

CHAPTER 14
HUMBOLDT-TOIYABE NATIONAL FOREST
BATTLE MOUNTAIN DISTRICT
ENVIRONMENTAL ANALYSIS FOR PENDING LEASE
APPLICATION:
NVN 074289

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SECTION 14.1

PURPOSE AND NEED

14.1.1 INTRODUCTION

This environmental analysis describes the environmental effects of leasing approximately 440 acres of NFS (160 acres), public (160 acres) and private (120 acres) land within the Austin-Austin and Tonopah Ranger Districts of the Humboldt-Toiyabe National Forest and within BLM Battle Mountain Field Office to private industry for the development of geothermal resources.

The pending lease site is partially within NFS lands (the Austin-Austin and Tonopah Ranger Districts of the Humboldt-Toiyabe NF), public lands (within the BLM Tonopah Field Office of the Battle Mountain District), and private lands. The FS is the surface management agency for the NFS lands portion of the site, and the BLM Battle Mountain District is the surface management agency for the public land portion of the site. For the NFS lands portion of the lease site, the Battle Mountain District issues leases with the consent of the FS (here, the Austin and Tonopah Ranger Districts of the Humboldt-Toiyabe NF) for the lands under application in the Humboldt-Toiyabe NF. Subsurface mineral rights are managed by the Battle Mountain District for all NFS, public, and private lands within the lease site.

This lease-specific analysis serves as an information resource to aid decision-makers in determining whether these lands are appropriate for leasing under FS and BLM management policies and existing environmental regulations.

14.1.2 LOCAL REGULATORY CONSIDERATIONS

The pending lease application site is located within Nye County, Nevada and is subject to state and local regulations, as described below.

State of Nevada Renewable Portfolio Standard Program

The Nevada Renewable Portfolio Standard Program is a Nevada law that requires investor-owned utilities in Nevada to provide 20 percent of their retail

sales of electricity from clean, renewable sources of energy in 2015. Geothermal energy is included in the definition of renewable resources under the program.

Toiyabe National Forest Land and Resource Management Plan (1986), as amended

The Humboldt-Toiyabe NF operates under the direction of the Record of Decision (ROD) for the Toiyabe National Forest Land and Resources Management Plan (Forest P. Revised.1an), as amended. The Forest Plan provides the following forest management direction in relation to minerals, including geothermal:

1. Encourage exploration and development of mineral resources and minimizing possible adverse impacts to surface resources.
2. Require an operating plan on all mineral operations that will cause surface resource disturbance.
3. Process notices of intent (NOI) and operating plans (OP) in accordance
4. Require operating plans which minimize impacts to surface and cultural resources and provide for reclamation of disturbed areas.
5. Insure conformity with operating plans through regular compliance inspections.
6. Require reclamation bonds commensurate with the requirements of reclamation plans.
7. Require reclamation plans to achieve the repair of surface disturbances and to return the area and natural resource values to as near pre-existing conditions as possible.
8. The following "Access and Reclamation Measures" will be encouraged for mineral exploration Forest-wide and will be emphasized in areas where surface resource values are considered highly sensitive and where the physical character of the land, such as terrain and soil type, permit their use:
 - a. Close or obliterate access unless identified to become part of the transportation system after mineral activity is complete.
 - b. Minimize need for road construction through the use of specialized exploration equipment.
 - c. Develop access to a standard necessary to minimize resource impacts and to facilitate reclamation. Development standards and reclamation criteria will be subject to Forest engineering review when land disturbing activities are proposed in areas identified as having highly sensitive resource values.

- d. Where new road and drill pad construction is essential for exploration access, such roads and other disturbed areas will generally be closed and stabilized by revegetation and recontouring where necessary to restore site productivity, to protect or restore visual quality, and to minimize resource conflicts.
 - e. Identify and save topsoil needed for reclamation prior to disturbance.
9. Input from county officials and others, as appropriate, will be considered before existing or proposed primary access roads are closed.
 10. Validity examinations by qualified geologists will be conducted on a case-by-case basis to substantiate mineral patent applications and proper use of mining claims on the Forest.
 11. Action will be taken on cases of abuse of mining laws, such as occupancy for purposes other than mining and mining related activities.
 12. Informal mineral evaluations may be conducted by qualified geologists, mining engineers, or mineral specialists before operating plans are approved in primitive, semi-primitive nonmotorized, and environmentally evaluation results in disagreement between the mineral operator and the Forest Service, the operator will have an opportunity to request the opinion of a consulting geologist.
 13. Conduct validity exams on all operations proposed in wilderness. Validity exams may be conducted for development proposals in RNA's and proposed wildernesses.
 14. Recommendations will be made to the Secretary of Interior concerning extension, removal, or modification of existing withdrawals.
 15. Prepare mineral evaluations for proposed withdrawals and land exchanges.
 16. Review and process all lease applications submitted by the BLM in a timely fashion. Specific stipulations are described in Table IV-7 and Appendix B of the Plan.
 17. Provide counties with an opportunity to review geothermal lease applications to ensure that proper stipulations are included.
 18. Except for mine sites where applicable, utilize existing borrow sites for common variety materials before new sites are developed.
 19. Process requests for new common variety material sites through the NEPA process. Except for mine development where applicable,

new sites will be developed on the Forest only when alternative sites off the Forest are not reasonably available.

20. Utilize the state permitting process for handling mineral dredging operations when applicable.
21. The Forest will work with industry to continue development of cost effective and environmentally sound reclamation procedures through research and experimentation.
22. The Forest will work with industry to further the development and use of drilling equipment, such as track-mounted drill rigs, that will result in effective exploration methods with the least impact on surface resources.
23. Reasonable access for mineral exploration, development, and production is guaranteed under the mining laws. The type of access approved will be consistent with the logical development of mineral properties.
24. The claimant/operator may be required to submit assay or other data, or identify mineral showings so that Forest Service mineral specialists can verify that the access proposed would be the next logical step in development.

Tonopah Resource Management Plan and Record of Decision (1997)

The pending lease area is managed under the Tonopah Resource Management Plan and Record of Decision (Tonopah RMP). The Tonopah RMP identifies 5,360,477 acres (88% of the Tonopah Planning Area) as open to fluid mineral leasing subject to standard lease terms and conditions, and 607,799 acres as closed. A further 72,400 acres are identified as open to leasing with seasonal restrictions due to crucial wildlife habitat, and 50,425 acres are identified as open subject to no-surface-occupancy. The RMP notes that the determinations apply to geophysical exploration, and that waivers to the determinations will be considered if the identified resource values can be protected.

14.1.3 SCOPE OF ANALYSIS AND APPROACH

This lease-specific analysis incorporates by reference the programmatic analysis presented in Volume I to which this lease-specific analysis is included. This analysis examines the pending noncompetitive lease application site NVN 074289, describes the Reasonably Foreseeable Development scenario for this site, examines the existing environmental setting, and describes the potential direct, indirect and cumulative impacts that issuing the lease at this site would have on the human and natural environment.

This report focuses on specific key resource concerns in the pending lease area, and incorporates by reference the impacts described in the PEIS. Decision-makers should consider both the impacts described in this lease-specific analysis,

in addition to those described in the main body of the PEIS. The analysis presented here does not reiterate the details of impacts identified in the PEIS, but rather refers to them as they arise in the impact analysis for proposed lease application sites addressed here. Humboldt-Toiyabe NF and Battle Mountain District staff members were contacted during the preparation of this lease-specific analysis to help identify local resource concerns.

14.1.4 CUMULATIVE ACTIONS

Consultation with the Humboldt-Toiyabe NF and Battle Mountain District revealed that other geothermal leasing and exploration activities are occurring to the northeast of the lease site on private lands. Continued geothermal well-drilling, and possibly a power plant, is expected in this area.

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SECTION 14.2

PROPOSED ACTION AND ALTERNATIVES

14.2.1 INTRODUCTION

This chapter provides the details of the proposed action, alternatives to the proposed action, and an overview of the reasonably foreseeable development (Reasonably Foreseeable Development) scenario for pending noncompetitive lease application site NVN 074289.

