. The terms of federal leases provide for such drilling if the offset well is on nonfederal lands or on federal lands leased at a lower royalty rate.

Many fields may progress through several development phases. A field may be considered fully developed and produce for several years, then a well may be drilled to a deeper pay zone. Discovery of a new pay zone in an existing field is a "pool" discovery as distinguished from a new field discovery. A pool discovery may lead to the drilling of additional wells, often from the same drilling pad as existing wells with the boreholes separated only by feet or inches. Existing wells may also be drilled deeper.

Transportation Development

Pipelines four to six inches in diameter are usually employed to transport the petroleum between the well, treatment, separating facilities and central collection points. These pipelines may be on the surface, buried or elevated. Pipelines may be used to transport oil and gas if the field is of sufficient size. The pipelines are used to move the oil from gathering stations to refineries. Transport by truck is often used to move crude oil from small fields where installation of pipelines is not economical and/or the natural gas from the field is not economically marketable.

Production

Production in an oil field begins just after the discovery well is completed and is usually concurrent with development operations. Temporary facilities may be used at first but as development proceeds and reservoir limits are determined, permanent facilities are installed. The extent of such facilities is dictated by the number of producing wells; expected production; volume of gas and water produced with the oil; the number of leases and whether the field is to be developed on a unitized basis.

The primary means of extracting oil from a well is by pump jacks. The pump jacks may be powered by electric motors requiring construction of powerlines. If there is sufficient casing head gas (natural gas produced with the pumped oil) or another gas source available, internal combustion engines may be employed.

Any production activities resulting in new or additional surface disturbance and/or not approved under the APD require approval of the authorized officer of the BLM. Activities requiring prior approval include but are not limited to re-drilling, deepening, performing casing repairs, plugging back, altering casing, performing nonroutine fracturing jobs, recompleting in a different interval, performing water shutoff, and converting to injection or disposal.

Disposal of Produced Water

Some wells drilled in an area may produce sufficient water which must be disposed of during the operation of the well. Although most produced waters are brackish to highly saline, some are fresh enough for beneficial use. If water is to be discharged, it must meet certain water quality standards. Oil skimmer pits may be established between separating facilities and surface discharge because water may not come from the treating and separating facilities completely free of oil.

When salt water is disposed of underground, it is usually introduced into a formation containing water of equal or poorer quality. The water may be injected into the producing zone from which it came or into other producing zones. In some cases, it could reduce the field productivity and may be prohibited by state regulation or mutual agreement of operators. In some fields, dry holes or depleted producing wells are used for water disposal, but occasionally, new wells are drilled for disposal purposes. Cement is squeezed between the casing and sides of the well to prevent the water from migrating up or down from the injection zone into other formations.

Crude oil is usually transferred from the wells to tank storage facilities (a tank battery) before it is transported from the lease. If the oil contains gas and water, they are separated out before the oil is stored in the tank battery. The treating and separating facilities are usually located at a storage tank battery on or near the well site.

After the oil, gas, and water are separated, the oil is piped to storage tanks located on or near the lease. Normally, there are at least two storage tanks so one tank can be filled as the contents of the other are measured, sold, and transported. The number and size of tanks vary with the rate of production on the lease and with the extent of automation in gauging the volume and sampling the quality of the tank contents.

IV. Field Abandonment Phase

The life-span of fields varies because of the unique characteristics of any given field. Such factors as proven reserves, reservoir characteristics, the nature and quality of the petroleum, subsurface geology, and political, economic, and environmental constraints all affect a field's life-span from discovery to abandonment. An estimate of 15 to 25 years is used for the average life of a typical field. Abandonment of individual wells may start early in a field life and reach a maximum when the field is depleted.

Well plugging and abandonment requirements vary with the rock formations, subsurface water, well site, and the well. Generally, however, in a dry (never produced) well, the bore hole below the casing is filled with heavy drilling mud, a cement plug is installed at the bottom of the casing, the casing is filled with heavy mud, and a cement cap is installed on the top of the casing. A pipe monument giving the location, lease number, operator, and name of the well is required unless waived by the authorized officer. If waived, the casing may be cut off and capped below ground level. Protection of aquifers and known oil and gas producing formations may require placement of additional cement plugs.

In some cases, wells that formerly produced are plugged as soon as they are depleted. In other cases, depleted wells are not plugged immediately but are allowed to stand idle for possible later use in a secondary recovery program. Truck-mounted equipment is used to plug former producing wells. In addition to the measures required for a dry hole, plugging of a depleted producing well requires a cement plug in the perforated section in the producing zone. If the casing is salvaged, a cement plug is put across the casing stub. The cement pump jack foundations are removed or buried below ground level. Surface flow and injection lines are removed but buried pipelines are usually left in place and plugged at intervals as a safety measure.

After the well is plugged, the drill rig is removed and the surface, including the reserve mud pit, is restored to the requirements described in the APD. This may involve the use of bulldozers and graders to recontour disturbed areas associated with the drill pad and the access road to the pad. The reserve pit must be evaporated or pumped dry and filled with the top soil material that was stockpiled when the site was prepared. Minimal leakage will occur if the pit was lined with plastic or bentonite. The area will be recontoured to restore the landform to approximately its original contour, minimize erosion, and allow revegetation to take place. After grading the subsoil and spreading the stockpiled topsoil, the site will be seeded with a grass mixture that will establish a vegetative cover. A fence may be erected to protect the site until revegetation is complete, particularly in livestock grazing areas. In many instances, any water wells developed are turned over to the land-managing agency to use for resource enhancement; i.e., wildlife, livestock, recreation.

Appendix D

INVASIVE PLAN, NOXIOUS WEED, AND PEST LIST

APPENDIX D

BUREAU OF LAND MANAGEMENT
BATTLE MOUNTAIN FIELD OFFICE & TONOPAH FIELD STATION

INVASIVE PLANT, NOXIOUS WEED, AND PEST LIST

Revised May 2006

The Battle Mountain Field Office (BMFO) directs the overall planning, budget and finance, management, administration, logistical support, labor, and operational aspects of the Invasive Plant, Noxious Weed, and Pest Program for both the BMFO and the Tonopah Field Station (TFS), jointly referred to herein as the "District," along with maintaining the renewable and non-renewable resources expertise while providing inventory, treatment, evaluation and outreach for the northern portion of the "District." TFS collaborates with BMFO on all programmatic activities for the "District" and maintains the renewable and non-renewable resources expertise while providing inventory, treatment, evaluation, and outreach for the southern portion of the "District."

The invasive plants, noxious weeds, and pests that currently infest or are an eminent threat to infest the public lands managed by BMFO and TFS include the following:

Note: Continuing inventory, survey, newly reported or discovered infestations, monitoring, or updated federal and state listings require periodic updates to this list. Scientific, research, technical, academic, and field information is also added or updated as it becomes available.

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Russian Knapweed	*Acroptilon repens* [ACRE3]	18 inches to three feet tall with toothed leaves covered with fine hair. Showy pink flowers that bloom from June to September.	Deep-rooted and easily dominates cultivated fields and rangelands. ----- Mechanical treatment is not effective. Effectively controlled with herbicides.	Grows in cultivated fields, along ditch banks, fence rows, waste places, and rangelands. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 7,500 feet elevation.	Noxious weed. (BMFO & TFS) ----- **XXXX**
Spotted knapweed	*Centaurea maculosa* [CEMA4]	Up to four feet tall with flowering stalks. Solitary flowers at tip of stalks blooming from June to October.	Can easily dominate rangelands in less than eight inch precipitation zone. Early spring growth. Suppresses the growth of other plants by releasing inhibiting chemicals from the root. ----- Cultivation reduces numbers along with sheep and goat grazing. Chemical control is effective.	Rangelands, dry meadows, pasture land, stony hills, roadsides, and sandy and gravelly flood plains. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 7,500 feet elevation.	Noxious weed. (TFS) ----- **XXXX**

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Diffuse knapweed	*Centaurea diffusa* [CEDI3]	One to two feet tall with branched stems rough to the touch. White to rose flowering heads are numerous and narrow. Flowering occurs from July to September.	Are a threat to pastures and rangelands. Are highly competitive and threaten to exclude many desirable species. ----- Herbicides are most effective when applied at the early growth stage (seedling).	Infest roadsides, waste areas, and dry rangelands. -----	Noxious weed. (BMFO & TFS) ----- **XXXX**
Perennial Pepperweed (Tall white-top)	*Lepidium latifolium* [LELA2]	One to three feet tall with waxy stems and leaves. Dense cluster of small white flowers over entire top of the plant. Flowering occurs from early summer to fall.	Spreading roots and numerous seeds. ----- Mechanical treatment is not effective. Chemical treatment must be completed properly.	Waste places, wet areas, ditches, roadsides and crop-land, including alfalfa fields. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 8,000 feet elevation.	Noxious weed. (BMFO & TFS) ----- **XXXX**
Hoary Cress (Short white-top)	*Cardaria draba* [CADR]	Up to two feet tall with waxy leaves. Multiple stems with dense clusters of small white flowers at top of each stem. Emerges in very early spring, blooms and sets seed by mid-summer.	Grows from root fragments and numerous seeds. ----- Mechanical treatment is not effective. Effectively controlled with herbicides.	Common on waste places, cultivated fields, pastures, alkaline, irrigated, and disturbed soils. ---------- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 8,500 feet elevation.	Noxious weed. (BMFO & TFS) ---------- **XXXX**
Musk thistle	*Carduus nutans* [CANU4]	Up to six feet tall with long, spiny and waxy leaves. Solitary nodding flowers. Dense growth. Flowers appear in mid-summer.	Dense growth and spiny nature inhibits the use of an area by people and animals. May re-sprout from cut roots. ----- Chemical and biological controls are effective.	Pasture, range, and forest lands along roadsides, waste areas, ditch banks, stream banks, and grain fields. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Noxious weed. (BMFO & TFS) ----- **XXXX**
Scotch thistle	*Onopordum acanthium* [ONAC]	Up to eight feet tall with velvet-gray, hairy, spiny, coarsely-lobed leaves up to two feet long and one foot wide. Purple to violet colored flowers that are spiny. Flowers appear in second year of growth.	Dense impassable stands that impede water flow, crowds out native vegetation, and destroy wildlife habitat. ----- Root cutting kills the plant and chemical controls are effective.	Roadsides, fence-lines, ditchbanks, open dry areas, and pastures. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Noxious weed. (BMFO & TFS) ----- **XXXX**

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Canada thistle	*Cirsium arvense* [CIAR4]	One to four feet tall with lobed, spine-tipped leaves. Pink flowers appear in July and August.	Colonizes from numerous, horizontal roots. Male and female plants in same colony. Crowds out desirable forage and alters the native habitats. ----- Disking or plowing increases the number of plants. Repeated mowing reduces numbers along with sheep and goat grazing. Chemical controls are effective.	Widely distributed in cultivated fields, riparian areas, pastures, rangeland, forests, roadsides, and waste areas. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 4,000 to 9,500 feet elevation.	Noxious weed. (TFS) ----- **XXXX**
Bull thistle	*Cirsium vulgare* [CIVU]	Two to five feet tall with many spreading branches. Short, fleshy taproot. Leaves are hairy and prickly. Flowers are pinkish-purple, 1.5 to two inches wide clustered at the end of the branches. Flowering occurs July to September.	Introduced as a seed contaminant. Highly competitive. Best controlled in its first year rosette stage. -----	Widely established in pastures, roadsides, and disturbed sites. -----	----- **XXXX**
Field bindweed	*Convolvulus arvensis* [COAR4]	Prostrate stems one to four feet long with extensive rooting system. Leaves alternate and are arrowhead-shaped. Flowers are bell- or trumpet-shaped and are white to pinkish. Flowering occurs from late June until frost.	-----	-----	----- **XXXX**
Punctureveine	*Tribulus terrestris* [TRTE]	Forms a mat one to ten feet in diameter. Small compound leaves covered with fine hair. Small yellow individual flowers. Seeds are found in a hard, spiny bur that can remain viable for four to five years.	Spreads by seeds/burs that readily stick to tires and equipment. Crowds out desirable forage and alters the native habitat. Burs are harmful to livestock, objectionable in hay, and reduce the quality of wool. ----- Mechanical removal is effective with vegetative treatment follow-up. Chemical controls are effective.	Found along roads and in pastures and fields. ----- Valley floors, Alluvial fans, and Foothills. 3,500 to 7,000 feet elevation.	Noxious weed. (BMFO & TFS) ----- **XXXX**

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Saltcedar	*Tamarix ramosissima* [TARA]	Five to 20 feet tall. Reddish brown and smooth woody stems. Pink to white flowers that bloom from spring to late summer.	Aggressive root system that uses much water and out competes native plants. ----- Fire and mechanical treatment tolerant and will re-sprout. Mechanical and chemical treatment must be used together.	Throughout the desert southwest and along streams, canals, and reservoirs in much of the western US. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Invasive shrub or small tree. (BMFO & TFS) ----- **XXXX**
Juniper	*Juniperus* spp. [JUNIP]		-----	-----	----- **XXXX**
Larkspur (Geyer, Plains & Tall)	*Delphinium* spp. [DELPH]		-----	-----	----- **XXXX**
Medusahead	*Taeniatherum caput-medusae* [TACA8]		-----	-----	----- **XXXX**
Cheatgrass (Downy brome)	*Bromus tectorum* [BRTE]	Four to 30 inches tall with purplish awns on seed heads at maturity. Annual or winter annual.	Plant successfully competes with perennial grasses due to winter and early spring growth. A nuisance and fire hazard after maturity. ----- Effective chemical controls are being tested on the District (Plateau).	Widely distributed throughout North America along roadsides, waste areas, overgrazed pastures and rangelands, cultivated crop areas, and fire scars. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Invasive annual grass. (BMFO & TFS) ---- **XXXX**
Poison hemlock	*Conium maculatum* [COMA2]		-----	-----	---- **XXXX**
Western waterhemlock	*Cicuta douglasii* [CIMA2]		-----	-----	---- **XXXX**
Halogeton	*Halogeton glomeratus* [HAGL]	Two to over 18 inches tall with small, fleshy leaves tipped with a spine. Stems branch from base. Blue-green in spring and red or yellow by late summer. Resembles Russian thistle.	Adapted to semi-arid and high-desert livestock ranges. Poisonous to sheep and cattle, however, readily grazed at times. ----- Chemical control is available and most effective when combined with livestock practices that control overgrazing.	Ideally adapted to the alkaline soils and semi-arid areas of high-desert winter livestock ranges. Invades disturbed or overgrazed lands and is concentrated along roadsides, ship trails, and near areas where livestock congregate. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Invasive weed. (BMFO) ---- **XXXX**

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Common cocklebur	*Xanthium strumarium* [XANTH2]		-----	-----	---- **XXXX**
Russian thistle (Tumbleweed)	*Salsola iberica* [SAIB]	Ranges from 0.5 to three feet tall with rounded, bushy, highly branched form. Stems red or purple stripped.	Most common and troublesome weed in the drier regions of the U.S. Scattered by wind as common name implies. Rapid germination and seedling establishment. ----- Chemical control is available and most effective when combined with livestock practices that control overgrazing.	Well adapted to cultivated dry-land agriculture and is common on disturbed wastelands, overgrazed rangeland, and irrigated cropland. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Invasive weed. (BMFO & TFS) ---- **XXXX**
Foxtail barley	*Hordeum jubatum* [HOJU]	One to two feet tall and produce a pale green, bushy, spike. At maturity the heads break into seven-awned clusters.	Palatable to livestock when younger but awns of mature plants can cause serious injury to animals' eyes, nose, throat, and ears. -----	Most common on wet or alkaline soils, and rundown meadows and pastures. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Invasive grass. (TFS) ---- **XXXX**
Field dodder	*Cuscuta campestris* [CUCA2]	Stems are yellowish, thread-like and twining. Plant lacks chlorophyll which gives most plants their green color. Numerous flowers in compact clusters attached to host.	Parasitic annual that germinates on the soil surface but once attached to the host plant becomes wholly parasitic. Many broadleaf plants serve as hosts but alfalfa and clover are especially susceptible. -----	Cultivated or fallow fields. ----- Valley floors and Alluvial fans. 3,500 to 6,000 feet elevation.	Invasive weed. (TFS) ---- **XXXX**
Camelthorn (Desert)	*Alhagi pseudalhagi* [ALMA12]		-----	-----	---- **XXXX**
Rush skeletonweed	*Chondrilla juncea* [CHJU]		-----	-----	---- **XXXX**
Silky or Lambert crazyweed (Locoweed)	*Oxytropis sericea* [OXSE]		-----	-----	---- **XXXX**
Broom snakeweed	*Gutierrezia sarothrae* [GUSA2]		-----	-----	---- **XXXX**
Russian olive	*Elaeagnus angustifolia* [ELAN]		-----	-----	---- **XXXX**

