**ENVIRONMENTAL ASSESSMENT**
**EA-NV-030-08-001**

BLM
Carson City Field Office, Nevada

# Geothermal Resources Leasing in Churchill, Mineral, & Nye Counties, Nevada

Churchill, Mineral, & Nye Counties, Nevada
**May 2008**

Hazen

NV-07-08-003 2679.080 Acres
T.0200N, R.0250E, 21 MDM, NV
Sec. 002 LOTS 5-20;
010 ALL;
012 LOTS 1-16;
014 ALL;
024 LOTS 1-6;
Lyon County
Bureau of Reclamation

NV-07-08-004 900 Acres
T.0200N, R.0260E, 21 MDM, NV
Sec. 004 LOTS 5-12;
004 S2
006 LOTS 1-7;
006 S2NE,SENW,E2SW,SE
008 ALL;
Churchill County
Bureau of Reclamation

NV-07-08-005 2,040 Acres
T.0200N, R.0260E, 21 MDM, NV
Sec. 016 ALL;
018 LOTS 1-4;
018 E2,E2W2;
020 LOTS 1-8;
020 N2;
028 ALL;
Churchill County
Bureau of Reclamation

Salt Wells/Bunejug Mountains

NV-07-08-016 2706.920 Acres
T.0160N, R.0300E, 21 MDM, NV
Sec. 001 PROT ALL;
002 PROT ALL;
003 PROT ALL;
T.0160N, R.0310E, 21 MDM, NV
Sec. 006 LOTS 1-7;
006 S2NE,SENW,E2SW,SE;
Churchill County

Whiskey Flat

NV-07-08-015 <2,000 Acres
T.005N, R.030E, 21 MDM, NV
Sec. 012 ALL (minus USFS lands)
Sec. 013 ALL (minus USFS lands)
Sec. 023 ALL (minus USFS lands)
Sec. 024 ALL
Sec. 025 ALL
Sec. 026 ALL (minus USFS lands)
Mineral County
BLM Managed Lands Only

NV-07-08-017 5000.840 Acres
T.0050N, R.0310E, 21 MDM, NV
Sec. 016 ALL;
017 ALL;
018 LOTS 1-4;

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          018   E2,E2W2;
          019   LOTS 1-4;
          019   E2,E2W2;
          020   ALL;
          021   ALL;
          029   ALL;
          030   LOTS 1-4;
          030   E2,E2W2;
Mineral County
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Quartz Mountain

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NV-07-08-028        2560.000 Acres
  T.0140N, R.0360E, 21 MDM, NV
    Sec. 021   PROT ALL;
         022   PROT ALL;
         028   PROT ALL;
         029   PROT ALL;
Mineral and Nye Counties
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Edwards Creek Valley

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NV-07-08-041        3640.000 Acres
  T.0210N, R.0380E, 21 MDM, NV
    Sec. 013   E2E2,SWSE;
         021   E2,E2W2;
         023   SE;
         024   E2,NENW,SWNW,N2SW,SESW;
         025   ALL;
         026   E2,E2NW,SWNW,SW;
         027   S2N2,S2;
         028   E2,E2W2;
Churchill County

NV-07-08-050        3840.000 Acres
  T.0220N, R.0390E, 21 MDM, NV
    Sec. 013   ALL;
         023   ALL;
         024   ALL;
         025   ALL;
         026   ALL;
         027   ALL;
Churchill County

NV-07-08-052        3813.780 Acres
  T.0220N, R.0400E, 21 MDM, NV
    Sec. 004   LOTS 1-4;
         004   S2N2,S2;  portion in BMFO
         005   LOTS 1-4;
         005   S2N2,S2;
         006   LOTS 1-7;
         006   S2NE,SENW,E2SW,SE;
         007   LOTS 1-4;
         007   E2,E2W2;
         008   ALL;
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009 ALL; portion in BMFO
Churchill and Lander Counties
Portions of sections 4 and 9 Battle Mountain Field Office

NV-07-08-053 1901.940 Acres
T.0220N, R.0400E, 21 MDM, NV
Sec. 017 ALL;
018 LOTS 1-4;
018 E2,E2W2;
019 LOTS 1-4;
019 E2,E2W2;
Churchill and Lander Counties

NV-07-08-054 2834.590 Acres
T.0230N, R.0400E, 21 MDM, NV
Sec. 007 LOTS 4;
007 SESW,NESE,S2SE;
008 W2SW,SESW,S2SE;
016 ALL;
017 ALL;
020 ALL;
021 ALL;
Churchill County

NV-07-08-055 2541.340 Acres
T.0230N, R.0400E, 21 MDM, NV
Sec. 028 ALL; portion in BMFO
029 ALL;
031 LOTS 1-4;
031 E2,E2W2;
032 ALL;
Churchill and Lander Counties
Portion of section 28 in Battle Mountain Field Office

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

EA-NV-030-08-001

## I. INTRODUCTION/PURPOSE AND NEED

Introduction

The Bureau of Land Management ("BLM"), Carson City Field Office ("CCFO"), has prepared this environmental assessment to analyze impacts to the human and natural environment resulting from leasing of geothermal resources in Churchill and Mineral Counties, Nevada. Geothermal resources on public lands are subject to lease under the Geothermal Steam Act of 1970, as amended, 30 U.S.C. 1001-1028; The Energy Policy of 2005, (Pub. L. 109-58) (Energy Policy Act); 43 CFR 3200, Geothermal Resource Leasing. These provide the authority for the BLM to allow for the exploration, development, and utilization of geothermal resources on BLM-managed public lands, as well as, geothermal resources on lands managed by other surface management agencies, such as the United States Forest Service.

Geothermal resources means all products of geothermal processes, including indigenous steam, hot water, and hot brines; steam and other gases, hot water, and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations; heat or other associated energy found in geothermal formations; and any byproducts.

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 geothermal 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.

Geothermal 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 are be site specific and are derived from the current management plan for that specific area. The 2001 Carson City Field Office Consolidated Resource Management Plan currently does not identify lease stipulations.

Purpose and Need

The proposed action is to lease some or all of the geothermal resources at sites located in the Edwards Creek Valley (6 lease parcels), Hazen (3), and Salt Wells (1) areas of Churchill County and in the Whiskey Flats (1) area of Mineral County, and in the Quartz Mountain (1) area of Mineral and Nye Counties in Nevada – see Fig 1. The 12 pending lease parcels cover an area of approximately 38,000 acres. These parcels encompass BLM, BOR, and USFS managed lands that are open to fluid mineral leasing, excepting some of the BOR managed parcels or portions thereof as noted in this document.

On May 18, 2001, President Bush issued Executive Order (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 support efforts to increase energy production from federal lands, while preserving the health of the public lands.

Land Use Plan Conformance Statement

The proposed action and alternatives described below are in conformance with the 2001 Carson City Field Office Consolidated Resource Management Plan, page MIN10-1. 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.