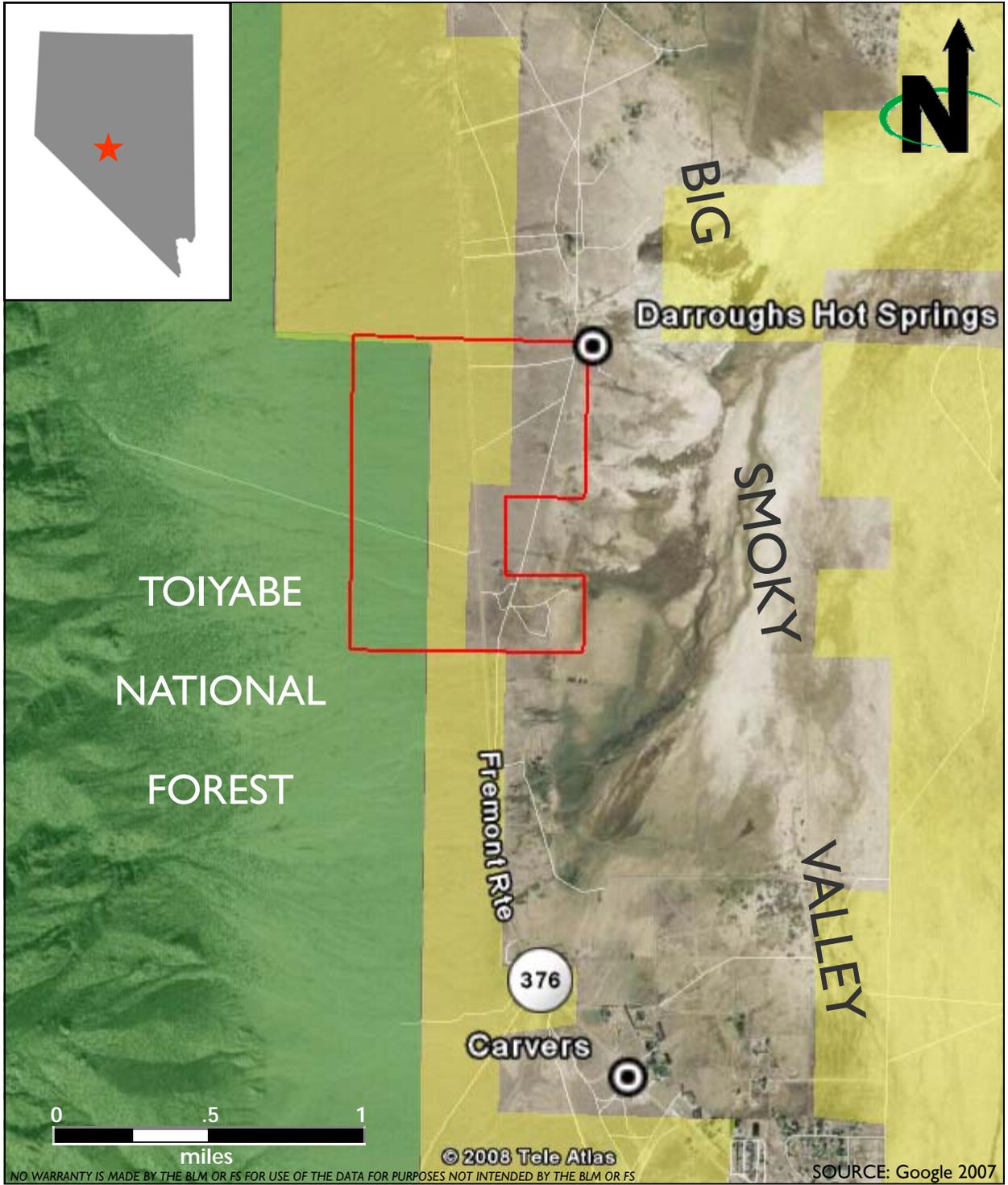
14.2.2 PROPOSED ACTION

The proposed action is to issue a lease to a private geothermal developer for one area within the Humboldt-Toiyabe NF and Battle Mountain District. The 440 acres of land lie along the western edge of the Big Smoky Valley, just below the lower slopes of the eastern side of the Toiyabe Range, in Nye County, Nevada (see Figure 1).

There is one pending lease application included within this area. NVN 074289 includes 440 contiguous acres of land. The legal description for this land is T11N R43E S18, parts E2W2, NE, W2SE, SESE, Lots 1-4. The site ranges in elevation from 5,600 feet to 5,900 feet above mean sea level. The western portion of the land (E2W2; 160 acres) lies within the Humboldt-Toiyabe NF, while the eastern portion of the site is on public (W2E2; 160 acres) and private (SESE, E2NE; 120 acres) lands.

Two roads traverse the site: Cove Canyon Road and State Route 376 (Fremont Route). Several additional unmarked roads crisscross the southeastern portion of the site. The nearest airport is the Wine Glass Ranch airport, approximately 0.6 mile to the southeast of the site.

There are no buildings within the proposed lease sites. The closest known buildings are 0.4 mile to the south of the proposed lease site at Wineglass Ranch, and 0.5 miles to the east at Darrroughs Hot Springs.



C:/EMPS/Geothermal/PEIS/Figures

NO WARRANTY IS MADE BY THE BLM OR FS FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY THE BLM OR FS

Lease site NVN 074289 is located on NFS land, BLM land, and private land.

- LEGEND:**
-  Lease site boundary
 -  NFS land
 -  BLM land

Lease Location
 NVN 074289
 Toiyabe NF / Battle Mountain FO

Figure 14-1

14.2.3 ALTERNATIVES

Two alternatives are considered in this lease-specific analysis: Alternative A, the No Action alternative, and Alternative B, the Proposed Action.

Alternative A: No Action

Under Alternative A, the BLM would deny the pending lease application.

Alternative B: Proposed Action

Under Alternative B, the BLM would issue the pending lease application with the stipulations identified in Chapter 2 of the PEIS.

14.2.4 REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

The proposed lease site is likely to be developed for electricity generation. The pending noncompetitive lease application was filed by Lillian Darrough (owner of the nearby Darroughs Hot Springs) in 2001, but represents a partnership with Great American Energy. Communication from Great American Energy defines the likely development of the site as being a single, 12 megawatt binary power plant (Great American Energy 2008). The development of this plant would be expected to result in approximately 10 acres of disturbance. The NFS lands portion of the lease site (western portion) are within an Inventoried Roadless Area, making it unlikely that any development would occur in that area; therefore, it is expected that development would take place in the eastern part of the lease site, which is comprised of public and privately owned lands.

Exploration activities for a 12-megawatt plant is expected to involve approximately 6 temperature gradient holes, disturbing approximately 0.15 acre each, for a total disturbance of approximately 1 acre. Disturbance would result from the types of activities described under Chapter 2 of the PEIS under *Phase One: Geothermal Resource Exploration*.

Assuming that a commercially viable resource is found within the lease area, drilling operations and development of the site would be expected to result in a further approximately three acres of land disturbance from the types of activities described in the Reasonably Foreseeable Development scenario of Chapter 2 of the PEIS under *Phase Two: Drilling Operations*.

Utilization, the third phase of a geothermal project, is expected to result in a further approximately six acres of land disturbance from the types of activities described in the Reasonably Foreseeable Development scenario of Chapter 2 of the PEIS under *Phase Three: Utilization*. The length and alignment of transmission lines are not estimated here since these factors would depend upon the positioning of any power plant and the distance to the nearest electrical tie-in.

Reclamation and abandonment, the fourth phase of a geothermal project, is expected to result in temporary disturbance of all originally disturbed acres,

after which, the site would be graded and vegetated to pre-disturbance conditions, as described in the Reasonably Foreseeable Development scenario of Chapter 2 of the PEIS under *Phase Four: Reclamation and Abandonment*.

SECTION 14.3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

14.3.1 INTRODUCTION

The following resource disciplines are not addressed in this section because they are not found in the leasing areas and are not relevant to the discussion: livestock grazing, national scenic and historic trails and special designations.

No wild horse and burro herd territories or herd management areas exist within 10 miles of the pending lease area, therefore wild horses and burros will not be brought forward for analysis.

All the pending lease applications are in geologic units that would be expected to have a relatively low potential for containing vertebrate fossils or scientifically significant invertebrate or plant fossils; therefore, paleontological resources are not analyzed in detail. Paleontological mitigative procedures outlined in the PEIS would be followed for all ground distributing activities. Protective measures outlined in the PEIS would be applied.

Future development of the proposed lease sites would also yield the same health and safety impacts as identified in Chapter 4 of Volume I of the PEIS and therefore is not repeated in this lease-specific analysis.

Cumulative impacts are only discussed for those resources that are likely to experience cumulative impacts from the proposed action, and from the cumulative actions identified in Section 14.1.4.

14.3.2 LAND USE, RECREATION

Setting

This section is a discussion of the current land ownership and use within the Region of Influence (Region of Influence) for the proposed lease site.

The Region of Influence is the land area within and adjacent to the proposed lease site.

Policies and Plans

It is the policy of the Department of the Interior, consistent with Section 2 of the MMPA and Sections 102(a) (7), (8) and (12) of FLPMA, to encourage the development of mineral resources, including geothermal resources, on federal lands. The Geothermal Steam Act of 1970 provides regulatory guidance for geothermal leasing by the BLM.

The Humboldt-Toiyabe Forest Land Management Plan (Forest Plan) and the BLM Tonopah Resource Management Plan (Tonopah RMP) provide direction for the leasing of geothermal resources. Additional detail of these plans is provided in Chapter 1 of this lease-specific analysis, under *Local Regulatory Considerations*. The Tonopah RMP identifies the pending lease area as open to fluid mineral leasing subject to standard lease terms and conditions.

Regional Setting

The pending lease area consists of approximately 606 acres of land along the western edge of the Big Smoky Valley, below the eastern slope of the lower Toiyabe Range. The western portion of the proposed lease site lies within the Humboldt-Toiyabe NF, the center portion of the site is on public land and the far eastern portion is privately owned (see Figure 1). As shown in Figure 1, adjacent land ownership includes NFS, public and private.

Lands immediately adjacent to the proposed lease site are primarily non-developed. The closest development is at Wineglass Ranch, approximately 0.4 miles to the south of the proposed lease site and at Darroughs Hot Springs, 0.5 miles to the east.

There are no designated recreation areas within or adjacent to the proposed lease site. In the Humboldt-Toiyabe NF, common dispersed recreational activities include hiking, camping, fishing, hunting, OHV recreation, horseback riding, bird and wildlife viewing, photography and pine nut collecting (US Forest Service 1986).

The nearest population center is Tonopah, which is approximately 50 miles south of the proposed lease site and has a population of approximately 2,800.

Pending Lease Areas

The Western portion of the pending lease area lies within Management Area 8 in the Humboldt-Toiyabe NF. Management direction for this area dictates that development of minerals be “*done in a manner that protects key dispersed recreation, wildlife, and fisheries resources.*” Prescriptions for the management area include areas for wilderness preservation; Intensive wildlife and dispersed recreation; and market opportunities (US Forest Service 1986). The NFS lands

within the lease site are all within an Inventoried Roadless Area. Cove Canyon Road passes through this portion of the site in an east-west alignment.