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Yellow Starthistle	*Centaurea solstitialis* [CESO3]	Up to three feet tall with multiple branches. Leaves grow low on plant. Both stem and leaves have a wooly appearance. Single yellow flower heads with inch long spines.	Can dominate rangeland with less than 15 inches of rainfall. Completely changes the natural habitat it invades. Causes the nervous syndrome called "chewing disease" in horses. Germinates in the dark. ----- Repeated tillage with chemical treatment is most effective.	Rangelands, roadsides, and waste areas. ----- Valley floors, Alluvial fans, and Foothills. 3,500 to 7,000 feet elevation.	Noxious weed. (BMFO & TFS) ---- **XXXX**
Leafy spurge	*Euphorbia esula* [EUES]	Up to three feet tall with erect shoots that are pale green and unbranched. Flowers are small in a pair of heart-shaped bracts.	Can cause severe irritation to the mouths and digestive tracts of domestic and wild grazing animals. Seed capsules explode when dry, shooting the seeds as far as 15 feet. Seeds remain viable in the soil for up to eight years. Can also reproduce by extensive creeping roots. ----- Chemical controls are effective. Biological (insect) control has proven effective. Sheep and goat grazing has also proven effective.	Rangelands, pastures, and riparian sites. ----- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500 feet elevation.	Noxious weed. (TFS) ---- **XXXX**
Dyer's woad	*Isatis tinctoria* [ISTA]		-----	-----	---- **XXXX**
Purple loosestrife	*Lythrum salicaria* [LYSA2]		-----	-----	---- **XXXX**
Purple loosestrife	*Lythrum virgatum* [LYVI3]		-----	-----	---- **XXXX**
Curly dock	*Rumex crispus* {RUCR]		-----	-----	---- **XXXX**
Kochia	*Kochia scoparia* [KOSC]		-----	-----	---- **XXXX**
Water hyacinth	*Eichhornia crassipes* [EICR]		-----	-----	---- **XXXX**
Anchored water hyacinth	*Eichhornia azurea* [EIAZ]		-----	-----	---- **XXXX**
Water lettuce	*Pistia stratiotes* [PIST2]		-----	-----	---- **XXXX**
Hydrilla	*Hydrilla verticillata* [HYVE3]		-----	-----	---- **XXXX**

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Malta starthistle	*Centaurea melitensis* [CEME]		-----	-----	---- **XXXX**
Black henbane	*Hyoscyamus niger* [HYONI]		-----	-----	---- **XXXX**
Black locust	*Robinia pseudoacadia* [ROPS]		-----	-----	---- **XXXX**
Common (wild) teasel	*Dipsacus sylvestris* [DISY]		-----	-----	---- **XXXX**
Dalmatian toadflax	*Linaria genistifolia dalmatica* [LIGED]		-----	-----	---- **XXXX**
Squarrose knapweed	*Centaurea virgata squarrosa* [CEVIS]		-----	-----	---- **XXXX**
Tree of heaven	*Ailanthus altissima* [AIAL]		-----	-----	---- **XXXX**
Poverty weed	*Iva axillaris* [IVAX]		-----	-----	---- **XXXX**
<u>Crickets</u>					
Mormon cricket	*Anabrus simplex*	1.5 to two inches long with a smooth shiny exoskeleton of varying colors. Flightless.	Migratory habit, traveling 25 to 50 miles per season especially during high population densities. Feeds on more than 400 species of plants. ----- Appropriate choice and accurate timing of biological, mechanical, and chemical treatments during the most vulnerable life stages of the crickets.	Open sagebrush or rangeland dominated by sage-brush of the Great Basin and Inter-mountain West. ----- Foothills and Uplands. 3,500 to 9,500+ feet elevation.	Economically detrimental. (BMFO & TFS) ---- **One**
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Jerusalem cricket	*Stenopelmatus focus*	Large reddish-brown to orange head. Black and white stripped abdomen. Flightless.	Live most of their lives underground. ----- Not enough known to identify a treatment or if there is a need for one.	Open grassy pastures, manure heaps and damp places west of the Rocky Mountains. ----- Valley floors, Alluvial fans, and Foothills. 3,500 to 7,000 feet elevation.	---- **No known threat at this time**

Common Name(s)	Scientific Name & Symbol	Growth Form	Special Note Recommended Treatment	Habitat Geographical & Phenological	Listing District Priority
Grasshoppers			In the western US grass-hoppers can consume up to 25% of available rangeland forage annually. --- Appropriate choice and accurate timing of biological, mechanical, and chemical treatments during the most vulnerable life stages of the grasshoppers.		Economically detrimental when abundant.
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Bandwing	*Trimerotropis pallidipennis*	Large with yellow, red or blue hind-wings.	Feed on a wide variety of native plant communities and cultivated crops including, cheatgrass, timothy, wooly Indianwheat, tumble-mustard, blue-bunch wheatgrass, alfalfa, and barley.	Arid western prairies, dry grasslands, desert grass, and scrub lands. --- Valley floors, Alluvial fans, Foothills, and Uplands. 0 to 9,500+ feet elevation.	BMFO & TFS --- **No known threat at this time**
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Bigheaded	*Aulocara elliottii*	Relatively large heads.	In Nevada consumes western wheat grass, needle and thread, thread-leaf, and sedge; crested wheat-grass is preferred.	Desert and mixed grass, short grass and bunch grass sites. --- Valley floors, Alluvial fans, and Foothills. 3,500 to 7,000 feet elevation.	BMFO & TFS --- **No known threat at this time**
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Clearwinged	*Camnula pellucida*	Medium size, yellow to brown with transparent hind-wings.	Outbreaks on rangelands have been known to devastate grasses and forages in areas as large as 1.3 million acres.	Rangelands and wet-pasture habitats from desert riparian sites to mountain meadows. Also in urban and agricultural settings. --- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	Economically detrimental. (BMFO & TFS) --- **Two**
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Migratory	*Melanoplus sanguinipes*	Sub-genital plate notch on end of abdomen.	Swarming habit. Causes more damage to crops than any other species currently found in the U.S.	Distributed widely across North America living in many habitats. Most common habitat is grasslands and meadows. --- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	BMFO & TFS --- **No known threat at this time**

Nevada Sage	*Melanoplus rugglesi*	Bright orange, tan with three dark bars, and blue legs.	Feed mainly on the shrub component of a site, including big, silver, and bud sagebrush, Douglas and gray rabbitbrush, spiny hopsage, littleleaf, horsebrush, antelope bitterbrush, and shadscale.	Cold desert shrub sites with an understory of forbs and grasses. --- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	BMFO & TFS --- **No known threat at this time**
Packard	*Melanoplus packardii*	Large tan, brown, and yellow.	Generally feeds on poor forage plants of little economic value except during cycles of high population numbers when it feeds on small grains and alfalfa.	Rangeland species, inhabiting tall-grass, short-grass, mixed grass, bunchgrass, and desert grass sites. --- Valley floors, Alluvial fans, Foothills, and Uplands. 3,500 to 9,500+ feet elevation.	BMFO & TFS --- **No known threat at this time**
Redlegged	*Melanoplus femurrubrum*	Red-legged.	Large numbers can develop in meadows, damaging forage grasses and forbs of all types. Will feed on alfalfa, clover, small grains, corn, and other vegetables.	Tall vegetation, grasslands, meadows, crop borders, reverted fields, idle croplands, and roadsides, excluding high mountains and very cold areas. --- Valley floors, Alluvial fans, and Foothills. 3,500 to 7,000 feet elevation.	BMFO & TFS --- **No known threat at this time**
Valley	*Oedaleonotus enigma*	Distinct white collar on thorax.	Feeds on forbs and shrubs and may be considered beneficial at low numbers. During high numbers will include alfalfa, cotton, grain crops, and vegetables.	Rangeland associated with semi-arid/sage-brush-grass areas and old burns in Foothills and valleys. --- Valley floors, Alluvial fans, and Foothills. 3,500 to 7,000 feet elevation.	BMFO & TFS --- **No known threat at this time**
Twostripped	*Melanoplus bivittatus*	Largest NV species with two distinct bright yellow stripes.	Major crop pests causing damage to small grains, alfalfa and corn. Can adjust to native vegetation and litter. ---	Less arid areas around tall, lush herbaceous vegetation, such as cropland habitats. --- Valley floors and Alluvial fans. 3,500 to 6,000 feet elevation.	BMFO & TFS --- **No known threat at this time**

The greatest impact of invasive plant, noxious weed, and pest invasion is the alteration and destruction of Native Plant Communities that have, through evolution, come to populate and thrive in a given ecosystem. These Native Plant Communities are the foundation of a healthy environment that supports all other natural life forms living upon and in that ecosystem as well as man's ever-changing existence therein. Management of invasive plants, noxious weeds, and pests relies, in part, on our ability to understand and define the critical vegetative regions and growing-periods for native and non-native vegetation, which, in turn, helps us determine approximately where, when, and in what priority our planning and on-the-ground inventory, treatment, and evaluation activities will be scheduled and carried out to protect those Native Plant Communities. To qualify the impact invasive plants, noxious weeds, and pests have on the Native Plant Communities they invade and to clarify the Habitat, Geographical, and Phenological information provided in column five of the above table the following tables identify additional information for each Geographical Group and Phenological Period of development for the Native Plant Communities in the "District." Elevation, precipitation zone, growing period, and aspect are critical elements that define growth and reproduction of herbaceous vegetation, forbs, shrubs, invasive plants, noxious weeds, and most pest populations on an annual and repeating basis. It must be recognized that while these plants, pests, and communities interact they are also being impacted by weather, soil moisture, livestock grazing, wild horse and burro utilization patterns, wildlife utilization patterns, and their manipulation and use by man.

BMFO

Geographical Groupings:

Great Basin Ecosystem:

Group	Elevation	Precipitation Zone	Growing Period	Aspect
Valley Floor	3,500-6,000 feet	6-10 inches	90-130 days	All
Alluvial Fan	4,000-6,000 feet	6-10 inches	90-130 days	East/West
Foothills	5,000-7,000 feet	8-12 inches	80-100 days	East/West
Uplands	6,500-9,500 feet	12-20 inches	50-100 days	East/West

Phenological Periods:

Great Basin Ecosystem:

Growth Stage	Plant Type	Period	Anomalies
Start Growth	Grass	3/1-4/30	(+/-) ½-1 month depending precipitation,
	Forb	3/1-4/30	snowfall, temperature and soil/range type.
	Shrub	3/1-4/30	See **Note** below.
Full Bloom	Grass	5/15-8/15	See **Note** below.
	Forb	6/1-8/15	
	Shrub	5/15-10/31	
Seed Ripe	Grass	6/1-9/15	See **Note** below.
	Forb	7/1-9/15	
	Shrub	6/1-11/30	

Note: For all District geographical groupings in the Great Basin Ecosystem south of Township 21 North phenology is approximately half a month later than north of Township 20 North.

Native Plant Communities Cross-referenced to Geographical Grouping, Soil Type & Major Land Resource Area (MLRA):

Great Basin Ecosystem:

Native Plant Community (by dominant species)	Plant Type	Percent of Community	Species List (dominant)	Geographical Grouping (elevation)	Soil Type	MLRA
Winterfat	Grass	25-45%	Indian ricegrass Bottlebrush squirreltail	4,000-6,000 feet	Silty Coarse silty	Humboldt – 024*
	Forb	5%	Globemallow Phlox			
	Shrub	50-70%	Winterfat Bud sagebrush Shadscale			
Sickle saltbush	Grass	35%	Indian ricegrass Bottlebrush squirreltail	4,000-5,500 feet	Saline terrace	Humboldt – 024*
	Forb	5%	Globemallow Povertyweed			
	Shrub	60%	Sickle saltbush			
Torrey quailbush	Grass	45%	Basin wildrye	3,500-5,500 feet	Deep sodic fan	Humboldt – 024*
	Forb	5%	Globemallow Povertyweed			
	Shrub	50%	Torrey quailbush Black greasewood Basin big sagebrush			
Spiny hopsage	Grass	40%	Basin wildrye Indian ricegrass Bottlebrush squirreltail Sandberg bluegrass Needleandthread	3,500-5,000 feet	Gravelly fan	Humboldt – 024*
	Forb	5%	Lupine Phlox Globemallow			
	Shrub	55%	Spiny hopsage Basin big sagebrush Black greasewood Anderson peachbrush Shadscale Fourwing saltbush Dalea			
Indian ricegrass	Grass	50-60%	Indian ricegrass Basin wildrye Needleandthread Thickspike wheatgrass	4,000-6,500 feet	Dunes Silty Sandy	Humboldt – 024*
	Forb	10%	Eveningprimrose Milkvetch Eriogonum Scurfpea Globemallow Canigre			
	Shrub	30-40%	Winterfat Basin big sage-brush Spiny hopsage Fourwing saltbush			
Alkali bluegrass	Grass	85%	Alkali bluegrass Alkali sacaton Baltic rush	4,000-5,500 feet	Wet meadow	Humboldt – 024*

Native Plant Community (by dominant species)	Plant Type	Percent of Community	Species List (dominant)	Geographical Grouping (elevation)	Soil Type	MLRA
			Inland saltgrass			
	Forb	15%	Arrowgrass Cinquefoil Povertyweed			
	Shrub	Trace	Rubber rabbitbrush Silver buffaloberry Black greasewood			
Basin wildrye	Grass	55-70%	Basin wildrye Western wheatgrass Creeping wildrye Alkali sacaton Alkali bluegrass Alkali cordgrass Inland saltgrass	4,000-6,000 feet	Dry floodplain Saline bottom Saline floodplain	Humboldt – 024*
	Forb	5%	Povertyweed Thelypody			
	Shrub	25-40%	Black greasewood Silver buffaloberry Basin big sagebrush Rubber rabbitbrush			
Alkali sacaton	Grass	70-85%	Alkali sacaton Alkali muhly Alkali bluegrass Inland saltgrass Alkali cordgrass Basin wildrye	4,000-5,500 feet	Saline meadow Sodic floodplain	Humboldt – 024*
	Forb	5-15%	Arrowgrass Povertyweed Thelypody			
	Shrub	Trace-25%	Willow spp. Rabbitbrush spp. Iodinebush Silver buffaloberry Black greasewood Woods rose			
Black greasewood	Grass	10-45%	Basin wildrye Indian ricegrass Bottlebrush squirreltail Inland saltgrass Needleandthread	3,500-6,000 feet	Sodic dunes Sodic terrace Sodic flat	Humboldt – 024*
	Forb	5%	Povertyweed Thelypody Milkvetch Globemallow Scurfpea			
	Shrub	50-85%	Black greasewood Spiny hopsage Basin big sagebrush Wyoming big sagebrush			
Inland saltgrass	Grass	45%	Inland saltgrass Nuttail alkaligrass Baltic rush	3,500-5,800 feet	Wet sodic flat	Humboldt – 024*
	Forb	20%	Cinquefoil			
	Shrub	35%	Alkali rabbitbrush Black greasewood Rubber rabbitbrush			
Silver buffaloberry	Grass	40%	Basin wildrye Alkali sacaton Inland saltgrass	4,00-6,00 feet	Sodic bottom	Humboldt – 024*
	Forb	5%	Povertyweed			