## II. PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The proposed action is to lease some or all of the geothermal resources at sites located in the Edwards Creek Valley (6 lease parcels), Hazen (3), and Salt Wells (1) areas of Churchill County and in the Whiskey Flats (1) area of Mineral County, and in the Quarts Mountain (1) area in Mineral and Nye Counties in Nevada – see the attached map. The 12 pending lease parcels cover an area of approximately 38,000 acres. The pending lease parcels encompass BLM, BOR, and USFS managed lands that are open to fluid mineral leasing, excepting some of the BOR managed lands as noted in this document. Subsequent geothermal resources exploration and production on these federally 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.

The proposed action is considered a federal action and a commitment to resource development therefore requiring NEPA analysis. While issuing a lease for geothermal resources confers on the lessee the right to future exploration and development of these resources within the lease area, it does not confer the right to proceed with any ground-disturbing activities to explore for

or develop geothermal resources if such activities would extend beyond the level of casual use. As a result, the proposed issuance of the lease would have no direct impacts.

Issuance of geothermal leases could have indirect impacts because such leasing represents a commitment of resources, and it is reasonably expected that subsequent exploration, development, production, and closeout activities would occur. This EA, therefore, presents a broad scope analysis of the potential indirect and cumulative impacts from geothermal leasing to determine whether these indirect impacts by the lessee could be significant.

Proposals for exploration and/or development at specific sites will be examined for conformance with the land use plan and analyzed for NEPA adequacy at the time the proposals are submitted. Any proposal for exploration and/or development must be analyzed as required by NEPA prior to the proposed action.

No Action Alternative

The only alternative considered is the No Action Alternative or no leasing. Under this alternative, the BLM would reject the leases 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 impacts to public land.

## III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS ANALYSIS

### Scoping and Issue Identification

Internal scoping was completed on June 18, 2007 with the Carson City Field Office Interdisciplinary Team. At that time, no issues were identified.

Letters were sent to the Churchill, Mineral, and Nye County Boards of Commissioners on June 28, 2007. A response requesting a project overview was received from the Mineral County Boards of Commissioners on July 13, 2007. A presentation was made to the Mineral County Commissions and public at their regularly scheduled meeting of October 17, 2007. The Commissions or the public did not express any concerns at that meeting.

Although not requested, a project overview was provided to the Churchill County Board of Commissioners and the public at their regularly scheduled meeting of September 19, 2007. At that meeting, the commissioners requested to review a copy of the environmental assessment. Comments were not expressed by anyone in attendance.

### General Setting

The Edwards Creek Valley proposed lease areas are located about 40 miles north of Eastgate in eastern Churchill County. This area extends into the southern Augusta Mountains, the New Pass Range and the Clan Alpine Mountains. Elevations range from 5,380 feet in the valley to 6,400 feet in the Clan Alpine Mountains and New Pass Range. Vegetation in this area consists of salt desert scrub communities to pinyon and juniper in the higher elevations. Several old mine workings and districts exist in this area.

The Hazen proposed lease area is located immediately north of Hazen on Bureau of Reclamation Lahontan Basin Area Office (BOR) managed public land. These lease parcels lie within the

Hazen Known Geothermal Resource Area (KGRA). Two sections of this proposed lease lie within the BLM Winnemucca Field Office and are not addressed in this environmental assessment. Portions of some lease parcels lie within the Fernley Wildlife Management Area, which is managed by the BOR pursuant to an agreement with the Nevada Department of Wildlife and the Truckee-Carson Irrigation District. These agencies signed a management agreement dated March 3, 2008, that provides for the management of this area as a wildlife area. The BOR has determined that the lands within this wildlife area are not available for geothermal leasing as they are a wildlife area administered by the Secretary of the Interior through BOR (43 CFR 3201.11(e)). Section 24, Lots 1, 2, 5, and 6 is private surface with the minerals reserved to the United States. Lots 3 and 4 are managed by the BOR. Elevation is about 3,900 feet in the proposed area. Vegetation consists of desert shrub. This area consists of alluvial deposits, beach gravels, and dune deposits.

The Bunejug Mountains proposed lease area has elevations ranging from 3,960 to 4,700 feet and vegetation of salt desert scrub and greasewood. Sand dunes may occur in the lower areas.

The Whiskey Flats area lies at the eastern base of the Excelsior Mountains about 20 miles south of Hawthorne, west of State Route 359. Portions of a lease parcel lie within National Forest and are not addressed in this environmental assessment. Only BLM managed lands in this vicinity are included in this analysis. Elevations range from 5,700 to 7,200 feet at the site. Vegetation consists of salt desert scrub on the alluvial fan to pinyon pine in the mountains. There are several old, inactive mine workings in this area.

Quartz Mountain lies at the northeastern sliver of Mineral County as its intersection with Nye County. The proposed lease area contains salt desert scrub vegetation with some sage brush at an average elevation of 5,600 feet above sea level. Several old, inactive mine workings exist in this area.

## Critical Elements of the Human Environment

Appendix 5 of BLM's NEPA Handbook (H-1740-1) identifies Critical Elements of the Human Environment that are subject to requirements specified in statutes or executive orders and must be considered in all BLM environmental documents. The Critical Elements are included in **Table 3-1** below.

**TABLE 3-1**
**CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT**

| Critical Element | Not Present | Present/Not Affected | Present/May Be Affected |
|---|---|---|---|
| Air Quality | | √ | |
| Areas of Critical Environmental Concern | √ | | |
| Cultural Resources | | | √ |
| Farm Lands (prime or unique) | √ | | |
| Floodplains | | √ | |
| Native American Religious Concerns | | | √ |
| Threatened or Endangered Species | | √ | |
| Wastes, Hazardous or Solid | √ | | |
| Water Quality (Surface/Ground) | | √ | |

| | | | |
|---|---|---|---|
| Wetlands/Riparian Zones | √ | | |
| Wild and Scenic Rivers | √ | | |
| Wilderness | √ | | |
| Invasive, Nonnative Species | | √ | |
| Environmental Justice | √ | | |

The following rationale was used to determine that Critical Elements present in the area would not be affected as a result of implementation of the Proposed Action.

**Air Quality** – Existing air quality would not be affected by the issuance of geothermal leases as there is no surface disturbance associated with the proposed action.

**Threatened or Endangered Species** – In July, 2007 the U.S. Fish and Wildlife Service's electronic listing of federally listed threatened, endangered, proposed for listing and candidate (TEPC) species was reviewed to determine which species might be associated with the six lease areas (www.fws.gov/nevada/protected_species/index.html 2007).

Bald eagles may fly over the Hazen and Bunejug lease areas. Stillwater National Wildlife Refuge, managed primarily for waterfowl, lies near both areas. Pyramid Lake Indian Reservation and Fernley Wildlife Management Area also contain food sources and habitat that attract bald eagles. The lease areas may be used for foraging by bald eagles. This bird uses fish but will also utilize carrion, which would provide occasional use by this eagle in the lease areas.