Cove Canyon Road and the Fremont Route as well as additional unnamed roads provide access to portions of the pending lease area. Darrroughs Hot Springs is located in the In the NENE of section 18 and additional hot springs are found within 0.5 mile of the pending lease area to the north.

No special land use areas are contained with or adjacent to the leasing area. There are no known trails or official recreation uses on the proposed lease site.

Impacts

Alternative A (No Action)

The No Action alternative would have no impact on existing land uses, including existing recreational uses and would not conflict with the Forest Plan, the management objectives for Management Area 8, or the Tonopah RMP because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would be consistent with Forest Plan the Tonopah RMP and applicable land classifications within these plans, provided that specific management guidelines are followed. The Reasonably Foreseeable Development scenario predicts that one 12 megawatt plant will be developed at eastern portion of the proposed lease site. Approximately 10 acres of disturbance is expected as a result of plant development. Typical impacts for a 50 megawatt plant on land use, recreation and special designations are discussed in detail in Section 4.2.3 of the PEIS. Plant construction and utilization may impact certain dispersed recreational uses in the pending lease area, specifically hunting, bird and wildlife viewing, and horseback riding.

Impacts on Inventoried Roadless Areas

The NFS portion of the lease sites is within an Inventoried Roadless Area. Development in this area would be consistent with this designation as long as no new roads are constructed to access the sites.

Cumulative Impacts

The Proposed Action could indirectly cumulatively contribute to an overall trend in land use changes in the Smoky Valley from undisturbed landscape, to developed uses.

Neither the geothermal activities that could potentially occur as an indirect result of the Proposed Action, nor the nearby geothermal activities occurring on private land would conflict with any land use designations under the Nye County General Plan, or local BLM or FS land use regulations.

Cumulative impacts to dispersed recreational uses would be minimal due to the minimally developed local environment and the large expanses of land available for recreation in the region.

14.3.3 GEOLOGIC RESOURCES AND SEISMICITY

Setting

The proposed lease site lies within the Great Basin area of the Basin and Range geological province. This province, characterized by steep, elongate mountain ranges alternated with long expanses of flat, dry desert, extends from eastern California to central Utah, and from southern Idaho into the state of Sonora in Mexico. Within the Basin and Range province the earth's crust and upper mantle have been stretched up to 100 percent of its original width. The entire region has been, and continues to be, subjected to extension that thinned and cracked the crust as it pulled apart, creating large, north-south trending faults (US Geological Survey 2004).

Expansion occurs in a roughly east-southeast to west-northwesterly direction at the rate of 13 mm/yr (US Geological Survey 2008a). Beginning approximately 20 million years ago, the upthrown side of these faults began to form mountains that rise abruptly and steeply, and the down-dropped side created broad, low valleys, resulting in the provinces' distinctive alternating pattern of linear mountain ranges and valleys. The fault plane extends deep into the crust, usually at a 60 degree angle. In places, the relief or vertical difference between the two sides is as much as 10,000 feet. As the ranges rise, they are immediately subject to weathering and erosion from water, ice, wind, and other agents (US Geological Survey 2004).

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. Eroded material washes down mountain side, often covering young faults until they rupture again. Sediment collects in adjacent valleys, in some places covering bedrock under thousands of feet of rock debris (US Geological Survey 2004).

In the past 150 years, there have been 14 earthquakes in the Great Basin large enough to rupture the earth's surface. Roughly 20 percent of the faults in this area have evidence of surface rupture in the past 15,000 years. Except for aftershock activity associated with some historical ruptures in the province, it is difficult to associate recorded seismicity with specific faults. There are virtually no examples of foreshock activity preceding large earthquakes. For the most part, normal faults within the Great Basin seem to be a seismic and locked, but some may be closed to the point of failure (US Geological Survey 2008a).

The lease site lies in one of the province's broad valleys. The Toiyabe Range fault zone, a late-quadernary fault zone, passes into the lease site. Fault lines are concentrated in the NENE, NWNE, NESE and SESE portions of the lease site.

Impacts

Alternative A (No Action)

The No Action alternative would have no impact on geological resources, and would not put any people or structures at risk from seismic-related events because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impacts on geological resources or put people or structures at risk from seismic events; however, the Proposed Action could have indirect impacts on these resources and result in indirect risks related to seismicity. Issuing leases for the proposed lease sites could indirectly result in the development of geothermal resources at the sites, including increased human presence on the site, and construction of facilities, infrastructure and transmission lines.

Prior to construction of any facilities or infrastructure, geotechnical investigations would need to be conducted to ensure that any construction can withstand strong seismic events.

Subsidence can occur where groundwater is pumped from underground aquifers at a rate exceeding the rate that it is of replenished. Most of the geothermal development includes reinjection of the geothermal fluid after the heat is utilized. Therefore, the potential for subsidence is low.

Cumulative Impacts

The cumulative indirect effects of the Proposed Action and cumulative actions on geologic resources and seismicity are expected to be generally minor provided that construction and operation of the proposed geothermal plants are in compliance with building codes, and state and local permit requirements.

14.3.4 ENERGY AND MINERALS

Setting

The local utility company that provides electricity to the Tonopah, Gabbs and Round Mountain Area of Nye County is Sierra Pacific Power. Sierra Pacific Power's total service territory covers approximately 50,000 square miles in northern Nevada and the Lake Tahoe area of northeastern California. Currently, Sierra Pacific meets energy demand of its customer base through generating power at company owned power plants (approximately 2,800 megawatt) and purchasing energy in the market to meet excess demand. By 2015, Sierra Pacific expects that about 40 percent of their electricity will be

produced using natural gas, 40 percent using coal and 20 percent from renewable energy. Currently, Nevada Power and Sierra Pacific Power get a portion of their power from 22 renewable energy sources, including geothermal, solar, hydro and biofuel resources (Sierra Pacific 2008).

Nevada's 2005 Renewable Portfolio Standards require that 20 percent of energy in the state be produced from alternative energy sources. This initiative has been supported by Sierra Pacific Power (Sierra Pacific 2008).

There is currently no extraction of leasable, locatable or salable resources occurring in the pending lease area. Locatable minerals have historically been a major source of industry in the region. Minerals produced include copper, gold, silver, molybdenum, lithium, fluor spar, bentonite clay, diatomaceous earth, mercury and turquoise (Bureau of Land Management 1994). Mining in the Humboldt-Toiyabe NF area is mainly associated with areas of historic gold and silver prospects, including the Reese River, Birch Creek, Big Creek, Kingston, Washington, Twin Rivers, and Jett mining districts (US Forest Service 1986). In the BLM Tonopah Resource Area there are 65 mining districts with a history of operation and 15 large mines operating as of 1994. In the pending lease area, BLM has identified the SW quarter of section 18 as having moderate potential for locatable minerals (Bureau of Land Management 1994).

Oil and gas development in the Tonopah Resource Area has primarily been limited to Railroad Valley. As of 1994, 160 wells had been drilled in the area and seven producing fields had been discovered (Bureau of Land Management 1994). Additional areas with moderate to high potential for oil and gas minerals are identified in the Tonopah RMP; none are within or adjacent to the pending lease area.

Additional Geothermal resources are found in the region. In the BLM Tonopah Resource Area, two additional known geothermal resource areas have been identified at Round Mountain and Fish Lake Valley. The Round Mountain known geothermal resource area has been developed by the Round Mountain Gold Corporation, who uses the geothermal energy to for direct-use at the Round Mountain Gold Mine. At Fish Lake Valley known geothermal resource area, a permit for a 5 megawatt plant was issued in 1987. Sale of power has been contracted to Southern California Edison (Bureau of Land Management 1994).

Darrough hot springs in the northern portion of the pending lease area had been drilled and flow tested prior to the release of the Tonopah RMP in 1997 (Bureau of Land Management 1997). The pending noncompetitive lease application was filed by Lillian Darrough, owner of Darroughs Hot Springs, in 2001 in partnership with Great American Energy.

Impacts

Alternative A (No Action)

The No Action alternative would have a minimal impact on energy and mineral resources, by not contributing to the local or State goals of increasing the development of renewable energy sources.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impact on energy or mineral resources, but would potentially result indirectly in the development of geothermal resources at the proposed lease sites. The Reasonably Foreseeable Development scenario predicts that one 12 megawatt binary power plant will be developed in the pending lease area for electricity generation.

General impacts of geothermal development on energy and minerals for a standard 50 megawatt plant are discussed in detail in Section 4.4 of the PEIS. Impacts in the pending lease area would be similar to those described in the PEIS but at a reduced level due to the smaller capacity of the power plant likely in this area. Indirect impacts would allow existing geothermal resources in the area to be utilized, and would contribute a renewable source of energy to the local and regional power grid. The Proposed Action could potentially contribute to the State of Nevada Renewable Portfolio Standard.

Development could also prevent other energy sources from being developed or minerals from being extracted in the immediate lease area.

Cumulative Impacts

The Proposed Action could indirectly cumulatively contribute to an increase in electricity generation in Smoky Valley and Nye County. Cumulative impacts limiting the extraction of other energy sources or minerals from being extracted are expected to be minimal due to the large expanses of undeveloped lands in the region.

14.3.5 SOIL RESOURCES

Setting

Soils in the pending lease area are dominated by Wrango stony fine sandy loam. This soil type is formed in stone or boulder overlying mixed alluvium, composed of no greater than five percent Calcium carbonate. Slopes of this soil type are typically two to eight percent. The soil is excessively drained, with a moderately high to high capacity to transmit water, and a low frequency of flooding. This soil type is intermixed along the east side of the proposed lease site with low quantities of silt and clay loams, which have a moderate-to-high available water capacity compared with the dominant soil type (Natural Resources Conservation Service 2008b).

There is no prime or unique farmland within the proposed lease site.