Native Plant Community (by dominant species)	Plant Type	Percent of Community	Species List (dominant)	Geographical Grouping (elevation)	Soil Type	MLRA
	Shrub	55%	Silver buffaloberry Shadscale Black greasewood Rubber rabbitbrush			
Shadscale	Grass	5-40%	Indian ricegrass Bottlebrush squirreltail Desert Needlegrass Sandberg bluegrass	3,400-7,000 feet	Gravelly loam Shallow silty Loamy slope Sodic terrace Loamy	Humboldt – 024*
	Forb	5%	Globemallow Eriogonum Thelypody			
	Shrub	55-85%	Shadscale Bud sagebrush Spiny hopsage Winterfat Seepweed			
Thurber needlegrass	Grass	50-55%	Thurber needlegrass Bluebunch wheatgrass Webber ricegrass Bottlebrush squirreltail Indian ricegrass Sandberg bluegrass	4,000-7,000 feet	Loamy Claypan Droughty loam Shallow calcareous loam Shallow loam	Humboldt – 024*
	Forb	5-10%	Globemallow Balsamroot Phlox Eriogonum			
	Shrub	35-45%	Wyoming big sagebrush Low sagebrush Black sagebrush Spiny hopsage Shadscale Bud sagebrush Ephedra spp.			
Bluebunch wheatgrass	Grass	50-65%	Bluebunch wheatgrass Bluegrass spp. Thurber needlegrass Basin wildrye Mountain brome Indian ricegrass Slender wheatgrass Letterman needlegrass Nevada bluegrass Cusick bluegrass	5,000-9,000 feet	Loamy Loamy slope South slope Shallow calcareous loam Stony loam Shallow loam	Humboldt – 024*
	Forb	10-15%	Lupine Hawksbeard Balsamroot Eriogonum Phlox Milkvetch Goldenweed			
	Shrub	20-40%	Wyoming big sagebrush Mountain big sagebrush Black sagebrush Serviceberry Oceanspray Snowberry Currant			

Native Plant Community (by dominant species)	Plant Type	Percent of Community	Species List (dominant)	Geographical Grouping (elevation)	Soil Type	MLRA
			Threetip sagebrush			
Fescue spp.	Grass	45-70%	Idaho fescue Sheep fescue Webber ricegrass Bluebunch wheatgrass Basin wildrye Thurber needlegrass Cusick bluegrass Sandberg bluegrass Nevada bluegrass Bluegrass spp. Mountain brome Slender wheatgrass Letterman needlegrass	5,500-9,500 feet	Mountain ridge Loamy slope North slope Claypan Steep north slope Steep gravelly loam Gravelly north slope Stony loam	Humboldt – 024*
	Forb	10-15%	Goldenweed Hawksbeard Balsamroot Lupine Eriogonum Milkvetch Helianthella White stoneseed			
	Shrub	15-40%	Oceanspray Serviceberry Dwarf sagebrush Low sagebrush Black sagebrush Mountain big sagebrush Wyoming big sagebrush Threetip sagebrush Snowberry Currant			
Needleandthread	Grass	50-60%	Needleandthread Indian ricegrass Basin wildrye Thurber needlegrass Bottlebrush squirreltail	4,000-6,500 feet	Sandy Sandy loam	Humboldt – 024*
	Forb	5-10%	Lupine Eriogonum Evening primrose Aster Phlox			
	Shrub	30-45%	Wyoming big sagebrush Basin big sagebrush Spiny hopsage Horsebrush			
Sagebrush spp.	Grass	25-40%	Bottlebrush Squirreltail Indian ricegrass Webber ricegrass Thurber needlegrass Sandberg bluegrass	4,000-6,500 feet	Stony slope Eroded slope Channery hill Loamy	Humboldt – 024*
	Forb	5%	Globemallow Phlox Milkvetch Eriogonum			
	Shrub	55-70%	Wyoming big sagebrush Lahontan sagebrush			

Native Plant Community (by dominant species)	Plant Type	Percent of Community	Species List (dominant)	Geographical Grouping (elevation)	Soil Type	MLRA
			Bud sagebrush Shadscale Spiny hopsage Nevada ephedra			
Mountain brome	Grass	50%	Mountain brome Idaho fescue Columbia needlegrass Slender wheatgrass Bluebunch wheatgrass Nevada bluegrass	6,500-9,500 feet	Loamy slope	Humboldt – 024*
	Forb	20%	Lupine Hawksbeard Larkspur			
	Shrub	30%	Mountain big sagebrush Serviceberry Snowberry			
Woodland	Grass	35-60%	Bluebunch wheatgrass Thurber needlegrass Indian ricegrass Bluegrass spp. Idaho fescue	5,500-8,500 feet	Woodland (multiple soil types)	Humboldt – 024*
	Forb	10-20%	Hawksbeard Balsamroot Phlox Milkvetch			
	Shrub	30-50%	Mountain big sagebrush Serviceberry Snowberry Anderson peachbrush Green ephedra Black sagebrush Wyoming big sagebrush Antelope bitterbrush Spiny hopsage Rabbitbrush spp. Currant			
	Woodland	20-35% (overstory canopy)	Utah juniper Singleleaf pinyon Curlleaf mountain mahogany			

* Descriptions for the following MLRAs will be added as planning, data collection and consolidation progresses towards a complete "District-wide" list –

- Owyhee High Plateau – 025
- Fallon-Lovelock – 027
- Central Nevada Basin & Range – 028B

TFS

Geographical Groupings:

Great Basin Ecosystem & Mojave Desert Ecosystems:

Group	Elevation	Precipitation Zone	Growing Period	Aspect
Hot Desert	3,000-4,500 feet	3-5 inches	140-180 days	All
Valley Floor	4,000-7,000 feet	3-10 inches	75-160 days	All
Alluvial Fan	4,000-7,000 feet	3-10 inches	75-160 days	East/West
Foothills	5,500-9,500 feet	8-14 inches	90-120 days	East/West
Uplands	6,500-9,500 feet	10-20 inches	80-100 days	East/West

Phenological Periods:

Great Basin Ecosystem:

Growth Stage	Plant Type	Period	Anomalies
Start Growth	Grass	4/1-6/30	(+/-) ½-1 month depending precipitation,
	Forb	3/1-5/31	snowfall, temperature, and soil/range type.
	Shrub	3/1-5/31	
Full Bloom	Grass	5/1-8/31	
	Forb	4/1-9/30	
	Shrub	5/1-10/31	
Seed Ripe	Grass	7/1-10/31	
	Forb	6/1-10/31	
	Shrub	6/1-11/30	

Mojave Desert Ecosystem:

Growth Stage	Plant Type	Period	Anomalies
Start Growth	Grass	3/1-4/30	(+/-) ½-1 month depending precipitation,
	Forb	2/1-4/30	snowfall, temperature, and soil/range type.
	Shrub	3/1-4/30	
Full Bloom	Grass	4/1-6/1	
	Forb	3/1-6/1	
	Shrub	4/1-5/31	
Seed Ripe	Grass	7/1-11/30	
	Forb	7/1-11/30	
	Shrub	6/1-11/30	

Native Plant Communities Cross-referenced to Geographical Grouping, Soil Type & Major Land Resource Area (MLRA):

Great Basin Ecosystem:

Note: Table under development as part of the "District" Invasive Plant, Noxious Weed, and Pest Management Plan.

Mojave Desert Ecosystem:

Note: Table under development as part of the "District" Invasive Plant, Noxious Weed, and Pest Management Plan.

Appendix E

MIGRATORY BIRD INFORMATION

Executive Order 13186

Presidential Documents

Executive Order 13186 -- Responsibilities of Federal Agencies To Protect Migratory Birds

January 10, 2001

By the authority vested in me as President by the Constitution and the laws of the United States of America, and in furtherance of the purposes of the migratory bird conventions, the Migratory Bird Treaty Act (16 U.S.C. 703-711), the Bald and Golden Eagle Protection Acts (16 U.S.C. 668-668d), the Fish and Wildlife Coordination Act (16 U.S.C. 661-666c), the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347), and other pertinent statutes, it is hereby ordered as follows:

Section 1. Policy. Migratory birds are of great ecological and economic value to this country and to other countries. They contribute to biological diversity and bring tremendous enjoyment to millions of Americans who study, watch, feed, or hunt these birds throughout the United States and other countries. The United States has recognized the critical importance of this shared resource by ratifying international, bilateral conventions for the conservation of migratory birds. Such conventions include the Convention for the Protection of Migratory Birds with Great Britain on behalf of Canada 1916, the Convention for the Protection of Migratory Birds and Game Mammals-Mexico 1936, the Convention for the Protection of Birds and Their Environment-Japan 1972, and the Convention for the Conservation of Migratory Birds and Their Environment-Union of Soviet Socialist Republics 1978.

These migratory bird conventions impose substantive obligations on the United States for the conservation of migratory birds and their habitats, and through the Migratory Bird Treaty Act (Act), the United States has implemented these migratory bird conventions with respect to the United States. This Executive Order directs Executive departments and agencies to take certain actions to further implement the Act. Sec. 2. Definitions. For purposes of this Order:

(a) "Take" means take as defined in 50 C.F.R. 10.12, and includes both "intentional" and "unintentional" take.

(b) "Intentional take" means take that is the purpose of the activity in question.

(c) "Unintentional take" means take that results from, but is not the purpose of, the activity in question.

(d) "Migratory bird" means any bird listed in 50 C.F.R. 10.13.

(e) "Migratory bird resources" means migratory birds and the habitats upon which they depend.

(f) "Migratory bird convention" means, collectively, the bilateral conventions (with Great Britain/Canada, Mexico, Japan, and Russia) for the conservation of migratory bird resources.

(g) "Federal agency" means an Executive department or agency, but does not include independent establishments as defined by 5 U.S.C. 104.

(h) "Action" means a program, activity, project, official policy (such as a rule or regulation), or formal plan directly carried out by a Federal agency. Each Federal agency will further define what the term "action" means with respect to its own authorities and what programs should be included in the agency-specific Memoranda of Understanding required by this Order. Actions delegated to

or assumed by nonfederal entities, or carried out by nonfederal entities with Federal assistance, are not subject to this Order. Such actions, however, continue to be subject to the Migratory Bird Treaty Act.

(i) "Species of concern" refers to those species listed in the periodic report "Migratory Nongame Birds of Management Concern in the United States," priority migratory bird species as documented by established plans (such as Bird Conservation Regions in the North American Bird Conservation Initiative or Partners in Flight physiographic areas), and those species listed in 50 C.F.R. 17.11.

Sec. 3. Federal Agency Responsibilities. (a) Each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement, within 2 years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) that shall promote the conservation of migratory bird populations.

(b) In coordination with affected Federal agencies, the Service shall develop a schedule for completion of the MOUs within 180 days of the date of this Order. The schedule shall give priority to completing the MOUs with agencies having the most substantive impacts on migratory birds.

(c) Each MOU shall establish protocols for implementation of the MOU and for reporting accomplishments. These protocols may be incorporated into existing actions; however, the MOU shall recognize that the agency may not be able to implement some elements of the MOU until such time as the agency has successfully included them in each agency's formal planning processes (such as revision of agency land management plans, land use compatibility guidelines, integrated resource management plans, and fishery management plans), including public participation and NEPA analysis, as appropriate. This Order and the MOUs to be developed by the agencies are intended to be implemented when new actions or renewal of contracts, permits, delegations, or other third party agreements are initiated as well as during the initiation of new, or revisions to, land management plans.

(d) Each MOU shall include an elevation process to resolve any dispute between the signatory agencies regarding a particular practice or activity.

(e) Pursuant to its MOU, each agency shall, to the extent permitted by law and subject to the availability of appropriations and within Administration budgetary limits, and in harmony with agency missions:

(1) support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions;

(2) restore and enhance the habitat of migratory birds, as practicable;

(3) prevent or abate the pollution or detrimental alteration of the Environment for the benefit of migratory birds, as practicable;

(4) design migratory bird habitat and population conservation principles, measures, and practices, into agency plans and planning processes (natural resource, land management, and environmental quality planning, including, but not limited to, forest and rangeland planning, coastal management planning, watershed planning, etc.) as practicable, and coordinate with other agencies and nonfederal partners in planning efforts;

(5) within established authorities and in conjunction with the adoption, amendment, or revision of agency management plans and guidance, ensure that agency plans and actions promote programs and recommendations of comprehensive migratory bird planning efforts such as Partners-in-Flight, U.S. National Shorebird Plan, North American Waterfowl Management Plan, North American Colonial Waterbird Plan, and other planning efforts, as well as guidance from other sources, including the Food and Agricultural Organization's International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries;

(6) ensure that environmental analyses of Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern;

(7) provide notice to the Service in advance of conducting an action that is intended to take migratory birds, or annually report to the Service on the number of individuals of each species of migratory birds intentionally taken during the conduct of any agency action, including but not limited to banding or marking, scientific collecting, taxidermy, and depredation control;

(8) minimize the intentional take of species of concern by: (i) delineating standards and procedures for such take; and (ii) developing procedures for the review and evaluation of take actions. With respect to intentional take, the MOU shall be consistent with the appropriate sections of 50 C.F.R. parts 10, 21, and 22;

(9) identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. With respect to those actions so identified, the agency shall develop and use principles, standards, and practices that will lessen the amount of unintentional take, developing any such conservation efforts in cooperation with the Service. These principles, standards, and practices shall be regularly evaluated and revised to ensure that they are effective in lessening the detrimental effect of agency actions on migratory bird populations. The agency also shall inventory and monitor bird habitat and populations within the agency's capabilities and authorities to the extent feasible to facilitate decisions about the need for, and effectiveness of, conservation efforts;

(10) within the scope of its statutorily-designated authorities, control the import, export, and establishment in the wild of live exotic animals and plants that may be harmful to migratory bird resources;

(11) promote research and information exchange related to the conservation of migratory bird resources, including coordinated inventorying and monitoring and the collection and assessment of information on environmental contaminants and other physical or biological stressors having potential relevance to migratory bird conservation. Where such information is collected in the course of agency actions or supported through Federal financial assistance, reasonable efforts shall be made to share such information with the Service, the Biological Resources Division of the U.S. Geological Survey, and other appropriate repositories of such data (e.g, the Cornell Laboratory of Ornithology);

(12) provide training and information to appropriate employees on methods and means of avoiding or minimizing the take of migratory birds and conserving and restoring migratory bird habitat;

(13) promote migratory bird conservation in international activities and with other countries and international partners, in consultation with the Department of State, as appropriate or relevant to the agency's authorities;

(14) recognize and promote economic and recreational values of birds, as appropriate; and

(15) develop partnerships with non-Federal entities to further bird conservation.

(f) Notwithstanding the requirement to finalize an MOU within 2 years, each agency is encouraged to immediately begin implementing the conservation measures set forth above in subparagraphs (1) through (15) of this section, as appropriate and practicable.

(g) Each agency shall advise the public of the availability of its MOU through a notice published in the Federal Register.

Sec. 4. Council for the Conservation of Migratory Birds. (a) The Secretary of Interior shall establish an interagency Council for the Conservation of Migratory Birds (Council) to oversee the implementation of this Order. The Council's duties shall include the following: (1) sharing the latest resource information to assist in the conservation and management of migratory birds; (2) developing an annual report of accomplishments and recommendations related to this Order; (3) fostering partnerships to further the goals of this Order; and (4) selecting an annual recipient of a Presidential Migratory Bird Federal Stewardship Award for contributions to the protection of migratory birds.

(b) The Council shall include representation, at the bureau director/administrator level, from the Departments of the Interior, State, Commerce, Agriculture, Transportation, Energy, Defense, and the Environmental Protection Agency and from such other agencies as appropriate.

Sec. 5. Application and Judicial Review. (a) This Order and the MOU to be developed by the agencies do not require changes to current contracts, permits, or other third party agreements.

(b) This Order is intended only to improve the internal management of the Executive branch and does not create any right or benefit, substantive or procedural, separately enforceable at law or equity by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

William J. Clinton
The White House,
January 10, 2001.

MIGRATORY BIRD TREATY ACT

16 U.S.C. §§ 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986 and 1989.

Overview. The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful.

Prohibited Acts. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns. Regulations are effective upon Presidential approval. §§ 703 and 704.

The Act makes it unlawful to: ship, transport or carry from one state, territory or district to another, or through a foreign country, any bird, part, nest or egg that was captured, killed, taken, shipped, transported or carried contrary to the laws from where it was obtained; import from Canada any bird, part, nest or egg obtained contrary to the laws of the province from which it was obtained. § 705.