The Nevada Natural Heritage Program (NNHP) database has no record of any plant species proposed for federal listing, plant species listed as endangered or plant species listed as threatened (Tonenna 2007).

The proposed leasing in the six general areas would not have an effect on federally listed species or their habitats. Leasing activity in the Hazen and Bunejug areas would not affect bald eagle foraging or carrion availability. There are no threatened or endangered plant species within the proposed leasing areas. Therefore, the proposed action would not have an impact of federally listed species.

**Water Quality (Surface/Ground)** – The Hazen area has the most significant surface water resources of the proposed lease areas. Much of the area contains low marshy lands and wetlands interspersed with the Fernley State Wildlife Management Area, which occupies the Fernley Sink in the Fortymile Desert. The wetlands are fed primarily by irrigation drain water from farmland surrounding Fernley to the west. The eastern part of the lease area is on higher ground, including the southwest portion of the Hot Springs Mountains. Surface drainage from these mountains is mainly toward the Fortymile Desert, except that east of the town of Darwin, the surface drainage is eastward, into the Carson Desert. The quality of the surface water in the Fernley WMA is poor, and the wetlands are subject to drying during droughts, such as occurred from 1987 to 1994.

The other lease areas have little perennial surface water. Most drainages are ephemeral and only a few springs are found on these parcels. Springs include Large Williams Spring in the Whiskey Flat area (NW¼ SW¼ sec 26, T5N, R30E), and unnamed springs and seeps in the Tungsten

Mountain area (SE¼ SE¼ sec 13, T21N, R38E, SW¼ NE¼ and SW¼ SW¼ sec 24, T21N, R38E.

A search of the Nevada Division of Water Resources water rights database showed only one existing right on the lease parcels. The Nevada Department of Wildlife has a certificated right (5054) in the Hazen geothermal lease area, which is for storage of Truckee River water.

Leasing land does not involve ground-disturbing activities or any type of construction, so there would be no direct impact on water resources, wetlands, riparian areas, or water rights.

Indirect Impacts of Future Actions Based on Reasonable Development Scenario

Future actions based on the reasonable development scenario could result in indirect impacts. The potential risk of these indirect impacts affecting water resources is assessed with respect to six significance criteria. Potential impacts on water resources could occur if reasonably foreseeable future actions were to result in any of the following:

- Violate promulgated federal, state, or local water quality standards or objectives;
- Impair existing or potential beneficial uses of waters of the US or of Nevada;
- Result in water or sediment quality conditions that could be harmful to aquatic life or human health, even if an accepted standard were not formally violated;
- Increase the potential for a substantial off-site flood hazard (substantial flood hazard is greater than one percent, or once in a hundred years);
- Result in erosion or sedimentation that would alter or impair the course of a permanent stream or substantially alter the area or capacity of a surface water feature; or
- Result in uses or facilities that would substantially degrade surface or groundwater quality.

During normal operations and when production wells are tested, geothermal plants produce wastewater from cooling tower blowdown. This is the spent water that is periodically discharged from the cooling system. Water in water-cooled systems periodically needs to be replenished due to evaporative losses. The original coolant water and the replenishment water contain salts that become concentrated in the cooling system over time, requiring that the coolant be periodically replaced. The cooling water may also contain metals or other constituents introduced from corroding pipes or from chemicals used to inhibit corrosion or microbial growth in the system.

Once a plant is operational, all excess fluids are injected back into the ground or to an evaporation pond. Any discharge of cooling tower blowdown would require a National Pollution Discharge Prevention System (NPDES) permit from the State of Nevada Department of Environmental Protection (NDEP), which would require testing to ensure that the water met the discharge requirements. The specific nature of any impacts related to the generation of wastewater would not be known until the specific development proposal is submitted, and any potential impacts would be addressed through NPDES permit requirements. Therefore, the potential for water quality impacts on surface water from discharges of a geothermal plant are expected to be less than significant or could be mitigated through the terms of the permit.

“Makeup” water used during production would likely be groundwater from local wells. Makeup water is used to replace or make up for the evaporative losses and blowdown in a water-cooled system. The quantity of cooling tower blowdown would depend on the size of the power plant, the quality of the makeup water (lower quality water requires more frequent cycling), the nature

of additives used to prevent mineral scale, and the number of times the water is cycled. The size of the power plants depends on a number of factors that cannot be predicted, including the demand for electricity and the productivity of the geothermal resources at the sites.

Depending on the quantity of water needed, the potential exists to affect ground water supplies. This could affect riparian areas or existing water rights in or near the lease areas. Issuance of a geothermal lease within the proposed areas would not have an effect on water quality as there is no surface disturbance associated with lease issuance.

**Invasive, Nonnative Species** - The only noxious weed species that commonly occurs on some of the parcels is salt cedar (Tamarix ramosissima), however the leasing action will have no effect on the spread or control of the populations of this species. Leasing of lands for geothermal exploration would have no direct impacts to the soils resource. Development/production actions in the future will be analyzed on a site specific basis.

## Resources Present but not Affected (other than critical elements)

The following resources, which are not Critical Elements of the Human Environment as defined by BLM's Handbook H-1740-1, are present in the area. BLM has evaluated the potential impact of the Proposed Action on these resources and has determined that although the resources are present, they would not be affected by the Proposed Action. Rational for dismissing these resources from further discussion in the document are as follows:

**Land Use** –Land ownership in the project areas is mainly public land administered by BLM. There are also National Forest and Bureau of Reclamation withdrawn lands in the vicinity, in addition to private lands. BLM issues land use authorizations for a variety of purposes, including transportation and utility use. The proposed action would be subject to existing rights so conflicts with any existing authorized land uses is not anticipated.

The Forest Service will prepare a separate environmental assessment for the lands it oversees. Therefore, the portions of nominated lease parcels that overlie National Forest lands are not analyzed in this environmental assessment.

**Visual resources** – The proposed lease areas are designated as Class III for visual resources. The management objective for Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.

**Grazing Resources** - These sites fall within the boundaries of various livestock grazing allotments for which the grazing seasons and numbers of livestock vary. Leasing for exploration will have no effect on livestock grazing on these allotments.

## Resources Present and Brought Forward For Analysis (critical & non-critical elements)

**Cultural Resources** – The proposed parcels discussed in this report would be offered for lease subject to applicable laws and lease conditions. The proposed parcels described herein 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 Bureau of Land Management (BLM) Carson City Field Office (CCFO) Class I Cultural Resources Report (CRR) for the Fiscal Year 2008 (FY2008) Geothermal Lease Sale adequately summarizes the presence and absence of archaeological inventories and cultural properties located on each proposed parcel (Lane 2007, CRR 3-2409). 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 parcels, 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.