Impacts

Alternative A (No Action)

The No Action alternative would have no direct or indirect impact on soil resources because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impact on soils, but would potentially result in indirect impacts on erosion related to ground disturbance from the geothermal exploration and development process. Potential impacts to soil resources from geothermal development are described in Chapter 4 of the PEIS.

Cumulative Impacts

The cumulative indirect effects of the Proposed Action and cumulative actions on soil resources are expected to be generally minor provided that construction and operation of all geothermal plants and ancillary facilities are in compliance with building codes, and state and local permit requirements.

14.3.6 WATER RESOURCES AND QUALITY

Setting

Surface Water

The pending lease area receives approximately 5 inches of precipitation per year (Western Regional Climate Center 2000). The site is traversed by three unnamed intermittent streams flowing down from the Toiyabe Mountains to the west, one stream that is fed by springs to the northeast of the proposed lease site, and one aqueduct. There are no springs within the proposed lease site, although there are several springs within 0.5 mile of the site to the east and the south, including Darroughs Hot Springs at 0.5 mile to the east, several unnamed springs directly adjacent to the pending lease area to the east, and several unnamed springs just south of Wineglass Ranch, approximately 0.5 mile to the south of the site.

The quality of Nye County's surface water is in compliance with the 1972 Clean Water Act. Vulnerability assessments conducted for public water supply systems did not identify any contamination of surface water drinking sources in the County. The key issues related to the surface water resources of Nye County are the protection of spring and stream discharge rates, the management and use of riparian areas, and the maintenance of surface water quality. Spring and stream discharges in Nye County may be reduced by diversions for beneficial use (a permitted activity), drought (a natural condition), or the effects of groundwater pumping that is located too near to surface water bodies. The Nye

County Water Resources Plan highlights how surface springs may be affected by groundwater pumping (Nye County 2004).

Key surface water management issues in Nye County include:

- Conservation;
- Relationships between surface and ground water uses;
- Interstate and inter-county management and use;
- Water use measurement and estimation;
- Nonpoint source pollution;
- Meeting recreational demands; and
- Maintenance of instream flows (Nye County 2004).

Ground Water

This proposed lease site lies within the Humboldt River Basin, in the Great Basin Hydrologic Region. The Great Basin region 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 Humboldt River Basin covers approximately 10,780,000 acres in multiple counties and contains the largest river (Humboldt River) wholly contained within Nevada. The basin includes 34 hydrographic areas and one hydrographic sub-area. It originates in the Ruby, Jarbidge, Independence, and East Humboldt Mountain ranges and terminates in the Humboldt Lake and Sink (Nevada Department of Conservation and Natural Resources 2008). Average flow of the Humboldt River is approximately 195,000 acre-feet per year. The Humboldt River Basin contains most of the active gold mines in northern Nevada, several of which have extended below local groundwater levels (US Geological Survey 1996) and contaminants from mining activity are a major factor affecting water quality. Much of the groundwater is diverted for irrigation of agricultural land (US Geological Survey 2008b).

Impacts

Alternative A (No Action)

The No Action alternative would have no direct or indirect impact on water resources and quality because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impact on water resources, but would potentially result in indirect impacts from subsequent geothermal development.

Typical impacts on water quality from geothermal development are described in Chapter 4 of the PEIS under Water Resources. Best management practices addressing stormwater are included in Appendix D of the PEIS and would reduce indirect impacts to surface water quality.

Indirect use geothermal projects require large amounts of water during all phases of a project from exploration through closeout; therefore, the Proposed Action could result in indirect impacts to the local groundwater table, which could affect the nearby surface springs that are near the proposed lease site. The potential for impacts on springs depends upon the proximity of the pumping, the hydraulic characteristics of the aquifer, and the magnitude and duration of pumping. Lease stipulations for this site are recommended to include monitoring of groundwater levels and of flow rates at the nearby springs.

Geothermal waters and groundwater rights would need to be appropriated through the Nevada Division of Water Resources, which would assess impacts to local groundwater supply.

Cumulative Impacts

The Proposed Action would not have any direct cumulative impacts on water quality or quantity in the lease area; however, the Proposed Action could indirectly contribute to cumulative water quality and quantity impacts in the area. The geothermal developments could cumulatively impact surface water quality through ground disturbance and stormwater runoff. Groundwater quality could be cumulatively impacted through onsite spills of petroleum products and other chemicals used during construction and maintenance of facilities. Lease stipulations identified in Chapter 2 and best management practices in Appendix D of the PEIS would reduce these potential cumulative impacts.

Cumulative impacts on groundwater supply would be expected due to the large volumes of water required for all stages of geothermal development.

14.3.7 AIR QUALITY AND CLIMATE**Setting**

The pending lease area is located in Nye County, an area with air quality status of Unclassified. Due to the remote location of the proposed lease site, air quality is generally considered to be good, except during wind/dust storms when levels of particulate matter are high.

The principal climatic features of the pending lease area are bright sunshine, small annual precipitation, (averaging five inches per year), clean, dry air, and exceptionally large daily ranges of temperature. The closest weather monitoring station to the proposed lease site is in Tonopah. Average maximum temperatures in Tonopah range from 39.9 degrees Fahrenheit in January, to 87.8 in July, with average minimum temperatures ranging from 22.4 degrees Fahrenheit in January, to 61.4 in July (Western Regional Climate Center 2000).

Impacts

Alternative A (No Action)

The No Action alternative would have no direct or indirect impact on air quality and climate because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action alternative would not result in violations of ambient air quality standards given the unclassified status of the county and the good level of air quality. The proposed action would have no direct impact on air quality or climate, but could result in minor indirect impacts should geothermal exploration and development occur. For example, a short-term minor impact from dust during construction is to be expected.

Cumulative Impacts

The Proposed Action would not have any direct cumulative impacts on air quality in Nye County; however, the Proposed Action could indirectly contribute to cumulative air quality impacts. Construction-related dust and diesel exhaust would be realized from the exploration and drilling operations and development phases of geothermal development, as well as all from other identified cumulative actions. These cumulative impacts would be temporary.

Cumulative air quality impacts during the utilization phase of a geothermal project would be limited to vehicle travel of operation and maintenance staff. Emissions from these vehicles would cumulatively contribute to a degradation in air quality in Nye County.

14.3.8 VEGETATION

Setting

The lease area is within the Great Basin, which has hot summers and cool dry winters. The vegetation occurring is well adapted to climactic extremes. The vegetation is sparse, but plays a critical role in ecosystem function, providing cover for wildlife from the elements and from predators. The pending lease areas are located within the Big Smoky Valley which is found in the Intermountain and Mountain Semi-desert and Desert ecoregion province (See Appendix G). This province makes up much of the Great Basin. Average maximum temperatures range from 43 degrees Fahrenheit (°F) in January to 91

°F in July. Precipitation comes equally as snow and rain for an annual average of five inches in the lease area (Western Regional Climate Center 2000).

The plant community sagebrush scrub dominates the area. Other important plants in the sagebrush belt are antelope bitterbrush (*Purshia tridentata*), shadscale (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), and rubber rabbitbrush (*Chrysothamnus nauseosus*). All these shrubs tolerate alkali to varying degrees, essential to their survival on the poorly drained soils widespread in the Great Basin. On soils with the highest concentrations of salt, even these shrubs are unable to grow; they are replaced by plant communities dominated by greasewood (*Sarcobatus* spp.) or saltgrass (*Distichlis spicata* var. *stricta*). Other plant communities found in the lease areas are the creosote bush scrub, iodine bush scrub, saltbush scrub (Bailey 1995).

Sagebrush Scrub

Sagebrush scrub is a treeless community of low shrubs stretching across much of the high desert (4,000 to 9,000 feet) and also within the montane forest. It is widely distributed in the Big Smoky Valley. Characteristic species include Great Basin sagebrush (*Artemisia tridentata*), rubber rabbitbrush, and antelope bitterbrush. Native bunch grasses, such as Great Basin wildrye (*Leymus cinereus*), Idaho fescue (*Festuca idahoensis*), and bluebunch wheatgrass (*Pseudoroegneria spicata*), have been affected by livestock grazing and largely replaced by native perennials and introduced annual grasses. The understory of this community is often sparse due to the harsh climate and difficult growing conditions (Barbour and Billings 1988, Natural Resources Conservation Service 2008a).

Creosote Bush Scrub

Creosote bush scrub is common in the lease areas (US Forest Service 1998). This plant community typically occurs on well-drained secondary soils of slopes, fans, and valleys. This habitat type is generally characterized by relatively barren ground with wide-spaced shrubs. Common plants include pure stands of creosote bush (*Larrea tridentata*) or mixed shrubs, including species of burrobush/white bursage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), ocotillo (*Fouquieria splendens*), and saltbushes (*Atriplex* spp) (Sawyer and Keeler-Wolf 1995). Less abundant species may include desert-holly (*Atriplex hymenelytra*), ephedras (*Ephedra* spp.), box-thorns (*Lycium* spp.), prickly-pears (*Opuntia* spp.), and indigo bush (*Psoralea schottii*).

Iodine Bush Scrub

Iodine bush scrub is mainly characterized by iodine bush (*Allenrolfea occidentalis*) and occurs around the margin of the Salton Sea. Other species within this community are seepweed (*Suaeda moquinii*), pickleweed (*Salicornia subterminalis*), and alkali heath (*Frankenia salina*).

Saltbush Scrub

Saltbush scrub is common in the valley (Resource Concepts Inc. 2008). This series is a temperate, broad-leaved, evergreen shrubland with common species that include fourwing saltbush, shadscale, big saltbush (*Atriplex lentiformis*), and allscale (*Atriplex polycarpa*) (Sawyer and Keeler-Wolf 1995).