Arrests/Search Warrants. To enforce the Act, authorized Department of Interior employees may: without a warrant, arrest a person violating the Act in the employee's presence or view; execute a warrant or other process issued by an officer or court to enforce the Act; search any place with a warrant. All birds, parts, nests or eggs that are captured, killed, taken, offered or sold, bartered, purchased, shipped, transported, carried, imported, exported or possessed contrary to the Act will be seized and, upon conviction of the offender or upon court judgment, be forfeited to the U.S. and disposed of by the Secretary. § 706.

Violations/Penalties. According to the Act, a person, association, partnership or corporation which violates the Act or its regulations is guilty of a misdemeanor and subject to a fine of up to $500, jail up to six months, or both. Anyone who knowingly takes a migratory bird and intends to, offers to, or actually sells or barters the bird is guilty of a felony, with fines up to $2,000, jail up to two years, or both. (Permissible fines are increased significantly by the Sentencing Reform Act of 1984, as amended in 1987, which is summarized separately in this Handbook.)

All guns, traps, nets, vessels, vehicles and other equipment used in pursuing, hunting, taking, trapping, ensnaring, capturing, killing, or any attempt on a migratory bird in violation of the Act with the intent to sell or barter, must be forfeited to the U.S. and may

be seized and held pending prosecution of the violator. The property is to be disposed of and accounted for by the Secretary. § 707.

Miscellaneous. The Act should not be construed to prevent states and territories from making or enforcing laws or regulations not inconsistent with the Act or which give further protection to migratory birds, nests and eggs, if such laws and regulations do not extend open seasons. § 708.

The Act cannot be construed to prevent the breeding of migratory game birds on farms and preserves, and the sale of birds lawfully bred to increase the food supply. § 711.

In accordance with the various migratory bird treaties and conventions, the Secretary is authorized to issue regulations to assure that the taking of migratory birds and their eggs by the indigenous inhabitants of Alaska is permitted for their nutritional and other essential needs during established seasons. § 712.

BIRDS PROTECTED BY THE MIGRATORY BIRD TREATY ACT
List of Migratory Birds

This is an adaptation of the List of Migratory Birds that appears in Title 50 of the Code of Federal Regulations, Section 10.13. The major difference between this list and the "official" published list is that the scientific and common (English) names have been changed to conform to the most recent taxonomy (as reflected in the 1983 AOU Check-list and published supplements through 1995). In cases where a name in the following list differs from that in the CFR list, the name in the CFR list is cross-referenced in parentheses. EXAMPLES: in the CFR list, the Yellow Bittern is listed as Chinese Bittern and the scientific name of the Crested Caracara (Caracara plancus) is given as Polyborus plancus. The referenced species are the same in both lists, only the nomenclature has changed.

Accentor, Siberian, Prunella montanella
Albatross, Black-footed, Diomedea nigripes
Laysan, Diomedea immutabilis
Short-tailed, Diomedea albatrus
Yellow-nosed, Diomedea chlororhynchos
Anhinga, Anhinga anhinga
Ani, Groove-billed, Crotophaga sulcirostris
Smooth-billed, Crotophaga ani
Auklet, Cassin's, Ptychoramphus aleuticus
Crested, Aethia cristatella
Least, Aethia pusilla
Parakeet, Cyclorrhynchus psittaculus
Rhinoceros, Cerorhinca monocerata
Whiskered, Aethia pygmaea
Avocet, American, Recurvirostra americana
Barn-Owl, Common (see Owl, Barn)
Beardless-Tyrannulet, Northern, Camptostoma imberbe
Becard, Rose-throated, Pachyramphus aglaiae
Bittern, American, Botaurus lentiginosus
Chinese (see Bittern, Yellow)
Least, Ixobrychus exilis
Yellow (=Chinese), Ixobrychus sinensis
Schrenk's, Ixobrychus eurhythmus
Black-Hawk, Common, Buteogallus anthracinus
Blackbird, Brewer's, Euphagus cyanocephalus
Red-winged, Agelaius phoeniceus
Rusty, Euphagus carolinus
Tawny-shouldered, Agelaius humeralis
Tricolored, Agelaius tricolor
Yellow-headed, Xanthocephalus xanthocephalus
Yellow-shouldered, Agelaius xanthomus

Bluebird, Eastern, Sialia sialis
Mountain, Sialia currucoides
Western, Sialia mexicana
Bluethroat, Luscinia svecica
Bobolink, Dolichonyx oryzivorus
Booby, Blue-footed, Sula nebouxii
Brown, Sula leucogaster
Masked, Sula dactylatra
Red-footed, Sula sula
Brambling, Fringilla montifringilla
Brant, Branta bernicla
Bufflehead, Bucephala albeola
Bullfinch, Eurasian, Pyrrhula pyrrhula
Puerto Rican, Loxigilla portoricensis
Bunting, Indigo, Passerina cyanea
Lark, Calamospiza melanocorys
Lazuli, Passerina amoena
McKay's, Plectrophenax hyperboreus
Painted, Passerina ciris
Pallas' (=Reed-bunting, Pallas'), Emberiza pallasi
Reed, (=Reed-Bunting, Common), Emberiza schoeniculus
Rustic, Emberiza rustica
Snow, Plectrophenax nivalis
Varied, Passerina versicolor
Bushtit, Psaltriparus minimus
Canvasback, Aythya valisneria
Caracara, Crested, Caracara (=Polyborus) plancus
Cardinal, Northern, Cardinalis cardinalis
Carib, Green-throated, Eulampis holosericeus
Catbird, Gray, Dumetella carolinensis
Chat, Yellow-breasted, Icteria virens
Chickadee, Black-capped, Parus atricapillus
Boreal, Parus hudsonicus
Carolina, Parus carolinensis
Chestnut-backed, Parus rufescens
Mexican, Parus sclateri
Mountain, Parus gambeli
Chuck-will's-widow, Caprimulgus carolinensis
Condor, California, Gymnogyps californianus
Coot, American, Fulica americana
Caribbean, Fulica caribaea
Eurasian, Fulica atra
Hawaiian (=American), Fulica alai (=americana)
Cormorant, Brandt's, Phalacrocorax penicillatus
Double-crested, Phalacrocorax auritus
Great, Phalacrocorax carbo

Neotropic (=Olivaceous), Phalacrocorax brasilianus (=olivaceus)
Olivaceus (see Cormorant, Neotropic)
Pelagic, Phalacrocorax pelagicus
Red-faced, Phalacrocorax urile
Cowbird, Bronzed, Molothrus aeneus
Brown-headed, Molothrus ater
Shiny, Molothrus bonariensis
Crake, Corn, Crex crex
Yellow-breasted, Porzana flaviventer
Crane, Common, Grus grus
Sandhill, Grus canadensis
Whooping, Grus americana
Creeper, Brown, Certhia americana
Crossbill, Red, Loxia curvirostra
White-winged, Loxia leucoptera
Crow, American, Corvus brachyrhynchos
Fish, Corvus ossifragus
Hawaiian, Corvus hawaiiensis
Mexican, Corvus imparatus
Northwestern, Corvus caurinus
White-necked, Corvus leucognaphalus
Cuckoo, Black-billed, Coccyzus erythropthalmus
Common, Cuculus canorus
Mangrove, Coccyzus minor
Oriental, Cuculus saturatus
Yellow-billed, Coccyzus americanus
Curlew, Bristle-thighed, Numenius tahitiensis
Eskimo, Numenius borealis
Far Eastern, Numenius madagascariensis
Least (see Curlew, Little)
Little (=Least), Numenius minutus
Long-billed, Numenius americanus
Dickcissel, Spiza americana
Dipper, American, Cinclus mexicanus
Dotterel, Eurasian, Charadrius morinellus
Dove, Inca, Columbina inca
Mourning, Zenaida macroura
White-tipped, Leptotila verreauxi
White-winged, Zenaida asiatica
Zenaida, Zenaida aurita
Dovekie, Alle alle
Dowitcher, Long-billed, Limnodromus scolopaceus
Short-billed, Limnodromus griseus
Duck, American Black, Anas rubripes
Harlequin, Histrionicus histrionicus
Hawaiian, Anas wyvilliana

Laysan, Anas laysanensis
Masked, Oxyura dominica
Mottled, Anas fulvigula
Ring-necked, Aythya collaris
Ruddy, Oxyura jamaicensis
Tufted, Aythya fuligula
Wood, Aix sponsa
Dunlin, Calidris alpina
Eagle, Bald, Haliaeetus leucocephalus
Golden, Aquila chrysaetos
White-tailed, Haliaeetus albicilla
Egret, Cattle, Bubulcus ibis
Chinese, Egretta eulophotes
Great, Ardea (=Casmerodius) alba (=albus)
Intermediate (=Plumed), Mesophoyx (=Egretta) intermedia
Plumed (see Egret, Intermediate)
Reddish, Egretta rufescens
Snowy, Egretta thula
Eider, Common, Somateria mollissima
King, Somateria spectabilis
Spectacled, Somateria fischeri
Steller's, Polysticta stelleri
Elaenia, Caribbean, Elaenia martinica
Emerald, Puerto Rican, Chlorostilbon maugaeus
Euphonia, Antillean, Euphonia musica
Falcon, Aplomado, Falco femoralis
Peregrine, Falco peregrinus
Prairie, Falco mexicanus
Fieldfare, Turdus pilaris
Finch, Cassin's, Carpodacus cassinii
House, Carpodacus mexicanus
Purple, Carpodacus purpureus
Rosy (see Rosy-Finch, Black; Rosy-Finch, Brown-capped; and Rosy-Finch, Gray-crowned)
Flamingo, Greater, Phoenicopterus ruber
Flicker, Gilded (=Northern), Colaptes chrysoides (=auratus)
Northern, Colaptes auratus
Flycatcher, Acadian, Empidonax virescens
Alder, Empidonax alnorum
Ash-throated, Myiarchus cinerascens
Brown-crested, Myiarchus tyrannulus
Buff-breasted, Empidonax fulvifrons
Cordilleran (=Western), Empidonax occidentalis (=difficilis)
Dusky, Empidonax oberholseri
Dusky-capped, Myiarchus tuberculifer
Fork-tailed, Tyrannus savana

Hawaiian, Branta (=Nesochen) sandvicensisRoss', Chen rossii
Snow, Chen caerulescens
Goshawk, Northern, Accipiter gentilis
Grackle, Boat-tailed, Quiscalus major
Common, Quiscalus quiscula
Great-tailed, Quiscalus mexicanus
Greater Antillean, Quiscalus niger
Grasshopper-Warbler, Middendorff's, Locustella ochotensis
Grassquit, Black-faced, Tiaris bicolor
Yellow-faced, Tiaris olivacea
Grebe, Clark's (=Western), Aechmophorus clarkii (=occidentalis)
Eared, Podiceps nigricollis
Horned, Podiceps auritus
Least, Tachybaptus dominicus
Pied-billed, Podilymbus podiceps
Red-necked, Podiceps grisegena
Western, Aechmophorus occidentallis
Greenfinch, Oriental, Carduelis sinica
Greenshank, Common, Tringa nebularia
Grosbeak, Black-headed, Pheucticus malanocephalus
Blue, Guiraca caerulea
Crimson-collard, Rhodothraupis celaeno
Evening, Coccothraustes vespertinus
Pine, Pinicola enucleator
Rose-breasted, Pheucticus ludovicianus
Yellow, Pheucticus chrysopeplus
Ground-Dove, Common, Zenaida passerina
Ruddy, Zenaida talpacoti
Guillemot, Black, Cepphus grylle
Pigeon, Cepphus columba
Gull, Black-headed (=Common Black-headed), Larus ridibundus
Bonaparte's, Larus philadelphia
California, Larus californicus
Common Black-headed (see Gull, Black-headed)
Franklin's, Larus pipixcan
Glaucous, Larus hyperboreus
Glaucous-winged, Larus glaucescens
Great Black-backed, Larus marinus
Heermann's, Larus heermanni
Herring, Larus argentatus
Iceland, Larus glaucoides
Ivory, Pagophila eburnea
Laughing, Larus atricilla
Lesser Black-headed, Larus fuscus
Little, Larus minutus
Mew, Larus canus

Ring-billed, Larus delawarensis
Ross', Rhodostethia rosea
Sabine's, Xema sabini
Slaty-backed, Larus schistisagus
Thayer's, Larus thayeri
Western, Larus occidentalis
Yellow-footed, Larus livens
Gyrfalcon, Falco rusticolus
Harrier, Northern, Circus cyaneus
Hawfinch, Coccothraustes coccothraustes
Hawk, Asiatic Sparrow, Accipiter gularis
Broad-winged, Buteo platypterus
Cooper's, Accipiter cooperii
Ferruginous, Buteo regalis
Gray, Buteo nitidus
Harris', Parabuteo unicinctus
Hawaiian, Buteo solitarius
Red-shouldered, Buteo lineatus
Red-tailed, Buteo jamaicensis
Rough-legged, Buteo lagopus
Sharp-shinned, Accipiter striatus
Short-tailed, Buteo brachyurus
Swainson's, Buteo swainsoni
White-tailed, Buteo albicaudatus
Zone-tailed, Buteo albonotatus
Hawk-Cuckoo, Hodgson's, Cuculus fugax
Hawk-Owl, Northern (see Owl, Hawk)
Heron, Great Blue, Ardea herodias
Green (=Green-backed), Butorides virescens (=striatus)
Green-backed (see Heron, Green)
Little Blue, Ardea caerulea
Night (see Night-Heron)
Pacific Reef, Ardea sacra
Tricolored, Ardea tricolor
Hoopoe, Upupa epops
House-Martin, Common, Delichon urbica
Hummingbird, Allen's, Selasphorus sasin
Anna's, Calypte anna
Antillean Crested, Orthorhynchus cristatus
Berylline, Amazilia beryllina
Black-chinned, Archilochus alexandri
Blue-throated, Lampornis clemenciae
Broad-billed, Cynanthus latirostris
Broad-tailed, Selasphorus platycercus
Buff-bellied, Amazilia yucatanensis
Calliope, Stellula calliope

Costa's, Calypte costae
Lucifer, Calothorax lucifer
Magnificent, Eugenes fulgens
Ruby-throated, Archilochus colubris
Rufous, Selasphorus rufus
Violet-crowned, Amazilia violiceps
White-eared, Hylocharis leucotis
Ibis, Glossy, Plegadis falcinellus
Scarlet, Eudocimus ruber
White, Eudocimus albus
White-faced, Plegadis chihi
Jabiru, Jabiru mycteria
Jacana, Northern, Jacana spinosa
Jaeger, Long-tailed, Stercorarius longicaudus
Parasitic, Stercorarius parasiticus
Pomarine, Stercorarius pomarinus
Jay, Blue, Cyanocitta cristata
Brown, Cyanocorax morio
Gray, Perisoreus canadensis
Gray-Breasted (see Jay, Mexican)
Green, Cyanocorax yncas
Mexican (=Gray-breasted), Aphelocoma ultramarina
Pinyon, Gymnorhinus cyanocephalus
Scrub (see Scrub-Jay, Florida; Scrub-Jay, Island; and Scrub-Jay, Western)
Steller's, Cyanocitta stelleri
Junco, Dark-eyed, Junco hyemalis
Yellow-eyed, Junco phaeonotus
Kamao (=Thrush, Hawaiian), Myadestes (=Phaeornis) myadestinus (=obscurus)
Kestrel, American, Falco sparverius
Eurasian, Falco tinnunculus
Killdeer, Charadrius vociferus
Kingbird, Cassin's, Tyrannus vociferans
Couch's, Tyrannus couchii
Eastern, Tyrannus tyrannus
Gray, Tyrannus dominicensis
Loggerhead, Tyrannus caudifasciatus
Thick-billed, Tyrannus crassirostris
Tropical, Tyrannus melancholicus
Western, Tyrannus verticalis
Kingfisher, Belted, Ceryle alcyon
Green, Chloroceryle americana
Ringed, Ceryle torquata
Kinglet, Golden-crowned, Regulus satrapa
Ruby-crowned, Regulus calendula