CLASS I INVENTORY RESULTS

Pertinent cultural resource information was reviewed and analyzed for the Area of Potential Effect (APE), which is defined as all parcels being offered for the August 2007 geothermal lease sale. Cultural resource information concerning the proposed parcels varies from parcels with no previous inventories to parcels where some inventories have covered a portion of the area. In no case is an entire parcel completely surveyed. Non-inventoried portions of parcels or entire parcels lacking inventory were compared with similar nearby areas. This analysis included an assessment of elevation, topography, vegetation and water resources.

Based on the results of previous cultural resource inventories, the potential for locating additional cultural resources within the proposed lease parcels reviewed for the FY2008 geothermal lease sale ranges from low to high. Furthermore, analysis of the reasonably foreseeable impacts of leasing both identified and unidentified cultural properties resulted in the recommendation of **No Historic Properties Affected** for all of the parcels except specifically in Township 20 North, Range 26 East, West Half and Southeast Quarter of Section 22, in the Hazen Area (within Winnemucca Field Office). This is based on the determination that, except for the sections identified, reasonable development could occur without impact to eligible properties in each of parcels.

Based on tribal consultation and previous treatment of three-quarters of Section 22 of T20N, R26E by the BLM Winnemucca Field Office, we recommend that BLM continue no surface occupancy within this one section of the Hazen Area parcels (this 480 acres represents 5.4 percent of the Hazen Area parcels). However, reasonably foreseeable impacts of leasing should be able to result in No Historic Properties Affected in at least some of the remaining 94.7 percent of the Hazen Area parcels, and in the other parcels, included in the proposed FY2008 geothermal lease. A brief summary and analysis of inventories within the proposed parcels follows, which illustrates how this determination was made.

Hazen Area Parcels

These proposed parcels include 14 checkerboard sections that total approximately 8,917 acres and are located at and immediately north of Hazen and Darwin, Nevada in Lyon and Churchill counties on public lands where the surface management is by Bureau of Reclamation and the BLM Winnemucca Field Office. The parcels lie south-southeast of the Truckee Range, just southwest of the Hot Springs Mountains, and east of Dodge Flat. Elevations range from just less than 3940 feet above mean sea level (AMSL) in the lowlands within the western sections to 4760 feet AMSL at Black Butte in the easternmost section. Much of the area is near-barren clay-silt playas, with vegetation ranges from emergent/riparian species surrounding the Fernley State Wildlife Management Area (WMA) to Great Basin desert shrub in the higher elevations within

the project parcels. Geology consists of Tertiary andesite and basalt flows that generally date from 6 to 17 million years ago in the eastern parcels and later Quaternary alluvial deposits that locally include beach gravels and sand dune deposits in the western parcels. Pliocene fossils also are known to occur within the area.

Overall, little survey for cultural resources has been completed in the project parcels. Four block-area cultural resources inventory projects (near the southernmost edge of these parcels) represent a small portion of the Hazen Area parcels. Three additional linear projects bisect the area and follow the SR 50/railroad corridor, also on the southern edge of the Hazen Area parcels. Based on these previous inventories, eight sites within the Hazen Area, and an additional five sites within one mile of the parcels, have been documented, to date. However, these inventories and regional understanding of cultural history have provided some information regarding the density and diversity of cultural resources present.

Previous work suggests that these parcels have high potential to contain additional significant resources, including, but not limited to prehistoric use of rockshelter sites, rock art sites, and open sites containing extensive artifact scatters; pebble mound complexes; and historic-period resources associated with continued use of the region by Native Americans or as transportation routes and water conveyance. Site types likely present include the highly significant Paleoarchaic Sadmat Site, a type site used to define the Hascomat archaeological concept, which lies outside, but near, the Hazen Area parcels. A site of this early period (before 7,500 years ago) is documented within the proposed FY2008 lease parcels, and others are likely to exist and would be significant. Other expected prehistoric site types in the area include later period base camps, resource procurement, processing, and special use sites. The enigmatic pebble mound sites are also partially within the parcels, and may represent either prehistoric or historic cultural activity (Sterns and McLane, 2007). Recorded historic period sites include historic roads with associated artifacts, the Southern Pacific Railroad, and a segment of the historic early twentieth-century Truckee Canal which was the first Bureau of Reclamation project in the United States. Additional significant historic properties are assumed to be present.

Furthermore, sites are expected to be present in moderate to high densities. A cultural resources predictive model developed for the BLM CCFO (Drews and Ingbar, 2007) depicts the Hazen parcels as exhibiting “best” and “good” probability (the two highest categories) for containing prehistoric sites, with ancient sites (dating to over 7,500 years ago) expected to be present. Historical sites can be anticipated to be high to moderately dense in the southern sections (near the Southern Pacific Railroad and the Truckee Canal) and of low density elsewhere in the Hazen Area parcels.

Based on the assessment of soils, elevation, topography, vegetation and water resources in surveyed areas with similar conditions, the potential for finding known or undocumented NRHP-eligible sites within these proposed Hazen Area lease parcels would be high to moderate. For the southern portion of the Hazen Area, potential development will need to consider the visual aspects of actions upon both prehistoric sites related to the nearby Sadmat Site, to areas of concern identified by Tribes at and around Black Butte, and to historic-period transportation-related sites, as these are—or are potentially—eligible for listing on the National Register of Historic Places (NRHP) under Criteria A and C.

Consultation with Tribes regarding the Hazen Area parcels and the section containing Black Butte (T20N, R26E, Section 22) are discussed below.

Salt Wells/Bunejug Mountains Area

These proposed parcels consist of four sections that total approximately 2,710 acres and are located about 15 to 20 miles southeast of the town of Fallon within Churchill County. The parcels include a portion of the northern Cocoon Mountains and the southern Bunejug Mountains, with Eightmile Flat to the northeast and Bass Flat within the Carson Sink to the southwest. Elevations range from just less than 3960 feet AMSL within the eastern section to 4710 feet AMSL in the uplands to the west. Vegetation is predominantly low elevation greasewood and salt desert scrub. Geology consists of Tertiary andesite and basalt flows that generally date from 6 to 17 million years ago and later Quaternary alluvial deposits that locally include beach and sand dune deposits. Clay silt playa blowouts and sand dunes are common within the low-lying areas of the parcels.

Previous inventories resulted in the documentation of four sites within the project parcels, with an additional 18 sites outside but within a mile of the project area. A few cultural resources inventories have occurred near or within the Bunejug Area parcels, with most of these around Simpson Pass and to the north of the parcels. Linear inventories traverse the Simpson Pass area and several scattered small surveys have been conducted throughout the eastern parts of the parcels.

Types of sites within the project parcels include prehistoric and historic artifact scatters and features. Native American sites dating back several millennia include possible prehistoric hearths and artifacts that represent domestic camps and resource procurement or processing sites. Known historical sites represent transportation and some mining, with the corridor and features associated with the Pony Express National Historic Trail and Overland Stage Route—a trail of considerable importance to the history of the United States—being the predominant feature present in the Township 16 North, Range 30 East, West Half of Section 2 and South Half of Section 3. These portions of the Bunejug Mountains Area parcels are sensitive for the presence of the Pony Express National Historic Trail. This area is not removed from the proposed lease, but areas within one-half mile of the Trail will have additional constraints and stipulations that apply for any future proposed development.