Invasive Species

Invasive species include any species that are not native to that ecosystem and includes plants or animals that have been introduced into an environment where they did not evolve. Invasive species can have dramatic impacts on the natural ecosystem by reducing habitat for native vegetation, as well as, altering forage and wildlife habitat. Invasive species reduce the productivity of healthy rangelands, forestlands, riparian areas, and wetlands. Invasive species can also change the fire regime, typically increasing the intensity and occurrence of fires. Eradication of these species is intensive, time consuming, and costly (Bureau of Land Management 2008).

Numerous exotic grasses and plants, like perennial pepper weed (*Lepidium latifolium*), annual medusahead (*Taeniatherum caput-medusa*), red brome (*Bromus rubens*), and various non-native thistles, have displaced native plants and altered local plant communities in the Great Basin (Bureau of Land Management 2008). Cheatgrass (*Bromus tectorum*) has had a particularly dramatic impact on native shrub and grassland communities of the Great Basin (Bureau of Land Management 2008). Cheatgrass displaces native grasses and forbs by more effectively tapping soil moisture and hinders seedling establishment of native shrubs by reducing moisture and nutrients in surface soils (Norton et al. 2004).

Wetlands/Riparian Areas

Freshwater emergent wetlands are found on the eastern side of the lease area as several geothermal springs rise to the surface and saturate the soil (US Fish and Wildlife 2008a). Willows (*salix* spp) and rush (*Scirpus* spp.) are present.

Impacts

Leasing of geothermal resources does not affect vegetation or important habitats and communities. They would be affected only by development of geothermal resources. Impacts are associated with the elimination and degradation of habitat occurring as the result of future development in the lease area or in immediately adjacent areas. Potential impacts on vegetation and important habitats could occur if reasonably foreseeable future actions were to:

- Affect a plant species, habitat, or natural community recognized for ecological, scientific, recreational, or commercial importance;
- Affect a species, habitat, or natural community that is specifically recognized as biologically significant in local, state, or federal policies, statutes or regulations;

- Establish or increase of noxious weed populations;
- Destroy or extensively alter habitats or vegetation communities in such a way that would render them unfavorable to native species; or
- Conflicts with BLM or FS management strategies.

Alternative A (No Action)

The No Action alternative would have no impact on vegetation because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impact on vegetation, but would potentially result in indirect impacts to vegetation from geothermal activities. Geothermal activities can cause the following stressors and which may result in associated indirect impacts to vegetation and important habitats:

- Habitat disturbance – Site clearing, well drilling, construction of access roads and geothermal facilities, as well as maintenance and operational activities would disturb habitat which in turn could cause mortality and/or injury to plants, an increased risk of invasive species colonization, and alter water and seed dispersion, as well as affect wildlife use, which can further affect vegetation communities.
- Direct Removal and Injury – Vegetation would be cleared for roadways, vehicle staging, buildings, pipelines, and transmission lines. These activities could result in loss of soil, loss of seed bank in soil, deposition of dust, and destruction of biological soil crusts. Maintenance around project components, such as drill pads, buildings, pipelines, or other facilities would involve mowing, herbicide treatment, and other mechanical or chemical means of removal and control of plant life. This would in turn result in a net loss of important habitats and communities throughout the planning area.
- Invasive Vegetation – Disturbance and access by vehicles and human foot traffic may expose areas to colonization by invasive and non-native species, making it more difficult for endemic species to reestablish in disturbed areas as well as threatening the continued existence of endemic species.
- Fire – Increased vehicular and human traffic, operation of equipment, and the extraction of geothermal fluids can increase the risk of fires. Vehicles, electrical lines, and cigarette smoking can all result in accidental fires. Fires destroy vegetation and can aid in the establishment of invasive species.

- Erosion – Site clearing, grading, construction of access roads, containment basins, site runoff, and vehicle and human foot traffic cause erosion. The effects of erosion include the removal of top soil, loss of seed bank, loss of native vegetation, the establishment of invasive species, the sedimentation of streams, and flooding (which can directly result in effects to riparian vegetation and riparian habitats).
- Exposure to Contaminants – Vehicle fuel, hydraulic fluid, solvents, cleaners, and geothermal fluids can all be harmful to vegetation and important habitats. Accidental spills can contaminate soils and water and directly harm vegetation. Licensed herbicide use would likely be used to control vegetation around geothermal facilities and support structures. Spills of herbicides or acute exposure to herbicides can have adverse effects on non-target vegetation.

Table 3.9-1 in Section 3.9 of the PEIS provides an analysis of the likelihood for impacts to occur during each phase of geothermal development (exploration, development, production, and close out).

Riparian and Wetland Habitat

Development of geothermal facilities and structures and the pumping and extraction of groundwater for drilling operations and/or geothermal fluids could affect the wetlands and riparian areas within the lease area, as well as wetlands and riparian habitat with a hydrological connection to the lease area or to the groundwater extracting during drilling operations. Wetlands could be filled or destroyed to provide for roadways and infrastructure, and groundwater tables may be lowered, which could affect ground springs and desiccate wetlands. The PEIS provides more specific detail on the impacts to riparian and wetland habitats associated with geothermal activities. Impacts to wetlands are regulated under the River and Harbors Act and Section 404 of the Clean Water Act. Permitting from the U.S. Army Corps of Engineers (Corps) will be required if future development at the site will have any impact to wetlands under the Corps' jurisdiction. In addition, E.O. 11990, "Protection of Wetlands," requires all federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. DOE implementation of this E.O. is included in 10 CFR 1022.

Cumulative Impacts

The Proposed Action would not have any direct cumulative impacts on vegetation in the lease areas; however, the Proposed Action could indirectly contribute to cumulative impacts on vegetation. Vegetation may be removed during exploration and drilling operations and development phases of a geothermal project along with the nearby geothermal activities. In areas where vegetation is removed, short-term, potential infestation of invasive weed species could occur. By complying with lease stipulations and best management

practices outlined in Chapter 2 and Appendix D, respectively, cumulative impacts on vegetation would be reduced.

14.3.9 FISH AND WILDLIFE

Setting

Fisheries

The Big Smoky Valley speckled dace (*Rhinichthys osculus lariversi*) may be found in the streams and pools that exist as a result of the geothermal springs found on the eastern side of the lease area (Nevada Natural Heritage Program 2008). The speckled dace is a small minnow (usually less than 2 inches long) with a robust elongate body. It typically inhabits rocky riffles, runs and pools of headwaters, creeks and small to medium rivers (Fishbase 2008).

Wildlife

Animal abundance and diversity are closely linked with the habitat types present, though abundance and distribution may vary by seasons. The inhospitable habitat conditions limit the number, type, diversity, and abundance of species in the lease area.

Desert animals are well adapted to survive under these extreme environmental conditions found in the lease area. Extensive root systems of desert plants provide access to subsurface openings for lizards, snakes, and small mammals. Common mammal species include mule deer (*Odocoileus hemionus*), black-tailed jackrabbits (*Lepus californicus*), coyote (*Canis latrans*). Other species that have the potential to occur are badger (*Taxidea taxus*) and bobcat (*Lynx rufus*). Several small mammals are found in the area. They include the desert pocket mouse (*Perognathus* spp.) and desert kangaroo rat (*Dipodomys deserti*). Many other small wildlife species may create burrows in open areas to escape the heat or predator.

Bird species that may occur include Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), red-tailed hawk (*Buteo jamaicensis*), golden eagles (*Aquila chrysaetos*), peregrine (*Falco peregrinus*), prairie falcons (*Falco mexicanus*), and American kestrel (*Falco sparverius*). Numerous waterfowl of the Pacific Flyway pass through the area during migration and likely use the pools and wetlands created by the geothermal springs as a stop over area for foraging and resting.

Nevada is home to over 50 reptile species and the lease area has habitat for numerous reptile species. These include the following: Great Basin western rattlesnake (*viridis lutosus*), Great Basin gopher snake (*Pituophis catenifer deserticola*), terrestrial garter snake (*Thamnophis elegans*), western aquatic garter snake (*T. couchii*), Great Basin collared lizard (*Crotaphytus bicinctores*), leopard lizard (*Gambelia wislizenii*), and western fence lizard (*Sceloporus occidentalis*),

among others (Morefield 2008). Several amphibians, such as the Great Basin spadefoot toad (*Spea intermontana*), are likely to occur in the lease area.

Impacts

Leasing of geothermal resources does not affect fish and wildlife. They would be affected only by development of geothermal resources on the lease sites. Impacts were assessed based on typical actions and disturbance associated with geothermal activities. Potential impacts on fish and wildlife species could occur if reasonably foreseeable future actions were to result in the following:

- Adversely affect a population by substantially reducing its numbers, causing a fish or wildlife population to drop below self sustaining levels, or by causing a substantial loss or disturbance to habitat utilized by a fish or wildlife population. Examples of such habitat effects could include vehicle impacts and crushing, increased predation, habitat fragmentation, or loss of seasonal habitat;
- Have a substantial adverse impact on nesting migratory birds, including raptors, as protected under the Migratory Bird Treaty Act;
- Interfere with the movement of any resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; or
- Conflict with the wildlife management strategies of the BLM or FS.

Alternative A (No Action)

The No Action alternative would have no impact on fish and wildlife because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impact on fish and wildlife, but would potentially result in indirect impacts to fish and wildlife from geothermal development activities.

The Big Smoky Valley speckled dace, as well as other aquatic biota, could be at risk of being affected by geothermal activities on the lease site. Activities that affect riparian and wetland habitats in the area may directly affect aquatic life. These activities could cause sedimentation, increased water temperature, lowered water levels, exposure to contaminants such as herbicides or fuels, and may directly affect habitat through the construction of roadways, facilities, or structures.

