

ENVIRONMENTAL ASSESSMENT

Fluid Mineral Leasing within Six Areas on the Carson City District

U.S. Department of the Interior
Bureau of Land Management
Carson City District
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Churchill, Lander, Lyon, Mineral and Nye Counties, Nevada
January 2009

Sierra Front and Stillwater Field Offices, Nevada

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I. INTRODUCTION/PURPOSE AND NEED

Introduction

The Bureau of Land Management (BLM) Sierra Front and Stillwater Field Offices have jointly prepared this environmental assessment (EA) to analyze impacts to the human and natural environment from leasing of fluid mineral resources on federal lands in selected areas of Churchill, Lander, Lyon, Mineral and Nye Counties, Nevada. This document has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA, and the Federal Land Policy and Management Act of 1976 (FLPMA). The document is consistent with the Consolidated Resource Management Plan (CRMP) for the Carson City District, the Shoshone-Eureka Resource Management Plan (RMP) for the Battle Mountain District, and the President's National Energy Policy (NEP), Executive Order (EO) 13212, and the Energy Policy Act of 2005.

Issuing leases for fluid mineral resources is considered a federal action and a commitment to resource development, so it requires NEPA analysis. While issuing a lease for fluid mineral resources confers on the lessee the right to future exploration and development of fluid mineral resources within the lease area, it does not confer the right to explore for or develop fluid mineral resources if such activities would extend beyond the level of casual use. As a result, the proposed issuance of fluid mineral leases would have no direct impacts.

Issuance of fluid mineral leases could have indirect impacts because such leasing represents a commitment of resources, and it is reasonably expected that subsequent exploration and development activities would occur. The EA therefore presents a broad scope analysis of the potential indirect and cumulative impacts from fluid mineral leasing in selected areas of Churchill, Lander, Lyon, Mineral and Nye Counties, Nevada, to determine whether these indirect impacts by the lessee could be significant.

For clarity in this document, both the BLM and other federal land together will be referred to as federal lands. Federal lands also include split estate lands, where the government disposed of the surface estate and retained the mineral rights. Fluid minerals referred to in this document include non-renewable energy resources such as oil and gas as well as geothermal resources, a source of renewable energy.

Background for Fluid Mineral Resource Leasing

Oil and Gas Leasing

Oil and gas resources generally include oil, oil shale, native asphalt, solid and semisolid bitumen, and bituminous rock (including oil-impregnated rock or sands from which oil is recoverable only by special treatment after the deposit is mined or quarried) or gas (excepting helium). Oil and gas resources in federal lands are subject to lease under the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 *et seq.*), and the onshore oil and gas leasing regulations (43 CFR 3100).

After a lease has been granted, it is reasonably foreseeable that the operator may propose subsequent exploration and development activities for BLM approval. These would require BLM authorization and, if necessary, environmental review. For exploration other than casual use activities, the operator must file an exploration permit that identifies, among many things, the areas to be explored and the method of exploration. When the operator has filed this permit with

the local BLM office, the Proposed Action in the exploration permit undergoes NEPA review to determine if there are any environmental conflicts in the area to be disturbed. If so, the BLM may, at its discretion, approve or disapprove the permit or modify it by requiring additional mitigating measures. Should the operator not be willing to accept the decision, the permit can be modified and resubmitted, or the decision can be appealed.

The development phase occurs when the operator has located a potentially economic reservoir. The operator must file an operations plan to describe how an operator will drill for and test the oil and gas resources covered by the lease. The action proposed in the operations plan would undergo NEPA review by the local BLM office to evaluate the possible environmental impacts of the action. If environmental conflicts are likely to occur, the BLM may again approve, modify, or disapprove the plan.

Barring abandonment of exploration and development wells, the final phase of this process is the creation of, for example, a production well. After the appropriate paperwork is filed with the local BLM office, the Proposed Action again undergoes the approval process. Should this drilling operation result in producing wells, continued monitoring would be required to check for any hydrocarbon spills resulting from leaking pipelines, overfilled tank batteries, or tanker truck spills. This area would need continued monitoring to ensure safety for people, livestock and wildlife.

Oil and gas exploration and production upon BLM managed land are conducted through leases with the BLM and are subject to terms and stipulations to comply with all applicable federal and state laws pertaining to various considerations for sanitation, water quality, wildlife, safety, and reclamation. Stipulations may be site specific and are derived from the environmental analysis process.

All lands available for oil and gas leasing are offered for competitive oral bidding. The BLM Nevada State Office is required to hold sales for such lands at least quarterly. At least 45 days before a competitive auction, lands to be offered for competitive lease sale are posted in the Nevada State Office. At the day of the auction, the minimum acceptable bid of \$2 per acre, the total first years rental and a \$75 administration fee must be paid. The remainder of the bonus bid for each parcel is due within 10 working days. The lands offered in leasing units will be a maximum of 2,560 acres per lease. Only lands that have been offered competitively and receive no bid are made available for noncompetitive leasing. Lease offers are not made for less than 640 acres and may not include more than 10,240 acres. Leases are issued for a primary term of 10 years. The amount of rental for leases will be \$1.50 per acre for the first 5 years of the lease term and \$2 per acre for any subsequent year. A royalty rate of 12.5 percent on all leases is required on the amount or value of the production removed or sold.

Geothermal Leasing

A geothermal lease is for the earth's heat resource where there is federal mineral estate. Geothermal resources are underground reservoirs of hot water or steam created by heat from the earth. Geothermal steam and hot water can reach the surface of the earth in the form of hot springs, geysers, mud pots, or steam vents. These resources also can be accessed by wells, and the heat energy can be used for generating electricity or other direct uses, such as heating greenhouses and aquaculture operations or for dehydrating vegetables. Geothermal resources on federal lands are subject to lease under the Geothermal Steam Act of 1970, as amended (30 USC § 1001, et seq.), and geothermal resource leasing regulations (43 CFR §3200).

Developing geothermal resources on federal lands involves four phases; leasing, exploration, development/operation and close-out. The first phase is to issue a lease. Leasing of geothermal resources confers an implied right to the lessee to explore and or develop the geothermal resource. The act of leasing does not directly result in surface disturbance activities; however ground disturbance would occur during the second phase, exploration and phase three, development. Phase four, close-out, would involve removing facilities and reclaiming the site. The BLM would require a separate site-specific NEPA analysis for exploration, development/operation, and close-out phases.

Geothermal leases are usually issued for a ten-year period. Once a geothermal resource is developed within the lease area, the lease allows the lessee use of the resource for up to 40 years. Leases are initially issued through a competitive process. Only lands that have been offered competitively and receive no bid are made available for noncompetitive leasing. Most lease applications are for a minimum of 640 acres.

Location of the Proposed Action

The Proposed Action is located on the federal lands open to leasing which are encompassed by six discrete “lease areas” within Churchill, Lander, Lyon, Mineral and Nye Counties, Nevada (Figures 1 through 7). The six lease areas comprising the Proposed Action are described as:

- Wabuska Lease Area
T. 15 N., R. 25 E.
Mount Diablo Base and Meridian
Lyon County, Nevada

- Fallon Lease Area
T. 18 & 19 N., R. 28, 29 & 30 E.
Mount Diablo Base and Meridian
Churchill County, Nevada

- Dixie and Edwards Creek Valley Lease Area
T. 19 N.; R. 37, 38, 39 & 40 E.
T. 20 N.; R. 34, 35, 37, 38 & 39 E.
T. 21 N.; R. 34, 35, 36, 38,39 & 40 E.
T. 22 & 23 N.; R.36, 37, 38, 39 & 40 E.
T. 24 N.; R. 38, 39 & 40 E.,
Mount Diablo Base and Meridian
Churchill and Lander Counties, Nevada

- Gabbs Valley Lease Area
T. 11, 12 & 13 N.; R. 32, 33, 34, 35 & 36 E.
T. 14 N., S 1/2; R. 32, 33, 34, 35, 36 & 37 E.
Mount Diablo Base and Meridian
Mineral and Nye Counties, Nevada

- Teels Marsh Lease Area
T. 4 N., R. 32 & 33 E.
Mount Diablo Base and Meridian
Mineral County, Nevada

- Rhodes Salt Marsh Lease Area
T. 5 N., R. 35 & 36 E.
Mount Diablo Base and Meridian
Mineral County, Nevada

The subject lease areas have been delineated by the BLM on the basis of known potential for fluid minerals resources (Garside et. al., 1988; and FRETf, 2007), and encompass several parcels nominated specifically by the oil and gas or geothermal industry for leasing. The subject lands are managed by the BLM Sierra Front and Stillwater Field Offices and include portions of the BLM Battle Mountain District Office (BMDO). The legal descriptions for oil & gas and geothermal lease parcels that are pending within the subject lease areas comprising the Proposed Action are listed in Appendix A.

Purpose and Need

The recent increase in demand for domestic sources of renewable and non-renewable energy has resulted in the Nevada BLM receiving numerous applications to lease federal lands for fluid mineral exploration and development. In the past year alone, the Sierra Front and Stillwater Field Offices have received 85 lease applications, covering approximately 191,300 acres, within the Carson City District. The majority of the lease applications residing on the BLM Carson City District are located in the areas known to have fluid mineral resource potential. The purpose of the Proposed Action is to expedite the processing of both pending and anticipated future lease applications on BLM managed lands within these areas.

On May 18, 2001, President Bush issued EO 13212, Actions to Expedite Energy-Related Projects, which states “the increased production and transmission of energy in a safe and environmentally sound manner is essential.” Executive departments and agencies are directed to “take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.” EO 13212 further states that “(f)or energy-related projects, agencies shall expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections. The agencies shall take such actions to the extent permitted by law and regulation, and where appropriate.”

In response to the EO 13212, BLM issued a National Energy Policy Implementation Plan in June 2001, which directs the BLM to process leases, in a timely manner, in order to help support efforts to increase energy production from federal lands, while preserving the health of the federal lands.

Land Use Plan Conformance Statement

The Proposed Action and alternatives described below are in conformance with the Carson City District CRMP (2001, pg. MIN 10-1) and the Battle Mountain District Shoshone-Eureka RMP (1986, pg. 29 Leasable Minerals – Geothermal Steam, and Oil & Gas). It is the policy of the Department of the Interior to encourage the development of energy and mineral resources on lands in a timely manner to meet national, regional and local needs consistent with the objectives for other public land uses.

Figure 1 – Proposed Lease Areas

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Figure 2 – Wabuska Lease Area

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Figure 3 - Fallon Lease Area

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Figure 4 – Dixie and Edwards Creek Valleys Lease Area

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Figure 5 – Gabbs Lease Area

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Figure 6 – Teels Marsh Lease Area

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Figure 7 – Rhodes Salt Marsh Lease Area

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II. PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The BLM is presently considering leasing 59 parcels covering approximately 117,150 acres of federal land in Churchill, Lander, Lyon, Mineral and Nye Counties, Nevada. The Proposed Action is to lease some or all of these pending lease applications, as well as any anticipated future fluid mineral lease applications within the six lease areas comprising the “project area”. The fluid mineral lease areas encompass more than one-million acres of federal and private land throughout the west-central part of Nevada. In general, federal land occupies roughly half of the Wabuska and Fallon lease areas, while the four remaining lease areas are comprised almost entirely of federal land.

Lands not included for consideration within the subject lease areas, and therefore not assessed under the Proposed Action, are any lands not open to fluid mineral leasing such as lands within Wilderness Areas, Wilderness Study Areas (WSAs), Areas of Critical Environmental Concern (ACECs), or National Conservation Areas. Also excluded are tribal lands, wildlife refuges, wildlife management areas, and private land with titles that include all fluid mineral rights.

Leasing fluid mineral resources by the BLM vests with the lessee a non-exclusive right to future exploration and an exclusive right to produce and use the fluid mineral resources within the lease area for a 10-year period subject to existing laws, regulations, formal orders, and the terms and stipulations in or attached to the lease form. Lease issuance alone does not authorize any ground disturbing activities to explore for or develop fluid mineral resources beyond casual use without site-specific approval for the intended operation. Such approval would require a separate site-specific environmental analysis.

Resource Protection Stipulations

Land use plans will continue to serve as the primary vehicle for determining the necessity for lease stipulations (BLM Manual 1624). A lease stipulation is a provision that modifies standard lease rights; stipulations are in addition to restrictions applied to fluid mineral operations by federal regulations and become part of the lease, superseding any inconsistent provisions of the standard lease form. Stipulations typically fall into one of the following categories and may be site-specific or general in their application:

- No Surface Occupancy – Use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values;
- Timing or Seasonal Restriction – Prohibits surface use during specified time periods to protect identified resource values (typically does not apply to the operation and maintenance of production facilities);
- Controlled Surface Use – Use and occupancy is allowed, but identified resource values require special operation constraints that may modify lease rights; or,
- Special Administration Stipulation – Used when special external conditions require use of a one-of-a-kind stipulation that is not used in any other area or situation (such as pre-existing agreements with other agencies).

Documentation of the necessity for a stipulation is disclosed in land use plans. Land use plans also establish the guidelines by which future waivers, exceptions, or modifications may be granted. Past land use planning efforts in the BLM Carson City and Battle Mountain Districts have resulted in resource management plan (RMP) level decisions which identify specific areas that are either closed to fluid mineral leasing or where certain restrictions apply (BLM [CRMP], 2001; BMFO Shoshone-Eureka Resource Management Plan, 1986). The land use planning process also develops general stipulations commonly referred to as standard operating procedures (SOPs).

During the site-specific environmental analysis, best management practices (BMPs) appropriate to each site-specific activity would be included as conditions of approval (COA) in permits. More information on BMPs for oil & gas and geothermal operations can be found on the BLM Washington Office Fluid Minerals web site in the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM and USFS, 2007) at <http://www.blm.gov/bmp>; and, in the Programmatic Environmental Impact Statement (PEIS) for Geothermal Leasing in the Western United States (BLM and USFS, 2008) at http://www.blm.gov/geothermal_eis.

In addition, the BLM and U.S. Forest Service (FS) prepared the PEIS for Geothermal Leasing in the Western United States (BLM and USFS, 2008) to standardize geothermal and fluid mineral leasing and the permitting for fluid minerals operations on federal lands. That document consolidated and updated many of the mitigation measures, standard stipulations, and COA from various BLM and FS documents addressing geothermal and fluid mineral leasing and development, including RMPs, forest plans, and other environmental documents for fluid mineral leasing and development. The Record of Decision (ROD) from that PEIS, signed on December 17, 2008, will serve to amend and update exiting RMPs and forest plans and provide for the consistent mitigation of fluid minerals operations by federal land management agencies.

Stipulations provided in the PEIS would serve as the minimal level of protection and would be adopted into local land use plans (BLM and USFS, 2008). For example, if an administrative unit has eligible wild and scenic rivers, the wild river stipulation would apply. If an existing land use plan offers more protective measures or has resource specific commitments (e.g., memorandum of understanding for cultural resources), those more protective measures would apply instead. Existing land use plans would also be used to help identify locations of applicability, buffer sizes, and timing conditions for the stipulations.

The Bureau of Reclamation (BOR) has established Special Administration Stipulations for both oil & gas and geothermal leasing specific to the protection of facilities and infrastructure on lands under their jurisdiction. These stipulations offer more protection than the stipulations provided in the standard lease form and are applicable to all oil & gas and geothermal leases on lands under BOR jurisdiction.

Appendix B contains a complete list of stipulations applicable to the federal lands in the area of the Proposed Action including: RMP level closures or restrictions; SOPs; and, the recommended stipulations and BMPs from the PEIS for Geothermal Leasing in the Western United States (BLM and USFS, 2008); and, the standard oil & gas and geothermal lease forms (3100-11 and 3200-24). Appendix B also contains restrictions and closures pertaining to pending lease applications on lands under BOR jurisdiction as well as the respective BOR Special Administrative Stipulations for both oil & gas and geothermal leasing.

Proposed Lease Areas

Wabuska Lease Area

The Wabuska Lease Area encompasses one township (T. 15 N., R. 25 E.) comprising approximately 23,000 acres at the north end of Mason Valley in Lyon County, Nevada (see Figure 2). The land status is divided equally between federal (BLM) and private ownership. The federal land is concentrated for the most part in the northern half of the lease area. Wabuska Hot Springs resides on private land near the center of the lease area. The Walker River intersects the southeast corner of the lease area within the Mason Valley Wildlife Management Area managed by the Nevada Division of Wildlife (NDOW). A one-megawatt geothermal plant is in operation on private lands within the Wabuska Lease Sale Area. At present, no fluid mineral lease parcels are proposed on federal lands within the Wabuska Lease Area. The Proposed Action will analyze the potential direct, indirect and cumulative impacts from anticipated future fluid mineral leasing on federal lands within the Wabuska Lease Area. No area specific fluid mineral leasing restrictions currently exist for federal lands within the Wabuska Lease Area.