Based on the assessment of soils, elevation, topography, vegetation and water resources in surveyed areas with similar conditions, known and undocumented NRHP-eligible sites are expected to be present in low to high densities in the Bunejug Mountains Area parcels, dependant on landform. Based on habitat predictive models for the BLM CCFO and the Carson Lake region (Drews and Ingbar, 2007; Zeanah et al., 1995), prehistoric sites are likely to be present in high numbers and higher densities in the lowlands at the west and east margin of the parcels, and in low density in the uplands. Historic sites are probable in association with the Pony Express Nation Historic Trail, the Overland Mail route, and Simpson Pass, but of low likelihood elsewhere.

Quartz Mountain Area

These proposed parcels consist of four sections that total approximately 2,564 acres and are located about 12 miles north of Gabbs on the Nye County/Mineral County line. The parcels generally slope to the south and west, on the south end of the Broken Hills, just north of the Lodi Hills. Quartz Mountain is the the southwest. Elevations range from about 5265 feet AMSL nearest Quartz Mountain, up to 5975 feet AMSL in the uplands to the northeast. Vegetation is predominantly salt desert scrub with some sagebrush communities in higher elevations. Geology

consists of Tertiary flows and breccias of andesite and related rocks of intermediate composition; Tertiary welded and non-welded silicic ash-flow tuffs that locally include thin units of air-fall tuff and sedimentary rock; and later Quaternary alluvial deposits that locally form beach and sand dune deposits.

Three small inventories within the parcels of the seven inventories conducted within a mile did not result in documentation of any sites within a mile of the Quart Mountain Area parcels. Furthermore, little cultural resources inventory has been carried out in the general vicinity. As a result, our knowledge of the area is limited. The parcels lie within and around the Tolicha/Quartz Mountain mining district, which was discovered in 1905 and produced gold and silver (Tingley 1998). Prospects, shafts, and adits are marked on the topographic map throughout much of the southwestern area of the parcels. The proximity of the historic site of Quartz Mountain, located just west of the westernmost parcel, as well as the nearby San Rafael and Hasbrouck mines, indicate moderate probability for historical mining related sites to be present within the project parcels.

Based on the limited data available, BLM can assume that prehistoric sites are expected to occur in moderate frequency within lowland areas and in low frequency in higher elevations with rugged terrain. In higher elevations, prehistoric sites are expected to be represented predominantly by small limited activity sites. Sites toward the valleys—such as the southern margin of the parcels—are likely to be larger and more complex than upland sites.

Edwards Creek Valley/Tungsten Mountain Area

These proposed parcels consist of eight sections that total approximately 5,125 acres and are located about 25 miles north-northeast of Eastgate in Churchill County. The parcels mainly cover a portion of Edwards Creek Valley, with the northwestern edge in the eastern slope of the Clan Alpine Mountains. Nearly all of the parcels range from about 5085 to 5400 feet AMSL, with only a small portion upslope to a maximum of 7200 feet. Vegetation ranges from near-bare playa flats, to salt desert scrub and sagebrush communities, to pinyon and juniper woodland within areas of highest elevation. Geology consists of shale, mudstone, siltstone, sandstone, and carbonate rock that include sparse volcanic rocks dating to the Upper Triassic and Lower Jurassic (including the Gabbs formation); Tertiary flows and breccias of andesite and related rocks of intermediate composition; Tertiary welded and non-welded silicic ash-flow tuffs that locally include thin units of air-fall tuff and sedimentary rock; and later Quaternary alluvial deposits that locally include beach and sand dune deposits.

Very little of the Tungsten Mountain Area has been surveyed for cultural resources. Five previous inventories are located within a mile of the parcels and consist of linear surveys and small-area surveys resulted in the documentation of only four isolated artifacts of the prehistoric or historic periods. Anticipated in the region are Native American pinyon gathering and hunting camps, and processing sites, at and above the ecotone between sagebrush and pinyon-juniper vegetation along drainages, such as is found in the lower Edwards Creek Valley (Napton and Greathouse, 1976). Prehistoric sites also are likely to be present near seeps and springs, and along the lower alluvial fans and oriented toward the sand dunes at the playa margin. There is a, with a low probability for locating prehistoric sites in the steep sloped-uplands, but a high probability for prehistoric sites elsewhere throughout the parcels.

The Tungsten Mountain Mine, which was part of the larger Augusta district that was active in the 1860s (Tingley 1998), is located just northwest of the parcels. As a result, numerous mining sites are expected to be present within the uplands on the northwestern edge of the parcels.

Elsewhere, some historic transportation-related sites may be expected, such as the Overland Road and Western Union Telegraph Line (Bowyer et al. 2000), but in low to moderate site density.

Edwards Creek Valley/Shoshone Meadows Area

These proposed parcels consist of 25 sections that total approximately 16,250 acres and are located about 35-45 miles north of Eastgate in Churchill and Lander counties, in the northern Edwards Creek Valley. The northernmost portion of the parcels extends to the southern August Mountains, with some of the Shoshone Meadows Area in the New Pass Range and the Clan Alpine Mountains. Antelope Valley is located east of the parcels. Elevations range from about 5380 feet AMSL to southern Antelope Valley to about 6400 feet AMSL in the Clan Alpine Mountains and New Pass Range. Vegetation ranges from salt desert scrub communities up into pinyon and juniper woodlands. Geology and soils are fairly similar to those in the Tungsten Mountain Area.

Further similarity to the Tungsten Mountain Area is due to very few past cultural resources surveys in or near the Shoshone Meadows Area parcels. Thirteen small previous inventories are located within a mile of the parcels resulting in the documentation of 14 prehistoric sites of flaked or ground stone. However, based on other cultural resources work in this part of central Nevada, prehistoric site density can be anticipated as being high throughout the parcels, with the presence of pinyon gathering areas, hunting camps, resource processing sites, and special use locales that may contain rock art.

The project parcels include the McCoy Mine, the Wildhorse Mine, and a number of prospects, adits, and shafts marked on the topographic maps. The northern part of the parcels are located within the historic Wild Horse mining district, which was also part of the original 1866 August district (Tingley 1998). Consequently, mining related historical sites are expected to be present within the project area, particularly in the areas around known historic mines. The project area also includes Hole in the Wall Well, so may also contain historical ranching sites, as well as transportation sites related to historic roads passing from Edwards Creek Valley to the south to the Augusta Mountains and Dixie Valley to the north and west. The area is considered of moderate probability for historic-period resources.