Terrestrial wildlife species could be displaced during the removal of habitat or development of geothermal facilities. Small ground dwelling species, such as reptiles and small mammals, could be crushed either by vehicle traffic and/or

clearing activities. Fire can also cause direct mortality. Vehicles, cigarette smoking, and power lines can cause wildfires that can kill and displace animal species, especially smaller and less mobile animals. Invasive vegetation introduced during exploration and development activities can also alter wildlife habitat, making it less suitable for habitation.

The PEIS provides a detailed discussion of the impacts that may occur to fish and wildlife as the result of geothermal activities.

Cumulative Impacts

The Proposed Action would not have any direct cumulative impacts on wildlife in the lease areas; however, the Proposed Action could indirectly contribute to cumulative wildlife impacts. Construction activities, such as grading, digging, and the use of heavy vehicles, could result in temporarily disturbing wildlife under the Proposed Action and other cumulative actions. Habitat could also be lost under the indirect impacts of the Proposed Action and the nearby geothermal projects.

14.3.10 THREATENED AND ENDANGERED SPECIES AND SPECIAL STATUS SPECIES

Setting

This section provides an overview of threatened, endangered, and special status species, and their habitats that may occur in the lease area. Special status species are those identified by federal or state agencies as needing additional management considerations or protection. Federal species are those protected under the Endangered Species Act and those that are candidates or proposed for listing under the Endangered Species Act. State sensitive species are those considered sensitive by the Nevada Department Wildlife. The Nevada Natural Heritage program NFS biologists, and US Fish and Wildlife Service species lists were consulted to assess the potential for sensitive species in the area.

A species of particular concern that may be present is the pygmy rabbit (*Brachylagus idahoensis*). Pygmy rabbits are typically found in areas of tall, dense sagebrush (*Artemisia spp.*) cover, and are highly dependent on sagebrush to provide both food and shelter throughout the year. Their diet in the winter consists of up to 99 percent sagebrush (US Fish and Wildlife Service 2008b). The Nevada population of Pygmy rabbit is not listed under the Endangered Species Act, but the United States Fish and Wildlife Service is currently reviewing whether or not the species warrants formal listing under the ESA (US Fish and Wildlife Service 2008c).

The sagebrush habitat found in the lease areas may provide quality habitat for greater sage-grouse (*Centrocercus urophasianus*). Greater sage-grouse have experienced long-term declines due to the degradation and loss of important sagebrush-steppe and grassland habitats (BLM 2005b). Greater sage-grouse

require contiguous, undisturbed areas of high-quality habitat during their four distinct seasonal periods of breeding, summer-late brooding and rearing, fall, and winter (Connelly et al. 2004). Sagebrush is important to the greater sage-grouse for forage and for roosting cover, and the greater sage-grouse cannot survive where sagebrush does not exist (Connelly et al 2004). The greater sage grouse is not formally listed under the ESA, but it is a FS sensitive species and has been proposed for listing. The BLM and FS have developed the Sage-Grouse Habitat Conservation Strategy to manage public lands in chorus other agencies in a manner that will maintain, enhance, and restore greater sage-grouse habitat while providing for multiple use (Bureau of Land Management 2004). The strategy is consistent with Nevada sage-grouse conservation planning efforts.

The only special status fish species known to occur in the lease area is the Big Smokey Valley speckled dace. The fish may be present in the riparian stream and wetland areas found on in the eastern portion of the lease area. The fish is a Nevada species of concern (Nevada Natural Heritage Program 2008).

Impacts

Potential impacts on threatened and endangered and special status species could occur if reasonably foreseeable future actions were to:

- Violate the Endangered Species Act, the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, or applicable state laws; or
- Decrease a plant or wildlife species population to below self-sustaining levels.

Alternative A (No Action)

The No Action alternative would have no impact on special status species because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impact on special status species, but would potentially result in indirect impacts to special status species as the result of future geothermal activities. Threatened and endangered, and special status species, including the Big Smoky Valley speckled dace, could be affected as a result of 1) habitat disturbance, 2) the introduction of invasive vegetation, 3) injury or mortality, 4) erosion and runoff, 5) fugitive dust, 6) noise, 7) exposure to contaminants, and 8) interference with behavioral activities.

Because of the regulatory requirements of the Endangered Species Act and various state regulations, and the requirements specified in BLM Manual 6840 Special Status Species Management, and other resource-specific regulations and guidelines, any future geothermal activities would incorporate appropriate

survey, avoidance, and mitigation measures. These measures would be identified and implemented prior to any geothermal activities in order to limit any adverse affects to Big Smoky Valley speckled dace or to any other special status species which either may be found or were expected to occur in the lease area at the time of the survey.

Cumulative Impacts

The Proposed Action would not have any direct cumulative impacts on special status species in the region; however, the Proposed Action could indirectly contribute to cumulative special status species impacts. Loss of habitat from all aspects of development is a major factor contributing to the increase in the number of species listed as threatened or endangered. Future development in the lease areas is likely; however, development would be limited to small areas and disturbance would be temporary. Cumulative impacts are not likely to adversely affect special status species in the lease area.

Roads contribute to the cumulative impacts within a region. Existing roads would be used where possible for future development; however, improvements to existing roads and construction of new roads would likely be needed for future projects under the Proposed Action as well as under cumulative actions.

14.3.11 CULTURAL RESOURCES

Setting

Cultural resources are past and present expressions of human culture and history in the physical environment and include prehistoric and historic archaeological sites, structures, natural features, and biota that are considered important to a culture, subculture, or community. Cultural resources also include aspects of the physical environment that are a part of traditional lifeways and practices and are associated with community values and institutions.

As in the PEIS, discussions relevant to cultural resources in this document are found in three sections. Traditional cultural resources and traditional cultural properties are addressed in Section 14.3.13 Tribal Interests and Traditional Cultural Resources. Cultural resources in this section include the physical remains of prehistoric and historic cultures and activities.

The subject lease areas are contained within the Great Basin culture region, as described broadly in the Appendix I of the PEIS. Bengston (2003) provides a comprehensive ethnographic overview of the project area within this larger culture region. The following discussion is based on that overview. As outlined in Appendix I, the earliest people to inhabit this area are referred to as Paleoindian, Archaic, and Fremont cultures. Little is known about these groups. Bengston places the project area near the western territorial boundary of the Western Shoshone (Bengston 2003). It is believed that the Western Shoshone

entered the Great Basin approximately 1,000 – 5,000 years ago, most likely from the west. The Western Shoshones remained in the area and are one of the Native American groups encountered by historic European explorers. The prehistoric group is categorized as a hunting and gathering group, subsisting on plant gathering and hunting of game. They were highly mobile, utilizing temporary and easily-constructed structures. Winter camps were established in the same general areas year to year with temporary camps established throughout territorial areas for the purposes of hunting and gathering. One winter camp is documented in the Big Smoky Valley near the project area (Bengston 2003). Other structures built by the Western Shoshone included gabled houses, conical-shaped sweat, lodges, sun shades, windbreaks, and pine nut caches. Rockshelters and caves were also used as temporary shelters.

A variety of historic-era activities have been documented within the region of the proposed project. These included fur trapping during an initial period of Euro-American exploration, emigration and settlement by Euro-Americans, establishment of wagon roads and later freight roads and railroads, mining, and agriculture. Fur-trapping potential was always marginal in the Great Basin, and expeditions ended in the early 1840s. As fur trapping declined, official government mapping and exploration expeditions were expanded into the Great Basin, partially to establish an American presence in what was, until 1848, Mexican territory. Later, several trails were established by emigrants, most passing through the state to California during the Gold Rush and establishment of the Comstock. Some of the first permanent settlements of Nevada were established along those trails. The new population centers and mineral discoveries gave rise to regional wagon road networks connecting markets to supply points and mineral sources to mills. Many of the initial roads ran east-west for delivery to California, but with the completion of the transcontinental railroad along the Humboldt River corridor in 1869, freight roads running north-south linking railheads with interior mining districts began to be established. Some wagon road networks were expanded and developed into Nevada's federal highway system as the state continued to develop into its modern form. The importance of mining in Nevada's economy faded between 1880 and 1900 as no new discoveries were made and areas that had been developed in connection with mining declined (Bengston 2003; Pendleton et al. 1982).

In 1871, the Army relinquished Camp McGarry near Summit Springs and it was turned over for use as the first reservation for Northern Paiutes and Western Shoshones. It is now known as the Summit Lake Indian Reservation. Some Western Shoshone however were still living on lands rented from Euroamerican farmers. In 1877, reservations began to be established for some of the Western Shoshone bands in Nevada by the US through Executive Order at Duck Valley and Carlin Farms, both in northern Nevada. The Carlin Farms Reservation lasted only two years and although some Western Shoshone relocated to the Duck Valley Reservation, some refused to move from their traditional

territories. Over time, additional reservations were established throughout the state. These are documented in Table 3.1 of Bengston (2003). The nearest reservation to the project area is the Yomba Shoshone Reservation on the west side of the Toiyabe Range (Bengston 2003).

Data on cultural resources of the proposed lease area were gathered from the Nevada Cultural Resource Information System in April 2008. Consultations with interested parties, including local tribes and historic preservation groups, have not been initiated. Consultation with the Nevada State Historic Preservation Office has not been initiated yet either.