Fallon Lease Area

The Fallon Lease Area encompasses approximately 140,000 acres surrounding the City of Fallon, in Churchill County, Nevada (see Figure 3). The land status in the area is divided equally between federal (BOR, BLM and Military) and private ownership. At present, 23 oil & gas lease parcels comprising a total of approximately 78,864 acres are proposed on federal lands within the Fallon Lease Area. No geothermal lease parcels are proposed in the area at this time. The Proposed Action will be analyzed for potential direct, indirect and cumulative impacts from currently proposed and anticipated future fluid mineral leasing on federal lands within the Fallon Lease Area. The following area specific restrictions apply to fluid mineral leasing within the Fallon Lease Area:

- No surface occupancy (NSO) may occur in association with fluid mineral leasing due to high resource values on the following lands: T.18N., R.30E., Sections 19 E½, 22, 27, 28, 29, 30 NE¼, 32 E½ & NW¼, 33, 34, 35, 36;
- A 640 acre portion of the Grimes Point Archaeological Area (in T.18N., R.30E., Sec. 15, W½NE¼, E½NW¼, and Sec. 21, SW¼NE¼, S½NW¼, S½) is closed to geothermal leasing (see Figure 3);
- Special administration stipulations concerning NSO have been established to prevent damage to any BOR dams, reservoirs, canals, ditches, laterals, tunnels, and related facilities, and contamination of the water supply therein, and avoid interference with recreation development and/or impacts to fish and wildlife habitat;
- The BOR has recommended that no leasing occur within the Fallon Lease Area in selected areas (see BOR letter in Appendix B); and,
- The Naval Air Station at Fallon is closed to fluid mineral leasing.

Dixie and Edwards Creek Valley Lease Area

The Dixie and Edwards Creek Valley Lease Area encompasses approximately 423,000 acres within Dixie and Edwards Creek Valleys and at the northeast end of the Clan Alpine Mountains

in Churchill County, Nevada (see Figure 4). The lease area also includes a portion of the extreme western margin of Antelope Valley in Lander County, Nevada. The area is comprised almost entirely of federal (BLM and Military) land. At present, 23 oil & gas and four geothermal lease parcels totaling approximately 45,600 acres are proposed on federal lands within the Dixie and Edwards Creek Valley Lease Area. The Proposed Action will analyze the potential direct, indirect and cumulative impacts from currently proposed and anticipated future fluid mineral leasing on federal lands within the Dixie and Edwards Creek Valley Lease Area. The Dixie Valley Training Area is closed to geothermal leasing under the Military Lands Withdrawal Act of 1999.

Gabbs Valley Lease Area

The Gabbs Valley Lease Area encompasses approximately 397,000 acres in the Gabbs and Lodi Valleys in Mineral and Nye Counties north and west of the Town of Gabbs, Nevada (see Figure 5). The area is comprised almost entirely of federal (BLM) land. At present, seven geothermal lease parcels totaling approximately 21,115 acres are proposed on federal lands within the Gabbs Lease Area. No oil & gas lease parcels are proposed in the area at this time. The Proposed Action will analyze the potential direct, indirect and cumulative impacts from currently proposed and anticipated future fluid mineral leasing on federal lands within the Gabbs Lease Area. No area specific fluid mineral leasing restrictions currently exist for federal lands within the Gabbs Lease Area.

Teels Marsh Lease Area

The Teels Marsh Lease Area encompasses approximately 47,000 acres south of the small settlement of Marietta at the southern end of Mineral County, Nevada (see Figure 6). The area is comprised almost entirely of federal (BLM) land. The Teels Marsh area is home to the nation's first formally recognized wild burro range which is managed by BLM. The 68,000-acre range encompasses a majority of the Teels Marsh lease area and is home to approximately 85 burros. At present, one geothermal lease parcel totaling approximately 5,120 acres is proposed on federal lands within the Teels Marsh Lease Area. No oil & gas lease parcels are proposed in the area at this time. The Proposed Action will analyze the potential direct, indirect and cumulative impacts from currently proposed and anticipated future fluid mineral leasing on federal lands within the Teels Marsh Lease Area. No area specific fluid mineral leasing restrictions currently exist for federal lands within the Teels Marsh Lease Area.

Rhodes Salt Marsh Lease Area

The Rhodes Salt Marsh Lease Area encompasses approximately 46,000 acres south and east of Sodaville in southeast Mineral County, Nevada (see Figure 7). The area is comprised almost entirely of federal (BLM) land. At present, one geothermal lease parcel totaling approximately 4,600 acres is proposed on federal lands within the Rhodes Salt Marsh Lease Area. No oil & gas lease parcels are proposed in the area at this time. The Proposed Action will analyze the potential direct, indirect and cumulative impacts from currently proposed and anticipated future fluid mineral leasing on federal lands within the Rhodes Salt Marsh Lease Area. No area specific fluid mineral leasing restrictions currently exist for federal lands within the Rhodes Salt Marsh Lease Area.

No Action Alternative

The only alternative considered is the No Action Alternative or no leasing. Under this alternative, the BLM would reject the pending and anticipated future leases within the subject lease areas and future exploration and development could not occur. Implementation of this

alternative is inconsistent with the Federal Energy Policy to promote the development of environmentally attractive energy resources. However, the BLM could adopt the No Action Alternative if the Proposed Action would result in unacceptable impact to the federal lands.

Reasonably Foreseeable Development Scenarios

A Reasonably Foreseeable Development (RFD) scenario for fluid minerals is a long-term projection of fluid minerals exploration, development, production, and abandonment or close-out activity. An RFD provides an example of fluid minerals activity in a defined area for a specified period of time, and projects a baseline scenario of activity assuming all potentially productive area 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 fluid mineral activity. The RFD also provides the basic information that could be analyzed in the NEPA document under various alternatives. The RFD discloses indirect future or potential impacts that could occur once the lands are leased. A RFD scenario for the Proposed Action and a description of the various types of activities that could be expected to occur subsequent to leasing is included in Appendix C.

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III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter identifies and describes the current condition and trend of elements or resources in the human environment which may be affected by the Proposed Action or Alternatives and the environmental consequences or effects of the action(s). This chapter will incorporate by reference and tier off of the respective affected environment and environmental consequences analyses (Chapters 3 and 4) of the PEIS for Geothermal Leasing in the Western United States (BLM and USFS, 2008) at http://www.blm.gov/geothermal_eis, where appropriate.

Scoping and Issue Identification

Internal Scoping

Internal scoping meetings for the BLM were initiated on June 2, 2008, and continued through November 17, 2008. During that time, BLM personnel identified key issues and concerns regarding the Proposed Action.

External Scoping

Scoping letters detailing the content of the EA were sent out to Churchill, Lander, Lyon, Mineral, and Nye Counties on November 19, 2008. The BOR was issued a preliminary copy of the EA on December 11, 2009. The Fallon Paiute-Shoshone Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, Yomba Shoshone Tribe and Timbisha Shoshone Tribe were notified of the proposed lease sale via certified letter on October 29, 2008. Comments were received from BOR (see letter of December 17, 2008 in Appendix B) as a result of scoping. Representatives from Lander, Lyon and Nye Counties indicated that they had no comments or concerns. Comments received as a result of the tribal scoping are detailed later in this chapter.

Proposed Action

General Setting

The project area resides in a high-desert environment characterized by arid to semiarid conditions, bright sunshine, low annual precipitation, and wide daily ranges in temperature. The terrain consists of expansive valleys containing playas and dunes surrounded by steep mountainous areas shrouded by alluvial fans. Elevations range from 3,000 feet above mean sea level (AMSL) to 9,000 feet. The climate is controlled primarily by the rugged and varied topography to the west, particularly 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 precipitation in the area of the Proposed Action is greatest in the mountains and least in the valleys. The higher elevations (above 8,000 feet amsl) may receive up to 25 inches of precipitation annually and the lower elevations (below 6,000 feet amsl) can receive less than 10 inches annually (PRISM precipitation map of Nevada, Oregon State University Spatial Climate Analysis Service 2002).

Wabuska Lease Area

The Wabuska Lease Area is centered on the settlement of Wabuska, about 12 miles north of Yerington, Nevada. The lease area is located directly northwest of the Mason Valley Wildlife Management Area and contains a portion of the Desert Mountains, Adrian Valley, and Mason Valley. Elevations range from just less than 4,300 feet AMSL in the lowlands within valley areas to 5,740 feet in the Desert Mountains. Vegetation includes shadscale in higher elevations, salt desert shrub in intermediate elevations, and barren playa in low elevations. Emergent

riparian species surround the Mason Valley Wildlife Management Area. Some of the southern portion of the area consists of active agricultural fields.

Fallon Lease Area

The Fallon Lease Area is located predominantly within the Lahontan Valley. The Lahontan Mountains are in the southeast corner of the lease area. The northern extent of Carson Lake, and Soda and Little Soda Lakes are in the northwest corner along with the Carson River. The City of Fallon is in the north central portion where Alternate U. S. Highway 95 and U. S. Highway 50 bisect. The Fallon Naval Air Station is in the central portion of the lease area and the northwest corner of the US Naval Reservation is located in the southeast corner and the northeast corner borders the Stillwater National Wildlife Refuge. The Fallon Paiute-Shoshone Tribe/Indian Reservation is in the northeast portion of the lease area on the northern boundary. The entire lease area is located within Churchill County and is 139,412 acres in size; approximately 50% is managed by the BOR and BLM, and 50% is private land. Elevations range from 3,905 feet AMSL in the Lahontan Valley and the highest is 4,448 feet in the Lahontan Mountains at Salt Wells Mountain.

Dixie and Edwards Creek Valley Lease Area

The Dixie and Edwards Creek Valley Lease Area is located within portions of Dixie Valley north and east of Job Peak on the southwest end, east of the Humboldt Salt Marsh and interfacing along the alluvial fans west of the Clan Alpine Mountains and a small area north and west of Boo Spring, the northeast point of the Clan Alpine Mountains at the Augusta Mountain interface, the majority of Edwards Creek Valley at the interface of the east side of the Clan Alpine Mountains, the west side and portions of the New Pass and Desatoya Ranges on the east side to the Churchill and Lander County line, excluding the New Pass pass and New Pass Mine. The lease area is 423,346 acres in size, approximately 90% is on federal lands and 10% is privately owned. Elevations range from just less than 3,365 feet AMSL in the lowlands of Dixie Valley, 5,052 feet in the lowlands of Edwards Valley to the highest elevation of 9,002 feet in the Desatoya Range in the eastern most portion of this lease area. The area is watered by west facing slopes draining into both valleys. Edwards Creek Valley contains an extinct lake bed. Vegetation ranges from near-bare playa flats, salt desert scrub, sagebrush communities and pinyon and juniper woodland within higher elevations.

Gabbs Valley Lease Area

The proposed lease area is located within Gabbs and Lodi Valleys, Lodi Hills, the west central area including Downeyville and northern end of the Paradise Range, southern edge of the Sand Springs Range including Big Kasock Mountain, southern most Fairview Valley and the majority of the Monte Cristo Mountains including Mount Annie, Fissure Ridge and Black Hills within portions of Nye and Mineral Counties. The majority of the northern boundary of the lease area is the Churchill and Mineral County boundary until it diverges at the Churchill and Nye County line. The lease area is 379,088 acres in size and approximately 90% is on federal lands and 10% is privately owned. Elevations range from 4,100 feet AMSL in Gabbs Valley, to the highest elevation of 7,543 feet in the Paradise Range followed by Big Kasock Mountain at 7,142 feet in the Sand Springs Range. Sand dunes are prominent on the north, west and southern edges of Gabbs Valley. Water resources were identified by the examination of topographic maps. Hot and cold springs, and developed wells would indicate the presence of water subsurface in the dry alkali valleys within the lease area. The subsurface water is recharged by the runoff from the various range and hills surrounding the valleys including several washes (Nugent, Phillips, Gabbs and Finger Rock). Vegetation ranges from Great Basin desert shrub communities (salt

desert scrub, greasewood, and sagebrush) to scattered junipers at mid to higher elevations. Riparian plants have been identified near open cold springs or previously developed hot springs.

Teels Marsh Lease Area

The Teels Marsh Lease Area includes the Teels Marsh surrounded by the Excelsior Mountains on the northern boundary and hills on the west side of the marsh and lease area and the Candalaria Hills on the east and south sides within Mineral County. The lease area is 46,826 acres in size and approximately 90% is on federal lands and 10% is privately owned. Elevations range from 4,920 feet AMSL in the Teels Marsh to the highest elevation of 7,854 feet in the Excelsior Mountains. Run off from the Excelsior Mountains and surrounding hills drain into the marsh. Springs were noted on the topographic maps within and on the outer edge of the southern boundary of the lease area. Vegetation ranges consists of salt desert scrub, greasewood flats with some barren sand dunes and playa margins, sagebrush and perennial communities, grasslands within the lowlands with pinyon and mountain mahogany at the higher elevations.

Rhodes Salt Marsh Lease Area

The Rhodes Salt Marsh Lease Area is located on the south end of Soda Spring Valley including the Rhodes Salt Marsh and the east side of the area is the southwest extent of the Pilot Mountains all located within Mineral County. Tonopah Junction is located in the west side of the lease area south of Sodaville along alternate Highway 95 and State Route 360. The lease area is 45,738 acres in size and approximately 90% is on federal lands and 10% is privately owned. Elevations range from 4,316 feet AMSL in the Rhodes Salt Marsh to the highest elevation of 7,507 feet in the Pilot Mountains. Run off from the Excelsior and Pilot Mountains and the Candalaria Hills drains into the marsh on the west side of the lease area. Springs were noted on the topographic maps within the marsh, in the upper northeast corner of the lease area. Vegetation ranges consists of salt desert scrub, greasewood flats with some barren sand dunes and playa margins, lowland riparian located within the marsh proper, sagebrush communities and pinyon/juniper at the higher elevations.

Supplemental Authorities

Appendix 1 of BLM's NEPA Handbook (H-1790-1) identifies Supplemental Authorities that are subject to requirements specified by statute or executive order and must be considered in all BLM environmental documents. The table below lists the Supplemental Authorities and their status in the leasing areas comprising the Proposed Action. Supplemental Authorities that may be affected by the Proposed Action are further described in this EA.

Supplemental Authority	Not Present *	Present/Not Affected *	Present/May Be Affected**	The following rationale was used to determine that Supplemental Authorities present in the area would not be affected as a result of implementation of the Proposed Action.
Air Quality			√	Carried Forward in EA.
Areas of Critical Environmental Concern	√			
Cultural Resources			√	Carried Forward in EA.
Environmental Justice			√	Carried Forward in EA.
Farm Lands (prime or	√			

Supplemental Authority	Not Present *	Present/Not Affected *	Present/May Be Affected**	The following rationale was used to determine that Supplemental Authorities present in the area would not be affected as a result of implementation of the Proposed Action.
unique)				
Fish Habitat ***	√			
Floodplains			√	Carried Forward in EA.
Invasive, Nonnative Species			√	Carried Forward in EA.
Migratory Birds			√	Carried Forward in EA.
Native American Religious Concerns			√	Carried Forward in EA.
Threatened or Endangered Species			√	Carried Forward in EA.
Wastes, Hazardous or Solid			√	Carried Forward in EA.
Water Quality (Surface/Ground)			√	Carried Forward in EA.
Wetlands/Riparian Zones			√	Carried Forward in EA.
Wild and Scenic Rivers	√			
Wilderness			√	Carried Forward in EA.

*Supplemental Authorities determined to be Not Present or Present/Not Affected need not be carried forward or discussed further in the document.

**Supplemental Authorities determined to be Present/May Be Affected must be carried forward in the document.

*** This fish habitat is related to specific Congressional Acts protecting marine and commercial fish habitat. It doesn't apply to common aquatic habitats and fisheries.

Resources or Uses Other Than Supplemental Authorities

The following resources or uses, which are not Supplemental Authorities as defined by BLM's Handbook H-1790-1, are present in the area. BLM specialists have evaluated the potential impact of the Proposed Action on these resources and documented their findings in the table below. Resources or uses that may be affected by the Proposed Action are further described in this EA.

Resource or Issue	Not Present *	Present/Not Affected*	Present/May Be Affected**	The following rationale was used to determine that resources present in the area would not be affected as a result of implementation of the Proposed Action or Alternatives.
Land Use			√	Carried Forward in EA.
Recreation			√	Carried Forward in EA.
Visual			√	Carried Forward in EA.
Noise			√	Carried Forward in EA.
Wild Horses & Burros			√	Carried Forward in EA.
Soils/Geology/Minerals			√	Carried Forward in EA.
Livestock Grazing			√	Carried Forward in EA.
Wildlife & Fisheries			√	Carried Forward in EA.
Socioeconomics			√	Carried Forward in EA.

*Resources or uses determined to be Not Present or Present/Not Affected need not be carried forward or discussed further in the document.

**Resources or uses determined to be Present/May Be Affected must be carried forward in the document.

Resources Present and Brought Forward For Analysis (All Resources)

The following resources are present in the area, may be affected by the Proposed Action, and are carried forward for analysis.

Air Quality

The Clean Air Act was passed in 1970 (and amended in 1990) to reduce air pollution across the US. Specific air pollutants associated with harming human health were identified as criteria pollutants. The criteria pollutants were assigned acceptable airborne concentration levels, and collectively the list was named the National Ambient Air Quality Standards. Under the Clean Air Act, the U. S. Environmental Protection Agency (EPA) is responsible for revising these standards when necessary as new air quality data and related impacts on the human environment become available. The Clean Air Act also mandates the EPA approve state implementation plans to ensure that local agencies comply with the Act.