Whiskey Flat Area

These proposed parcels consist of 14 sections that total approximately 8,960 acres and are located about 15-20 miles south-southeast of Hawthorne in Mineral County. The parcels lie primarily within Whisky Flat, though the southwestern edge includes a portion of the Anchorite Hills and the eastern edge take in parts of the northern foothills of the Excelsior Mountains. Elevations range from about 5740 feet AMSL in Whisky Flat to 7250 feet in Anchorite Hills. Vegetation includes lowland salt desert scrub and greasewood communities up to predominantly pinyon woodlands. Geology consists of Mesozoic granitic rocks (mostly quartz monzonite and granodiorite) that are not well-dated; Cretaceous granitic rocks (mostly quartz monzonite and granodiorite); Quaternary basalt flows that locally include maar deposits; and later Quaternary alluvial deposits that locally include beach and sand dune deposits.

Some areas within the Whisky Flat area have received past cultural resources inventories, with these documenting Native American prehistoric camps (including a historic-period wickiup), resource procurement/processing sites, storage caches, and a petroglyph site, as well as a nearby historic mining complex and a rock alignment/possible hunting blind.

With relatively large and complex prehistoric sites such as base camps known within lowland areas in the parcels, and a number of other preshistoric site types in both the lowlands and uplands, the parcels are shown to be rich in prehistoric cultural resources, and the region is considered of a high site density and a culturally-sensitive area to local Tribes.

Historically, the Whisky Flat Area parcels lie within the Whisky Flat (also known as Sulphide and Pahdet) mining district, which was discovered in 1866 (Tingley 1998). Several prospects are marked on the topographic maps, particularly in the uplands within the southwestern project parcels. Consequently, mining related sites are expected to be present within the project area, in moderate density. Historical ranching and transportation sites are also expected, but in low site density.

SUMMARY

After consideration of cultural resource information, and other general data including the applicable Carson City Consolidated Resource Management Plan (RMP) or the Winnemucca Field Office RMP, as appropriate, and associated Environmental Impact Statement (EIS) and geothermal activity NEPA documents, specific data relating to the individual proposed parcels such as topography and soils, it has been determined that reasonable 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 FY2008 lease sale and the CCFO determination, under the Nevada Protocol review threshold at VII.D.(1), is that **there are no historic properties affected; eligible sites are present but will not be affected 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 geothermal resources. The potential for locating additional cultural resources within the proposed lease parcels reviewed for the FY2008 Geothermal Lease Sale ranges from low to high. The Hazen and Tungsten Mountain area parcels are expected to have the highest potential to contain cultural resources, with three-quarters of one section in the Hazen Area parcels recommended as **No Surface Occupancy**. The Shoshone Meadows and Whisky Flat area parcels are expected to have high to moderate potential and the Quartz Mountain and Bunejug Mountain parcels are expected to have the lowest potential (moderate to low) to contain unknown cultural resources. However, areas of the Bunejug Mountain are anticipated to be of high importance to the history of the United States, and there may need to be additional consideration of this prior to location-specific exploration or development for geothermal resources. A complete inventory of the proposed lease parcels has not occurred; therefore, the following stipulation should be added to each lease parcel:

*"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."*

**Native American Religious Concerns** – The following tribes were notified of the proposed lease sale via certified letter on June 7, 2007: Pyramid Lake Paiute Tribe, Reno-Sparks Indian

Colony, Fallon Paiute-Shoshone Tribe, Yomba Shoshone Tribe, Walker River Paiute Tribe. They were asked to identify traditional cultural places or any other areas of traditional cultural importance that need to be considered within the area of potential effect. This was followed by a telephone call from CCFO staff. Comments or concerns regarding leasing the proposed parcels were submitted to the CCFO and included the Pyramid Lake Paiute Tribe specifically requesting that No Surface Occupancy occur within Section 22 of T20N, R26E. This portion falls within the BLM Winnemucca Field Office management boundary.

Consultation with the Pyramid Lake Paiute Tribe and the Fallon Paiute-Shoshone Tribe regarding the Hazen area parcels has continued and resulted in the recommendation that, in order to protect cultural resources and sensitive traditional use resources, no surface development occur within the western half and southeast quarter of Section 22 within T20N, R26E. This area also has been documented in ethnographic reports for the region, and, according to Winnemucca Field Office Lead Archaeologist Peggy McGuckian, this is cited in the recently-updated Winnemucca Field Office Resource Management Plan documents that identified Black Warrior Peak and Black Butte as "Places of Cultural and Religious Importance." This section of public lands has previously been recommended by Winnemucca Field Office for No Surface Occupancy in recent geothermal lease applications (currently deferred). According to the local Tribes, Little Black Butte also should be considered as an area of concern. A letter from the Pyramid Lake Paiute Tribe has been sent to the BLM CCFO to address this area, and both Tribes are planning a trip to this area with BLM CCFO management as part of the BLM's government-to-government consultation process specific to this proposed geothermal lease action.

BLM CCFO further consulted with potential interested parties relative to the Pony Express National Historic Trail, including a letter dated July 12, 2007, to the Nevada Division of the National Pony Express Association (NPXA)—attention of Steve Notterman, President—relative to this process. At this time, the NPXA has no specific concerns, but they may potentially have comments prior to any exploration or development near the trail.

According to Part VI.B (1)(d) of the Nevada Protocol, the BLM will request the review of the Nevada State Historic Preservation Office (SHPO) prior to project implementation. This review includes requesting SHPO concurrence on the determination of effect. The Nevada SHPO will be consulted regarding any proposed exploration and development.

**Soils/Geology/Minerals** - There are no mining operations authorized in these areas. However, there may be unpatented mining claim in these areas. A geothermal lease is subject to valid existing rights established by existing unpatented mining claims or mineral material sales contracts.

The lessee would agree per stipulation in the lease that future operations will not interfere with the material operations of Nevada Department of Transportation material sites.

Implementation of the proposed action would have no affect on soils, geology, or minerals in these areas. No ground disturbing activities beyond those currently authorized would occur as a result of geothermal leasing.

The Hazen parcels lie within the Hazen Known Geothermal Resource Area, which means an area where BLM determines that persons knowledgeable in geothermal development would spend money to develop geothermal resources.

**Wildlife** - Some of the six lease areas have good general wildlife diversity due to elevation change and diverse vegetation communities. The other areas have limited elevation change and vegetation communities that hosts limited general wildlife diversity. Several terrestrial wildlife habitats occur within the areas as described in the Nevada Wildlife Action Plan (Wildlife Action Plan Team 2006). The major wildlife habitat types include,

Intermountain Cold Desert Scrub – Historically, this habitat would have been dominated by Indian rice grass. Spiny hopsage, shadscale and chenopods would have been found at the lower elevations of this allotment prior to the fire (Wildlife Action Plan Team. 2006). Grasses, Ephedra sp and shadscale now dominate. Some bud sagebrush can be found. Wildlife species associated with this habitat type include pale kangaroo mouse, Great Basin collared lizard and black-throated sparrow (Wildlife Action Plan Team 2006). All six lease areas have this wildlife habitat.