Less than ten percent of the project area has been previously surveyed. Six cultural resource sites have been previously documented within one mile of the project area. Five are outside of the project area and include four isolated lithic artifacts and a prehistoric campsite. It is unknown if any of these resources have been evaluated for the National Register of Historic Places; they are assumed here to be unevaluated. The sixth site, NY4294, has been recorded as extending into the southern quarter of the project area. It is described as an extensive campsite with dispersed pieces of debitage evident on the ground surface. In 2003, the most recent recorder believed there may be buried artifacts within the site boundaries due to low-energy sheetwash deposition of sand, silt, and clay. The dispersed nature of surface artifacts and the large size of the site suggest that it was used for a series of small field camps. However, it is also noted that much of the surface artifact assemblage has likely been removed by looters. Post-1950s trash dumps still being used today are adjacent to several roads in the southern part of the site. The site as a whole was recommended as ineligible for the National Register of Historic Places.

Impacts

Alternative A (No Action)

The No Action alternative would have no impact on cultural resources.

Alternative B (Proposed Action)

Completion of the Section 106 process of the National Historic Preservation Act requires the BLM and FS to consult with the State Historic Preservation Office, tribes and other parties to identify and assess historic properties affected by the undertaking and develop measures to avoid, minimize, or mitigate any adverse effects of the undertaking on historic properties. Since ground disturbing activities would not occur until permits for phases of geothermal development are issued, direct impacts on cultural resources resulting from the issuance of the lease would not occur.

Given the density of sites within the surrounding areas of the Humboldt-Toiyabe lease area and general lack of previous surveys covering the lease area itself, indirect and secondary impacts on cultural resources could occur from subsequent permitted geothermal exploration, development, production and

closeout through ground disturbing activities, unauthorized actions and alterations to setting and cultural landscapes. The nature of these impacts is described in Chapter 4 of Volume I of the PEIS. Additionally, as described in Chapter 2 of Volume I of the PEIS, various areas of cultural resources would have No Surface Occupancy stipulations: National Landmarks, National Register Districts, National Register of Historic Places (NRHP)-listed and -eligible sites and their associated landscapes, traditional cultural properties, Native American sacred sites, and areas with important cultural and archaeological resources. Areas of potential effect would include access roads, well pads, power plant footprints, pipeline and transmission line routes, and construction staging areas as well as the boundaries of cultural resources those facilities cross and the aspects of setting that contribute to significance. These areas of potential effect would be developed at the project-specific level, and would require inventories, evaluations, and appropriate treatments as outlined in the Best Management Practices of Appendix D in Volume III of the PEIS. Under these cultural resources Best Management Practices the BLM would also conduct Section 106 consultations with the State Historic Preservation Office, Native American tribes with ties to the project area, and local historic preservation groups to identify the presence and significance of cultural resources within or adjacent to the lease area and assess the level of impact of geothermal leasing and development on those resources. Project specific impacts after leasing would be reduced by implementing these Best Management Practices.

Cumulative Impacts

Past ground disturbing activities and the project identified in Section 14.1.4, *Cumulative Projects*, undoubtedly have and will have effects on cultural resources given the regional density of resources and general lack of terrestrial survey coverage. Presumably past activities would have mitigated impacts to less than significant through re-design, data recovery, or other similar methods. Any indirect effects from the proposed action would be mitigated to less than significant through implementation of Best Management Practices during the permitting process; therefore, the proposed action will contribute to a cumulative effect on the archaeology and historic preservation of the area, however this effect is anticipated to be less than significant.

14.3.12 TRIBAL INTERESTS AND TRADITIONAL CULTURAL RESOURCES

Setting

Tribal interests include economic rights such as Indian trust assets, and resource uses and access guaranteed by treaty rights. Traditional cultural resources or properties include areas of cultural importance to contemporary communities, such as sacred sites or resource gathering areas. While most commonly considered in the context of Native Americans and Native Alaskans, there are traditional cultural resources associated with other ethnic or socially linked groups.

The subject lease areas are contained within the Great Basin culture region, as described broadly in the Appendix I of the PEIS. Bengston (2003) provides a comprehensive ethnographic overview of the project area within this larger culture region. Bengston places the project area near the western territorial boundary of the Western Shoshone. The Western Shoshone considered several springs significant traditional locations for ceremonies (Bengston 2003).

During the historic period several attempts were made to move Native American populations of Nevada to out-of-state reservations and other, more successful attempts were made to move some groups to in-state reservations. In 1871, the Army relinquished Camp McGarry near Summit Springs and it was turned over for use as the first reservation for Northern Paiutes and Western Shoshones. It is now known as the Summit Lake Indian Reservation. Some Western Shoshone however were still living on lands rented from Euroamerican farmers. In 1877, reservations began to be established for some of the Western Shoshone bands in Nevada by the US through Executive Order at Duck Valley and Carlin Farms, both in northern Nevada. The Carlin Farms Reservation lasted only two years and although some Western Shoshone relocated to the Duck Valley Reservation, some refused to move from their traditional territories. Over time, additional reservations were established throughout the state. The nearest reservation to the project area is the Yomba Shoshone Reservation on the west side of the Toiyabe Range (Bengston 2003).

Data on Tribal Interests and Traditional Cultural Resources of the proposed lease area were gathered from the ethnographic study of the Western Shoshone completed by Ginny Bengston (Bengston 2003). Bengston (2003) identifies several categories of traditional property types in Nevada including traditional origin and historic places, ceremonial locations, historical locations, ethnohistoric habitation sites, trails, burial sites, and resource collection areas. Of those culturally significant areas identified by the study, none are within Big Smoky Valley (Bengston 2003). It should be noted however, that locations of several of the areas were unknown to the researchers and could therefore not be mapped. Additionally, several concerns and issues of the Western Shoshone tribes are identified. These include concerns for culturally significant areas, the environment, land ownership, and the authenticity of ethnographic documentation of tribal information.

Consultation with federally recognized tribes that are affiliated with the lease area was initiated on September 12, 2007 to identify and assess tribal concerns and traditional resources that may be affected by the undertaking. No responses from the tribes have been received as of the date of publication. However, the consultation process is considered on-going. While many traditional cultural resources are well known, some locations or resources may be privileged information that is restricted to specific practitioners or clans. For tribes, maintaining confidentiality and customs regarding traditional knowledge

may take precedence over identifying and evaluating these resources, unless they are in imminent danger of damage or destruction.

Impacts

Alternative A (No Action)

The No Action alternative would have no impact on Tribal Interests and Traditional Cultural Resources.

Alternative B (Proposed Action)

Impacts on Tribal Interests and Traditional Cultural Resources are assessed using the criteria found in Chapter 4 of Volume I the PEIS. Because issuing geothermal leases confers on the lessee a right to future exploration and development of geothermal resources within the lease area, it is a commitment or granting of a right that may interfere with other uses or interests. Although no tribal interests or concerns have been identified by the consultation process, the process of Native American consultation is considered on-going and such resources may be identified in the future by tribes. Impacts on Tribal Interests would be minimized or avoided by implementing Best Management Practices in Appendix D of Volume III of the PEIS for each of the phases of the Reasonably Foreseeable Development scenario as described in Chapter 2 of Volume I of the PEIS.

For traditional cultural resources, completion of the Section 106 process of the National Historic Preservation Act requires the BLM and FS to consult with the State Historic Preservation Office, tribes and other parties to identify and assess historic properties affected by the undertaking and develop measures to avoid, minimize, or mitigate any adverse effects of the undertaking on historic properties which includes traditional cultural properties. No Traditional Cultural Resources have been identified by consulted tribes thus far, but consultation is considered on-going. Additionally, archaeological resources such as those discussed in Section 14.3.11, *Cultural Resources*, are often considered traditional resources by tribes. However, no direct impacts on Traditional Cultural Resources are expected to result from the Proposed Action of leasing since no rights to ground disturbing activities would occur.

Indirect and secondary impacts to traditional cultural resources could occur from subsequent geothermal exploration, drilling operations and development, utilization, and reclamation and abandonment through ground disturbing activities, unauthorized actions and alterations to setting and cultural landscapes. The nature of these impacts and mitigations are described in Chapter 4 of Volume I of the PEIS. Areas of potential effect would include access roads, well pads, power plant footprints, pipeline and transmission line routes, and construction staging areas as well as the aspects of setting that contribute to significance. These areas of potential effect would be developed at the project-specific level, and would require inventories, evaluations, and appropriate treatments as outlined in the Best Management Practices of Appendix D in

Volume III of the PEIS. Under these cultural resources Best Management Practices the BLM and/or the FS would also conduct Section 106 consultations with the State Historic Preservation Office, Native American tribes with ties to the project area, and local historic preservation groups to identify the presence and significance of cultural resources within or adjacent to the lease area and assess the level of impact of geothermal leasing and development on those resources. Project specific impacts after leasing would be reduced by implementing these Best Management Practices.

14.3.13 VISUAL RESOURCES

Setting

This section describes the visual resources in the region of influence, which is defined as the areas within and immediately surrounding the pending lease areas. Described below is the method for managing scenic resources and the visual landscape of the pending lease areas.

The BLM's Visual Resource Management System is a tool for inventorying and managing scenic resources, as well as analyzing potential impacts on visual resources. The scenery is managed using the Visual Resource Management system, described in the PEIS. All BLM lands within the lease site are in VRM Class IV, Modification.

The scenery of the Forest is managed through the application of the Visual Management System (Agricultural Handbook- 462, National Forest Landscape Management, Volume 2, Chapter I, The Visual Management System). The Visual Management System was adopted by the Forest Service in 1974. The key component of the Visual Management System is the establishment of Visual Quality Objectives within the Land and Resource Management Plan.

There are five differing levels of Visual Quality Objectives: Preservation, Retention, Partial Retention, Modification, and Maximum Modification. The following is a brief description of the five Visual Quality Objectives:

- Preservation – Allows ecological change only. Management activities are prohibited except for very low visually impacting recreation facilities.
- Retention – Management activities may not be visually evident. Contrasts in form, line, color and texture must be reduced during or immediately after the management activity.
- Partial Retention – Management activities must remain visually subordinate to the characteristic landscape. Associated visual impacts in form, line, color and texture must be reduced as soon after project completion as possible but within the first year.