The EPA established National Ambient Air Quality Standards for the following six criteria pollutants to protect public health and welfare: sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ozone (O₃), lead (Pb), and particulate matter (PM).

Particulate matter, or particulate pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. The EPA regulates particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. The EPA groups particulate pollution into two categories:

- Inhalable coarse particles, such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter (PM₁₀).
- Fine particles, such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller (PM_{2.5}). These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

In addition to criteria pollutants, the EPA, together with the states, also controls air toxics, or hazardous air pollutants. Such substances, if present in the surrounding air, are thought to have serious health impacts. Lists of substances identified as air toxics have been issued by the EPA and some individual states. The details of the list and regulations applied to the hazardous air pollutants may vary among jurisdictions. Due to their minute emissions, fluid minerals exploration and development activities would most likely be exempt from air toxics emissions regulations, depending on the types of technology and local attainment status.

Existing air quality conditions within a given area are described in terms of attainment status. Counties are designated as nonattainment or maintenance areas depending on their ability to meet criteria pollutant standards for air quality. Ambient pollutant levels are expected to be low in the undeveloped regions and negligible in remote areas. Areas with high pollutant levels are

typically associated with large amounts of human development or high winds and dusty soil types with little vegetation.

Affected Environment

Various air emissions would result from oil & gas field investigations, exploration activities and the construction of oil & gas operational facilities. Off-highway vehicular travel and the use of unpaved roads would increase the release of fugitive dust particles. The use of internal combustion engines in vehicles and other equipment would result in release of carbon dioxide, carbon monoxide, nitrogen oxides, saturated hydrocarbons, PM10, and the production of photochemical air pollutants such as ozone. 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.

Geothermal plants emit small amounts of nitrogen oxides and carbon dioxide and nearly no sulfur dioxide or particulate matter (Geothermal Energy Association, 2007). The primary pollutant of geothermal power plants is hydrogen sulfide, which is naturally present in most geothermal reservoirs. Hydrogen sulfide emissions are maintained below the most stringent standards with the use of sophisticated abatement equipment. Studies carried out in the past few decades estimating emissions from geothermal power plants have concluded that geothermal energy emissions are small and have been reduced by advanced technologies and energy-saving techniques. Steam from a geothermal plant is condensed when passing through a turbine; however, noncondensable gases in the reservoir fluid such as carbon dioxide, hydrogen sulfide, sulfur dioxide, mercury, and several others pass through the turbine without condensing and are released into the atmosphere. The amount of noncondensable gases present and emitted depends on factors such as reservoir fluid composition, temperature, method of power generation (flash, binary, or combined cycle), and equipment efficiency (Bloomfield et al., 2003).

Environmental Consequences

There are no direct air quality impacts from issuing leases for future fluid minerals exploration, development, and production activities. None of the lease areas comprising the Proposed Action lay in designated nonattainment or maintenance areas for criteria air quality pollutants.

Air quality would be affected during exploration and development, by an increase in particulate matter (dust), and release of gases and vapors. These effects would most likely be greatest during the development and abandonment or close-out phases. Many of these disturbed areas would be reclaimed shortly after disturbance.

Potential air quality impacts would be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs. In accordance with recommended BMPs (BLM and USFS, 2008), operators would coordinate with NDEP to develop and implement an air quality monitoring plan.

Cultural Resources

Pending or future lease parcels within the proposed lease areas would be offered for lease subject to applicable laws and lease conditions. The proposed lease areas may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve

any ground disturbing activities that may affect cultural properties eligible to the National Register of Historic Places (NRHP), until it completes its obligations under applicable requirements of the NHPA and other authorities. On all lease areas, once a project specific proposal is submitted, an additional Section 106 cultural resource assessment would be completed where site specific issues would be addressed as appropriate. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.

Affected Environment

The BLM Carson City District Office Class I Cultural Resources Report (CRR) completed for this EA adequately summarizes the presence and absence of archaeological inventories and cultural properties located on each proposed lease area (McCabe and Lane, 2008). Pertinent cultural resource information was reviewed and analyzed for the Area of Potential Effect (APE), which is defined as all lease areas comprising the Proposed Action. Cultural resource information available for each of the proposed lease areas varied, with some having very few inventories to others where a significant portion of the lease area was inventoried. In no case is an entire lease area completely surveyed. Un-inventoried portions of lease areas or lease areas with small or minimal inventories were compared to nearby areas with similar land forms. This analysis included an assessment of these lease areas for cultural resource sensitivity based upon elevation, topography, vegetation and water resources especially in areas that have not been previously inventoried. A brief summary and analysis of inventories within the proposed lease areas is provided below.

Wabuska Lease Area: Twenty-three previous Class III inventories within the Wabuska Lease Area have covered a total of 895 acres, or approximately 4% of the area. Previous inventories resulted in documentation of 41 sites within the Wabuska study area; 13 of these sites lie entirely or partially on BLM lands. Most of the sites date to the Prehistoric Period and consist of both simple and complex lithic scatters; many of these are located in dune areas with good potential for buried materials and contain evidence of thermal features and include complex assemblages. In the past, hot springs in the area were used by tribal members for a variety of practices and are still considered sacred. Sites dating to the Historic Period include refuse scatters, historic road and railroad grade segments, historic buildings, segments of the Carson & Colorado Railroad, segments of the Nevada Copper Belt Railroad, and the historic site of Thompson, which was a smelter town active between 1910 and the 1920s.

Portions of the lease area are located within the Yerington Mining District. This District has also been known variously as the Mason, Mason Pass, Mason Valley, Ludwig, Indian Spring, and Indian Springs Districts. The District was discovered in 1865 and includes the Singatse Range, Mason Valley, and a portion of the Wassuk Range. The area most important commodity produced within the District has been copper (Tingley, 1992).

Based on the assessment of soils, elevation, topography, vegetation and water resources in surveyed areas with similar conditions, the potential for finding NRHP-eligible sites within the lease area is most likely within lowland areas, where prehistoric sites are expected to be present in moderate to high densities. The occurrence of wetlands within the lease area indicates excellent potential for large significant prehistoric sites with multiple features to be present. A cultural resources predictive model developed by

Gnomon, Inc. for the CCDO that takes statistical and environmental factors such as landform, soils, vegetation, and distance to water into account is also useful for examining probability of locating prehistoric and historic sites in the lease area (Drews and Ingbar 2007). The model depicts low lying areas as exhibiting “best” and “good” probability (the two highest categories) for containing prehistoric sites; much of the lease area falls within these classifications. Upland areas within the northern portion of the lease area in the Desert Mountains are generally ranked very low to low probability for prehistoric resources.

Probability to locate historic resources, according to this model (Drews and Ingbar 2007), is highest along modern transportation corridors and settlement areas such as Wabuska. Historically, the lease area has been used primarily as an agricultural area and a transportation corridor. The lease area contains portions of the Wabuska Drain, the Perozzo Slough, and a number of tertiary irrigation features. Portions of the Southern Pacific Railroad, abandoned Nevada Copper Belt Railroad, abandoned Carson & Colorado Railroad, and U.S. 95A also pass through the lease area. As a result, historical sites related to mining, transportation, and agriculture are likely to be present. Refuse scatters and features related to Thompson, a settlement that processed copper ore, are also likely to be present.

Fallon Lease Area: Approximately 17,852 acres or 13% of the lease area has been inventoried. One hundred and fifty two surveys have been conducted resulting in the identification of 300 cultural resources, both prehistoric and historic. Prehistoric sites are the predominant type identified during these inventories. Although a small percentage of the lease area has been surveyed for cultural resources, the results of the inventories have provided regional understanding of the cultural history and have provided some information regarding the density and diversity of cultural resources both known and likely to be identified.

Approximately 12,000 years ago Lake Lahontan submerged most of the lease area and through the process of wave action created rockshelters and caves that have been used by 10,000 BP by Native Americans. The area has several natural water sources including two remnant lakes (Soda and Little Soda), the Carson River, the south branch of the Carson River, and the New and Stillwater Sloughs. There are many constructed water sources the S Line and Harmon reservoirs and a series of canals and drains associated with the Newlands Irrigation system. Vegetation includes agricultural fields on private lands, sagebrush, greasewood and saltbush communities, including a variety of native grasses and riparian related vegetation traditionally used by local Native Americans.

The topography, vegetation and water provided a highly desirable location for occupation by people for over 10,000 years. The long term occupation within and adjacent to the lease area has been confirmed by carbon dating textiles recovered from caves and rockshelters created by the wave action along the 12,000 year old Lake Lahontan shoreline. As the lake receded a new ecosystem evolved, rich in animal and plant resources creating a prime location for the long term occupation of the area further confirmed by the results of the current inventories for both prehistoric and historic occupation of the ever changing landscape, both naturally occurring and through human manipulation.

The long term occupation of the Grimes Point Archaeological area, as well as surrounding areas have been inventoried and recorded over the last 70 years by a variety of anthropologists (Pendleton et. al, 1982). The studies have resulted in the identification of continuous use over the last 10,000 years by Native Americans. Dry caves and rockshelters have yielded significant archaeological materials and other plant information (plant remains, pollen, etc.) that are critical to the understanding of the landscape and the people that inhabited the lease area.

During the analysis for the 2006 Carson City Field Office Geothermal Leasing Environmental Assessment (BLM, 2006), areas very high in cultural resource sensitivity were identified in and around the Grimes Point Archaeological Area by cultural resource staff and through consultation with the Fallon Paiute-Shoshone Tribe. As a result, several locations within the proposed lease area were stipulated as NSO (T. 18 N., R. 30 E.; Sec. 19, E½; Sec. 30, NE¼; Sec. 32, NW¼ and E½; and all of Sections 20, 22, 27, 28, 29, 33, 34, 35 and 36). The ROD from the PEIS (BLM and USFS, 2008) will serve to amend and update the CRMP to reflect that NSO restriction.

Expectations for cultural resources in the areas surrounding the stipulated NSO would be moderate to high and based upon previous inventories the following site types are likely to be identified during future inventories: rockshelters, rock art sites, open sites containing extensive artifact scatters, base camps, resource procurement that would include lithic and plant processing and historic-period resources associated with the traditional use of the region by Native Americans.

Expectations for historic sensitivity are moderate to high for a variety of reasons including but not limited to agricultural, ranching, mining, transportation corridors, and pivotal to the agricultural expansion in the Fallon area, the Newlands Irrigation Project and those components associated with the construction and maintenance of all the aforementioned activities. The Newlands Irrigation Project, formerly the Truckee-Carson Project, was one of the first Reclamation projects. Construction began in 1903 and provides full service irrigation water from the Truckee and Carson Rivers for cropland in the Lahontan Valley near Fallon. Canals and drains support the irrigation and drainage; these canals and drains are identified on topographic maps throughout the lease area. Due to the historic significance of the Newlands Project and role in the development of agricultural and ranching in Fallon and the surrounding area, the cultural resource sensitivity is rated moderate to high. According to historic GLO maps, there are many transportation routes throughout the Fallon lease area associated with the various developments both unnamed and named roads including the Overland Road and Smith Toll Road. The Pony Express and later the Lincoln Highway are well documented through the lease area. Borax was mined from the Big and Little Soda Lakes from the mid to late 19th century (Lincoln, 1982). Within the lease area is a small segment of an historic railroad line which was constructed between 1906 and 1907 (Myrick, 1962) by the Nevada and California Railway from Hazen to Fallon. Historic refuse and camps associated with the construction development of the aforementioned historic routes and the Newlands Irrigation system suggest potential for identification of historic resources throughout the lease area as moderate to high.

Dixie and Edward Creek Valley Lease Area: The area on the east side of the Lander County line was not analyzed in this document (see BLM, 2008). Approximately 4,390

acres or 1% of the total lease area acreage has been inventoried. Seventy-five surveys have been conducted resulting in the identification of 100 cultural resources, both prehistoric and historic. Most of the inventories are linear surveys for communication and power line corridors in Dixie Valley with two bisecting the Clan Alpine Mountains and southern Edwards Creek Valley within this lease area. The smaller inventories vary in size from one to 40 acres and were conducted for the purpose of mining related exploration and ranching.

Although a very small percentage of the lease area has been surveyed for cultural resources the overall results suggest that the vegetation and water have supported various uses on the landscape that include prehistoric and historic occupation. These inventories and the subsequent results have provided regional understanding of the cultural history and have provided some information regarding the density and diversity of cultural resources present.

The previous inventories suggest that this lease area has low to high potential for significant resources dependent upon the location, mountains or valleys. Expectations would be low for resources on extreme slopes and playas, moderate to high near water, including extinct lake shorelines and areas of lithic and plant procurement. Prehistoric site types that have been previously identified or likely to be identified during future inventories including but not limited to the following: rockshelters, rock art sites, open sites containing extensive artifact scatters, base camps, resource procurement that would include lithic and plant processing (high altitude procurement of pine nuts, a highly valued food resource and various seed plant procurement and processing sites) and historic-period resources associated with continued and traditional use of the region by Native Americans.

Potential for 19th and 20th century historic period sites would be moderate to high due to the following historic site types including but not limited to transportation, mining and ranching. Historic transportation corridors within the lease area include the Pony Express, Overland Stage road, Overland Stage station, Overland telegraph line, Lincoln Highway and a number of unnamed routes identified on historic General Land Office (GLO) maps reviewed for this lease area. Within or adjacent to the lease area are the Augusta, Alpine and Tungsten Mining districts in the Clan Alpine Range and the New Pass District in the New Pass Range. Prospects, shafts and adits were identified on the topographic maps. Historic ranching (sheep and cattle) has been ongoing throughout the lease area and ranch ruins are identified on topographic maps for Dixie Valley and fields and houses identified on all historic era GLO maps for this lease area. The presence historic refuse and structural remains are directly related to the aforementioned activities and the likelihood of small depositional remains is moderate throughout the lease area.

Based on the assessment of elevation, topography, vegetation and water resources in previously inventoried areas with similar conditions, the potential for finding known or undocumented NRHP-eligible prehistoric resources within this proposed lease area would be moderate to high. Potential for NRHP-eligible historic-period sites related to ranching and mining would be moderate to low, however the aforementioned historic transportation resources that have been recorded and are potentially or currently listed as eligible to the National Register of Historic Places (NRHP) and based upon the GLO the potential for identifying additional segments related to these routes is moderate to high.

Gabbs Lease Area: One hundred nineteen inventories have been conducted within the lease area resulting in the identification of 139 cultural resources. Approximately 2% of the lease area has been inventoried. Most of the inventories have been block or linear surveys conducted primarily in association with mining and geothermal exploration, most of the cultural resources that have been recorded are directly associated with mining.

The majority of the cultural resources identified and recorded are associated with the mining that occurred from the middle 19th to the early/middle 20th century. Mining has been an ongoing industry for the last 125 years within the lease area. Several historic mining districts have been documented including Rawhide/Regent, Eagleville/Hot Springs, Broken Hills, Gabbs, Lodi (Mammoth, Marble, Ellsworth), Tolicha (Monte Cristo, Quartz Mountain, and Clarkdale), Rawhide and Rand/Bovard. In most cases towns or camps developed in concert with the mining districts (Lincoln, 1982). Many mines and prospects, shafts, and adits are marked on the topographic map throughout the entire lease area. The expectation of historic mining cultural resources is moderate to high for the following site types including but not limited to remains of mining structures both industrial and living quarters, campsites, larger historic refuse sites associated with towns and large mining concerns, cemeteries (Rawhide), smaller historic refuse deposits associated with mining exploration, cairns, construction associated with the Rawhide Western Railway grade, segment of the Wadsworth-Columbus Freighting Route to Dead Horse Well, roads to and from towns as identified on the 1884 General Land Office (GLO) maps (Downeyville, Deadhorse Well to Rawhide and Hot Springs) and various mining exploration site types throughout the lease area. Further examination of the 1884 GLO maps provide additional historic site types including several “house” locations in the Gabbs Valley area most likely associated with agriculture, ranching and stage stops along the aforementioned named roads. The valley is identified as a “dry alkali lake bed with good grazing land”. At least three house locations were identified on the 1884 GLO maps; one house was identified as the “Woodruffs house and well” and was a stage and auto stop (Pendleton et. al, 1982). Expectations for ranching, agricultural or stage stations site types (structures, refuse, fence lines, water lines/Dead Horse Well Water Company [Myrick, 1962]) are moderate to high.

Based on the limited data availability, an assumption can be made that complex prehistoric sites are expected to occur in moderate to high frequency in the sand dunes along the edge of the former dry lake bed or Gabbs Valley and adjacent to the well watered areas both hot and cold springs. As the former lake bed evaporated local Native Americans would have most likely used these locations for the collection of marsh related plants and animals as identified in similar ecosystems within the western and central Great Basin. Expectations would be low for resources on extreme slopes and within the alkaline valley playas bisected by copious drainages. Expectations for isolated artifacts and lithic reduction locations within the valleys and surrounding ranges would be low to moderate. Prehistoric site types that may be identified or likely to be identified during future inventories would include but not limited to the following: rockshelters, rock art sites (petroglyphs and pictographs), geoglyphs, open sites containing extensive artifact scatters, base camps, resource procurement that would include lithic reduction or testing of locally occurring chert cobbles and plant processing, and historic-period resources associated with the traditional use of the region by Native Americans.