Kiskadee, Great, Pitangus sulphuratus
Kite, American Swallow-tailed (see Kite, Swallow-tailed)
Black, Milvus migrans
Black-shouldered (see Kite, White-tailed)
Hook-billed, Chondrohierax uncinatus
Mississippi, Ictinia mississippiensis
Snail, Rostrhamus sociabilis
Swallow-tailed, Elanoides forficatus
White-tailed (=Black-shouldered), Elanus leucurus (=caeruleus)
Kittiwake, Black-legged, Rissa tridactyla
Red-legged, Rissa brevirostris
Knot, Great, Calidris tenuirostris
Red, Calidris canutus
Lapwing, Northern, Vanellus vanellus
Lark, Horned, Eremophila alpestris
Sky (=Skylark, Eurasian), Alauda arvensis
Limpkin, Aramus guarauna
Lizard-Cuckoo, Puerto Rican, Saurothera vieilloti
Longspur, Chestnut-collared, Calcarius ornatus
Lapland, Calcarius lapponicus
McCown's, Calcarius mccownii
Smith's, Calcarius pictus
Loon, Arctic, Gavia arctica
Common, Gavia immer
Pacific (=Arctic), Gavia pacifica (=arctica)
Red-throated, Gavia stellata
Yellow-billed, Gavia adamsii
Magpie, Black-billed, Pica pica
Yellow-billed, Pica nuttalli
Mallard, Anas platyrhynchos
Mango, Antillean, Anthracothorax dominicus
Green, Anthracothorax viridis
Martin, Caribbean, Progne dominicensis
Cuban, Progne cryptoleuca
Gray-breasted, Progne chalybea
Purple, Progne subis
Meadowlark, Eastern, Sturnella magna
Western, Sturnella neglecta
Merganser, Common, Mergus merganser
Hooded, Lophodytes cucullatus
Red-breasted, Mergus serrator
Merlin, Falco columbarius
Mockingbird, Northern, Mimus polyglottos
Moorhen, Common, Gallinula chloropus
Murre, Common, Uria aalge
Thick-billed, Uria lomvia

Murrelet, Ancient, Synthliboramphus antiquus
Craveri's, Synthliboramphus craveri
Kittlitz's, Brachyramphus brevirostris
Marbled, Brachyramphus marmoratus
Xantus', Synthliboramphus hypoleucus
Needletail, White-throated, Hirundapus caudacutus
Night-Heron, Black-crowned, Nycticorax nycticorax
Japanese, Nycticorax goisagi
Malay, Nycticorax melanolophus
Yellow-crowned, Nyctanassa (=Nycticorax) violacea (=violaceus)
Nighthawk, Antillean, Chordeiles gundlachii
Common, Chordeiles minor
Lesser, Chordeiles acutipennis
Nightjar, Buff-collared, Caprimulgus ridgwayi
Puerto Rican, Caprimulgus noctitherus
Jungle, Caprimulgus indicus
Noddy, Black, Anous minutus
Blue-gray, Procelsterna cerulea
Brown, Anous stolidus
Lesser, Anous tenuirostris
Nutcracker, Clark's, Nucifraga columbiana
Nuthatch, Brown-headed, Sitta pusilla
Pygmy, Sitta pygmaea
Red-breasted, Sitta canadensis
White-breasted, Sitta carolinensis

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Oldsquaw, Clangula hyemalis
Olomao (=Thrush, Hawaiian), Myadestes (=Phaeornis) lanaiensis (=obscurus)
Omao (=Thrush, Hawaiian), Myadestes (=Phaeornis) obscurus
Oriole, Altamira, Icterus gularis
Audubon's, Icterus graduacauda
Baltimore (=Northern), Icterus galbula
Black-cowled, Icterus dominicensis
Black-vented, Icterus wagleri
Bullock's (=Northern), Icterus bullockii (=galbula)
Hooded, Icterus cucullatus
Northern (see Oriole, Baltimore; and Oriole, Bullock's)
Orchard, Icterus spurius
Scott's, Icterus parisorum
Streak-backed, Icterus pustulatus
Osprey, Pandion haliaetus
Ovenbird, Seiurus aurocapillus
Owl, Barn (=Barn-Owl, Common), Tyto alba

Barred, Strix varia
Boreal, Aegolius funereus
Burrowing, Speotyto (=Athene) cunicularia
Elf, Micrathene whitneyi
Flammulated, Otus flammeolus
Great Gray, Strix nebulosa
Great Horned, Bubo virginianus
Hawk (=Hawk-Owl, Northern), Surnia ulula
Long-eared, Asio otus
Northern Saw-whet, Aegolius acadicus
Short-eared, Asio flammeus
Snowy, Nyctea scandiaca
Spotted, Strix occidentalis
Oystercatcher, American, Haematopus palliatus
Black, Haematopus bachmani
Parula, Northern, Parula americana
Tropical, Parula pitiayumi
Pauraque (=Pauraque, Common), Nyctidromus albicollis
Common (see Pauraque)
Pelican, American White, Pelecanus erythrorhynchos
Brown, Pelecanus occidentalis
Petrel, Black-capped, Pterodroma hasitata
Bonin, Pterodroma hypoleuca
Bulwer's, Bulweria bulwerii
Cook's, Pterodroma cookii
Dark-rumped, Pterodroma phaeopygia
Herald, Pterodroma arminjoniana
Juan Fernandez (=White-necked), Pterodroma externa
Kermadec, Pterodroma neglecta
Mottled, Pterodroma inexpectata
Murphy's, Pterodroma ultima
White-necked, Pterodroma cervicalis (=externa)
Pewee, Greater, Contopus pertinax
Lesser Antillean, Contopus latirostris
Phainopepla, Phainopepla nitens
Phalarope, Red, Phalaropus fulicaria
Red-necked, Phalaropus lobatus
Wilson's, Phalaropus tricolor
Phoebe, Black, Sayornis nigricans
Eastern, Sayornis phoebe
Say's, Sayornis saya
Pigeon, Band-tailed, Columba fasciata
Plain, Columba inornataRed-billed, Columba flavirostris
Scaly-naped, Columba squamosa
White-crowned, Columba leucocephala
Pintail, Northern, Anas acuta

White-cheeked, Anas bahamensis
Pipit, American (=Water), Anthus rubescens (=spinoletta)
Olive-backed (=Tree-Pipit, Olive), Anthus hodgsoni
Pechora, Anthus gustavi
Red-throated, Anthus cervinus
Sprague's, Anthus spragueii
Water (see Pipit, American)
Plover, Black-bellied, Pluvialis squatarola
Common Ringed, Charadrius hiaticula
Great Sand, Charadrius leschensultii
Little Ringed, Charadrius dubius
Mongolian, Charadrius mongolus
Mountain, Charadrius montanus
Piping, Charadrius melodus
Semipalmated, Charadrius semipalmatus
Snowy, Charadrius alexandrinus
Wilson's, Charadrius wilsonia
Pochard, Baer's, Aythya baeri
Common, Aythya ferina
Poorwill, Common, Phalaenoptilus nuttallii
Puaiohi (=Thrush, Small Kauai), Myadestes (=Phaeornis) palmeri
Puffin, Atlantic, Fratercula arctica
Horned, Fratercula corniculata
Tufted, Fratercula cirrhata
Pygmy-Owl, Ferruginous, Glaucidium brasilianum
Northern, Glaucidium gnoma
Pyrrhuloxia, Cardinalis sinuatus
Quail-Dove, Bridled, Geotrygon mystacea
Key West, Geotrygon chrysia
Ruddy, Geotrygon montana
Rail, Black, Laterallus jamaicensis
Clapper, Rallus longirostris
King, Rallus elegans
Virginia, Rallus limicola
Yellow, Coturnicops noveboracensis
Raven, Chihuahuan, Corvus cryptoleucus
Common, Corvus corax
Razorbill, Alca torda
Redhead, Aythya americana
Redpoll, Common, Carduelis flammea
Hoary, Carduelis hornemanni
Redshank, Spotted, Tringa erythropus
Redstart, American, Setophaga ruticilla
Painted, Myioborus pictus
Slate-throated, Myioborus miniatus
Reed-Bunting, Common (see Bunting, Common)

Pallas' (see Bunting, Pallas')
Roadrunner, Greater, Geococcyx californianus
Robin, American, Turdus migratorius
Clay-colored, Turdus grayi
Rufous-backed, Turdus rufopalliatus
Rosefinch, Common, Carpodacus erythrinus
Rosy-Finch (=Finch), Black (=Rosy), Leucosticte atrata (=arctoa)
Brown-capped (=Rosy), Leucosticte australis (=arctoa)
Gray-crowned (=Rosy), Leucosticte tephrocotis (=arctoa)
Rough-winged Swallow, Northern, Stelgidopteryx serripennis
Rubythroat, Siberian, Luscinia calliope
Ruff, Philomachus pugnax

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Sanderling, Calidris alba
Sandpiper, Baird's, Calidris bairdii
Broad-billed, Limicola falcinellus
Buff-breasted, Tryngites subruficollis
Common, Actitis hypoleucos
Curlew, Calidris ferruginea
Least, Calidris minutilla
Marsh, Tringa stagnatilis
Pectoral, Calidris melanotos
Purple, Calidris maritima
Rock, Calidris ptilocnemis
Semipalmated, Calidris pusilla
Sharp-tailed, Calidris acuminata
Solitary, Tringa solitaria
Spoonbill, Eurynorhynchus pygmeus
Spotted, Actitis macularia
Stilt, Calidris himantopus
Terek, Xenus cinereus
Upland, Bartramia longicauda
Western, Calidris mauri
White-rumped, Calidris fuscicollis
Wood, Tringa glareola
Sapsucker, Red-breasted, Sphyrapicus ruber
Red-naped (=Yellow-bellied), Sphyrapicus nuchalis (=varius)
Williamson's, Sphyrapicus thyroideus
Yellow-bellied, Sphyrapicus varius
Scaup, Greater, Aythya marila
Lesser, Aythya affinis
Scoter, Black, Melanitta nigra
Surf, Melanitta perspicillata

White-winged, Melanitta fusca
Screech-Owl, Eastern, Otus asio
Puerto Rican, Otus nudipes
Western, Otus kennicottii
Whiskered, Otus trichopsis
Scrub-Jay (=Jay), Florida (=Scrub), Aphelocoma coerulescens
Island (=Scrub), Aphelocoma insularius (=coerulescens)
Western (=Scrub), Aphelocoma californica (=coerulescens)
Sea-Eagle, Steller's, Haliaeetus pelagicus
Seedeater, White-collared, Sporophila torqueola
Shearwater, Audubon's, Puffinus lherminieri
Black-vented, Puffinus opisthomelas
Buller's, Puffinus bulleri
Christmas, Puffinus nativitatis
Cory's, Bulweria diomedea
Flesh-footed, Puffinus carneipes
Greater, Puffinus gravis
Little, Puffinus assimilis
Manx, Puffinus puffinus
Pink-footed, Puffinus creatopus
Short-taild, Puffinus tenuirostris
Sooty, Puffinus griseus
Townsend's, Puffinus auricularis
Wedge-tailed, Puffinus pacificus
Shoveler, Northern, Anas clypeata
Shrike, Loggerhead, Lanius ludovicianus
Northern, Lanius excubitor
Siskin, Pine, Carduelis pinus
Skimmer, Black, Rhynchops niger
Skua, Great, Catharacta skua
South Polar, Catharacta maccormicki
Skylark, Eurasian (see Lark, Sky)
Smew, Mergellus albellus
Snipe, Common, Gallinago gallinago
Jack, Lymnocryptes minimus
Pin-tailed, Gallinago stenura
Swinhoe's, Gallinago megala
Solitaire, Townsend's, Myadestes townsendi
Sora, Porzana carolina
Sparrow, American Tree, Spizella arborea
Bachman's, Aimophila aestivalis
Baird's, Ammodramus bairdii
Black-chinned, Spizella atrogularis
Black-throated, Amphispiza bilineata
Botteri's, Aimophila botterii
Brewer's, Spizella breweri

Cassin's, Aimophila cassinii
Chipping, Spizella passerina
Clay-colored, Spizella pallida
Field, Spizella pusilla
Five-striped, Amphispiza quinquestriata
Fox, Passerella iliaca
Goldlen-crowned, Zonotrichia atricapilla
Grasshopper, Ammodramus savannarum
Harris', Zonotrichia querula
Henslow's, Ammodramus henslowii
Lark, Chondestes grammacus
Le Conte's, Ammodramus leconteii
Lincoln's, Melospiza lincolnii
Nelson's Sharp-tailed (=Sharp-tailed), Ammodramus nelsoni (=caudacutus)
Olive, Arremonops rufivirgatus
Rufous-crowned, Aimophila ruficeps
Rufous-winged, Aimophila carpalis
Sage, Amphispiza belli
Savannah, Passerculus sandwichensis
Seaside, Ammodramus maritimus
Saltmarsh Sharp-tailed (=Sharp-tailed), Ammodramus caudacutus
Sharp-tailed (see Sparrow, Nelson's Sharp-tailed; and Sparrow, Saltmarsh Sharp-tailed)
Song, Melospiza melodia
Swamp, Melospiza georgiana
Vesper, Pooecetes gramineus
White-crowned, Zonotrichia leucophrys
White-throated, Zonotrichia albicollis
Worthen's, Spizella wortheni
Spoonbill, Roseate, Ajaia ajaja
Starling, Ashy, Sturnus cineraceus
Violet-backed, Sturnus philippensis
Starthroat, Plain-capped, Heliomaster constantii
Stilt, Black-necked, Himantopus mexicanus
Stint, Little, Calidris minuta
Long-toed, Calidris subminuta
Red-necked (=Rufous-necked), Calidris ruficollis
Temminck's, Calidris temminckii
Stork, Wood, Mycteria americana
Storm-Petrel, Ashy, Oceanodroma homochroa
Band-rumped, Oceanodroma castro
Black, Oceanodroma melania
Fork-tailed, Oceanodroma furcata
Leach's, Oceanodroma leucorhoa
Least, Oceanodroma microsoma
Sooty (see Storm-Petrel, Tristram's)

Tristram's (=Sooty), Oceanodroma tristrami
Wedge-rumped, Oceanodroma tethys
White-faced, Pelagodroma marina
Wilson's, Oceanites oceanicus
Surfbird, Aphriza virgata
Swallow, Bahama, Tachycineta cyaneoviridis
Bank, Riparia riparia
Barn, Hirundo rustica
Cave, Hirundo fulva
Cliff, Hirundo pyrrhonota
Northern Rough-winged (see Rough-winged Swallow, Northern)
Tree, Tachycineta bicolor
Violet-green, Tachycineta thalassina
Swan, Trumpeter, Cygnus buccinator
Tundra, Cygnus columbianus
Whooper, Cygnus cygnus
Swift, Antillean Palm, Tachornis phoenicobia
Black, Crypseloides niger
Chimney, Chaetura pelagica
Common, Apus apus
Fork-tailed, Apus pacificus
Vaux's, Chaetura vauxi
White-collared, Streptoprocne zonaris
White-throated, Aeronautes saxatalis
Tanager, Hepatic, Piranga flava
Puerto Rican, Neospingus speculiferus
Scarlet, Piranga olivacea
Stripe-headed, Spindalis zena
Summer, Piranga rubra
Western, Piranga ludoviciana
Tattler, Gray-tailed, Heteroscelus brevipes
Wandering, Heteroscelus incanus
Teal, Baikal, Anas formosa
Blue-winged, Anas discors
Cinnamon, Anas cyanoptera
Falcated, Anas falcata
Green-winged, Anas crecca
Tern, Aleutian, Sterna aleutica
Arctic, Sterna paradisaea
Black, Chlidonias niger
Black-naped, Sterna sumatrana
Bridled, Sterna anaethetus
Caspian, Sterna caspia
Common, Sterna hirundo
Elegant, Sterna elegans
Forster's, Sterna forsteri