- **Modification** – Management activities may visually dominate the characteristic landscape. However, landform and vegetative alterations must borrow from naturally established form, line, color or texture so as to blend in with the surrounding landscape character. The objective should be met within one year of project completion.
- **Maximum Modification** – Management activities including vegetative and landform alterations may dominate the characteristic landscape. However, when viewed as background they must visually appear as natural occurrences within the surrounding landscapes or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail which is incongruent with natural occurrences as seen in foreground or middle ground. Reduction of contrast should be accomplished within five years.

The NFS lands portion of the pending lease site have Partial Retention and Modification Visual Quality Objectives.

The pending lease area is east of Cove Canyon in the Humboldt-Toiyabe NF and straddles State Route 376 just north of Carvers, Nevada, and approximately 8 miles north of Hadley, Nevada. Cove Canyon Road and a few other roads cross the area. The area is relatively flat and sloped. Portions of the pending lease area are in the Humboldt-Toiyabe NF and also on public land. With the exception of State Route 376, there are no sources of light in the pending lease areas.

According to the Humboldt-Toiyabe NF Land and Resource Management Plan, the area is typical of the Basin/Range landform in Nevada (US Forest Service 1998). Vegetation consists of pinyon/juniper, sagebrush types, aspen at higher elevations, and subalpine and alpine plant communities consisting of mountain mahogany, limber pine, and bristlecone pine. Although most of the moisture falls in the winter, intense summer thunderstorms and flash flooding are common occurrences.

According to the Proposed Tonopah Resource Management Plan and Final Environmental Impact Statement, visitors are attracted to the wide open spaces and vistas of the Tonopah Resource Area (Bureau of Land Management 1994). The Tonopah Resource Area has panoramic views of the topography, north-south trending mountain ranges, and intervening basins. The landscapes are dominated by flat playas, level basin fill plains, and long sloping alluvial fans which merge upwards into the mountains.

Impacts

Alternative A (No Action)

There would be no impacts on visual resources, because no surface development would occur. There would be no changes to visual resources.

Alternative B (Proposed Action)

The potential risk of changes affecting visual resources is assessed for five significance criteria, which are described in the PEIS. Future actions based on the Reasonably Foreseeable Development scenario could result in changes that impact visual resources.

Future geothermal development activities could involve new structures, roads, and operations that are described in the reasonable development scenario. The new structures, roads, and operations would alter the characteristic landscape and be sources of light and glare. These impacts would be noticeable, because they would be in areas that are relatively undeveloped, would be readily visible due to topography and lack of obstructions, and would be near areas where recreation takes place. Best management practices outlined in Appendix B of the PEIS would minimize these impacts. It is assumed the stipulations would result in positioning new structures, roads, and operations in the landscape so they would remain visually subordinate to the characteristic landscape, and would result in landform and vegetative alterations that blend in with the surrounding landscape character. Therefore, changes to visual resources based on the reasonable development scenario would result in impacts on visual resources that would be consistent with Visual Resource Management Class IV objectives and Partial Retention and Modification Visual Quality Objectives.

Cumulative Impacts

The proposed action and cumulative development projects would increase the number of highly visible structures in the area. This would substantially reduce the natural undeveloped landscape of the area. As with the Proposed Action, cumulative impacts would be very noticeable because future structures would not blend with the surrounding natural landscape. Sensitive receptors in the area could be negatively affected.

14.3.14 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Setting

The leasing area covers approximately 606 areas within Nye County. Nye County was selected as the Region of Influence for socioeconomic analysis as the impacts of leasing are likely to occur within this region. A summary of the population, housing, employment, local school data and low-income and minority populations for the County is provided based primarily on data from Census 1990 and 2000 population, demographic and housing information (US Census Bureau 1990, 2000).

Population

Total population within the county was 42,693 in 2006 (US Census Bureau 2006), a more than 31 percent population increase over 2000 when the population was 32,485 and 114 percent increase over 1990 census numbers. Despite recent population increases, population density in the county remains low, at 1.8 people and 0.9 houses/square mile in 2000 (US Census Bureau 1990, 2000).

Housing

In 2000, the total number of housing units was 15,934, of which 13,309 were occupied and 10,167 were owner-occupied. The vacancy rate for homeowners was 3.4 percent and the rental property vacancy rate 17.9 percent. In 1990 there were 8,073 total housing units, 6,664 occupied and 4,677 owner-occupied, for a homeowner vacancy rate of 2.5 percent and a rental property vacancy rate of 12.1 percent (US Census Bureau 1990, 2000).

Employment

In 1999, the work force consisted of 13,263 people which 12,263 people were employed and 940 people (3.7 percent) of the population were unemployed. This is a decrease in unemployment from 1989, when the workforce consisted of 8,934 of which 8,256 were employed and 467, or 5.2 percent were unemployed.

Median household income in Nye County was \$36,024 in 2000, a 16 percent increase over the median income of \$30,211 in 1989. The median income remains lower than the state average which was \$44,581 per household in 2000.

In 2000, the industries employing the greatest percent of the in Nye County were recreation, accommodation and food services (17.6 percent) educational health and human services (12.9 percent); construction (12.6 percent); and agriculture, forestry, fishing and hunting, and mining (10.1 percent) (US Census Bureau 2000).

Schools and Public Infrastructure

In 2000, 5,747 students were enrolled in K-12 in the Nye County. In 1990, 2,784 students were enrolled. There are approximately 17 students per teacher in the Tonopah School District which is comprised of 19 schools in the County. This ratio slightly lower than the state average of 19 students per teacher (National Center for Education Statistics 2006)

Environmental Justice

Based on 2000 data, 89.6 percent of the population in the county was White of non-Hispanic decent. The largest minority group in the area is Hispanic or Latino, which comprise 8.4 percent of the population. American Indians comprise approximately 2 percent of the population (US Census Bureau 1990, 2000). See Table 14.3-1, below for additional details.

**Table 14.3-1
Population by Race/Ethnicity in Nye County**

	1990	2000	Percent change
Total Population	17,781	32,485	+ 82.7 %
White/non-Hispanic	16,393	29,117	+ 77.6 %
Black/African American	291	383	+ 31.6 %
American Indian/Alaskan Native	499	636	+ 27 %
Asian	155	253	+ 63 %
Pacific Islander*	N/A	105	N/A
Other	443	969	+ 119 %
Two or more*	N/A	1,022	N/A
Hispanic or Latino**	1,237	2,713	+ 119 %

Source: US Census Bureau, 2000

* Not reported on 1990 census: Asian and Pacific Islanders were one group and more than one race was not an option.

** In combination with other race. Totals may add to more than 100 percent as individuals can report more than one race.

In 1999, 10.7 percent of individuals were below the poverty level. Poverty levels have remained fairly stable despite dramatic population growth; in 1989, 10.5 percent of individuals polled were in poverty status (US Census Bureau 1990, 2000).

Impacts

Alternative A (No Action)

The No Action alternative would have no direct or indirect impact on socioeconomics in Nye County's minority or low income populations because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would have no direct impacts on socioeconomics or environmental justice. Indirect impacts include a potential increase in jobs and decrease in unemployment in the Nye County due to construction and operations and maintenance jobs at newly developed geothermal plant. The Reasonably Foreseeable Development scenario is one plant at 12 megawatt. Due to small size of the plant, a large population influx is not anticipated; therefore impacts to schools and public infrastructure and housing would be minimal. Low income and minority populations are not likely to be impacted by geothermal development due to the lack of a residential population in and around the pending lease area. A detailed discussion of the impacts of geothermal leasing is found in Chapter 4 of the PEIS under *Socioeconomics and Environmental Justice*.

Cumulative Impacts

The overall cumulative economic indirect effect of geothermal development in combination with nearby geothermal development would be a positive stimulus to the local economy through both tax revenues for Nye County, and local employment.

14.3.15 NOISE**Setting**

Current sources of noise in the pending lease areas are limited to wind, dispersed recreational use, traffic from roads traversing the pending lease area, and wildlife. Sources of noise originating outside of the pending lease areas but affecting the pending lease areas include traffic from adjacent roads and air traffic.

Sensitive noise receptors are generally considered to be homes, hospitals, schools, and libraries. There are no sensitive receptors within the pending lease area. Sensitive receptors within half a mile of the pending lease area are limited to Wineglass Ranch, 0.4 miles south of the proposed lease site, and Darroughs Hot Springs, 0.5 miles east of the proposed lease site. Wildlife is also considered to be a sensitive noise receptor, depending on the species present in the project area. Wildlife in the project area is discussed in sections 3.10, *Fish and Wildlife*, and 3.11 *Threatened and Endangered Species and Special Status Species*.

Impacts**Alternative A (No Action)**

The No Action alternative would have no direct or indirect impact on noise because no ground disturbing activities would be approved.

Alternative B (Proposed Action)

The Proposed Action would not have any direct impact on noise, but would potentially result in indirect impacts to noise in the pending lease areas.

No sensitive receptors have been identified within the pending lease areas. Adjacent and nearby sensitive receptors would be protected from noise impacts since any projects approved by the BLM would be required to adhere to the BLM regulations, requiring that noise from a major geothermal operation shall not exceed 65 A-weighted decibels at the proposed lease boundary. Impacts to wildlife from noise sources are discussed in Sections 3.10, *Fish and Wildlife*, and 3.11 *Threatened and Endangered Species and Special Status Species*.

Cumulative Impacts

Any cumulative construction or operation activity that causes noise disturbance would adhere to local, state, and federal regulations; therefore no cumulative noise impacts are expected.

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SECTION 14.4

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