Teels Lease Area: The proposed lease area includes the Teels Marsh surrounded by the Excelsior Mountains on the northern boundary and hills on the west side of the marsh and lease area and the Candaleria Hills on the east and south sides within Mineral County. The lease area is 46,826 acres in size and approximately 90% is on federal lands and 10% is privately owned. Elevations range from 4,920 feet above mean sea level (AMSL) in the Teels Marsh to the highest elevation of 7,854 feet in the Excelsior Mountains. Run off from the Excelsior Mountains and surrounding hills drain into the marsh. Springs were noted on the topographic maps within and on the outer edge of the southern boundary of the lease area. Vegetation ranges consists of salt desert scrub, greasewood flats with some barren sand dunes and playa margins, sagebrush and perennial communities, grasslands within the lowlands with pinyon and mountain mahogany at the higher elevations.

Sixteen inventories have been conducted resulting in the identification of approximately 31 cultural resources of both prehistoric and historic site types. Approximately 85 acres has been inventoried for cultural resources, less than 1% of the lease area. The predominant site type at this juncture is prehistoric with extensive occupation along the marsh boundaries and within the sand dunes. Prehistoric site types have been identified but few have been recorded in the lease area. Expectations are high for the following sites types adjacent to the marsh during future inventories, antelope drives, complex sites containing extensive artifact scatters and rock rings, base camps, resource procurement that would include lithic reduction area and plant processing sites. At high altitudes it is likely that pine nut procurement sites may be identified as they are a highly valued food resource and finally historic-period resources associated with activities of traditional use of the region by Native Americans. Information obtained during consultation suggests that the Teels Marsh was a traditional gathering and wintering area for three Northern Paiute bands. This would account for the number and variety of site types adjacent to the marsh area. Additional inventories would likely confirm and expand the diversity of site types at this location therefore expectations are high for prehistoric sites within this lease area. Historic borax and salt mining was conducted within the lease area at Teels Marsh and Marietta Districts. The Marietta district is just outside of the northern border of the lease area. Examination of the 1883 GLO maps around the marsh area shows identification of unnamed roads to the north and west of the mining concerns. A few mines were identified on the topographic maps but little information has been documented for these mines or other historic resources. Expectations for historic resources are low to moderate based upon the current review for this lease area.

Rhodes Salt Marsh Lease Area: Twenty six inventories, approximately 1,274 acres of the lease area have been conducted resulting in the identification of approximately 37 cultural resources of both prehistoric and historic site types. During previous surveys conducted in the 1980s expectations were low for prehistoric cultural resources due to the assumed lack of potable water. The final inventories identified many prehistoric sites that were recommended to the National Register (Pendleton et. al, 1982). Although historic sites are present the predominant site type throughout the lease area is prehistoric based upon the small number of inventories (less than 3% of the entire lease area). Paleolithic cultural resources have been previously inventoried and are moderate to high within the sand dune formations. Rhodes Salt Marsh was a traditional gathering and wintering area for three Northern Paiute bands (see consultation section). This would account for the number and variety of site types adjacent to the marsh area. Prehistoric

site types that have been previously identified or likely to be identified during future inventories would include but not limited to the following: complex sites containing extensive artifact scatters, base camps, resource procurement that would include lithic quarries and plant processing (high altitude procurement of pine nuts, a highly valued food resource and various seed plant procurement and processing sites) and historic-period resources associated with traditional use of the region by Native Americans.

Historic resources have been identified within the lease area ranging in age from the middle 19th century through the 20th century and are associated with the following activities, mining of borax and salt by the Nevada Salt and Borax Company, Carson and Colorado/ Tonopah and Goldfield Railroad, Sodaville-Tonopah Stage Route, historic refuse and campsites associated with the construction of aforementioned transportation corridors and mining activities. The 1881 and 1894 GLO maps were reviewed and the following were identified in and around the marsh area: roads to Belleville, Columbus, Sodaville, and a road to a wood camp, dwellings, mill and a house in the same vicinity as the Garfield and Arthur Salt and Borax Placer Mines. It is likely that ranching or agricultural endeavors would have occurred with the many ongoing activities and the necessity to provide provisions. The expectations or likelihood of identifying historic resources associated with the aforementioned activities would be low to moderate for this lease area.

Environmental Consequences

Issuing new fluid mineral leases would not result in any direct impacts to cultural resources because no surface disturbing activities would be authorized. Potential direct and indirect impacts from exploration and development activities would be analyzed under a separate site-specific environmental analysis.

Based on the results of previous cultural resource inventories, the potential for locating additional cultural resources within the proposed lease areas reviewed for the Proposed Action ranges from low to high. Furthermore, analysis of the reasonably foreseeable impacts of leasing for both identified and unidentified cultural properties resulted in the recommendation of **No Historic Properties Affected** for all of the lease areas except where the Grimes Point Archaeological Area occupies a portion of the Fallon Lease Area. This is based on the determination that, with the exception of the sections identified, **leasing** could occur without impact to eligible properties in each of the lease areas.

After consideration of cultural resource information, and other general data including the CRMP (BLM, 2001), the PEIS (BLM and USFS, 2008), and applicable fluid mineral activity NEPA documents, specific data relating to the individual proposed parcels such as topography, vegetation, water and soils, it has been determined that reasonable fluid mineral development could occur without adverse impacts to cultural properties eligible to the NRHP.

The Nevada Protocol Part VII.D. was applied to the cultural resource review for the Proposed Action and the CCDO determination, under the Nevada Protocol review threshold at VII.D.(1), is that **there are no historic properties effected; eligible sites are present but will not be effected as defined by 36 CFR 800.4.**

Known cultural resources are located in such a fashion (size, density and placement) that avoidance is feasible during development of fluid mineral resources. The potential for locating

additional cultural resources within the six lease areas reviewed for the Proposed Action ranges from low to high. The Fallon, Teels and Rhodes Salt Marsh lease areas are expected to have the highest potential to contain cultural resources, with the recommended **No Surface Occupancy** for portions of three sections and all of four sections at the Grimes Point Archaeological Area within the Fallon lease area. Based upon the small percentage of inventory, extensive acreage, previously recorded sites combined with the analysis (water, vegetation, elevation and topography) of Dixie and Edwards Creek and Gabbs lease areas, expectations are high to moderate for unknown cultural resources with the exception of the interior playa of Gabbs Valley which would be low. In the Wabuska Lease Area, expectations are moderate to high for prehistoric and low to moderate for historic cultural resources. A complete inventory of the proposed or anticipated future lease parcels has not occurred; therefore, the following stipulation should be added to lease parcels in the project area:

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

Environmental Justice

As required by NEPA, and specifically in accordance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, federal agencies must incorporate environmental justice as part of their missions. This section addresses topics related to environmental justice, providing specific information on economic, racial, and demographics in and around the area of the Proposed Action to identify low income and high-minority populations.

The following definitions describe low-income and minority population categories discussed in this section:

- **Minority:** The minority category includes persons who classify themselves as belonging to any of the following racial groups: Hispanic or Latino, Black or African American, American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander, and some other race (non-White). The term minority includes all persons classifying themselves in various racial categories, except those identifying themselves as not of Hispanic origin and as White or Other Race (U. S. Census Bureau, 2007).
- **Low-Income:** The U. S. Census Bureau (2007) determines which families or individuals are poor using a set of money income thresholds, taking into account family size and composition. Those families or individuals that fall below their relevant poverty threshold are considered low income.

Affected Environment

In 2006, the minority population in the five counties (Churchill, Lander, Lyon, Mineral and Nye) which occupy all or part of the six proposed lease areas was estimated at 27,220 (U.S. Census

Bureau – Quick Facts). That equates to 21.0 percent of the 129,100 population of all five counties combined. Of the total population in Mineral County, 34.9 percent were considered minority, followed by 24.4 percent in Lander County, 22.7 percent in Churchill County, 20.8 percent in Lyon County, and 18.5 percent in Nye County. This compares to an estimated 41.4 percent minority population for all of Nevada. With the exception of Mineral County, the Hispanic population dominated the minority ethnic groups. American Indian is the dominant minority ethnic group in Mineral County owing to the majority of the Walker River Indian Reservation, and the main town of Schurz on that reservation, residing in Mineral County.

In 2004, the poverty (low-income) rate for Nevada was estimated at 11.1 percent, which is less than the National estimate of 12.7 percent. Mineral (14.8 percent) and Nye (11.9 percent) Counties both had estimated poverty rates higher than the Nevada average (U.S. Census Bureau – Quick Facts). Lyon (9.0 percent), Lander (9.5 percent), and Churchill (10.2 percent) Counties all had estimated poverty rates below the state and National averages. Mineral County had an estimated poverty rate that exceeded the National average by a small margin. It should be noted that in 2008 the Nation as a whole has been trending towards a recession which could account for a relative increase the poverty rates Nationwide.

Environmental Consequences

Issuing new fluid mineral leases would not result in direct environmental justice impacts because no surface disturbing activities would be authorized. Potential direct and indirect impacts from exploration and development activities would be analyzed under a separate site-specific environmental analysis.

Indirect impacts to air quality, water quality, noise, cultural resource, geological resource, and hazardous materials resulting from fluid mineral exploration and development could potentially affect minority or low-income populations on private lands adjacent to leasing areas. Potential environmental justice impacts would be avoided through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs. Appropriate BMPs in this case would be directed at minimizing dust, noise, and other disturbance adjacent to residential areas, schools, or other adjacent urban land uses.

Areas open to potential geothermal leasing may include lands of tribal concern, or having traditional cultural resources or sacred sites. Intergovernmental coordination with affected tribes prior to leasing should limit negative impacts on Native American populations. A narrative describing Native American Religious Concerns associated with the Proposed Action as determined through tribal consultation is presented later in this chapter.

Floodplains

For NEPA analyses the BLM generally considers the base floodplain as described in the *Floodplain Management Guidelines* for implementing Executive Order 11988 (U.S. Water Resources Council, 1978). The base floodplain is defined as “the lowland and relatively flat areas adjoining inland and coastal waters..., including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.” The base floodplain is similar to the 100-year flood zone commonly shown on maps prepared by the Federal Emergency Management Agency. The guidelines make the base floodplain the minimum area to consider, and floodplain management may include additional flood-prone areas that have significant resource values.

Affected Environment

Some of the proposed lease areas are either within delineated 100-year flood zones, such as portions of the Wabuska and Fallon lease areas, or may be in areas subject to periodic flooding where the flood hazard has not been determined.

Environmental Consequences

Issuing new fluid mineral leases would not result in any direct impacts to floodplains because no surface disturbing activities would be authorized. Potential direct and indirect impacts from exploration and development activities would be analyzed under a separate site-specific environmental analysis.

Surface disturbance adjacent to a floodplain has some potential to adversely affect floodplain function. Potential impacts to floodplains would be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs. The CCDO lease restriction that no surface occupancy may occur within 500 feet of any water (BLM [CRMP], 2001) would provide additional protection to floodplains. Water in this case includes water bodies, riparian areas, wetlands and playas; up to and including the 100-year floodplain.

Invasive, Nonnative Species

Affected Environment

Numerous invasive plant and noxious weed infestations are located on the federal and private lands within the project area. The predominant species in the area of the Proposed Action include salt cedar (*Tamarix ramosissima*), hoary cress (*Cardaria draba*), perennial pepperweed (*Lepidium latifolium*), musk thistle (*arduus nutans*), and Russian knapweed (*Acroptilon repens*).

The spread and increase of invasive species in the area of the Proposed Action are contributing factors in the decrease and quantity and/or quality of many of the other renewable resources in the affected environment. Riparian and wetland zones are affected by the spread and increase of invasive plants and noxious weeds. Soils are exposed to erosion as plant communities are converted to unstable invasive plants and noxious weeds. Rangeland grazing potential is reduced as less palatable invasive plants and noxious weeds increase. The protection of threatened and endangered, special status plant and animal species, and their habitat becomes increasingly more difficult as invasive plants and noxious weeds spread. 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 and noxious weeds spread.

Environmental Consequences

There would be no direct affects to the propagation of invasive, non-native species from issuing new fluid mineral leases alone because leasing does not directly authorize the surface disturbing activities associated with fluid mineral exploration and development. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

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 and noxious weeds within the area of the Proposed Action. The most likely invader other than early seral stage native weeds would be cheatgrass (*Bromus tectorum*), halogeton

(*Halogeton glomeratus*), Russian thistle (*Salsola iberica*), hoary cress (*Cardaria draba*), and Russian knapweed (*Acroptilon repens*).

Fluid mineral 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. New, continued and enlarged infestations would be minimized through the implementation of appropriate BMPs.

Recommended BMPs (BLM and USFS, 2008) include: (1) the use of certified, weed-free mulch when stabilizing disturbed areas; (2) visually inspect construction equipment arriving at the project area and remove and collect seeds that may be adhering to tires and other equipment surfaces; (3) fill materials and road surfacing materials that originate from areas with known invasive vegetation problems will not be used; (4) revegetation, habitat restoration and weed control activities will be initiated as soon as possible after construction activities are completed; (5) clean all reclamation equipment prior to use to reduce the potential for introduction of noxious weeds or other undesirable non-native species; and, (6) use of pesticides must be approved by the agency.

Migratory Birds

On January 11, 2001, President Clinton signed Executive Order 13186 (Land Bird Strategic Project) placing emphasis on conservation and management of migratory birds. The species are not protected under the Endangered Species Act, but most are protected under the Migratory Bird Treaty Act of 1918. Management for these species is based on BLM Instruction Memorandum – IM 2008-050 dated December 18, 2007 (BLM, 2007a).

Affected Environment

The Intermountain West is the center of distribution for many migratory western birds. Over half of the biome's species of continental importance have 75% or more of their population here (Beidleman, 2000). BLM's IM 2008-050 contains a list of migratory bird Species of Concern that are a minimum for analysis of impacts. The species of concern taken from this list that do or could occur in the general project area are shown in Appendix D (BLM, 2007a). Not every species listed would use the project area for a life cycle function; some would simply fly over the project area, but would be a resource asset for wildlife viewing.

There are several general habitat types described by Neel (1999) and Beidleman (2000) within the project area that support life cycle functions of migratory birds listed in Appendix D. These general habitat types are grasslands, salt desert, lowland shrub, shrubsteppe, sagebrush, mountain shrub, woodlands, riparian wetlands, lakes and playas, and cliffs / talus. Most of the migratory bird species using or potentially using the project area would be associated with more than one habitat type.

The National Audubon Society has established a program of identifying areas of importance for migratory birds. Although these Important Bird Areas (IBA) have no legal status or recognition within the official BLM wildlife program, they are useful for planning analysis. Several IBAs are associated with the six leasing areas comprising the Proposed Action. The Lahontan Valley Wetlands IBA is associated with the Fallon Lease Area. Walker Lake IBA is associated with Teels Marsh and Rhodes Salt Marsh Lease Areas because the lease areas serve as stopover and corridor habitat for the IBA. The Carson River Delta IBA is associated with the Wabuska Lease area and also serves as stopover and corridor habitat (McIvor, 2005). The presence of an IBA

would indicate unusually large numbers of birds, greater diversity and the potential for unusual species sightings for habitat types present in a focused project area.

Environmental Consequences

Although lists that show bird species present within the project area are useful, presence or absence isn't significant. The presence of a habitat type used by a migratory bird guild is much more important. If a habitat type is present, a certain guild of bird species does use or *could* use the habitat. Impacts to the habitat result in potential impacts to whole guilds of migratory birds. BLM Instruction Memorandum – IM 2008-050 states that analysis of impacts to migratory birds should include impacts to individuals, but the end result of analysis should be effects on populations at local, state, regional or rangewide levels.

There would be no impacts to migratory bird individuals or populations expected or occurring in the areas of the Proposed Action because this leasing action is purely administrative. Additionally, leasing alone does not directly authorize fluid minerals exploration and development activities, actions that could be impacting. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis. Impacts from exploration and development could include those related to impacts to individuals and habitats which could include groundwater pumping/withdrawal, direct loss of habitat as well as fragmentation from road and power line development. These potential impacts are not meant to be all inclusive; identification of the entire range of potential impacts would need to be addressed when site specific information was known.

Potential indirect impacts to migratory birds would be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs. Where standard lease terms or BMPs do not provide adequate protection, the BLM would apply seasonal or time limited (TL) stipulations or controlled surface use (CSU) stipulations to leases. Timing limitations are used to protect resources that are sensitive to disturbance during certain periods (BLM and USFS, 2008). Such stipulations are generally applicable to specific areas, seasons, and resources, and are commonly applied nesting habitat for migratory birds.

Native American Religious Concerns

In accordance with the NHPA, NEPA, FLPMA, the American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, and E.O. 13007, the BLM must 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.

Affected Environment

The following Tribes were notified of the proposed lease sale via certified letter on October 29, 2008. The Fallon Paiute-Shoshone Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, Yomba Shoshone Tribe and Timbisha Shoshone Tribe. They were asked to identify traditional cultural places or any other areas of traditional cultural importance that need to be considered within the APE. This was followed by both telephone calls and face to face meetings from CCDO staff. Comments or concerns regarding leasing in the proposed lease areas were submitted to the CCDO and documented during the consultation process which is ongoing.