Gray-backed, Sterna lunata
Gull-billed, Sterna nilotica
Least, Sterna antillarum
Little, Sterna albifrons
Roseate, Sterna dougallii
Royal, Sterna maxima
Sandwich, Sterna sandvicensis
Sooty, Sterna fuscata
White, Gygis alba
White-winged, Chlidonias leucopterus
Thrasher, Bendire's, Toxostoma bendirei
Brown, Toxostoma rufum
California, Toxostoma redivivum
Crissal, Toxostoma crissale
Le Conte's, Toxostoma lecontei
Long-billed, Toxostoma longirostre
Pearly-eyed, Margarops fuscatus
Sage, Oreoscoptes montanus
Thrush, Aztec, Ridgwayia pinicola
Bicknell's (=Gray-cheeked), Catharus bicknelli (=minimus)
Blue Rock, Monticola solitarius
Dusky, Turdus naumanni
Eyebrowed (=Eye-browed), Turdus obscurus
Gray-cheeked, Catharus minimus
Hawaiian (see Kamao, Olomao, and Omao)
Hermit, Catharus guttatus
Red-legged, Turdus plumbeus
Small Kauai (see Puaiohi)
Swainson's, Catharus ustulatus
Varied, Ixoreus naevius
Wood, Hylocichla mustelina
Tit, Siberian, Parus cinctus
Titmouse, Bridled, Parus wollweberi
Plain, Parus inornatus
Tufted, Parus bicolor
Towhee, Abert's, Pipilo aberti
Brown (see Towhee, California; and Towhee, Canyon)
California (=Brown), Pipilo crissalis (=fuscus)
Canyon (=Brown), Pipilo fuscus
Eastern (=Rufous-sided), Pipilo erythrophthalmus
Green-tailed, Pipilo chlorurus
Rufous-sided (see Tohwee, Eastern; and Towhee, Spotted)
Spotted (=Rufous-sided), Pipilo maculatus (=erythrophthalmus)
Tree-Pipit, Olive (see Pipit, Olive-backed)
Trogon, Eared, Euptilotus neoxenus
Elegant, Trogon elegans

Tropicbird, Red-billed, Phaethon aethereus
Red-tailed, Phaethon rubricauda
White-tailed, Phaethon lepturus
Turnstone, Black, Arenaria melanocephala
Ruddy, Arenaria interpres
Veery, Catharus fuscescens
Verdin, Auriparus flaviceps
Violet-ear, Green, Colibri thalassinus
Vireo, Bell's, Vireo bellii
Black-capped, Vireo atricapillus
Black-whiskered, Vireo altiloquus
Gray, Vireo vicinior
Hutton's, Vireo huttoni
Philadelphia, Vireo philadelphicus
Puerto Rican, Vireo latimeri
Red-eyed, Vireo olivaceus
Solitary, Vireo solitarius
Warbling, Vireo gilvus
White-eyed, Vireo griseus
Yellow-green (=Red-eyed), Vireo flavoviridis (=olivaceus)
Yellow-throated, Vireo flavifrons
Vulture, Black, Coragyps atratus
Turkey, Cathartes aura
Wagtail, Black-backed, Motacilla lugens
Gray, Motacilla cinerea
White, Motacilla alba
Yellow, Motacilla flava
Warbler, Adelaide's, Dendroica adelaidae
Arctic, Phylloscopus borealis
Bachman's, Vermivora bachmanii
Bay-breasted, Dendroica castanea
Black-and-white, Dendroica varia
Black-throated Blue, Dendroica caerulescens
Black-throated Gray, Dendroica nigrescens
Black-throated Green, Dendroica virens
Blackburnian, Dendroica fusca
Blackpoll, Dendroica striata
Blue-winged, Vermivora pinus
Canada, Wilsonia canadensis
Cape May, Dendroica tigrina
Cerulean, Dendroica cerulea
Chestnut-sided, Dendroica pensylvanica
Colima, Vermivora crissalis
Connecticut, Oporornis agilis
Elfin Woods, Dendroica angelae
Golden-cheeked, Dendroica chrysoparia

Golden-crowned, Basileuterus culicivorus
Golden-winged, Vermivora chrysoptera
Grace's, Dendroica graciae
Hermit, Dendroica occidentalis
Hooded, Wilsonia citrina
Kentucky, Oporornis formosus
Kirtland's, Dendroica kirtlandii
Lucy's, Vermivora luciae
MacGillivray's, Oporornis tolmiei
Magnolia, Dendroica magnolia
Mourning, Oporornis philadelphia
Nashville, Vermivora ruficapilla
Olive, Peucedramus taeniatus
Orange-crowned, Vermivora celata
Palm, Dendroica palmarum
Pine, Dendroica pinus
Prairie, Dendroica discolor
Prothonotary, Protonotaria citrea
Red-faced, Cardellina rubrifrons
Rufous-capped, Basileuterus rufifrons
Swainson's, Limnothlypis swainsonii
Tennessee, Vermivora peregrina
Townsend's, Dendroica townsendi
Virginia's, Vermivora virginiae
Willow, Phylloscopus trochilus
Wilson's, Wilsonia pusilla
Worm-eating, Helmitheros vermivorus
Yellow, Dendroica petechia
Yellow-rumped, Dendroica coronata
Yellow-throated, Dendroica dominica
Waterthrush, Louisiana, Seiurus motacilla
Northern, Seiurus noveboracensis
Waxwing, Bohemian, Bombycilla garrulus
Cedar, Bombycilla cedrorum
Wheatear, Northern, Oenanthe oenanthe
Whimbrel, Numenius phaeopus
Whip-poor-will, Caprimulgus vociferus
Whistling-Duck, Black-bellied, Dendrocygna autumnalis
Fulvous, Dendrocygna bicolor
West Indian, Dendrocygna arborea
Wigeon, American, Anas americana
Eurasian, Anas penelope
Willet, Catoptrophorus semipalmatus
Wood-Pewee, Eastern, Contopus virens
Western, Contopus sordidulus
Woodcock, American, Scolopax minor

Eurasian, Scolopax rusticola
Woodpecker, Acorn, Melanerpes formicivorus
Black-backed, Picoides arcticus
Downy, Picoides pubescens
Gila, Melanerpes uropygialis
Golden-fronted, Melanerpes aurifrons
Hairy, Picoides villosus
Ivory-billed, Campephilus principalis
Ladder-backed, Picoides scalaris
Lewis', Melanerpes lewis
Nuttall's, Picoides nuttallii
Pileated, Dryocopus pileatus
Puerto Rican, Melanerpes portoricensis
Red-bellied, Melanerpes carolinus
Red-cockaded, Picoides borealis
Red-headed, Melanerpes erythrocephalus
Strickland's, Picoides stricklandi
Three-toed, Picoides tridactylus
White-headed, Picoides albolarvatus
Woodstar, Bahama, Calliphlox evelynae
Wren, Bewick's Thryothorus bewickii
Cactus, Campylorhynchus brunneicapillus
Canyon, Catherpes mexicanus
Carolina, Thryothorus ludovicianus
House, Troglodytes aedon
Marsh, Cistothorus palustris
Rock, Salpinctes obsoletus
Sedge, Cistothorus platensis
Winter, Troglodytes troglodytes
Wryneck, Eurasian, Jynx torquilla
Yellowlegs, Greater, Tringa melanoleuca
Lesser, Tringa flavipes
Yellowthroat, Common, Geothlypis trichas
Gray-crowned, Geothlypsis poliocephala

Appendix F

WILDLIFE SPECIES LIST

APPENDIX F
WILDLIFE SPECIES LIST
SHOSHONE-EUREKA PLANNING AREA

MAMMALS - 71

Order - Common Name	Scientific Name	Status and Comments
Shrews - 2	**Order Insectivora**	
Vagrant shrew	*Sorex vagrans*	
Water shrew	*Sorex palustris*	
Bats - 12	**Order Chiroptera**	
Big brown bat	*Eptesicus fuscus*	***SS***
Fringed myotis	*Myotis thysandodes*	***SS***
Little brown myotis	*Myotis lucifugus*	***SS***
Long-eared myotis	*Myotis evotis*	***SS***
Long-legged myotis	*Myotis volans*	***SS***
Mexican free-tailed bat	*Tadarida brasiliensis*	***SS***
Pallid Bat	*Antrozous pallidus*	***SS***
Silver-haired bat	*Lasionycteris noctivagans*	***SS***
Small-footed myotis	*Myotis leibii*	***SS***
Spotted bat	*Euderma maculatum*	***SS***
Townsend's big-eared bat	*Plecotus townsendii townsendii*	***SS***
Western pipestrelle	*Pipistrellus hesperus*	***SS***
Western small-footed myotis	*Myotis ciliolabrum*	***SS***
Weasels - 7	**Order Carnivora**	
Badger	*Taxidea taxus*	
Long-tailed weasel	*Mustela frenata*	
Mink	*Mustela vison*	*Upper Reese River ?*
River otter	*Lutra canadensis*	***SS*** *- Unknown -Upper Reese River*
Short-tailed weasel	*Mustela erminea*	
Striped skunk	*Mephitis mephitis*	
Western spotted skunk	*Spilogale gracillis*	
Foxes and Coyotes - 4	**Order Carnivora**	
Coyote	*Canis latrans*	
Grey fox	*Urocyon cinereoargenteus*	
Kit fox	*Vulpes macrotis*	
Red fox	*Vulpes vulpes*	
Cats - 2	**Order Carnivora**	
Bobcat	*Lynx rufus*	
Mountain lion	*Felis concolor*	
Rodents - 34	**Order Rodentia**	
Belding's ground squirrel	*Citellus lateralis*	
Bushy tailed-woodrat	*Neotoma cinerea*	
Canyon mouse	*Peromyscus crinitus*	
Chisel-toothed kangaroo rat	*Dipodomys micros*	

Order - Common Name	Scientific Name	Status and Comments
Cliff chipmunk	*Tamias dorsalis*	
Colorado chipmunk	*Tamias quadrivittatus*	
Deer mouse	*Peromyscus maniculatus*	
Desert woodrat	*Neotoma lepida*	
Fish Spring pocket gopher	*Thomomys umbrinus abstrusus*	***SS,*** *PVT, Verification of species needed*
Golden mantle ground squirrel	*Citellus lateralis*	
Great Basin Kangaroo rat	*Dipodomys microps*	
Great Basin pocket mouse	*Perognathus parvus*	
House mouse	*Mus musculus*	*Introduced*
Least chipmunk	*Eutamial minimus*	
Little pocket mouse	*Perognathus lonimembris*	
Long-tailed pocket mouse	*Perognathus formosus*	
Long-tailed vole	*Microtus longicaudus*	
Merriam's kangaroo rat	*Dipodomys merriami*	
Montane vole	*Microtus montanus*	
Northern pocket gopher	*Thomomys talpoides*	
Ord's kangaroo rat	*Dipodomys ordi*	
Pinyon mouse	*Peromyscus truei*	
Richardson's ground squirrel	*Citellus richardsoni*	
Rock squirrel	*Spermophilus variegatus*	
Sagebrush vole	*Lagurus curtatus*	
Townsend's ground squirrel	*Citellus townsendi*	
Uinta chipmunk	*Tamis umbrinus*	
Western harvest mouse	*Reithrodontomys megalostis*	
Western jumping mouse	*Zapus princeps*	
White-tailed antelope ground squirrel	*Ammosphermophilus leucurus*	
Yellow-bellied marmot	*Marmota flaviventris*	
Muskrat	*Ondatra zieithicus*	*Reese River*
Beaver	*Castor canadensis*	*Reese River – Indian Creek*
Porcupine	*Erethizon dorsatum*	*Rarely found in SEPA*
Pika and Rabbits - 6	**Order Lagomorpha**	
Pygmy rabbit	*Sylvilagus idahoensis*	***SS***
Black-tailed jackrabbit	*Lepus califonicus*	
White-tailed jackrabbit	*Lepus townsendi*	
Mountain cottontail	*Sylvilagus nuttallii*	
Desert cottontail	*Sylvilagus audubonii*	
Pika	*Ochotona princeps*	
Hoofed Species - 4	**Order Artiodactyla**	
Mule deer	*Odocoileus hemionus hemionus*	
Pronghorn	*Antilocapra americana*	
Desert bighorn sheep	*Ovis canadensis nelsoni*	***SS***
Rocky Mountain Elk	*Cervus elaphus nelsoni*	

BIRDS

Common Name	Scientific Name	Status and Comments
Loons - 1	**Order Gaviiformes**	
Common loon	*Gavia immer*	
Grebes - 4	**Order Podicipediformes**	
Horned grebe	*Podiceps auritus*	
Eared grebe	*Podiceps nigricollis*	
Pied-billed grebe	*Podilymbus podiceps*	
Western grebe	*Aechmophorus occidentalis*	
Pelicans and Cormorants - 1	**Order Pelecaniformes**	
White pelican	*Pelecanus erythrorhynchos*	
Waterfowl - 23	**Order Anseriformes**	
Tundra/Whistling swan	*Cygnus columbianus*	
Canada goose	*Branta canadensis*	
White-fronted goose	*Anser albifrons*	
Snow goose	*Chen caerulescens*	
Mallard	*Anas platyrhynchos*	
Gadwall	*Anas strepera*	
Pintail	*Anas acuta*	
Green-winged teal	*Anas crecca*	
Blue-winged teal	*Anas discors*	
Cinnamon teal	*Anas cyanoptera*	
American widgeon	*Marcea americana*	
Northern shoveler	*Spatula clypeata*	
Wood duck	*Aix sponsa*	
Redhead	*Aythya americana*	
Ring-necked duck	*Aythya collaris*	
Canvasback	*Aythya valisineria*	
Lesser scaup	*Aythya affinis*	
Common goldeneye	*Bucephala clangula*	
Bufflehead	*Bucephala albeola*	
Ruddy duck	*Oxyura jamaicensis*	
Hooded merganser	*Lophodytes cucullatus*	
Common merganser	*Mergus merganser*	
Red-breasted merganser	*Mergus serrator*	
Vultures, Hawks, and Falcons-14	**Order Falconiformes**	
Turkey vulture	*Cathartes aura*	
Northern Goshawk	*Accipiter gentilis*	***SS***
Sharp-shinned hawk	*Accipiter straitus*	
Cooper's hawk	*Accipiter cooperii*	
Red-tailed hawk	*Buteo jamaicensis*	
Swainson's hawk	*Buteo swainsoni*	***SS***
Rough-legged hawk	*Buteo lagopus*	
Ferruginous hawk	*Buteo regalis*	***SS***
Osprey	*Pandion haliaetus*	
Merlin	*Falco columbarius*	
American kestrel	*Falco sparverius*	

Common Name	Scientific Name	Status and Comments
Prairie falcon	*Falco mexicanus*	***SS***
Golden eagle	*Aquila chrysaetos*	**SS**
Bald eagle	*Haliaeetus leucocephalus*	***Threatened*** *- Winter migrant*
Gallinaceous Birds - 7	**Order Galliformes**	
Blue grouse	*Dendragapus obscurus*	
Sage grouse	*Centrocercus urophasianus*	***SS***
California quail	*Callipepla californicus*	
Mountain quail	Oreortyx pictus	***SS***
Ring-necked pheasant	*Phasianus colchicus*	*Introduced*
Chukar partridge	*Alectoris chukar*	*Introduced*
Gray/Hungarian partridge	*Perdix perdix*	*Introduced*
Herons and Allies -6	**Order Ciconiiformes**	
Great blue heron	*Ardea herodias*	
American bittern	*Botaurus lentiginosus*	
Common egret	*Casmerodius albus*	
Snowy egret	*Egretta thula*	
Black-crowned night heron	*Nycticorax nycticorax*	
White-faced ibis	*Plegadis chihi*	***SS***
Cranes and allies - 4	**Order Gruiformes**	
Greater sandhill crane	*Grus canadensis tabida*	***SS***
Virginia rail	*Rallus limicola*	
Sora rail	*Porzana carolina*	
American coot	*Fulica americana*	
Shore Birds, Gulls, and Terns - 17	**Order Charadriiformes**	
Killdeer	*Charadrius vociferus*	
Common snipe	*Capella gallinago*	
Long-billed curlew	*Numenius americanus*	
Spotted sandpiper	*Actitis macularia*	
Solitary sandpiper	*Tringa solitaria*	
Willet	*Catoptrophorus semipalmatus*	
Greater yellowlegs	*Tringa melanoleucus*	
Western sandpiper	*Calidris mauri*	
American avocet	*Recurvirostra americana*	
Black-necked stilt	*Himantopus mexicanus*	
Wilson's phalarope	*Phalaropus tricolor*	
Red-necked/Northern phalarope	*Phalaropus lobatus*	
California gull	*Larus californicus*	
Ring-billed gull	*Larus delawarensis*	
Forster's tern	*Sterna forsteri*	
Caspian tern	*Sterna caspia*	
Black tern	*Childonias niger*	**SS**