Sagebrush – At the upper elevations, Wyoming sage brush and low sagebrush occur. Some grasses, globemallow, winterfat and rabbitbrush can be found. Great Basin pocket mouse, sagebrush lizard and sage sparrow are species associated with this habitat type. All but Hazen lease areas has this wildlife habitat.

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. Tungsten, Bunejug and Shoshone Meadows have this wildlife habitat.

Springs and Springbrooks - There are several springs associated with the lease areas. Riparian areas account for less than 1% of the wildland vegetation, but account for up to 80% of all vertebrate species use. Riparian vegetation ranges from herbaceous to gallery overstory cottonwood or willow. Wildlife species associated with this habitat type include Southwestern toad, shrew sp, and mourning doves (Wildlife Action Plan Team 2006). Shoshone Meadows and Tungsten areas have noticeable wildlife habitat of this type.

Dunes and Badlands – These areas are dominated by substrate rather than vegetation. These substrates include relict bedrock outcrops, weathered soil patches, Aeolian deposits (dunes) and other non-vegetated areas. Badlands are found at all elevations. Non-vascular lichens and cryptogamic species often dominate these sites. Unique plants are often found on these sites. Soils are nutrient poor and are often acidic. Wildlife species associated with dunes include kit fox, pallid kangaroo rat while desert horned lizard is representative of species found in badlands (Wildlife Action Plan Team 2006). Hazen, Shoshone Meadows and Whiskey Flats have this type of wildlife habitat.

Cliffs and Canyons – These areas are dominated by vertical or near vertical cliff lands. These areas are barren and sparsely vegetation (less than 10% plant cover). Vegetation that does occur includes a variety of conifers, shrubs, lichens, succulents and herbaceous species. Prairie falcon represents wildlife associated with ledges. Spotted bat is representative of species associated with crevices. Rocky slopes / cliffs host species that include Desert bighorn and Great Basin collared lizard (Wildlife Action Plan Team 2006). Tungsten and Whisky Flats have this type of wildlife habitat.

Mule deer would be found in each of the lease areas. In all but the Tungsten lease area, mule deer use would not be significant and no key areas have been identified.

The Tungsten Mountain lease area is mostly within the Clan Alpine Habitat Management Plan (BLM 1988). In the Tungsten lease area, the Augusta, Rocky Straight and Byers Canyon areas are key mule deer wintering areas (BLM 1988).

A few pronghorn may be found in all of the proposed lease areas on a seasonal basis. No key pronghorn areas have been identified.

Only two of the proposed lease areas have bighorn sheep. The extreme western portion of the Whiskey Flats area has bighorn sheep use. Sheep from the Excelsior Range to the south travel to this area.

The Tungsten Mountain lease area is mostly within the Clan Alpine Habitat Management Plan (BLM 1988). In the Tungsten Mountain proposed lease area, all of the area west of the main valley road is considered bighorn sheep habitat or potential bighorn sheep habitat (BLM 1988).

Four of the lease areas are within Sage Grouse Population Management Units (PMU):

Quartz Mt. - Desatoya PMU
Tungsten Mt. - Clan Alpine PMU
Shoshone Med. - Clan Alpine PMU
Whisky Flat Mt. - Grant PMU

There are no known leks near the proposed lease sites, however, these areas have not been inventoried (Axtell 2007).

A few mourning doves could be found in all of the lease areas but free water would limit their use. The exotic species chukar partridge can be found in all of the proposed lease areas. Mountain and California quail could be found in Tungsten and Shoshone Meadows proposed lease areas. Upland game bird populations are extremely dependent on cyclic water years.

The proposed leasing in the six general areas would not have an effect on wildlife or habitat.

**Special Status Species**

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 (BLM 2003).

Sage grouse are on the BLM Sensitive species list and have been addressed previously as an upland game species.

Nevada BLM sensitive species expected, or found in or near the area are shown in Appendix A (BLM 2003).

The proposed leasing in the six general areas would not have an effect on BLM sensitive species or habitats expected or occurring in the area. If exploration or development were proposed, the following sensitive plants could be negatively impacted: Nevada Oryctes (*Oryctes nevadensis*), Nevada dune beardtongue (*Penstemon arenarius*) and Lahontan beardtongue (*Penstemon palmeri* var. *macranthus*).

Neo-tropical Migratory Birds

On January 11, 2001, President Clinton signed Executive Order 13186 (Land Bird Strategic Area) 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. No BLM policies have been developed to provide guidance on how to incorporate migratory birds into NEPA analysis. However, advice based on past USFWS MOU's, list items the USFWS believes are fundamental for the analysis of impacts to and planning for these birds. These items are (1) effects to highest priority birds listed by Partners in Flight; (2) effects to important bird areas (IBA's); (3) effects to important over wintering areas.

Avifaunal Biomes that are found on the area are described by Partners in Flight (PIF) [Beidleman 2000], PIF-Nevada (Neel 1999) and Nevada Wildlife Action Plan (Nevada Wildlife Action Plan Team 2006). The Intermountain West is the center of distribution for many western birds. Over half of the biome's Species of Continental Importance have 75% or more of their population here. Many breeding species from this biome migrate to winter in central and western Mexico or in the Southwestern biome (Beidleman 2000). There are no Important Bird Areas (IBA) associated with this area.

The species of concern listed by PIF that could occur in the area are shown in Appendix B.

The proposed leasing in the six general areas would not have an effect on neo-tropical migratory bird populations expected or occurring in the area.

**No Action Alternative**

The physical descriptions of the affected environment for the 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 geothermal exploration and development, other than casual use.

Although environmental impacts would not occur under the No Action Alternative, implementation of this alternative would not be consistent with the land use plan or the issuance of geothermal leases in the project area. This is also inconsistent with the Federal Energy Policy to promote the development of environmentally attractive energy resources. The No Action Alternative would deprive the BLM of royalty payments which could be generated by the successful completion of geothermal development.

**Cumulative Impacts**

Cumulative impacts include the combined effect of past projects, current projects, specific planned projects, and other reasonably foreseeable future actions (RFAs) within the project study area to which the geothermal exploration development may add incremental impacts. The time frame for cumulative impact analysis encompasses the projected life of the exploration which is approximately one year. The area of analysis encompasses the lease sale parcels and the adjacent mountains. The resources that would be directly or indirectly affected by the consequences of geothermal leasing or other actions that are analyzed in a cumulative sense consist of soils and vegetation, visual resources, noise, air quality, wildlife, range, and socio economic resources.

All resource values have been evaluated for cumulative impacts. It has been determined that cumulative impacts would be negligible as a result of the proposed action or alternative.

**Monitoring**

Monitoring needs for this action have been identified in the standard stipulations that have been attached to this document.