The Fallon Paiute-Shoshone Tribe responded concerning previous consultation for the Grimes Point Archaeological Area and the designated No Surface Occupancy at the locations within the current Fallon Lease Area within Township 18 North, Range 30 East, Sections: east ½ of 19, northeast ¼ of 30, northwest ¼ and east ½ of 32 and all of 20, 28, 29, and 33 be designated for the current lease process. The Walker River Paiute Tribe stated that there were no comments or concerns for the lease, however expectations were that consultation will be ongoing for any future projects that develop as a result of the leasing process. The Timbisha Shoshone Tribe did not have any concerns for the current lease areas. The Yerington Paiute Tribe had some concerns regarding the Wabuska, Teels and Rhodes Salt Marsh lease areas, many of which were discussed previously in the Cultural Resources Section of this EA. The Yomba Shoshone Tribe has not responded with comments or concerns. All of these Tribes will be contacted with any developments resulting from the leasing process in the future.

Environmental Consequences

Issuing new fluid mineral leases would not result in any direct impacts because no surface disturbing activities would be authorized. Potential direct and indirect impacts from exploration and development activities would be analyzed under a separate site-specific environmental analysis.

Although the act of selling fluid mineral leases does not directly authorize exploration, development, production, or any other related ground disturbance activities, there does exist the potential to impact Native American sites of spiritual, cultural, or traditional nature. 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 a sacred spiritual belief and/or use, is not to be viewed by non-natives as unimportant. 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.

Without a specific proposed project location and description, identifying impacts to specific tribal resources is difficult. 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. As noted previously, the BLM would produce a site specific EA for any future development. Such an EA would discuss alternatives or measures that may reduce or eliminate impacts to Native American Religious Concerns.

Threatened or Endangered Species

The Endangered Species Act (ESA) was passed in 1973 to address the decline of fish, wildlife, and plant species in the US and throughout the world. The species and habitat administered under this Act are collectively known as federally listed species. This includes those listed as threatened, endangered, proposed for listing and candidate species. Each federally listed species carries its own level of management and habitat delineation including critical habitat designation.

Affected Environment

On December 4, 2008, the U.S. Fish and Wildlife Service's electronic listing of federally listed threatened, endangered, proposed for listing species was reviewed to determine which species might be associated with the project areas (www.fws.gov/nevada/protected_species/index.html 2008).

Rhodes Salt Marsh Lease Area's eastern boundary is within 1 mile of Blue Link Spring which houses the endangered Hiko White River Springfish. This spring's pool is less than 2 acres in size.

The Fallon Lease Area has the Carson River within its boundaries which support threatened Lahontan Cutthroat Trout. This portion of the Carson is not considered to have Lahontan Cutthroat even though some trout may exhibit Lahontan characteristics. This portion of the Carson River is not identified as a recovery area (USFWS, 1995). The southeastern and southwestern portions of the Fallon Lease Area could contain potential habitat for the endangered southwest willow flycatcher.

Teels Marsh Lease Area has springs at the northwest corner of the salt marsh that contain unidentified fish. These fish were likely transplanted by the public but fish could have originated from Blue Link Spring or private land at Sodaville that contain the endangered Railroad Valley springfish.

The U.S. Fish and Wildlife Service is currently under court order to review a petition to list Greater Sage Grouse under the Endangered Species Act. If the entire population of Greater Sage Grouse or the Mono sub-population of sage grouse were listed and critical habitat designated, the proposed lease areas may need to be re-examined to determine if sage grouse and sage grouse habitat were present or nearby even if a decision had been signed. If sage grouse listing did occur, this species would need to be included in any future planning for exploration and development at the minimum. The only lease areas not containing sage grouse habitat or being adjacent to it are the Rhodes Salt Marsh, Wabuska and Fallon Lease Areas.

Environmental Consequences

There would be no impacts to federally listed species or habitats expected or occurring in the areas of the Proposed Action because the leasing action is purely administrative. Additionally, leasing alone does not directly authorize fluid minerals exploration and development activities, actions that could be impacting. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis. Impacts from exploration and development could include those related to impacts to individuals and habitats which could include groundwater pumping/withdrawal, direct loss of habitat as well as fragmentation from road and power line development. These potential impacts are not meant to be all inclusive; identification of the entire range of potential impacts would need to be addressed when site specific information was known. Depending on the exact nature of exploration and development, Section 7 consultation may be needed under the Endangered Species Act.

In accordance with BLM Instruction Memorandum No. 2002-174, the BLM will apply the following stipulation on any leases where threatened, endangered, or other special status species or critical habitat is known or strongly suspected. Additionally, the BLM will provide a separate notification through a lease notice to prospective lessees identifying the particular special status species that are present on the lease parcel offered.

“The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove

proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 USC 1531 et seq., including completion of any required procedure for conference or consultation.”

Wastes, Hazardous or Solid

Laws, Acts, and authorities pertaining to fluid minerals waste 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 Nevada Administrative Code.

Affected Environment

Hazardous materials, hazardous waste, and solid waste are not normally considered to be part of the natural environment. These items are, rather, the result of human intrusion into the natural environment. This EA is concerned only with hazardous materials, hazardous waste, and solid waste used or generated by exploration and development activities resulting from leasing under the Proposed Action.

Environmental Consequences

There are no direct impacts from issuing leases for future fluid mineral exploration, development, and production activities. The indirect impacts of leasing by exploration, development, and production activities from hazardous materials, hazardous waste, and solid waste, which might be encountered include the following:

Exploration - Indirect leasing impacts from future exploration could include drilling fluid or hydrocarbon spills, leakage from improperly constructed sump pond or wastewater collection systems, improperly handled briny 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 exploratory drill rigs. Briny water from exploratory drilling, if improperly disposed, could raise the pH of existing surface waters to hazardous levels. Accumulations of non-hazardous waste solids and liquids could include trash, drill cuttings, wastewater, bentonite, and cement generated during drilling operations.

Development - Indirect leasing impacts from future development would be the same as from exploration, but the quantities of hazardous materials, hazardous waste, or solid waste used and generated could be greater. In addition, stormwater runoff could contain elevated quantities of heavy metals and volatile organic compounds. Substantial quantities of non-hazardous solid waste and liquids could be generated at this stage, increasing the potential for contamination of water, soil, and possible toxic impacts to wildlife.

Production - Indirect leasing impacts resulting from future long-term production could include spills and leaks from routine fluid mineral extraction facilities or geothermal power plant operations. Some of the involved materials could be hydraulic fluid,

gasoline, oil, paint, antifreeze, cleaning solvents, transformer insulating fluid, binary fluids, and grease; these discharges could result in adverse impacts to water, soil, air, and wildlife. Accidental releases from sumps or wastewater collection systems could include hazardous water-treatment chemicals such as chlorine. Stormwater runoff containing excess heavy metals and volatile organic compounds could be a problem. There would likely be substantial quantities of non-hazardous solid waste generated. Binary geothermal operations could use hazardous materials (such as isobutene or isopentane) which are highly explosive and could have impacts to public safety, and increase the potential for wild fires.

Proper management of these substances according to state and federal regulations would reduce the potential for soil, ground-water, or surface-water contamination, thus minimizing adverse effects to wildlife, worker health and safety, or the surrounding communities. Potential indirect impacts from the storage and handling of solid and hazardous waste would be further minimized through the operator's adherence to lease stipulations, and implementation of appropriate BMPs.

Water Quality (Surface/Ground)

Affected Environment

The project area resides within the Great Basin Hydrographic Region. The Great Basin Hydrologic Region in Nevada is an arid region located in the rain-shadow of the Sierra Nevada Mountains. The region is characterized by northerly trending mountain ranges and intermountain valleys with closed drainage. None of the streams that originate within this basin have an outlet to the ocean. The Great Basin's internal drainage results from blockage of water movement by high fault-created mountains and lack of sufficient water flow to merge with larger drainages outside of the Great Basin. The Great Basin Hydrologic Region primarily encompasses basin-fill aquifers (USGS 2002).

This region's surface water sources evaporate or percolate before they can flow to the ocean (USGS 2004). Precipitation generally falls as rain and mountain snowfall. Streams flowing from the mountains carry water to the basins, which infiltrates into the alluvial sediments and provides the only substantial recharge to basin ground water. Surface-water flow in the basins is derived almost entirely from the mountain streams (BLM, 2007b). Any water that falls as rain or snow into this region does not leave except through evaporation or consumption (USGS, 2004).

Apart from major rivers such as the Walker and Carson Rivers proximal to the Wabuska and Fallon lease areas, respectively, surface water flow is intermittent along the mountain fronts and ephemeral in the basins themselves. Surface-water flow in the mountainous areas is limited mainly to late spring snowmelt in the higher areas. Agricultural diversions of major streams emanating from the mountains are common. Diversions from the Carson and Truckee Rivers are used extensively for irrigation within the Fallon Lease Area, while diversion of the Walker River support a portion of the agricultural development proximal to the Wabuska Lease Area.

The water-yielding materials in the Basin and Range aquifers are in valleys and basins, consisting primarily of unconsolidated alluvial-fan deposits. Local floodplain and lacustrine (lake) beach deposits may also yield water to wells. Also, the consolidated bedrock that underlies the unconsolidated alluvium are a water source if sufficiently fractured. Many of these valleys and basins are internally drained where water from precipitation that falls within the basin recharges the aquifer and ultimately evaporates within the basin. Rarely, basins might be hydraulically connected in the subsurface by fractures or solution openings in the underlying

bedrock. Also, several basins or valleys may develop surface water drainage that hydraulically connects the basins, and ground water flows between the basins, mostly through the unconsolidated alluvial stream/floodplain sediments (USGS 2002).

The basin-fill aquifers are primarily unconsolidated sand and gravel of Quaternary and Tertiary age. The most permeable basin-fill deposits are present in the depressions created by late Tertiary to Quaternary block faulting and can be classified by origin as alluvial-fan, lake-bed, or fluvial deposits. Other rock types within the region have low permeability and act as boundaries to the flow of fresh groundwater (USGS 2002). The dissolved solids concentrations in the water in the basin-fill aquifers are generally less than 1,000 milligrams per liter.

Ground-water discharge in the area of the Proposed Action is primarily through evapotranspiration (ET). ET varies throughout the area is dependent on several factors such as 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. A phreatophyte is a long-rooted plant, such as some varieties of sagebrush, which have adapted to desert or arid environments by developing a long, deep root system to absorb water from the water table or other permanent ground supply. The average ET rates for phreatophyte areas with less than 20 percent plant cover ranged from 0.13 to 1.60 feet per year (Berger, 2000). Twenty percent or less plant cover can be considered representative of phreatophytic plant density within the area of the Proposed Action. Other discharge of ground water is for consumptive use that includes domestic, municipal, agriculture, and mining.

Shallow ground water in the alluvium of the basins in the area of the Proposed Action is the main source of water for domestic consumption, irrigation, and power plant cooling. Some areas have geothermal reservoirs that underlie the shallow groundwater reservoirs. The Great Basin contains many of the largest groundwater reservoirs in the US. These reservoirs are largely untapped at present, but major urban areas like Las Vegas, Nevada, are actively pursuing their development (BLM, 2007b).

Environmental Consequences

Issuance of a fluid mineral lease within the proposed lease areas would not have an effect on water quality as there is no surface disturbance associated with fluid mineral lease issuance. The indirect impacts of leasing would be realized with the implementation of subsequent exploration and development phases of operation. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis.

Fluid minerals resources, primarily geothermal, involve the presence and characteristics of available heat and ground water. Ground water is the primary water resource that is potentially affected by fluid mineral exploration and development. Fluid minerals 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. This activity would not be expected to produce large quantities of ground water, geothermal, or oil & gas fluids. Fluids produced during drilling are generally incorporated into the drilling fluid. On completion of drilling, remaining fluids are contained in a mud pit or sump and must be disposed.

Testing and development of the fluid mineral resource would be focused on evaluation of the hydraulic and production character of the fluid mineral reservoir. The testing and development

phase is accomplished in open uncased boreholes or cased boreholes (wells). Geophysical techniques and limited pumping (production) of the potential fluid mineral reservoir of oil & gas or geothermal fluids is then implemented in order to evaluate the reservoir. The volume of fluids 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 actual 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 shallow aquifers and a surface water resource. Disposal options may include reinjection to the source reservoir, evaporation, or release to the land surface.

Determining the indirect environmental impacts of leasing within the project area is difficult. Data describing existing water systems, ground-water reservoirs, oil & gas or geothermal reservoirs and the interrelationships of these systems are inadequate. Potential impacts from exploration and development or production activities to water quality would be evaluated during the site-specific environmental analysis and permitting process. Potential impacts to water quality would then be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs which would be incorporated into site-specific permits as COA.

In accordance with recommended BMPs (BLM and USFS, 2008), operators would be required to gain a clear understanding of the local hydrology and would avoid creating hydrologic conduits between aquifers. Operators would also develop a storm water management plan for the site to ensure compliance with applicable regulations and to prevent off-site migration of contaminated water or increased soil erosion. It is expected that these measures, along with the measures outlined to protect soil resources, would effectively minimize impacts on water resources and quality by protecting sensitive surface and ground water resources, protecting wetland and riparian habitats, reducing water quality degradation (i.e., contamination and sedimentation), and meeting applicable water quality standards.

The CCDO lease restriction that no surface occupancy may occur within 500 feet of any water (BLM [CRMP], 2001) would provide additional protection to water quality. Water in this case includes water bodies, riparian areas, wetlands and playas; up to and including the 100-year floodplain. Any leases that contain thermal features (e.g., springs or surface expressions) would have a stipulation requiring monitoring of the thermal features during any exploration, development, and production of the lease to ensure that there are no impacts to water quality or quantity (BLM and USFS, 2008).

Water rights are very specific to individual locations, aquifers, landowners, and local jurisdictions. Fluid minerals developers must obtain the appropriate water rights and state permits, in addition to the Federal lease for the resources.

Wetlands/Riparian Zones

Wetlands are defined as areas that are inundated or saturated by surface or ground water for periods of time necessary to support hydric soils and aquatic/wetland vegetation such as cattails, sedges, rushes, etc. Riparian areas are distinguished by the presence of vegetation, which is a direct result of 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: 1) lotic riparian areas are associated with flowing water (streams and rivers) and 2)

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.

Sections 401 and 404 of the Clean Water Act require states to supervise the protection of wetlands and riparian areas. Section 401 requires operators to obtain Water Quality Certification and Stormwater Discharge Permits which are designed to minimize the introduction of pollutants into wetland and riparian ecosystems. Section 404 Compliance is under the jurisdiction of the U.S. Army Corps of Engineers and the USFWS. Section 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 must comply with EO 11990 – Protection of Wetlands - which mandates federal agencies to support policies to minimize or prevent the “destruction, loss, or degradation of wetlands”.

Affected Environment

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

Environmental Consequences

There would be no direct impacts from issuing new fluid mineral leases alone because leasing does not directly authorize exploration and development activities. Direct and indirect impacts from these activities would be analyzed under a separate site-specific environmental analysis. Surface disturbance adjacent to wetland/riparian zones has the potential to adversely affect the functioning condition of a riparian area’s soil and watershed attributes. Additionally, active exploration and development adjacent to riparian areas would have the potential to disturb and displace wildlife.

It is expected that the indirect impacts to wetland and riparian habitats from the Proposed Action would be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs. The CCDO lease restriction that no surface occupancy may occur within 500 feet of any water (BLM [CRMP], 2001) would provide additional protection to wetlands and riparian areas.

Wilderness

Wilderness Study Areas (WSAs) are roadless area or islands of public land that have been inventoried and found to possess wilderness characteristics as described in Section 603 of FLPMA and Section 2(c) of the Wilderness Act of 1964. Pending Congressional review and official designation or release, such lands are managed according to the Interim Management Policy which preserves the wilderness character. The wilderness areas may be devoted to the public purposes of recreation, scenic, scientific, educational, conservation, and historical use (BLM [CRMP], 2001).

It is BLM policy not to offer any lands for fluid mineral leasing with 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, in and of itself, preclude such activities or uses up to the boundary of a WSA. When fluid mineral exploration, development and production 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.

Affected Environment

The Dixie and Edwards Creek Valley and Gabbs Valley Lease Areas share a border with the Clan Alpine Mountains and Gabbs Valley Range WSAs, respectively (Figures 4 and 5). The Clan Alpine Mountains WSA is located in Churchill County in west central Nevada. The WSA straddles the northeast trending ridge of the Clan Alpine Mountain Range that separates Dixie Valley to the northwest from Edwards Creek Valley to the southeast. The WSA is thirty miles long and ranges from seven to 15 miles in width. Most of the WSA is highly dissected with over twenty named canyons and dozens of unnamed ones. In general, the area may be characterized as rugged, mountainous and possessing excellent topographic screening. The middle elevations of the WSA afford the best opportunities to experience a sense of seclusion and solitude due to the deeply incised terrain and the excellent vegetative screening.