Common Name	Scientific Name	Status and Comments
Pigeons and Doves - 2	**Order Columbiformes**	
Mourning dove	*Zenaida macroura*	
Rock dove/domestic pigeon	*Columba livia*	
Cuckoos - 1	**Order Cuculiformes**	
Yellowed-billed cuckoo	*Coccyzus erythropthalmus*	***Candidate species – Eureka Co***.
Owls - 7	**Order Strigiformes**	
Barn owl	*Tyto alba*	
Great horned owl	*Bubo virginianus*	
Long-eared owl	*Asio otus*	***SS***
Northern saw-whet owl	*Aegolius acadicus*	
Short-eared owl	*Asio flammeus*	***SS***
Western burrowing owl	*Athene cunicularia*	***SS***
Western screech owl	*Otus kennicottii*	
Goat Suckers - 3	Order Caprimulgiformes	
Common Poorwill	Phalaenoptilus nuttallii	
Common nighthawk	Chordeiles minor	
Lesser nighthawk	Chordeiles acutipennis	
Swifts and Hummingbirds - 7	Order Apodiformes	
White-throated swift	Aeronautes saxatalis	
Vaux's swift	Chaetura vauxi	
Black-chinned hummingbird	Archilochus alexandri	
Costa's hummingbird	Calypte costae	
Broad-tailed hummingbird	Selaphorus platycercus	
Rufous hummingbird	Selaphorus rufus	
Calliope hummingbird	Stellula calliope	
Kingfishers - 1	Order Coraciiformes	
Belted kingfisher	Ceryle alcyon	
Woodpeckers -6	Order Piciformes	
Northern flicker	Colaptes auratus	red-shafter/yellow-shafted/guilded
Lewis' woodpecker	Melanerpes lewis	**SS**
Yellow-bellied sapsucker	Sphyrapicus varius	
Williamson's sapsucker	Sphyrapicus thyroideus	
Hairy woodpecker	Picoides villosus	
Downy woodpecker	Picoides pubescens	

Common Name	Scientific Name	Status and Comments
Perching Birds	**Order Passeriformes**	
Flycatchers - 11		
Eastern kingbird	*Tyrannus tyrannus*	
Western kingbird	*Tyrannus verticalis*	
Ash-throated flycatcher	*Myiarchus cinerascens*	
Say's phoebe	*Sayornis saya*	
Willow flycatcher	*Empidonax traillii*	
Cordilleran/Western flycatcher	*Empidonax occidentalis*	
Hammond's flycatcher	*Empidonax hammondii*	
Dusky flycatcher	*Empidonax oberholseri*	
Gray flycatcher	*Empidonax wrightii*	
Western wood pewee	*Contopus sordidulus*	
Olive-sided flycatcher	*Contopus borealis*	
Larks - 1		
Horned lark	*Eremophila alpestris*	
Swallows - 6		
Violet-green swallow	*Tachycineta thalassina*	
Tree swallow	*Tachycineta bicolor*	
Bank swallow	*Riparia riparia*	
Rough-winged swallow	*Stelgidopteryx ruficollis*	
Barn swallow	*Hirundo rustica*	
Cliff Swallow	*Hirundo pyrrhonota*	
Jays, Magpies and Crows - 6		
Common raven	*Corvus corax*	
American crow	*Corvus brachyrhynchos*	
Black-billed magpie	*Pica pica*	
Pinyon jay	*Gymnorhinus cyanocephalus*	**SS**
Scrub jay	*Aphelocoma coerulescens*	
Clark's nutcracker	*Nucifraga columbiana*	
Chickadees and Allies - 3		
Mountain chickadee	*Parus gambeli*	
Plain titmouse	Parus inornatus	
Juniper titmouse	Chondestes grammacus	**SS**
Nuthatches - 3		
Bushtit	Psaltriparus minimus	
White-breasted nuthatch	Sitta carolinensis	
Red-breasted nuthatch	Sitta canadensis	
Creepers - 1		
Brown creeper	Certhia americana	
Wrens - 4		
House wren	Troglodytes aedon	
Rock wren	Salpinctes obsoletus	
Long-billed Marsh wren	Cistothorus palustris	
Canyon wren	Catherpes mexicanus	

Common Name	Scientific Name	Status and Comments
Dippers - 1		
American Dipper	Cinclus mexicanus	
Kinglets and Allies - 3		
Blue-gray gnatcatcher	Polioptila caerulea	
Golden-crowned kinglet	Regulus satrapa	
Ruby-crowned kinglet	Regulus calendula	
Thrushes - 6		
Robin	Turdus migratorius	
Hermit thrush	Catharus guttatus	
Swainson's thrush	Catharus ustulatus	
Western bluebird	Sialia mexicana	
Mountain bluebird	Sialia currucoides	
Townsend's solitaire	Myadestes townsendi	
Pipits and Wagtails - 1		
American/Water pipit	Arthus rubescens	
Mockingbirds and Thrashers-3		
Northern Mockingbird	*Mimus polyglottos*	
Brown thrasher	*Toxostoma rufum*	
Sage thrasher	*Oreoscoptes montanus*	
Waxwing - 2		
Bohemian waxwing	*Bombycilla garrulus*	
Cedar waxwing	*Bombycilla cedrorum*	
Shrikes - 2		
Loggerhead shrike	*Lanius ludovicianus*	***SS***
Northern shrike	Lanius excubitor	
Starlings - 1		
Starling	Sturnus vulgaris	Introduced
Vireos - 2		
Solitary vireo	Vireo solitarius	
Warbling vireo	Vireo gilvus	
Warblers - 11		
Orange-crowned warbler	Vermivora celata	
Virginia's warbler	Vermivora virginiae	
Yellow warbler	Dendrocia petechia	
Myrtle/Audubon's/Yellow-rumped warbler	Dendrocia coronata	
Black-throated gray warbler	Dendrocia nigrescens	
Townsend's warbler	Dendrocia townsendi	
Hermit warbler	Dendrocia occidentalis	
McGillivray's warbler	Oporornis tolmiei	
Common yellowthroat	Geothylpis trichas	
Yellow-breasted chat	Icteria virens	
Wilson's warbler	Wilsonia pusilla	

Common Name	Scientific Name	Status and Comments
Tanagers - 1		
Western tanager	Piranga ludovicianus	
Grosbeaks - 3		
Black-headed grosbeak	Pheucticus melanocephalus	
Indigo bunting	Passerina cyanea	
Lazuli bunting	Passerina amoena	
Sparrows and Buntings - 20		
Green-tailed towhee	Pipilo chlorurus	
Rufous-sided towhee	Pipilo erythrophthalmus	
Lark bunting	Calamospiza melanocorys	
Savannah sparrow	Passerculus sandwichensis	
Grasshopper sparrow	Ammodramus savannarum	
Vesper sparrow	Pooecetes gramineus	
Lark sparrow	Chondestes grammacus	
Black-throated sparrow	Amphispiza bilineata	
Sage sparrow	Amphispiza belli	
Oregon junco	Junco hyemalis	
Tree sparrow	Spizella arborea	
Chipping sparrow	Spizella passerina	
Brewer's sparrow	Spizella breweri	
Harris' sparrow	Zonothrichia querula	
White-crowned sparrow	Zonothrichia leucophrys	
White-throated sparrow	*Zonothrichia albicollis*	
Golden-crowned sparrow	*Zonothrichia atricapilla*	
Fox sparrow	*Passerella iliaca*	
Lincoln's sparrow	*Melospiza lincolnii*	
Song sparrow	*Melospiza melodia*	
Bobolinks, Blackbirds & Orioles	***10***	
Bobolinks	*Dolichonyx oryzivorus*	
Western meadowlark	*Sturnella neglecta*	
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	
Red-winged blackbird	*Agelaius phoeniceus*	
Scott's oriole	*Icterus parisorum*	
Northern/Bullock's oriole	*Icterus galbula*	
Brewer's blackbird	*Euphagus cyanocephalus*	
Common grackle	*Quiscalus quiscula*	
Great-tailed grackle	*Quiscalus mexicanus*	
Brown-headed cowbird	*Molothrus ater*	
Finches - 9		
Cassin's finch	Carpodacus cassinii	
House finch	Carpodacus mexicanus	
Gray-crowned rosy finch	Leucosticte tephrocotis	
Black rosy-finch	Leucosticte atrata	
Pine siskin	Carduelis pinus	
American goldfinch	Carduelis tristis	
Lesser goldfinch	Carduelis psaltria	
Red crossbill	Loxia curvirostra	

Common Name	Scientific Name	Status and Comments
Evening grosbeak	Coccothraustes vespetinus	
Weaver Finches - 1		
House or English sparrow	Passer domesticus	Introduced

FISH

Common Name - 10	Scientific Name	Status and Comments
Brook Trout	*Salvelinus fontinalis*	introduced
Brown Trout	*Salmo trutta*	introduced
Diamond Valley speckled dace	*Rhinichthys osculus ssp. (unnamed)*	**SS** - PVT
Fish Creek Springs tui chub	*Gila bicolor euchila*	**SS** - PVT
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	**Endangered**
Lahontan speckled dace	*Rhinichthys osculus robustus*	
Monitor Valley speckled dace	*Rhinichthys osculus ssp. (unnamed)*	
Rainbow Trout	*Oncorhynchus mykiss*	introduced
Speckled dace	*Rhinichthys osculus*	
tui chub species	*Gila bicolor ssp*	

AMPHIBIANS

Common Name	Scientific Name	Status and Comments
Toads and frogs - 6	***Salientia***	
Great Basin spade-footed toad	*Scaphiopus intermontanus*	
Pacific chorus frog	*Hyla regilla*	
Western toad	*Bufo boreas boreas*	
Great Basin Columbia Spotted frog	*Rana luteiventris*	**Candidate** -Toiyable subpopulation
Northern Leopard frog	*Rana pipiens*	
Bullfrog	*Rana catesbeiana*	Introduced

REPTILES

Common Name	Scientific Name	Status and Comments
Lizards, Skinks, & Snakes	***Order Squamata***	
Lizards - 11		
Desert collared lizard	*Crotaphytus insularis bicictores*	
Desert horned lizard	*Phrynosoma platyrhinos*	
Great basin fence lizard	*Sceloporus occidentalis longipes*	
Great Basin whiptail	Cnemidophorus *tigris tigris*	
Long-nosed leopard lizard	*Crotaphytus wislizenii*	
Nevada side-bloched lizard	*Uta stansburiana nevadensis*	
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	
Short-horned lizard	*Phrynosoma douglassi*	
Western fence lizard	*Sceloporus occidentalis*	
Yellow-backed spiny lizard	*Sceloporus magister uniformis*	
Zebra-tailed lizard	*Callisaurus draconoides myurus*	
Skinks - 1		
Great Basin skink	*Eumeces skiltonianus utahensis*	
Boas and Pythons - 1		
Rubber boa	*Charina bottae*	

Snakes - 9		
Common California kingsnake	*Lamproheltis getulus californiae*	1????
Desert night snake	*Hypsiglena torquata deserticola*	
Desert striped whipsnake	*Masticophis taeniatus taeniatus*	
Great Basin gopher snake	*Pituophis melanoleucus deserticola*	
Great basin whip tail	*Cnemidorphorus tigrus tigris*	
Nevada ground snake	*Sonora semiannulata*	
Wandering garter snake	*Thamnophis elegans vagrans*	
Western long-nosed snake	*Rhinoncheilus lecontei lecontei*	
Western yellow-bellied racer	*Coluber constrictor mormon*	
Pit Vipers - 1		
Great Basin rattlesnake	*Crotalus viridis lutosus*	

Appendix G

BEST MANAGEMENT PRACTICES FOR WEEDS

APPENDIX G

Bureau of Land Management
Battle Mountain Field Office/Tonopah Field Station
Invasive Plants, Noxious Weeds, and Pests
Prevention Schedule and Best Management Practices

Revised 9-30-05

Note: This prevention schedule and these practices should be referenced in your environmental documentation and incorporated into your plan of operations. They also should be implemented in the field and documented, as appropriate, when completed.

Prevention Schedule

PREVENTION ACTIVITY	WHEN	WHO IS RESPONSIBLE
Clean all off-road vehicles and equipment (manual and power cleaning) of all mud, dirt, and plant parts before moving into invasive plant, noxious weed and pest free areas.	All Year	All Field-Going Personnel, Contractors & Volunteers Equipment Operator Engine/Equipment Operator (Fire) Weed & Pest Management Specialist – Oversight
Re-establish vegetation on all disturbed soil from construction, reconstruction, and maintenance activities.	Spring &/or Fall	Project Lead Equipment Operator Surface Protection Specialist Civil Engineer Geologist Hydrologist Rangeland Management Specialist Wildlife Biologist Natural Resource Specialist Wild Horse & Burro Specialist Weed & Pest Management Specialist – Oversight

Inspect gravel pits and fill sources to identify invasive plant, noxious weed and pest free sources. Gravel and fill to be used in relatively invasive plant, noxious weed and pest free areas must come from invasive plant, noxious weed and pest free sources.	All Year	Project Lead Equipment Operator Surface Protection Specialist Civil Engineer Geologist Hydrologist Rangeland Management Specialist Wildlife Biologist Natural Resource Specialist Wild Horse & Burro Specialist Weed & Pest Management Specialist – Oversight
Ensure that areas with recreation special use permits have on-site invasive plant, noxious weed and pest controls that minimize spread to other areas.	All Year	Outdoor Recreation Planner Weed & Pest Management Specialist – Oversight
Control timing of livestock grazing and wild horse and burro gather and movement from infested to non-infested areas to minimize invasive plant, noxious weed and pest transport into moderate or high ecological risk areas.	Grazing Season or Gather Period	Rangeland Management Specialist Wildlife Management Specialist Wild Horse & Burro Specialist Natural Resource Specialist Weed & Pest Management Specialist – Oversight
Ensure that invasive plant, noxious weed and pest prevention is considered in all forest (woodland) management designs and projects.	All Year	Natural Resource Specialist Weed & Pest Management Specialist – Oversight
Sign trailheads and improved campgrounds for invasive plant, noxious weed and pest awareness and prevention techniques.	Spring, Summer &/or Fall	Outdoor Recreation Planner Weed & Pest Management Specialist – Oversight
Environmental analysis will include invasive plant, noxious weed and pest considerations.	All Year	Project Lead Weed & Pest Management Specialist
Invasive plant, noxious weed and pest identification and awareness training for all field-going employees and contractors and awareness training for managers.	Spring, Summer &/or Fall	Project Lead Weed & Pest Management Specialist
Distribute invasive plant, noxious weed and pest public information.	All Year	Public Affairs Officer Weed & Pest Management Specialist

Include invasive plant, noxious weed and pest risk factors, identification, awareness, prevention schedules and practices in Fire Fighter, Incident Management Team, Resource Advisor (Fire) training and duties, and in Wild Land Urban Interface, Fuels, and Emergency Stabilization and Rehabilitation planning and implementation activities.	Fire Season & All Year	Fire Management Officer Assistant Fire Management Officer Fire Fighter et al. Incident Management Team Resource Advisor (Fire) Fuels Management Specialist Fire Ecologist Weed & Pest Management Specialist – Oversight