## IV. CONSULTATION, COORDINATION AND PREPARATION

Consultation with others

The following local agencies were consulted during preparation of the EA:

Nye County Board of Commissioners
Churchill County Board of Commissioners
Mineral County Board of Commissioners
Yomba Shoshone Paiute Tribe
Fallon Paiute-Shoshone Tribe
Pyramid Lake Paiute Tribe
Walker River Paiute Tribe
Reno-Sparks Indian Colony

List of Preparers and Reviewers

Bureau of Land Management, Carson City Field Office

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| Carla James | EA Project Team Leader, Supervisory Geologist |
| Terri Knutson | Planning & Environmental Coordinator |
| JoAnn Hufnagle | Supervisory Realty Specialist |
| Terry Neumann | HazMat |
| Arthur Callan | Recreation, Wilderness, VRM |
| Jim Carter | Cultural Resources, Paleontology |
| Susan McCabe | Native American Religious Concerns |
| Jim Schroeder | Water Resources |
| Jim deLaureal | Soils; Invasive, Nonnative Species |
| Steep Weiss | Forestry |
| Dean Tonenna | T&E Plants, Vegetation |
| Rita Suminski | Wildlife, T&E Animals, Migratory Birds |
| Keith Barker | Fire |
| Russ Suminski | Range Resources |

Bureau of Reclamation, Lahontan Basin Area Office

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| William BC Deschler | Realty Specialist |

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**Appendix A**
**BLM Sensitive Species associated with six proposed lease areas**

**Animal**

Golden Eagle – *Aquila chrysaetos*
Ferruginous Hawk - *Buteo regalis*
Northern Goshawk - *Accipiter gentilis*
Burrowing owl - *Athene cunicularia*
Prairie Falcon – *Falco columbarius*
Swainson's Hawk- *Buteo swainsoni*
Cooper's Hawk – *Accipiter cooperii*
Sharp-shinned Hawk- *Accipiter striatus*
Peregrine Falcon- *Falco peregrinus*
Short-earred Owl – *Asio flammeolus*
Long-billed Curlew – *Numenius americanus*
Greater sage-grouse- *Centrocercus urophasianus*
Mountain quail - *Oreortyx pictus*
Western Snowy Plover- *Charadrius alexandrinus*
Gray vireo- *Vireo vicinior*
Juniper Titmouse – *Baeolophus griseus*
Pinon Jay – *Gymnorhinus cyanocephalus*
Loggerhead shrike- *Lanius ludovicianus*
Vesper Sparrow – *Pooecetes gamineus*
Bendire thrasher – *Toxostoma bendirei*
Desert bighorn sheep – *Ovis Canadensis nelsoni*
Silver-haired bat – *Lasionycteris noctivagans*
Townsend's big-eared bat – Corynorhinus townsendii
Big brown bat – *Eptesicus fuscus*
Hoary bat – *Lasiurus cinereus*
Small-footed myotis – *Myotis ciliolabrum*
Yuma myotis – Myotis yumanensis
Little brown bat – *Myotis lucifugus*
Long-legged myotis – *Myotis volans*
Pallid bat – *Antrozous pallidus*
Long-earred myotis – Myotis evotus
Spotted bat – *Euderma maculatum*
Western Pipistrelle Bat – *Pipistrellus hesperus*
Brazilian free-tailed bat - *Tadarida braziliensis*
Fringed myotis – *Myotis thysanodes*
California myotis – *Myotis californicus*
Pygmy rabbit – *Brachylagus idahoensis*
Hardys aegialian scarab – *Aegialia hardyi*

**Plants**

Nevada Oryctes – *Oryctes nevadensis*
Nevada dune beardtongue – *Penstemon arenarius*
Lahontan beardtongue – *Penstemon palmeri* var. *macranthus*

Source: www.natureserve.com, www.heritage.nv.gov, CCFO Habitat Management Plans, misc. observ

## APPENDIX B

**Neo-tropical Migratory Birds, Species of Continental Importance on six proposed lease areas**

**Salt Desert Scrub (**Beidleman 2000) **–** This biome experiences harsh climactic variation and is often dominated by salt-tolerant shrubs. Species of concern associated with this habitat type in the project area are,

Loggerhead Shrike – *Lanius ludovicianus* (Neel 1999, Nevada Wildlife Action Plan 2006)
Burrowing Owl – *Athene cunicularia* (Neel 1999)

Issues related to this habitat type include physical destruction of salt desert shrubs, habitat conversion and use of rangeland pesticides (Neel 1999). Off-road vehicle activity and non-native species invasion has also been identified as an issue (Nevada Wildlife Action Plan 2006).

**Western Shrublands (**Beidleman 2000) – Shrubsteppe was identified as the highest priority habitat for conservation for breeding birds. This habitat type supports the largest nesting-bird species list of any upland vegetation type in the West (Beidleman 2000). Species of concern associated with this habitat type in the plan area,

Shrub-Steppe
Brewer's sparrow – *Spizella breweri* (Beidleman 2000)
Sage Sparrow – *Amphispiza belli* (Neel 1999, Beidleman 2000, Nevada Wildlife Action Plan 2006)
Sage Thrasher – *Oreoscoptes montanus* (Neel 1999, Beidleman 2000, Nevada Wildlife Action Plan 2006)

Issues related to this habitat type include fragmentation from man-caused activities. Threats to this habitat type include overgrazing of grasses and forbs that alter community structure, invasion of non-native grasses and fire suppression / crown-killing wildfire (Beidleman 2000). Loss of shrub understory, increasing human infrastructure which fragments and degrades habitat, and increases soil erosion was also identified (Nevada Wildlife Action Plan 2006).

**Woodland** – Pinyon-juniper woodlands are characteristic of this habitat type Species of concern associated with this habitat type in the plan area,

Gray Flycatcher – *Empidonax wrightii* (Beidleman 2000)
Gray Vireo - *Vireo vicinior* (Beidleman 2000)
Juniper Titmouse – *Baeolophus ridgwayi* (Beidleman 2000)
Mountain Bluebird – *Sialia currucoides* – cavity nester (Neel 1999)
Pinyon Jay – *Gymnorhinus cyanocephalus* (Neel 1999)
Western Bluebird- *Sialia mexicana* – snags / hollow tree (Neel 1999)

Issues related to this habitat type include fragmentation from man-caused activities (Beidleman 2000).

**Riparian** – This habitat type supports the highest bird diversity of any western habitat type but is one of the rarest. Some riparian areas consist of herbaceous and shrubby vegetation while others have a treed understory of cottonwood, aspen, alter or willow. Species of concern associated with this habitat type in the plan area,

Calliope hummingbird – *Stellula calliope*- (Beidleman 2000)

Mountain Riparian – (Neel 1999)
Cooper's Hawk – *Accipiter cooperii*
Northern Goshawk - *Accipiter gentilis*
Wilson's Warbler - *Wilsonia pusilla*
MacGillivray's Warbler - *Oporornis tolmei*

Issues related to this habitat type include de-watering and alteration of water flows / channels, road construction, nonnative species, logging, recreation and overgrazing (Beidleman 2000). Groundwater withdrawal and shallow aquifer pollution were mentioned as specific Nevada issues (Nevada Wildlife Action Plan 2006).

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