The Gabbs Valley Range WSA is located in Mineral County, 30 miles east of Hawthorne, Nevada. The WSA contains 79,600 acres of public land which abuts the southern Gabbs Valley leasing area boundary. The WSA is approximately 16 miles in length from north to south and varies in width from three to 15 miles. The opportunity for solitude is excellent in the center of the WSA around Red Rock Canyon due to the presence of ridges and pinyon-juniper that isolate visitors from the human developments found around the edge of the area. The rugged terrain and relatively limited amount of water found in the area pose challenges to recreational visitors.

Environmental Consequences

There would be no direct impacts from issuing new fluid mineral leases alone because leasing does not directly authorize exploration and development activities. There would also be no direct impacts from these activities because fluid mineral leasing is not allowed within WSAs. Although exploration and development activities could be conducted up to the boundary of the WSA and would not be precluded because they can be seen or heard from areas within a WSA, site-specific environmental assessments would be required before any action was undertaken and indirect impacts to WSAs would be assessed. Impacts to WSAs would then be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs which would be incorporated into site-specific permits as COA.

Land Use

The BLM manages public lands under the authority of FLPMA. FLPMA provides direction for land use planning, administration, access and transportation, range management, rights-of-way, designated management areas (including specific locations and general designation of wilderness areas), and effects on existing rights. The BLM is responsible for carrying out a variety of programs for the management and conservation of resources on 258 million surface acres, as well as 700 million acres of subsurface mineral estate. These surface acres comprise about 13 percent of the total US land surface.

Land use authorizations include various authorizations and agreements to use BLM-administered land, such as right-of-way grants, road use agreements, and land use permits. Land use authorizations are issued for a variety of purposes, both short and long term. Short-term uses include commercial filming, construction equipment storage sites, and other uses involving minimal land improvements or disturbances. Long-term uses include rights-of way grants for power lines, highways, roads, pipelines, fiber optics, communication sites, electric power generation sites, irrigation works and other facilities.

No right-of-ways are required for “on lease” activities by a fluid mineral lease holder. A fluid mineral lessee must acquire authorized FLPMA right-of-ways for “off lease” activities, such as access road construction to the lease area for other facilities. The Application for Permit to Drill (APD) for oil & gas or Geothermal Drilling Permit may serve as the supporting document for the off lease right-of-way plan of development; however, the appropriate NEPA analysis for off-site developments would be required and site-specific stipulations would be determined. Third party facilities, such as pipelines or power lines not owned by the lessee, would require a FLPMA right-of-way across a lease.

Affected Environment

The fluid mineral lease areas encompass more than one-million acres of federal and private land throughout the west-central part of Nevada. In general, federal lands occupy roughly half of the Wabuska and Fallon lease areas, while the remaining lease areas are comprised almost entirely of federal land. BLM is the primary surface management agency for federal lands in the Wabuska, Dixie and Edwards Creek Valley, Gabbs, Teels Marsh, and Rhodes Salt Marsh Lease Areas. The U.S. Bureau of Reclamation (BOR) is the primary surface management agency for federal lands in the Fallon Lease Area. The Fallon Lease Area also encompasses a portion of the Fallon Naval Air Station. The Dixie and Edwards Creek Valley Lease Area contains a portion of the Dixie Valley Training Area which is managed by the military. The BLM does not track the acres of split (surface/mineral) estate; however, of the lands under private ownership in the project area, only a very small percentage is split estate. Approximately 400 acres of public lands within the Wabuska area have been identified through BLM land use planning for potential disposal from federal ownership.

There are a variety of land use authorizations within the area of the Proposed Action, including numerous BLM permitted rights-of-way. Many of these authorizations are non-exclusive to the holder. In other words, under the principals of “multiple use” as mandated by FLPMA, other uses of the land such as mining, grazing, recreation or fluid minerals leasing are allowed.

Environmental Consequences

Leasing creates a valid existing right, which could conflict with other existing or future land use authorizations and could impact sale or other conveyance of lands currently designated for disposal from federal ownership. It is anticipated that portions of some lease parcels would be proposed for roads during fluid minerals exploration, development and processing. On lease activities such as this would be subject to site-specific NEPA analysis. Off-lease right-of-way applications and grants would also be anticipated for pipelines and power lines in support of fluid mineral developments. These off-lease right-of-ways would be nonexclusive where possible; that is, they can be used by the general public for other purposes such as access to public lands and would also be subject to the appropriate site-specific NEPA analysis.

FLPMA requires that prior existing rights must be recognized, so fluid mineral development would be designed to avoid or minimize impacts to existing authorized uses or facilities. Through appropriate coordination with authorized land use holders, physical disturbances or temporary disruptions in use may be acceptable.

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 fluid mineral development and production create prior existing rights for the lessees and could affect the direction or placement of future non fluid mineral related right-of-ways.

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 fluid mineral leases.

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 of 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. Visitors typically travel on a previously used or marked motorized vehicle route to reach a recreation site or trailhead. Recreation opportunities range from intensive vehicle-oriented activities to non-motorized activities undertaken in a primitive setting, although the two often overlap. The demand for different types of recreation events and locations varies.

Affected Environment

Recreational activities within the project area are generally dispersed but could be anticipated to be more concentrated within designated recreation areas, as well as the various mountain ranges adjacent to some of the lease areas. The Grimes Point Archeological Area is a high use area within the Fallon Lease Area of the Proposed Action.

Environmental Consequences

Issuing new leases within the project area does not involve ground disturbance, or changes in population or human occupation levels. There would be no direct impact on the use of existing recreation facilities or the public's enjoyment of the current recreational opportunities.

Indirect impacts from the Proposed Action could occur to recreation resources if:

- Population levels increase; therefore placing an increased demand on existing facilities
- Existing public land recreation opportunities become altered as a result of increased development or access to previously remote public land locations.

Implementation of the Proposed Action could result in the eventual development of fluid mineral resources in the lease areas and in areas of dispersed recreation resource opportunities. Development in any of the areas would reduce the amount and quality of natural landscape. The creation of new roads could increase public land access and generate additional roads and trails in previously un-roaded landscapes.

Visual

The BLM initiated visual resources 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. The objectives of these classes vary from very limited management activity to activity that allows major landscape modifications.

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 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.

Management classes are utilized to identify minimum 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 5432-1.1. 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 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 the 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.

Affected Environment

The project area is located in 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 area of the Proposed Action 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 ranges, 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 (NHT), large open pit mines, gravel pits, small dams and reservoirs, telecommunication towers and associated buildings.

A large portion of the area of the Proposed Action (with the exception of the Fallon lease 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 great 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.

Environmental Consequences

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

According to BLM policy, interim VRM classes can be adopted. In order to have a standard against which indirect impacts can be assessed post leasing, all BLM lands within the confines of the six lease areas which comprise the project area for the Proposed Action would be assumed to have a VRM Class III designation (BLM, 2002b). The management objective for this visual resource class is shown in the above Table.

Although the Proposed Action would not directly affect any of the Wilderness Study Areas (WSAs), they are a scenic backdrop to several of the proposed lease areas. WSAs are mandated to be managed according to VRM Class I objectives until designation or release by Congress.

Indirect impacts to Class III areas would probably range from severe to light depending on the amount of development and the proximity to high-use areas. The following are potential environmental impacts on visual resources that could occur.

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, tank batteries and power lines would result in long term modification to the line, form color, and texture of the characteristic landscape. Roads, pipelines and power lines 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 drilling and development facilities were removed. Constructed features would have strong geometric and linear shapes, as well as solid colors, all contrasting with the natural landscapes and continuing throughout the life of the project.

Final Abandonment/Close Out - 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.

Potential indirect impacts from the Proposed Action to visual resources from long-term developments and facilities such as access roads and drill pads would be mitigated on a case-by-case basis through the implementation of appropriate BMPs. In accordance with recommended BMPs (BLM and USFS, 2008), operators will incorporate visual design considerations into the planning and design of the project to minimize potential visual impacts and to meet the VRM objectives of the area and the agency.

Noise

The federal law that directly affects noise control is the Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978 (42 USC 4901-4918). This Act delegates to the states the authority to regulate environmental noise. It also directs government agencies to comply with local community noise statutes and regulations, and to conduct their programs to promote an environment free of any noise that could jeopardize public health or welfare.

Affected Environment

Noise is defined as any undesirable sound. Sound is any pressure variation that the ear can detect. Sound pressure levels are measured in units of decibels. Any time a sound level (or sound pressure level) is referred to, a decibel notation is implied.

Audible sounds range from 0 decibel, considered the quietest sound that can be heard by an average person, called the “threshold of hearing,” to about 130 decibels, which is considered so loud that it causes pain, and is called the “threshold of pain”. The perceived pitch of a sound, which characterizes the sound as being high or low when heard, is determined by its frequency.

Low-pitched or bass sounds have low frequencies, and high-pitched or treble sounds have high frequencies. A healthy, young person can hear sounds with frequencies ranging from approximately 20 to 20,000 cycles per second (hertz). The sound of human speech is typically in the range 300 to 3,000 hertz (Canada’s National Occupational Health and Safety Resource 2008).

The A-weighted decibel scale estimates the range of human hearing by filtering out lower frequency noises, which are not as damaging as high frequencies. This scale is widely used in noise standards, guidelines, and ordinances, and is widely accepted in analyzing noise and its impacts on humans. A comparison between Noise Source and Sound Level for some common sounds is shown in the Table below.

Noise Source	Sound Level (A-weighted decibel scale)
Near leaves rustling from breeze	25
Whisper at six feet	35
Inside average suburban residence	40
Near a refrigerator	40
Inside average office, without nearby telephone ringing	55
Speech at 3 feet, normal voice level	60
Automobile (60 miles per hour) at 100 feet	65
Vacuum cleaner at 10 feet	70
Garbage disposal at 3 feet	80
Electric lawn mower at 3 feet	85
Food blender at 3 feet	90
Auto horn at 10 feet	100

Source: Geothermal Energy Association 2007

Environmental Consequences

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

In consideration of the indirect impacts from the Proposed Action, noise levels would be expected to be greatest during exploration, development and close-out (geothermal) or abandonment (oil & gas) phases. By comparison, noise produced by a fully developed oil field would be nominal, and noise from a fully developed power producing steam field is modest, originating from the occasional venting from wells through mufflers and from pipeline leaks, or the constant sound of cooling fans at a power plant facility. BLM regulations mandate that noise at one-half mile - or at the lease boundary, if closer - from a major fluid minerals operation shall not exceed 65 A-weighted decibels (43 CFR 3200.4[b]).

Potential indirect impacts from noise in association with the Proposed Action would be further minimized through the implementation of appropriate BMPs. Recommended BMPs (BLM and USFS, 2008) include: (1) taking measurements to assess the existing background noise levels at a given site and compare them with the anticipated noise levels associated with the proposed project; (2) well drilling or major facility construction operations within two miles of existing occupied residences will be restricted to non-sleeping hours (7:00 am to 10:00 pm); (3) equipment will have sound-control devices no less effective than those provided on the original equipment, and construction equipment used will be adequately muffled and maintained; (4) all stationary construction equipment (i.e., compressors and generators) will be located as far as practicable from nearby residences; (5) if blasting or other noisy activities are required during the

construction period, nearby residents will be notified by the operator at least one hour in advance; and, (6) Explosives will be used only within specified times and at specified distances from sensitive wildlife or streams and lakes, as established by the federal and state agencies.

Wild Horses and Burros

The primary responsibilities of the BLM under the Wild Free-Roaming Horse and Burro Act of 1971 are to preserve and protect wild horses and burros and to manage for healthy rangelands (BLM, 2002a). Under the Act, the BLM was directed to identify herd areas where horses and burros were located. The BLM inventoried and mapped these herd areas in the first few years following passage of the act. Through the BLM planning process, areas where wild horses are managed as a component of the public lands are designated as herd management areas (HMAs).

Affected Environment

The BLM manages wild horses and burros in HMAs, and there are approximately 103 HMAs in Nevada. In addition to HMAs, the Marietta Wild Burro Range southeast of Hawthorne, Nevada, is the nation's only formally recognized wild burro range. It was dedicated in 1991, contains approximately 85 burros, and covers 68,000 acres. The CCDO manages 15 HMAs, and all but one of which, the Marietta Wild Burro Range, is for horses. The HMAs are scattered throughout the field office. Portions of the Augusta Mountains, New Pass, Clan Alpine, Pilot Mountain, Garfield Flat and Marietta Wild Burro Range HMAs overlie the project area (see Figures 4, 6 and 7).

Environmental Consequences

There are no direct impacts to issuing leases for future fluid mineral exploration, development, and production activities. Wild horses and burros could be affected by fluid mineral resource development within each lease area. Any effects would vary with each site, and would be assessed in site-specific EAs prepared for development of individual leases.

Indirect impacts from noise or surface disturbance associated with the Proposed Action could influence herd distribution and migration within and between the HMAs, and cause disturbance to forage resources. Horses and burros would likely shift their movements to avoid disturbances, thus causing impacts to other areas within the HMA. The relative impacts would be greater to smaller HMAs with limited areas of forage and water availability.

The potential for indirect impacts to horse and burro population would be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs. Recommended BMPs (BLM and USFS, 2008) include:

- The operator will ensure employees, contractors, and site visitors avoid harassment and disturbance of wild horses and burros, especially during reproductive (e.g., breeding and birthing) seasons. In addition, any pets will be controlled to avoid harassment and disturbance of wild horses and burros.
- Operators will gain a clear understanding of the local hydrogeology. Areas of ground-water discharge and recharge and their potential relationships with surface water bodies will be identified.

- Ponds, tanks and impoundments containing harmful liquids should be excluded from wildlife access by fencing, netting or covering at all times when not in active use.
- Observations of potential problems regarding wild horses or burros, including animal mortality, will be immediately reported to the agency.

Soils/Geology/Minerals

Affected Environment

Soils - The soils within the proposed lease areas vary considerably in physical, chemical, and biological characteristics. Parent material, surface and subsurface textures and rock fragments, elevation, aspect, and slope determine the inherent productivity. Erosion and runoff potential, while affected greatly by these factors, are also dependent upon the basal and canopy cover of vegetation on site. Also, roads, livestock and horse use, mining and other overland activities, and general motorized vehicle use have impacted soils in certain areas. Generally the soils in the respective lease areas are classified as aridisols or entisols; or mollisols at higher elevations. The lease areas fall within several precipitation zones ranging from 4 to 12 inches per year. Soil reactions range from neutral or slightly alkaline to strongly alkaline. Detailed descriptions of the soils within the respective leasing areas can be found within the various County Soil Surveys, issued by the U.S. Dept. of Agriculture-Natural Resource Conservation Service.

Geology – All six lease areas which comprise the Proposed Action are situated within the Basin and Range physiographic province. Centered on Nevada and extending from eastern California to central Utah, and from southern Idaho into Sonora, Mexico, the Basin and Range province can be divided into the Great Basin in the north and the Salton Trough, Mojave-Sonoran Desert, Mexican Highlands, and Sacramento Mountains in the south (Figure 3-1) (USGS 2003a , US DOE and BLM 2007). The Basin and Range province has a characteristic topography, with more than 400 evenly spaced, nearly parallel mountain ranges and intervening basins. The mountain ranges are generally abrupt, steeply sloping, and deeply dissected with relief between 3,000 and 5,000 feet above the intermountain basins. The basins are typically broad, gently sloping, and largely undissected with altitudes from below sea level to about 5,000 feet above sea level (US DOE and BLM 2007).

The Basin and Range province was created about 20 million years ago as the earth's crust stretched, thinned, and then broke into some 400 mountain blocks that partly rotated from their originally horizontal positions (USGS 2003a). Along roughly north-south-trending faults, mountains were uplifted and valleys down-dropped, producing the province's distinctive alternating pattern of linear mountain ranges and valleys or basins (USGS 2002).

The mountain ranges consist of complexly deformed late Precambrian and Paleozoic rocks and some Mesozoic granitic rocks in the western part of the province. Cenozoic volcanic rocks are widespread throughout the province (US DOE and BLM 2007). These uplifted rocks erode and fill the intervening valleys and basins with fresh sediment (USGS 2003a). These basins generally contain an underlying, relatively undeformed sequence of rock that was deposited in the area prior to uplift and an overlying younger layer of rock and sediment that was derived from the erosion of nearby uplifted areas. Some of these basins contain older sedimentary rocks or volcanic rocks, and almost all

contain a thick overlying sequence of Tertiary and Quaternary sediment derived from erosion of nearby uplifted blocks (USGS 2002).

Minerals - There are no mining operations authorized in any of the proposed lease areas. However, several unpatented mining claims do exist in portions of some of the lease areas, and fluid mineral leases would be subject to valid existing rights. There are numerous Nevada Department of Transportation (NDOT) mineral material sites within the project area along main and alternate routes of U.S. highway 50 and 95, as well as state route 361.

Environmental Consequences

Issuing new fluid mineral leases would not result in any direct impacts to soils, geology, or minerals because no surface disturbing activities would be authorized. Potential direct and indirect impacts from exploration and development activities resulting from the issuance of new leases would be analyzed under a separate site-specific environmental analysis.

Potential indirect impacts from the Proposed Action would occur to soil resources during fluid mineral exploration and development. These activities may include the clearing of soil from roadways, staging areas, construction sites and maintenance areas, which may result in some soil loss. The potential for indirect impacts to soils would be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs.