Best Management Practices

REQUIREMENTS	PRACTICES	PROGRAM RESPONSIBILITY
Incorporate invasive plant, noxious weed and pest awareness, prevention and control into facilities and transportation planning, location, layout, design and the development of alternatives.	• Consider invasive plant, noxious weed and pest risk factors including, but not limited to, on or adjacent to native plant species and communities, on or adjacent to sensitive habitats, desired plant species and communities after rehabilitation, geography, climate, multiple-uses within effectual distance, past catastrophic events, expected travel or visit frequency, and maintenance requirements. Also identify existing infestations within effectual distance and the means to prevent their increase and spread.	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal) • Invasive Plants, Noxious Weeds & Pests
Remove invasive plant, noxious weed and pest sources from vehicles and equipment prior to leaving invasive plant, noxious weed and pest infested areas and prior to entry into infestation free areas of ecological risk.	• Before vehicles and equipment move into invasive plant, noxious weed and pest infested areas, treat the infestation on-site and on all access routes. Sites and access routes, when under construction, reconstruction, maintenance or rehabilitation must follow the requirements and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. • Clean off equipment and vehicles (manual or power cleaning) of all mud, dirt, plants and insects including invasive plants, noxious weeds and pests prior to leaving infested areas and prior to entry into infestation free areas of ecological risk. This includes service vehicles that will normally stay on an access route when traveling frequently into, out	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal) • Invasive Plants, Noxious Weeds & Pests

	of, and within the area of ecological risk.. • Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	
Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread.	• For all construction, reconstruction, maintenance, and rehabilitation activities, seed all disturbed areas except designated access routes and facilities within seven days (exception – see below) of work completion, unless ongoing activities and practices will prevent invasive plant and noxious weed establishment. In that case, seeding shall be done within seven days of final disturbance or during rehabilitation. Use an approved seed mix that includes fast, early growing season species that will provide effective competition for invasive plants and noxious weeds. Seed should be certified invasive plant and noxious weed free. Exception – During periods of minimal or no precipitation and high temperatures, seeding should be delayed until climatic and soil moisture conditions are favorable to seed germination. • Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	• Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Minerals & Oil & Gas (wind & geothermal) • Invasive Plants, Noxious Weeds & Pests
Minimize invasive plant, noxious weed and pest increase and spread caused by moving infested gravel and fill material to	• Inspect, record and maintain a list of gravel pits and fill sources that are invasive plant, noxious weed and pest	• Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities,

infestation free locations.	free. Also maintain a list of those that are not infestation free. • Inspect, record and maintain a list of gravel and fill material and their sources prior to transport or use on-site and disqualify infested material from use. Exception – Where infestation mitigation is in place and assured of active implementation and enforcement.	transportation, construction, operations & maintenance) • Recreation (WSA) • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Minerals & Oil & Gas (wind & geothermal) • Invasive Plants, Noxious Weeds & Pests
Minimize sources of invasive plants, noxious weeds and pests in areas not yet re-vegetated.	• Keep active construction sites which are in invasive plant, noxious weed and pest free areas of ecological risk closed to vehicles, equipment and livestock that are not involved with the construction activity.	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal) • Invasive Plants, Noxious Weeds & Pests
Ensure establishment and maintenance of vigorous, desirable vegetation to discourage invasive plants and noxious weeds.	• Monitor all seeded (rehabilitated) sites. Spot reseed and treat invasive plants, noxious weeds and pests as needed. Use approved native species for reseeding .	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal) • Invasive Plants, Noxious Weeds & Pests
Minimize roadside sources of invasive plant and noxious weed seed that could be transported to	• Road maintenance programs should include pre-maintenance invasive plant	• Riparian (wetland) • Realty (ROW)

other areas.	and noxious weed evaluation and treatment of known infestations as well as year-around inventory for new infestations. New and recurring infestations should be scheduled for evaluation and/or treatment according to their phenological susceptibility to treatment within the annual maintenance scheduling.	• Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal) • Invasive Plants, Noxious Weeds & Pests
Ensure that invasive plant, noxious weed and pest awareness, prevention and control and related resource protection is considered in travel management.	• Consider invasive plant, noxious weed and pest risk and spread factors in travel plan decision-making.	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal) ▪ Invasive Plants, Noxious Weeds & Pests
Minimize transport of invasive plant and noxious weed seed by pack and saddle stock..	• All pack and saddle stock in designated areas should use only certified invasive plant and noxious weed free feed and bedding (in established wilderness, this requirement should be deferred to the Limits of Acceptable Change planning process). • Pack and saddle stock should be secluded and fed only invasive plant and noxious weed free feed for 24 hours prior to traveling into designated areas . Before seclusion, tails and manes should be brushed out to remove any invasive plant and noxious weed seed.	• Riparian (wetland) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Invasive Plants, Noxious Weeds & Pests

Encourage an invasive plant, noxious weed and pest free trail user's ethic.	• Sign trailheads for invasive plant, noxious weed and pest awareness and prevention at designated locations.	▪ Riparian (wetland) ▪ Realty (ROW) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Cultural (Archeology) ▪ Invasive Plants, Noxious Weeds & Pests
Ensure that areas under special use permits including cultural, archeological and paleontological sites have on-site invasive plant, noxious weed and pest awareness, prevention and control programs.	▪ Revise special use permits to require invasive plant, noxious weed and pest awareness, prevention and control measures consistent with the current Programmatic Invasive Plant, Noxious Weed and Pest Plan and Environmental Assessment(s). ▪ Sites and access routes, when constructed, reconstructed, maintained or rehabilitated must follow the requirements and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. ▪ Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	▪ Riparian (wetland) ▪ Realty (ROW) ▪ Fire (suppression, WUI, ESR & fuels) ▪ Support Services (facilities, transportation, construction, operations & maintenance) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Cultural (Archeology) ▪ Minerals & Oil & Gas (wind & geothermal) ▪ Invasive Plants, Noxious Weeds & Pests
Post invasive plant, noxious weed and pest information at developed (permanent or temporary) campgrounds.	▪ Post pertinent invasive plant, noxious weed and pest posters, warnings, pamphlets and brochures at developed (permanent or temporary) campgrounds at designated locations.	▪ Riparian (wetland) ▪ Realty (ROW) ▪ Fire (suppression, WUI, ESR & fuels) ▪ Support Services (facilities, transportation, construction, operations & maintenance) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Cultural (Archeology)

		▪ Minerals & Oil & Gas (wind & geothermal) ▪ Invasive Plants, Noxious Weeds & Pests
Incorporate invasive plant, noxious weed and pest awareness, prevention and control into wildlife habitat improvement project planning, location, layout, design, construction and maintenance and in the development of alternatives.	• Consider invasive plant, noxious weed and pest risk factors including, but not limited to, on or adjacent to native plant species and communities, on or adjacent to sensitive habitats, desired plant species and communities after rehabilitation, geography, climate, multiple-uses within effectual distance, past catastrophic events, expected travel or visit frequency, and maintenance requirements. Also identify existing infestations within effectual distance and the means to prevent their increase and spread. ▪ Sites and access routes, when constructed, reconstructed, maintained or rehabilitated, must follow the requirements and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. ▪ Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	▪ Riparian (wetland) ▪ Fire (suppression, WUI, ESR & fuels) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Invasive Plants, Noxious Weeds & Pests
Minimize the creation of bare soil and other related problems due to livestock and wild horse and burro management that promote invasive plants, noxious weeds and pests.	▪ Manage grazing allotments and wild horse and burro areas to prevent excessive native plant and soil disturbance at all permanent, temporary, natural and man-made mineral licks, watering sites, and areas or habitat with sensitive	▪ Riparian (wetland) ▪ Fire (suppression, WUI, ESR & fuels) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Invasive Plants, Noxious Weeds & Pests

	native plant and/or soil conditions.	
Minimize invasive plant and noxious weed seed transport by livestock and wild horses and burros to invasive plant and noxious weed free areas of ecological risk.	▪ In grazing allotments and wild horse and burro areas that have both invasive plant and noxious weed infested and free areas of ecological risk, control the timing of animal entry and movement from infested to non-infested areas. Prevent movement from infested to non-infested areas after weed seed set. ▪ Livestock should be fed only invasive plant and noxious weed free forage for 24 hours prior to entry or movement into areas of ecological risk . The hides of livestock should also be examined and cleaned of any invasive plant and noxious weed seed prior to entry or movement.	▪ Riparian (wetland) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Invasive Plants, Noxious Weeds & Pests
Ensure success of re-vegetation efforts by minimizing invasive plant, noxious weed and pest increase and spread from livestock and wild horses and burros.	▪ Avoid or eliminate grazing from any reseeded sites until prescribed vegetation is well established. ▪ Monitor all seeded (rehabilitated) sites. Spot reseed and treat invasive plants, noxious weeds and pests as needed. Use approved native species or substitutes for reseeding .	▪ Riparian (wetland) ▪ Realty (ROW) ▪ Fire (suppression, WUI, ESR & fuels) ▪ Support Services (facilities, transportation, construction, operations & maintenance) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Cultural (Archeology) ▪ Minerals & Oil & Gas (wind & geothermal) ▪ Invasive Plants, Noxious Weeds & Pests
Ensure that invasive plant, noxious weed and pest awareness, prevention and control is considered in all timber (woodland) management projects.	• Consider invasive plant, noxious weed and pest risk factors (e.g. maximize shade & minimize soil disturbance) in all silvicultural prescriptions and in alternative development and evaluation of all timber (woodland) sale environmental analyses. • Consider invasive plant, noxious weed and pest risk	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Invasive Plants, Noxious Weeds & Pests

	factors including, but not limited to, on or adjacent to native plant species and communities, on or adjacent to sensitive habitats, desired plant species and communities after rehabilitation, geography, climate, multiple-uses within effectual distance, past catastrophic events, expected travel or visit frequency, and maintenance requirements. Also identify existing infestations within effectual distance and the means to prevent their increase and spread. ▪ Sites and access routes, when constructed, reconstructed, maintained or rehabilitated, must follow the requirements and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. ▪ Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	
Minimize the creation of bare soil and other related factors that promote invasive plant, noxious weed and pest establishment in all timber (woodland) management projects.	• Minimize soil disturbance by the following measures: 1) no more disturbance on planting and revegetation projects than needed for tree regeneration, 2) prescribe winter skidding on invasive plant, noxious weed and pest high risk sites, 3) prescribe broadcast burning over dozer piling and burning, 4) when using dozer piles, prescribe small piles and burn under conditions that minimize heat transfer to the soil, 5) avoid dozer fire line construction on invasive plant, noxious weed and pest	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Invasive Plants, Noxious Weeds & Pests

	high risk sites, and 6) ensure prompt regeneration to maximize shading. ▪ Sites and access routes, when constructed, reconstructed, maintained or rehabilitated, must follow the requirements and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. ▪ Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	
Ensure that invasive plant, noxious weed and pest awareness, prevention and control measures are considered in all lands (e.g. rights-of-way), mining, oil and gas, wind energy and geothermal projects.	• Consider invasive plant, noxious weed and pest risk factors (e.g. maximize shade & minimize soil disturbance) in all plans of operation and reclamation plans and in alternative development and in the evaluation of all environmental analyses. • Consider invasive plant, noxious weed and pest risk factors including, but not limited to, on or adjacent to native plant species and communities, on or adjacent to sensitive habitats, desired plant species and communities after rehabilitation, geography, climate, multiple-uses within effectual distance, past catastrophic events, expected travel or visit frequency, and maintenance requirements. Also identify existing infestations within effectual distance and the means to prevent their increase and spread. ▪ Sites and access routes, when constructed, reconstructed, maintained or rehabilitated, must follow the requirements	• Riparian (wetland) • Realty (ROW) • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal energy) • Invasive Plants, Noxious Weeds & Pests

	and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. ▪ Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation. ▪ Retain reclamation bonds for invasive plant, noxious weed and pest control until the site is returned to invasive plant, noxious weed and pest free conditions.	
Remove invasive plant, noxious weed and pest sources from all lands (e.g. rights-of-way), mining, oil and gas, wind energy and geothermal project vehicles and equipment prior to leaving invasive plant, noxious weed and pest infested areas and prior to entry into infestation free areas of ecological risk.	• Before vehicles and equipment move into invasive plant, noxious weed and pest infested areas, treat the infestations on-site and on all access routes. Sites and access routes, when under construction, reconstruction, maintenance or rehabilitation must follow the requirements and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. Ensure inclusion into the Plan of Operations and Reclamation Plan. ▪ Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation. ▪ Clean off equipment and vehicles (manual or power cleaning) of all mud, dirt, plants and insects including invasive plants, noxious weeds and pests prior to	• Riparian (wetland) • Realty (ROW) • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal energy) • Invasive Plants, Noxious Weeds & Pests

	leaving infested areas and prior to entry into infestation free areas of ecological risk. This includes service vehicles that will normally stay on an access route when traveling frequently into, out of, and within the area of ecological risk.. Ensure inclusion into the Plan of Operations and Reclamation Plan.	
Minimize the creation of bare soil and other related problems that promote invasive plant, noxious weed and pest establishment in all lands (e.g. rights-of-way), mining, oil and gas, wind energy and geothermal projects.	• Minimize soil disturbance by the following measures: 1) stabilize the site immediately, 2) establish a productive perennial plant community as soon as possible, 3) the plant community must contribute to stability and produce the type and amount of vegetation necessary to meet or exceed both the land use and activity plan objectives for the site, 4) reconstructed soil and the site capabilities to establish and sustain a plant community must be considered, 5) use plant species native to the area or acceptable introduced species where needed, and 6) meet the requirements of applicable State and Federal regulations for seed, invasive plant, noxious weed and introduced species. Ensure inclusion into the Plan of Operations and Reclamation Plan. ▪ Sites and access routes, when constructed, reconstructed, maintained or rehabilitated, must follow the requirements and practices as set forth in the "Re-establish vegetation on all disturbed or bare ground to minimize invasive plant and noxious weed increase and spread." section. Ensure inclusion into the Plan of Operations and Reclamation Plan.	• Riparian (wetland) • Realty (ROW) • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Minerals & Oil & Gas (wind & geothermal energy) • Invasive Plants, Noxious Weeds & Pests

	• Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	
Ensure that areas under special use permits for lands (e.g. rights-of-way) have on-site invasive plant, noxious weed and pest awareness, prevention and control programs.	• Revise special use permits to require invasive plant, noxious weed and pest awareness, prevention and control measures consistent with the current Programmatic Invasive Plant, Noxious Weed and Pest Plan and Environmental Assessment(s).	• Riparian (wetland) • Realty (ROW) • Fire (suppression, WUI, ESR & fuels) • Support Services (facilities, transportation, construction, operations & maintenance) • Recreation (WSA) • Wild Horse & Burro • Wildlife (T&E & sensitive species) • Forestry (woodland) • Rangeland (livestock) • Cultural (Archeology) • Invasive Plants, Noxious Weeds & Pests
Ensure that wild land fire suppression, prescribed fire, wild land urban interface, fuels, and emergency stabilization and rehabilitation planning and implementation minimizes invasive plant, noxious weed and pest infestation, increase or spread.	▪ Include invasive plant, noxious weed and pest risk factors, identification, awareness, prevention schedules and practices in Fire Fighter, Incident Management Team, Resource Advisor (Fire) training and duties, and in Wild Land Urban Interface, Fuels, and Emergency Stabilization and Rehabilitation planning and implementation activities. ▪ Seed all disturbed areas except designated access routes and facilities within seven days (exception – see below) of incident completion, unless ongoing activities and practices will prevent invasive plant and weed establishment. In that case, seeding shall be done within seven days of final disturbance or during rehabilitation. Use an approved seed mix that includes fast, early growing season species that will	▪ Riparian (wetland) ▪ Realty (ROW) ▪ Fire (suppression, WUI, ESR & fuels) ▪ Support Services (facilities, transportation, construction, operations & maintenance) ▪ Recreation (WSA) ▪ Wild Horse & Burro ▪ Wildlife (T&E & sensitive species) ▪ Forestry (woodland) ▪ Rangeland (livestock) ▪ Cultural (Archeology) ▪ Minerals & Oil & Gas (wind & geothermal energy) ▪ Invasive Plants, Noxious Weeds & Pests

	provide effective competition for invasive plants and noxious weeds. Seed should be certified invasive plant and noxious weed free. Exception – During periods of minimal or no precipitation and high temperatures, seeding should be delayed until climatic and soil moisture conditions are favorable to seed establishment. ▪ Follow the Northeastern Great Basin Area Standards and Guidelines – Appendix A – Rehabilitation and Revegetation section for the development and evaluation of project planning and implementation.	