The recommended stipulation that No Surface Occupancy may occur on slopes in excess of 40 percent and/or soils with high erosion potential (BLM and USFS, 2008) would provide additional protection to soil resources. Potential indirect impacts to soil resources in association with the Proposed Action would be further minimized through the implementation of appropriate BMPs. Recommended BMPs (BLM and USFS, 2008) include:

- Operations will disturb the minimum amount of surface area necessary to conduct safe and efficient operations. When possible, equipment will be stored and operated on top of vegetated ground to minimize surface disturbance.
- In areas to be heavily disturbed, the top [eight (8)] inches of soil material, will be stripped and stockpiled around the perimeter of the well location to control run-on and run-off, and to make redistribution of topsoil more efficient during interim reclamation. Stockpiled topsoil may include vegetative material. Topsoil will be clearly segregated and stored separately from subsoils.
- Earthwork for interim and final reclamation will be completed within 6 months of well completion or plugging unless a delay is approved in writing by the BLM authorized officer.
- Salvaging and spreading topsoil will not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment. If such equipment creates ruts in excess of four (4) inches deep, the soil will be deemed too wet.
- No major depressions will be left that would trap water and cause ponding.

Livestock Grazing

The primary laws that govern grazing on public lands are the Taylor Grazing Act of 1934, FLPMA, and Public Rangelands Improvement Act of 1978. The Taylor Grazing Act directs that occupation and use of the range be regulated to preserve the land and its resources from destruction or unnecessary injury, and to provide for the orderly use, improvement, and development of the range. FLPMA provides authority and direction for managing federal lands on the basis of multiple use and sustained yield and mandates land use planning principles and procedures for federal lands. The Public Rangelands Improvement Act does the following:

- Defines rangelands as public lands on which there is domestic livestock grazing or that are suitable for livestock grazing;
- Establishes a national policy to improve the condition of public rangelands so they will become as productive as feasible for all rangeland values;
- Requires a national inventory of public rangeland conditions and trends; and
- Authorizes funding for range improvement projects.

The BLM manages rangelands on public lands under 43 CFR Part 4100 and BLM Handbooks 4100 to 4180. The BLM conducts grazing management practices through BLM Manual H-4120-1 (BLM 1984). Under this management, ranchers may obtain a grazing permit for an allotment of public land on which a specified number of livestock may graze. An allotment is an area of land designated and managed for livestock grazing. The number of permitted livestock on a particular allotment on public land is determined by how many animal unit months (AUMs) that land will support. An animal unit month is the quantity of forage required by one mature cow and her calf (or the equivalent in sheep or horses) for one month.

Affected Environment

Livestock production is a major industry within the CCDO administrative boundary. There are 16 grazing allotments within or overlapping the project area. The grazing allotments are comprised of both public and private lands. A full AUM fee is charged for each month of grazing by adult animals based on the following: 1) the grazing animal is weaned; 2) is six months of age or older when entering public land; or 3) would become 12 months of age during the period of use. The grazing allotments operations consist of a mixture of cattle, sheep, and horses.

Environmental Consequences

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

The indirect impacts from the Proposed Action would include disturbance from seismic lines, exploration and thermal gradient wells, road construction, gravel pit expansions, as well as land disturbance for fluid mineral production. The removal of vegetation would temporarily decrease the amount of available forage for 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 by shifting and/or intensifying livestock grazing over other areas.

These potential impacts are not meant to be all inclusive; identification of the entire range of potential impacts would need to be addressed when site specific information was known. At that time, potential indirect impacts to livestock and grazing would be minimized through compliance with state and federal regulations, adherence to lease stipulations, and implementation of appropriate BMPs. In accordance with recommended BMPs (BLM and USFS, 2008), the operator will coordinate with livestock operators to minimize impacts to livestock operations.

Wildlife & Fisheries (non-Marine, or commercial)

Affected Environment

General Wildlife & Fisheries: The majority of the acreage comprising the project area has extensive general wildlife diversity associated with lower and mid-elevation vegetation types. The species assemblages present do reflect a transition from the Great Basin Physiographic region to the upper Mojave region in the most southern lease areas. Several terrestrial and aquatic wildlife and fisheries habitats occur within the areas as described in the Nevada Wildlife Action Plan (Wildlife Action Plan Team 2006). The major wildlife habitat types and representatives of wildlife assemblages associated with the types include:

Intermountain Cold Desert Scrub: Historically, this habitat would have been dominated by Indian rice grass, spiny hopsage, shadscale and chenopods. Range evaluations indicate these plants still dominate. Wildlife species associated with this habitat type includes pale kangaroo mouse, Great Basin collared lizard and black-throated sparrow.

Sagebrush: The lease areas has a mix of Intermountain basin big sagebrush and Great Basin xeric mixed sagebrush. Low sagebrush, big sagebrush, spiny menodora, horsebrush, needlegrass and galetta grass (BLM 1988) and shadscale are included in the xeric communities. Desert kit fox, desert horned lizard and vesper sparrow are species associated with this habitat type.

Lower Montane Woodlands: Utah juniper is the primary vegetation type in some upper elevations of the lease areas. Some mountain big sagebrush, Ephedra sp, cliffrose, Sandburg bluegrass and phlox can be found in the understory. All of these are key game forage species. Wildlife species such as short-horned lizards, pinyon mouse and juniper titmouse can be found in this habitat type.

Intermountain Rivers and Streams: The lowland riverine riparian habitats have floodplains that are dominated by herbaceous communities of grasses, sedges and rushes in the understory. Some of these habitats are dominated by cottonwood stands in some areas, and by diverse willow stands in others. The Carson River that runs through the Fallon Lease Area is a lowland riverine riparian system. Wildlife species associated with this riparian corridor includes vagrant shrew, Western bluebird, sculpins and trout species. California floater may be associated with the Carson River.

Springs and Springbrooks: Springbrook outflows are associated. Both spring and springbrooks can be found within every proposed lease area. These areas generally have some form of riparian vegetation associated with them such as wiregrass, forbs and grasses, willow and rose that need richer soil and damper soil conditions. Wildlife species associated with this habitat type includes wandering garter snake, shrew sp and hummingbird sp. The springs may support native and exotic fish transplanted by the public.

Wet Meadows: This habitat type would be limited to small areas within the Rhodes Salt Marsh and Teels Marsh Lease Areas. These areas have surface water for part or all of the year and are a form of grassland. Vegetation in these areas would be made up of sedges, rushes, grasses and forbs that need high water table or standing water. Wildlife species associated with this habitat type includes vole sp., southwestern toad and calliope hummingbird.

Marsh: Marshes are associated with soils that remain moist or saturated most of the year. Vegetation is dictated by water levels and salinity. Cattails, bulrushes and certain grasses dominate these sites. Avocet, northern leopard frog and vole species are representative of wildlife species that can be found in this habitat type. Parts of Rhodes Salt Marsh and Teels Marsh contain this habitat type.

Desert Playas: This habitat type experiences intermittent flooding and evaporation that precipitates fine soils and mineral salts. Soils can be very saline. The area surrounding the playa generally has fresher soils and supports 4-winged saltbush, saltgrass and pickleweed. This habitat is especially important to Snowy Plover and several other avian species that use the mud flats for winter habitat, reproduction and foraging. It is key stopover habitat for some shorebird species. Toads and frogs may use ephemeral pools for breeding. Bats would use inundated areas for foraging. Rhodes Salt Marsh and Teels Marsh represent large desert playas. Smaller ones occur in all of the proposed lease areas.

Sand Dunes and Badlands: These areas include bedrock outcrops, Aeolian deposits and other areas dominated by substrate rather than vegetation. Stable sand dunes can support rich stands of ricegrass, native sunflowers and other unique forbs such as Lahontan beardtongue. Representative wildlife species associated with this type include kangaroo rat and mouse sp., kit fox and desert horned lizard.

Game Species - Mule deer can be found in and around portions of each of the lease areas. The Dixie Valley and Edwards Valley Lease Area have some key mule deer winter area in either side of the Clan Alpine Range. Key summer range is adjacent to the lease areas at the higher elevations of the Stillwater Range and Clan Alpine Range (NDOW, 2004). Most of the remainder of these two ranges are designated as yearlong mule deer range. Mule deer would be expected to travel through most of this lease area seasonally. Rhodes Salt Marsh has occupied mule deer range in the northeast portion (NDOW, 2004). A few deer could be found in the lease area in winter. Teels Marsh has key mule deer winter range in the northwest portion and is adjacent to a large winter range associated with the Excelsior Range (NDOW, 2004). A few deer would be expected in all portions of this lease area in the winter. Although no other key or important mule deer areas occur in

association with the lease areas, a few mule deer would be expected to use each of the areas on a seasonal, annual basis.

Historically, pronghorn were present in all valleys of Nevada (BLM 1988). Teels Marsh Lease Area could have some pronghorn on the site in winter. Yearlong habitat lies adjacent to the south of this lease area (NDOW, 2006). The Gabbs and Dixie Valley / Edwards Valley Lease Areas are blanketed by yearlong pronghorn habitat (NDOW, 2006). No key areas have been identified in this area.

Several of the lease areas have occupied bighorn sheep range within the boundary or adjacent to a boundary. Dixie and Edwards Creek Valleys Lease Area is surrounded by occupied bighorn habitat. It is possible that animals cross this lease area at certain times of the year. The Gabbs Valley Lease Area is also surrounded by occupied bighorn range. The Monte Cristo Range in the central part of the area contains bighorn sheep. It is likely that bighorn use many areas within this lease area for life cycle function and travel. Teels Marsh Lease Area has occupied bighorn range in the northwest area in the Excelsior Range. These animals use most of this lease area to travel between Pilot Mountain and the Excelsior Range. Rhodes Salt Marsh Lease Area has occupied bighorn range on the northeast boundary on Pilot Mountain. Bighorn would use much of this lease area to travel to the Excelsior Range and back during certain times of the year (NDOW, 2006).

The Gabbs Valley Lease Area has occupied black bear habitat in the northwest portion of the area that is associated with the Excelsior Range (NDOW, 2005). Because several of the lease areas have key mule deer areas, particularly winter ranges near or on the project areas, there would also be mountain lions in these areas. Numbers would generally cycle with mule deer numbers. Lions would be expected to cross all of the lease areas while travelling from one mountain range to another.

Potential elk habitat has been identified in the Clan Alpine Range associated with the Dixie and Edwards Cr. Valleys Lease Area (NDOW, 2006). Elk sightings have been made in the northern end of the Clan Alpine Range. Elk from the Humboldt-Toiyabe Forest to the east are likely pioneering the Clan Alpine Range. These animals would likely use the Mt. August / New Pass areas seasonally as they pioneer.

The Teels Marsh and Rhodes Salt Marsh lease areas are within the Mt. Grant Population Management Unit (PMU) for sage grouse. The grouse in this PMU are the Mono sub-population of Greater Sage Grouse. No active or historic leks are known to occur within the lease boundaries. Additionally, nesting habitat isn't known to occur within the lease boundaries of these two lease areas (NDOW, 2005). The Gabbs Lease Area may have sage grouse habitat on the eastern boundary or be adjacent to habitat on USFS land. Scattered sage grouse reports have been made from areas adjacent to the southern boundary of this lease area. It is unknown if these grouse are Mono sub-population grouse. The Dixie and Edwards Cr. Valleys Lease Area is within the Stillwater, Clan Alpine, Desatoya PMU. These sage grouse are not of the Mono sub-population. Active leks, key winter areas, key summer habitat and nesting habitat all occur within or adjacent to this lease area (NDOW, 2005).

A few mourning doves can be found in the lease areas but free water would limit their use (BLM 1995). Mountain quail would be found at higher elevations. California quail

would be found in lower elevations. The exotic species chukar partridge can be found in some of the lease areas.

BLM Sensitive Species: BLM Manual 6840 defines sensitive species as "...those species not already included as BLM Special Status Species under (1) Federal listed, proposed or candidate species; or (2) State of Nevada listed species. Native species may be listed as "sensitive" if it: (1) could become endangered or extirpated from a state or significant portion of its range; (2) is under review by the FWS/NMFS; or (3) whose numbers or habitat capability are declining so rapidly that Federal listing may become necessary, or (4) has typically small and widely dispersed populations; (5) inhabits ecological refugia, specialized or unique habitats; (6) is state-listed, but is better conserved through application of the BLM sensitive species status." It is BLM policy to provide sensitive species with the same level of protection that is given federal candidate species. The major objective of this protection is to preclude the need for federal listing.

A list of sensitive species associated with BLM lands in Nevada was signed in 2003. A list of BLM sensitive species expected, or found in or near the proposed lease areas are shown in Appendix E (BLM, 2003).

Sage grouse were addressed in the proceeding narrative as an upland gamebird species. These are also a BLM sensitive species.

Environmental Consequences

General Wildlife & Fisheries: Although lists that show wildlife and/or fisheries species present within a project area are useful, presence or absence isn't significant. The presence of a habitat type is much more important. If a habitat type is present, a certain assemblage of wildlife and/or fish species does use or *could* use the habitat. Impacts to the habitat result can result in impacts to whole assemblages of wildlife and/or fish. There would be no impacts to general wildlife and fish individuals or populations expected or occurring in the areas of the Proposed Action because this leasing action is purely administrative. Additionally, leasing alone does not directly authorize fluid minerals exploration and development activities, actions that could be impacting. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis. Impacts from exploration and development could include those related to impacts to individuals and habitats which could include groundwater pumping/withdrawal, direct loss of habitat as well as fragmentation from road and power line development. These potential impacts are not meant to be all inclusive; identification of the entire range of potential impacts would need to be addressed when site specific information was known.

Game Species: The presence of a delineated game range must be subjected to impacts analysis. Impacts to the delineated range translates into possible impacts to game individuals and populations. There would be no impacts to game individuals or populations expected or occurring in the areas of the Proposed Action because this leasing action is purely administrative. Additionally, leasing alone does not directly authorize fluid minerals exploration and development activities, actions that could be impacting. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis. Impacts from exploration and development could include those related to impacts to individuals and habitats which could include

groundwater pumping/withdrawal, direct loss of habitat as well as fragmentation from road and power line development. These could include blockage of travel corridors. These potential impacts are not meant to be all inclusive; identification of the entire range of potential impacts would need to be addressed when site specific information was known.

BLM Sensitive Species: Although lists that show BLM sensitive species being present within a project area are useful, presence or absence isn't significant. The presence of a habitat type used by the sensitive species is much more important. If a habitat type is present, a certain BLM sensitive species does use or *could* use the habitat. Impacts to the habitat result in potential impacts to the sensitive species. Although impacts to individual BLM sensitive species are discussed, the end result of impacts analysis for BLM sensitive species is whether or not impacts from actions on a project area would result in the federal listing of the entire species. There would be no impacts to BLM sensitive expected or occurring in the areas of the Proposed Action because this leasing action is purely administrative. None of the species would be upgraded to federal listing if this action were approved. Additionally, leasing alone does not directly authorize fluid minerals exploration and development activities, actions that could be impacting. No BLM sensitive species would be federally listed as a result of implementing the leasing action. Direct impacts from these activities would be analyzed under a separate site-specific environmental analysis. Impacts from exploration and development could include those related to impacts to individuals and habitats which could include groundwater pumping/withdrawal, direct loss of habitat as well as fragmentation from road and power line development. These potential impacts are not meant to be all inclusive; identification of the entire range of potential impacts would need to be addressed when site specific information was known. For agency designated sensitive species (e.g., sage grouse), a lease stipulation (NSO, CSU, or TL) would be imposed for those portions of high value/key/crucial species habitat where other existing measures are inadequate to meet agency management objectives (BLM and USFS, 2008).

Socioeconomics

Fluid minerals operations have the potential to contribute to local, state, and national economies through the creation of jobs, generation of property taxes, royalty payments, and voluntary contributions to local communities. Royalty payments from geothermal leases are generally divided between the respective county, state, and federal agencies within which a lease resides. Royalties from oil & gas leasing is generally divided equally between the respective state and federal agencies where the lease resides. The construction of direct-use geothermal facilities for heating greenhouses and aquaculture operations or for dehydrating vegetables also contributes to economies through job creation and property tax generation. Areas of high geothermal potential are often located in rural areas, which typically have chronic, high unemployment rates. The development of fluid resources in such rural areas can improve local socioeconomic conditions.

Affected Environment

The project area encompasses portions of Lyon, Churchill, Mineral, Lander and Nye Counties. The potential exists for several communities within these counties to experience socioeconomic effects as a result of fluid mineral leasing and subsequent exploration and development. A brief description of the current socioeconomic conditions on a county by county basis is provided below.

Lyon County – Lyon County encompasses 1,994 acres in west-central Nevada. The population of Lyon County experienced a 48.5 percent increase from 34,501 in 2000 to 51,231 in 2006 (U.S. Census Bureau – Quick Facts). The City of Yerington is the county seat. Yerington’s population is estimated to have increased 34 percent, from 2,883 to 3,871, between 2000 and 2007, respectively (U.S. Census Bureau - Annual Estimates of the Population for Incorporated Places in Nevada 2000 to 2007). Other notable population centers in Lyon County include Dayton and Fernley. The respective populations of Dayton and Fernley were 5,907 and 8,543 in 2000, and are estimated to have increased to 8,896 and 12,673 in 2007. In 2007, all industrial sectors in Lyon County supported 13,350 jobs. The largest employment sector in the county was Trade Transportation and Utilities (2,743 employees) followed closely by Manufacturing (2,600) and Government (2,328). Lyon County’s largest employers are: Lyon County School District (Yerington), Amazon.com NVDC Inc. (Fernley), Lyon County (Yerington) Quebecor World Nevada Inc. (Fernley), MSC Industrial Supply Co. (Fernley), and Trex Company Inc. (Fernley). The unemployment rate in Lyon County was 6.5 percent in September 2007, which was 1.4 percent higher than the State of Nevada as a whole.

Churchill County - Churchill County is located east of Lyon County and encompasses 4,929 square miles. The population of Churchill County experienced a 34 percent increase from 17,938 in 1990 to 23,982 in 2000. In 2005, the estimated population of Churchill County was 24,556, approximately 2.4 percent higher than the 2000 population (U.S. Census Bureau - Quick Facts). The City of Fallon is the county seat of Churchill County and home to Naval Air Station Fallon. In 2000, the population of Fallon was 7,536 (2000 Table DP-1). In 2005, the community had an estimated population of 8,103 (U.S. Census Bureau - Cities & Towns / All Places 2000 to 2005). In 2004, Churchill County attributed an average of 248 jobs to the labor category natural resources and mining which also includes agricultural forest related activities and fishing. The unemployment rate in Churchill County was 4.5 percent in September 2007, which was 0.6 percent lower than the State of Nevada as a whole.

Mineral County - Mineral County borders Churchill County to the south and encompasses 3,756 square miles. Between 1990 and 2000 the population of Mineral County decreased 22 percent from 6,475 to 5,071. The 2005 estimated population of Mineral County was 4,910, approximately 3.2 percent lower than the 2000 population (U.S. Census Bureau - Quick Facts). Hawthorne, the county seat and largest town in Mineral County, experienced a similar decrease from 3,311 in 2000 to an estimated population of 2,956 in 2005 (The Nevada State Demographer’s Office - Nevada County Population Estimates July 1, 1990 to July1, 2005). In 2005, all industrial sectors in Mineral County supported 1,736 jobs. The largest employment sector in the county was the Government (585 employees) followed by Leisure and Hospitality (261). Mineral County’s largest employers were all located in the City of Hawthorne and consisted of: Day & Zimmerman Hawthorne, El Capitan, Mineral County, Mineral County School District, and Mount Grant General Hospital. The unemployment rate in Mineral County was 7.3 percent in September 2007, which was 2.2 percent higher than the State of Nevada as a whole.

Nye County - Nye County is the third largest county in the United States totaling 18,064 square miles. Over 95 percent of the land in Nye County is administered by the federal

government. Tonopah, the county seat, is located 239 miles southeast of Reno and 207 miles northwest of Las Vegas. The total population of Nye County in 2006 was 42,693, which represents an increase of 31.3 percent since the 2000 census (U.S. Census Bureau – Quick Facts). Roughly 80 percent of that population resides in the City of Pahrump, 150 miles south-southeast of Tonopah. 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. The unemployment rate in Nye County was 7.6 percent in November 2007, which was 2.3 percent higher than the State of Nevada as a whole.

Lander County - Lander County is located in north-central Nevada and encompasses 5,494 square miles. Over 85 percent of the land in Lander County is administered by the federal government. Battle Mountain is the county seat, located 200 miles northeast of Reno. The total population of Lander County in 2006 was estimated to be 5,272 (U.S. Census Bureau – Quick Facts), which was a decrease of 19 percent since 1990 (population 6,266). The majority of job-related income in the county is derived from the mining sector. Agriculture also plays an important role in the local economy. Fifty-two percent of farm income was from livestock production while 32 percent was derived from crop sales. The unemployment rate in Lander County was 4.0 percent in November 2007, which was 1.4 percent lower than the State of Nevada as a whole. Job growth has increased in the past three years due to an increase in mining and exploration activities.

Environmental Consequences

The Electric Power Research Institute (2001) estimates that 4.0 jobs would be created per megawatt during the construction and development phase of a geothermal power plant, while 1.7 jobs per megawatt would be required for the continued operation and maintenance of a geothermal power facility. For example, development of a moderate sized 15-megawatt geothermal power plant would translate to the creation of approximately 45 temporary jobs lasting from two to three years, and nearly 25 permanent, high skilled, full-time jobs for operation and maintenance. Development projects such as this would also provide an even greater number of full-time jobs in the community after considering the economic multiplier effect; the idea that a single expenditure in an economy can have repercussions throughout the entire economy. The long lifetime of geothermal plants means that they can become a stable, reliable part of a community's economic base (National Geothermal Collaborative 2007).

No Action Alternative

The physical descriptions of the affected environment for the No Action Alternative would be the same as that for the Proposed Action. Implementation of the No Action Alternative would result in the lands not being open to new fluid mineral leasing and the resulting indirect impacts from exploration, other than casual use, or development. Hence, no ground disturbing activities beyond those proposed for or authorized under past leases would occur as a result of the No Action Alternative to the Proposed Action.

Although environmental impacts resulting from the issuance of new leases within the area of the Proposed Action would not occur under the No Action Alternative, implementation of this alternative would not be consistent with the land use plan. This is also inconsistent with the Federal Energy Policy to promote the development of environmentally attractive energy resources. The No Action Alternative would deprive county, state and federal agencies of

royalty payments which could be generated from fluid mineral leasing and the successful development of fluid mineral resources.

Cumulative Impacts

The analysis presented in this section, as required by CEQ regulations (40 CFR 1500-1508), addresses the potential cumulative impacts associated with the Proposed Action and No Action alternatives. The CEQ regulations state that the cumulative impact analysis should include the anticipated impacts to the environment resulting from “the incremental impact of [an] action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time” (40 CFR 1508.7).

The cumulative impact analysis in this section builds upon the analyses of the direct and indirect impacts of anticipated future actions to be taken consistent with the Proposed Action and No Action alternatives presented above. This section also tiers off of and incorporates by reference the cumulative impact analysis (Chapter 5) in the PEIS for Geothermal Leasing in the Western United States (BLM and USFS, 2008) at http://www.blm.gov/geothermal_eis, where appropriate. The region of influence for each resource evaluated by the cumulative impacts analysis is, unless otherwise noted, the project area defined by the six proposed leasing areas.

The reasonably foreseeable time frame for future actions evaluated in this cumulative analysis is 20 years from the decision to allocate lands as available for fluid mineral leasing. While it is difficult to project reasonably foreseeable future actions (or trends) beyond a 20-year time frame, it is acknowledged that the effects identified in the cumulative impacts analysis will likely continue beyond the 20-year horizon.

Proposed Action

Past, Present and Reasonably Foreseeable Future Actions

The six leasing areas comprising the project area for the Proposed Action fall into one of two general categories, rural (containing no main population center) or urban (adjacent to a main population center). In the more rural leasing areas such as the Dixie and Edwards Creek Valleys, Gabbs Valley, Teels Marsh and Rhodes Salt Marsh, the dominant past, present, and reasonably foreseeable future activities on private and federal land have been and continue to be mineral exploration, development and production (extraction), livestock grazing, recreation, transmission and distribution system construction, and transportation. The dominant past, present, and reasonably foreseeable future activities on the private and federal land in the more urban lease areas of Fallon and Wabuska have been and will continue to be agricultural, residential and commercial property development, urbanization and resource use (e.g. water).

Fluid mineral leasing has occurred within all six leasing areas comprising the project area in the past. As a result, fluid mineral lessees have conducted and will continue to conduct exploration and development activities in accordance with their existing leases. Other past, present and reasonably foreseeable activities in the project area include realty actions, wild horse gathers, noxious weed treatment, fire suppression and rehabilitation, greater sage grouse habitat improvement projects, and fence construction.

Cumulative Impacts of the Proposed Action

Leasing fluid minerals on federal lands in the six leasing areas comprising the Proposed Action would not contribute to cumulative impacts on resources or resource uses in the project area. Likewise, issuing leases itself does not cause direct impacts. Issuing fluid mineral leases is, however, a conditional commitment of resources for future exploration and utilization. While the number, variety, and magnitude of actions on federal lands that may be considered to occur is great, information about how many future projects may actually be undertaken is lacking, and information about the likely locations of future development is unknown.

In light of these considerations, the cumulative impact analysis for this EA tiers off of and incorporates by reference the general cumulative impact analysis (Chapter 5) in the PEIS for Geothermal Leasing in the Western United States (BLM and USFS, 2008). That analysis assesses the incremental contribution of the direct and indirect impacts of fluid mineral leasing as well as other anticipated future actions associated with development of fluid mineral resources, along with the added impacts from past, present, and reasonably foreseeable future actions similar to those identified above.

The majority of the area of the Proposed Action, excluding the Fallon and Wabuska lease areas, is located on federal lands in a relative low-use rural setting far away from population centers. In consideration of the cumulative impacts analysis in the PEIS (BLM and USFS, 2008), the overall cumulative impacts of past activities, current activities, and other reasonably foreseeable future actions, inclusive of the potential incremental impacts resulting from the Proposed Action, would be negligible in these rural areas.

The Fallon and Wabuska Lease Areas incorporate or reside near the population centers of Fallon and Yerington, respectively. The cumulative impacts in these areas would depend on the amount of growth that is anticipated to occur in these nearby population centers. The various activities on the federal land in these areas would be mitigated through site-specific analysis in consideration of cumulative impacts, and the impacts for activities on the adjacent private lands would be mitigated through the planning efforts of local agencies. In consideration of the cumulative impacts analysis in the PEIS (BLM and USFS, 2008), the overall cumulative impacts of past activities, current activities, and other reasonably foreseeable future actions, inclusive of the potential incremental impacts resulting from the Proposed Action within the Fallon and Wabuska lease areas would also be negligible.

No Action Alternative

Under the No Action Alternative, no new leases would be processed in the project area. The only fluid mineral activities that would occur in these areas would be casual use, or site-specific exploration and development permitted under existing fluid mineral leases. Cumulative impacts from potential future exploration and development activities would be similar in nature to those described under the Proposed Action. Therefore the cumulative impacts of the No Action Alternative on the affected resources described in this EA would also be negligible in the six proposed leasing areas. The primary difference between the Proposed Action and No Action Alternative would be that the incremental impacts under the No Action Alternative from past leasing activities in the project area would all but cease after the ten years leasing period, and the only impacts from past leasing after that time would be related to fluid mineral production.

Monitoring

Monitoring needs for this action have been identified in the BMPs and stipulations that have been attached to this document in Appendix B.

IV. CONSULTATION, COORDINATION AND PREPARATION

Consultation with Others

The following federal, state and local agencies were consulted during preparation of the EA:

Churchill County Board of Commissioners
Lander County Board of Commissioners
Lyon County Board of Commissioners
Mineral County Board of Commissioners
Nye County Board of Commissioners
Fallon Paiute-Shoshone Tribe
Pyramid Lake Paiute Tribe
Timbisha Shoshone Tribe
Walker River Paiute Tribe
Yerington Paiute Tribe
Yomba Shoshone Tribe

List of Preparers and Reviewers:

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Fran Hull	Outdoor Recreation Planner (Stillwater FO)
Susan McCabe	Archaeologist
Jim Schroeder	Hydrologist (Sierra Front FO)
Gabe Venegas	Hydrologist (Stillwater FO)
Jim deLaureal	Weed Specialist/Soil Scientist (Stillwater FO)
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Keith Barker	Fire

Bureau of Reclamation, Lahontan Basin Area Office

Peter Neugebauer	Water and Lands Specialist
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V. REFERENCES

Beidleman, C. (ed) 2000. Partners in Flight Land Bird Conservation Plan, Version 1.0 Colorado Partners in Flight, Estes Park, Colorado.

Berger, D.L. 2000. Water-Budget Estimates for the 14 Hydrographic Areas in the Middle Humboldt River basin, North-Central Nevada: U.S. Geological Survey Water-Resources Investigation Report 00-4168.

Bloomfield, K.K., Moore, J.N., and Neilson, R.N. 2003. Geothermal energy reduces greenhouse gases. Geothermal Resources Council Bulletin, 32.

BLM. 1984. Grazing Management. Manual Handbook Number H-4120-1. Washington, D.C.

----- . 1985. Lahontan Resource Management Plan and Environmental Impact Statement.

----- . 1988. Mina Habitat Management Plan. Unpub. Doc. CCDO Files.

----- . 2001. Consolidated Resource Management Plan, BLM Carson City Field Office. May 2001.

----- . 2002a. Wild Free-Roaming Horses and Burros Live in Herd Management Areas. Internet Web site: <http://www.nv.blm.gov/hma/>. Accessed on May 15, 2002.

----- . 2002b. Environmental Assessment for Leasing of Geothermal Resources Managed by the BLM CCFO. EA-NV-030-02-021. July 2002.

----- . 2003. Nevada BLM Sensitive Species List. Unpub. Doc. Signed 7-1-03. Reno, NV.

----- . 2006. Carson City Field Office Geothermal Leasing Environmental Assessment, BLM Carson City Field Office. July 2006.

----- . 2007. IM-2008-050 Migratory Bird Treaty Act – Interim Guidance. Dated December 18, 2007. Unpub. Doc. CCDO files.

----- . 2007b. Vegetation Treatments on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Report. US Department of the Interior.

BLM and USFS, 2007, Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (i.e., the Gold Book, 4th Edition, 2007) at <http://www.blm.gov/bmp>;

BLM and USFS, 2008, Programmatic Environmental Impact Statement (PEIS) for Geothermal Leasing in the Western United States at http://www.blm.gov/geothermal_eis.

Drews, M. and Ingbar, E. 2007. The Carson City Field Office Cultural Resources Model for Fuels Management. Gnomon, Inc., Carson City. Report and electronic data on file at the Bureau of Land Management, Carson City Field Office.

- Federal Renewable Energy Task Force. 2007. Renewable Energy in Nevada: Regional Geothermal Potential and Land Management Map compiled for the Federal Renewable Energy Task Force (FRETf).
- Garside, L.J., Hess, R.H., Fleming, K.L., and Weimer, B.S. 1988. Oil and gas developments in Nevada: Nevada Bureau of Mines and Geology Bulletin 104, 136 p.
- Geothermal Energy Association. 2007. An Assessment of Geothermal Resource Development Needs in the Western United States. Daniel J. Fleischmann. January 2007.
- Lincoln, F. C. 1982. Mining Districts and Mineral Resources of Nevada (reprint of 1923 edition). Nevada Publications, Las Vegas.
- McCabe and Lane. 2008. A Class I Cultural Resources Overview for Six Areas Proposed for Fluid Mineral Leasing, Churchill, Lander, Lyon, Mineral, and Nye Counties, Nevada. Report on file at the Bureau of Land Management, Carson City Field Office (CRR 3-2477).
- McIvor. 2005. Important Bird Areas of Nevada. Lahontan Audubon Society pub. Reno, Nv. 150 pp.
- Myrick, David F. 1962. Railroads of Nevada and Eastern California, Volume One-The Northern Roads. Howell-North Books, Berkeley, California.
- Neel, L. (ed.) 1999. Nevada Partners in Flight, bird conservation plan. Unpub. Doc. BLM State Office, Reno, Nevada. 269 pp.
- NDOW. 2004. Misc. key game habitat maps. CCDO files. Carson City, NV.
- . 2005. Misc. key game habitat maps. CCDO files. Carson City, NV.
- . 2006. Misc. key game habitat maps. CCDO files. Carson City, NV.
- Pendleton, L. S. A., McLane, A. R., and Thomas, D. H. 1982. *Cultural Resources Overview, Carson City District, West Central Nevada*. Cultural Resource Series No. 5, Part 1. Nevada State Office of the Bureau of Land Management, Reno.
- Stewart, J. H., and Carlson, J. E. 1978. Geologic Map of Nevada. United State Geological Survey and Nevada Bureau of Mines and Geology.
- Tingley, J. V. 1992. *Mining Districts of Nevada*. Nevada Bureau of Mines and Geology Report 47. University of Nevada, Reno.
- Tonenna, D., 2007. Specialist report to 2007 oil and gas leasing. Unpub. Doc. CCDO files.
- U. S. Census Bureau, 2007. American FactFinder, US Bureau of the Census, Washington, DC. Internet Web site: <http://factfinder.census.gov/>. Accessed in November 2007.
- U.S. Fish and Wildlife Service. 1995. Recovery Plan for the Lahontan Cutthroat Trout. Portland, OR.

USGS. 2002. Ground Water Atlas Archive of the United States.
<http://capp.water.usgs.gov/gwa/gwa/gwa.html>. Last updated May 6, 2002. Accessed January 4, 2008.

USGS. 2004. Geologic Provinces of the United States: Basin and Range Province.
<http://wrgis.wr.usgs.gov/docs/usgsnps/province/basinrange.html>. Last updated January 13, 2004.

Wildlife Action Plan Team. 2006. Nevada Wildlife Action Plan. Nevada Department of Wildlife, Reno.

http://www.fws.gov/nevada/protected_species/index.html

<http://heritage.nv.gov/reqintro.htm>

www.natureserve.com

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